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AID 1025-1 (7-71) (FACE SHEET)
NONCAPITAL PROJECT PAPER (PROP)

I. PROJECT IDENTIFICATION

1. PROJECT TITLE

FOOD PRODUCTIVITY AND NUTRITIONAL IMPROVEMENT

APPENDIX ATTACHED ☒ YES ☐ NO

2. PROJECT NO. (M.O. 1095.2) 520-11-130-232

3. RECIPIENT (specify)
☒ COUNTRY GUATEMALA
☐ REGIONAL ____ ☐ INTERREGIONAL ____

4. LIFE OF PROJECT
BEGINS FY 1975
ENDS FY 1979

5. SUBMISSION
☒ ORIGINAL 12/11/74 DATE
☐ REV. NO. ____ DATE
CONTR./PASA NO. ____

II. FUNDING ($000) AND MAN MONTHS (MM) REQUIREMENTS

A. FUNDING BY FISCAL YEAR	B. TOTAL $	C. PERSONNEL (1) $	C. PERSONNEL (2) MM	D. PARTICIPANTS (1) $	D. PARTICIPANTS (2) MM	E. COMMODITIES $	F. OTHER COSTS $	G. PASA/CONTR. (1) $	G. PASA/CONTR. (2) MM	H. LOCAL EXCHANGE CURRENCY RATE: $ US ____ (U.S. OWNED) (1) U.S. GRANT LOAN	(2) COOP COUNTRY (A) JOINT	(2) COOP COUNTRY (B) BUDGET
1. PRIOR THRU ACTUAL FY												
2. OPRN FY 1975	179.0	107.5	21	25.0	24	32.5	14.0	107.5	21			1,930
3. BUDGET FY 1976	421.5	367.5	75	37.5	36	0.5	16.0	367.5	75			2,400
4. BUDGET +1 FY 77	414.2	361.7	74	37.5	36	1.0	14.0	361.7	74			2,880
5. BUDGET +2 FY 78	401.7	361.7	74	25.0	24	1.0	14.0	361.7	74			2,900
6. BUDGET +3 FY 79	406.6	391.6	80			1.0	14.0	391.6	80			2,939
7. ALL SUBSQ. FY												
8. GRAND TOTAL	1823.0	1590.0	324	125.0	120	36.0	72.0	1590.0	324			13,049

9. OTHER DONOR CONTRIBUTIONS

(A) NAME OF DONOR	(B) KIND OF GOODS/SERVICES	(C) AMOUNT
1. Rockefeller Foundation	1. 20 man years T.A.;participant trg.	$1,500,000
2. IDB	2. Grant & loan assist. for seed prm.	2,100,000

III. ORIGINATING OFFICE CLEARANCE

	TITLE	DATE
1. DRAFTER CBneitenbach/KMcDermott/CKoone/JODonnell/RCCoulter/FSchieck/EWCoy	LA/DR; TA/AG;USAID Guatemala	Dec. 11,1974
2. CLEARANCE OFFICER E.W. Coy Edward W Coy	Director, USAID/Guatemala	Dec. 11, 1974

IV. PROJECT AUTHORIZATION

1. CONDITIONS OF APPROVAL

2. CLEARANCES

BUR/OFF.	SIGNATURE	DATE	BUR/OFF	SIGNATURE	DATE

3. APPROVAL AAs OR OFFICE DIRECTORS
SIGNATURE ____ DATE ____
TITLE ____

4. APPROVAL A/AID (See M.O. 1025.1 VI C)
SIGNATURE ____ DATE ____
ADMINISTRATOR, AGENCY FOR INTERNATIONAL DEVELOPMENT

SUMMARY

The project proposed in this PROP is directed both to the immediate problems of increasing the production and nutritive quality of basic food crops in Guatemala, and to the long-term objective of strengthening and developing the GOG's Agricultural Science and Technology Institute (ICTA). Its goal is to improve the quality of life of rural Guatemalans by increasing the quantity and nutritional quality of food available for consumption and by increasing small farmer incomes in the process. Financing is requested over a five-year period for technical assistance, commodities, and participant training. Project activities will be concentrated on research and outreach programs designed to increase unit-area yields of Guatemala's basic food crops and to improve human nutrition through the development and widespread utilization of high yielding food crops with improved nutritional value.

means - end

ICTA, which will administer the project, was created in May 1973. Its basic mission is to carry out field testing and adaptation research in basic food crops as a basis for formulating and delivering profitable technological production packages to small farmers. These important activities have received AID grant and loan support. This PROP will continue financing for expatriate technicians already on-board and their research/production activities will be expanded to incorporate the nutrition improvement element. In addition, we will support a new program wherein existing varieties of high lysine corn developed by the International Center for Improvement of Wheat and Corn (CIMMYT) for lowland areas will be adapted to Guatemalan conditions. At the same time, research will be carried on to identify high yielding, high lysine varieties suitable for use in the highlands (above 3,000 feet). These activities will be integrated with a program to deliver the new varieties to small farmers.

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I. BACKGROUND

In 1970, the Government of Guatemala approved a five-year development plan (1971-1975) which represented a considerable departure from previous developmental efforts. For the first time, large amounts of money were allocated for rural development within the framework of fundamental changes in the structure of public institutions operating in the sector. With establishment of the Plan, previous public sector priorities were shifted from the agriculture export sector to the traditional sector which encompasses the production of domestic food crops at the subsistence level as well as the commercial sub-sector producing for domestic consumption. In order to assist the GOG in carrying out the development plan, which promised to have a substantial impact on improving the quality of rural life in Guatemala, AID responded with a series of loans and grants. These supported agriculture, education, and health programs designed to reach the rural poor through new, innovative programs developed in accordance with Plan priorities.

Initial GOG activities in agriculture concentrated on reorganizing the Ministry of Agriculture so as to make it more responsive to the needs of small and medium-sized farmers through more intensive programs in the areas of technical assistance, training at all levels, credit, marketing and storage of staples, and the development and application of new technology. Under this reorganization, four new autonomous agencies were created and the National Institute of Agrarian Transformation (INTA) was incorporated into the decentralized group of agencies. The new agencies created as a result of the reorganization were:

1. Directorate General of Agricultural Services (DIGESA), which is charged with providing technical assistance at the farm level in farm planning activities leading to preparation and supervision of production credit loans. DIGESA also carries out an extensive human resources training project. Other activities include irrigation, natural resources preservation, and animal and plant disease control activities.

2. National Agricultural Development Bank (BANDESA), which was created by consolidating three previously existing credit agencies. BANDESA provides agricultural production credit and loans for farm capital improvements.

3. National Agricultural Commercialization Agency (INDECA) which has principal responsibility for establishing a national basic grains price stabilization program which includes the operation of grain storage centers.

4. Agricultural Science and Technology Institute (ICTA) which carries out applied and adaptive research programs oriented toward increasing basic grain and vegetable yields.

The first three agencies mentioned above were created in 1971, while ICTA was chartered in May, 1973.

In support of the above programs, AID authorized the following projects:

a. Agriculture Sector Loan 018, FY 1970

b. Agricultural Marketing PROP, FY 1971

c. Agriculture Production PROP, FY 1971

d. Agriculture Human Resources PROP, FY 1971

e. Agriculture Cooperative Development PROP, FY 1972

f. Credit Union Development PROP, FY 1972

g. Cooperative Development Loan 024, FY 1973

Subsequently, the agricultural production and human resources development PROPs were incorporated into a single project, Agriculture Development, in October 1973, with life of project through FY 1975. Under this grant, four long-term technicians were contracted by ICTA to provide technical assistance in the following fields:

1. Regional research and extension coordination (2)

2. Vegetable production

3. Bean production

Of these, the first was already on-board at the time of PROP approval, the second arrived in late CY 1973, the third in July, 1974, and the fourth in September 1974.

In late CY 1973, a TAB-sponsored team visited Guatemala for the purpose of determining the possibilities of moving ahead with a multidisciplinary project to extend the breakthrough research results of CIMMYT in high lysine, high yielding corn. After discussions with a number of GOG agriculture sector agencies and the USAID, the team concluded that Guatemala would be an ideal site for such an activity. Also, it concluded that knowledge gained in both the lowland and highland areas should have application in other countries. Accordingly, a plan of action covering a three-phased program to extend over five years was prepared and was designed to strengthen existing sector activities being financed under Loan 520-L-018 (Agriculture Development) by:

a. Incorporating more nutritive characteristics in the maize produced and consumed in Guatemala;

b. Promoting more rapid use of high lysine corn through a program of research, breeding, training and communications; and,

c. Determining through a series of studies the benefits to be achieved by increased production, industrial processing, and consumption of high lysine maize.

As originally proposed, the high lysine project was to have been implemented as a separate project requiring the creation in ICTA of a new unit whose operations would have paralleled activities of other sections. However, as the result of continuing AID/W - Mission - ICTA discussions, it was recognized that integration of the high lysine activity with ongoing ICTA programs was essential in order to effectively ensure that the nutritional dimension becomes an across-the-board research/operational objective. Accordingly, the Mission decided to combine in one PROP financing for the high lysine activity with continued technical assistance

to ICTA for complementary activities. TAB Offices of Agriculture and Nutrition have participated in the development of this PROP, and we count on their continued interest and collaboration throughout its implementation period.

II. PROJECT RATIONALE

The Guatemalan agricultural situation is generally typical of Central America and has been described in numerous USAID documents (see the Mission's 1973 Development Assistance Program). Some aspects, however, are particularly significant and will be highlighted here.

Three agricultural sub-sectors can be identified, although there is some overlapping:

1. Traditional subsistence agriculture principally in the central highlands, but also in other areas, revolving around the production of corn, beans and wheat;

2. The export sub-sector, which largely produces coffee, cotton, bananas, sugar and beef, and

3. The commercial agriculture sub-sector which produces most of the remaining crops for internal consumption.

Three distinct geographical areas are involved in the production of basic grains, which is almost exclusively the province of small farmers in each. In the highlands they try to produce enough to survive on the steep slopes or on minifundias on the valley floors. It takes 9 or 10 months for a crop of corn to mature, and the soils have been intensively farmed for centuries. Fertilizer produces high returns in these areas although, given the small farms and the rough topography, delivery of fertilizers is significantly more difficult in this area than in the other two. The highland farmer has done considerable selection of corn varieties over the years, and at this time scientists have no germ plasm for this area markedly superior to the best varieties grown there. However, the extent to which the best materials have been disseminated throughout the highlands is not known. Some good genetic material of beans is also available, but much of the seed is infected with a seed-borne virus disease which reduces yields.

The situation is reversed in the Coastal Lowlands and the Eastern areas. In these areas there are superior varieties available, and most of the yields increase will come from better varieties and cultural practices. The need for fertilizer is far less in these areas than in the Highlands. The small farmer on the Coast, which is a relatively newly developed region, is located for the most part within the La Máquina colonization area. At the time of the AID supported colonization (mid-1950's), each settler received 20 hectares of relatively fertile level land. It is now estimated that this land has been sub-divided at least once so that each farmer probably

has access to about 10 hectares. The Eastern area has been settled much longer than the Coast, and the holdings are even smaller. However, the fertility is relatively high, and both improved varieties and cultural practices (weed and insect control) are considered to be more important as technological innovations than is fertilization. An important characteristic of this area is that it is drier than either of the other two areas with erratic rainfall distribution. Sorghum is an important crop in this area and will likely become of increasing importance.

Overall, 87% of the country's 417,000 farms are less than seven hectares in size, but these produce the bulk of the basic grains consumed domestically, Whereas in the past local production was largely sufficient to meet domestic demand, Guatemala has had to import corn and beans in the last three years due to the impact of natural disasters and the increasing higher cost of fertilizer, which has lowered usage. Quite apart from these factors, however, local production historically was not increasing at a rate sufficient to meet increased demand from population growth.

Corn is the most important food crop in Guatemala by overwhelming odds. No other crop reaches even ten percent the tonnage of corn. It is the staple food crop, constituting from 80-90% of the diet of some of the people. Beans are grown in combination with corn in many of the areas in variable systems of multiple cropping. Beans are the principal source of protein for most of the rural (and urban) poor. Given the close association of beans and corn and the substitutability of corn and sorghum (both for resource inputs and utilization) this project is addressing all three, as well as vegetable crops which could substitute for or complement the three basic food crops. In addition, vegetable production permits diversification and can contribute to increased farm income.

Most of the small farm sector is characterized by subsistence farming. Typically, some small amounts of production are sold to provide cash for immediate necessities and to pay off any credit the farmer may have received. Where production is not sufficient, the farmer works at other jobs, either as hired farm labor or (in the highlands) by practicing some craft (weaving, pottery, etc.). For example, a recent survey of 503 small farmers in the Department of Jutiapa indicates that 75.7% consumed all of their corn and only a few (10%) sold even half of their crop. Over one-third (37%) consumed their entire bean crop. As could be expected, tortillas and beans were used daily in all of the homes. Very few families used vegetables as part of the daily diet, but 37-38% used them at least once a week. As in the highlands, many of the farmers (36%) leave the area for a few weeks to work as laborers on larger farms (generally on the Pacific Coast).

With the high incidence of subsistence farming and limited diets, it is not surprising that the nutritional well-being of a large portion of the population is poor. As illustrated in the following table, half of the country's population consumes only 50% of the calories necessary for body maintenance and development--comparable deficits can be observed in the consumption of proteins, fats, and oils.

GUATEMALA: Daily Consumption of Nutrients, by Economic Strata. 1970

Population Strata	Nutrients		
	Calories	Proteins (grams)	Fats (grams)
1. 50% poorest	1,326	31	19
2. 30% medium	2,362	57	38
3. 15% wealthy	2,919	75	57
4. 5% very wealthy	4,234	130	121

SOURCE: GAFICA/SIECA

In 1965, the Institute of Nutrition of Central America (INCAP) undertook a detailed nutritional study in Guatemala which revealed that the most affected sub-groups of the population were children of pre-school age. An estimated 81% of the children in this age group had nutritional deficiencies. In general, the main nutritional problems identified by the study for the population as a whole were:

1. Protein - calorie malnutrition
2. Vitamin A deficiency
3. Riboflavin deficiency
4. Nutritional anemias
5. Dental caries.

The study concluded that the basis of the nutritional problem is low production, availability and effective demand of basic foods to insure an adequate diet.

Thus, in this project our strategy is to work with ICTA to increase the productivity of small farmers, their income, and the nutritive qualities of the basic food they produce for the nation.

III. GENERAL OPERATION OF THE PROJECT

ICTA will be responsible for carrying out the project although, because of the interdependent nature of the activity, the cooperation of the other public sector agencies will be necessary in order to achieve its objectives. Also, the project will need the collaboration of regional institutions such as INCAP and certain international centers, especially CIMMYT and CIAT. Technical assistance is also being provided by the Rockefeller Foundation (four staff members) and additional financing for a key project element, seed production (discussed below) is expected from the IDB.

When chartered, ICTA was given responsibility for all public sector research and extension activities which had been a DIGESA function. Rather than take on this role all at once, ICTA has elected to move slowly and limit initial activities exclusively to food crops produced by the small farmer (ICTA's own statement of programs and major areas of work is

attached as Annex A). ICTA is currently working in the three major geographical areas where large concentrations of small farmers producing basic food crops exist: the Highlands, the Eastern and the Coastal colonization areas.

At present, ICTA is understaffed with agricultural professionals although a number of employees are attending long-term training programs financed under the current AID agriculture loan. Four are presently abroad studying, and five will depart for training during CY 1975. Because solution of the personnel problem is not possible in the short-run, ICTA is very dependent on foreign support, especially if new initiatives are to be undertaken. As was noted previously, the Rockefeller Foundation and AID are each providing four staff members who have played critical roles during ICTA's start-up period. With respect to operating philosophy, ICTA will continue to use its direct linkages with CIAT and CIMMYT as sources of basic research, directing its major efforts to application of knowledge at the farm level.

Operationally, ICTA has been organized to work at two levels. First, three regional production teams have been formed for the purpose of working directly with small farmers in on-farm development and application of improved practices and in obtaining credit for necessary inputs.

The following personnel are assigned to each team:

1 team leader
1 production agronomist
1 production economist
4 production assistants
10 promotores

To provide the necessary technical backstopping for these teams, commodity groups have been organized to develop, for each main ecological region of the country, high-yielding, biologically efficient crop varieties and related agronomic practices. These groups operate through a network of five experiment stations, one in the Eastern area (Monjas), two on the South Coast (Cuyuta and La Máquina), and two in the Highlands (Chimaltenango and Quezaltenango). Research is also being conducted at the farm level under controlled conditions, as well as on test/demonstration plots farmed by the landowners. Close contact is maintained with the production teams so as to ensure adequate feedback as well as the transfer of research results. Each commodity group is responsible for providing necessary technical assistance in the production of foundation seed for varieties released for production. A key staff member of each commodity group is the production specialist who is highly experienced in the production of the particular crop concerned. The foregoing operational method was developed and adapted from the Puebla Plan in Mexico.

The high lysine research effort will be approached as follows, according to the geographic region:

Coastal Lowlands: Extensive consultations during the last twelve months have indicated that the most rapid approach to introducing high lysine corn to farmers in this area is to start with the Tuxpeño variety developed

by CIMMYT that is adapted to similar geographic, climatic and soil conditions. Some 81 lbs. of seed provided by CIMMYT was planted in 1974. Harvest now is underway. Yields appear to be somewhat lower than those of improved varieties used in the area but higher than most native corn varieties. Furthermore, there is still a high percentage of soft endosperm recognized to be a bad characteristic. This variety offers promise while demonstrating that it is still not ideal. Project strategy will be to improve this variety in yield and endosperm hardness while at the same time working on introduction of the high lysine gene into other high yielding varieties used in this area.

Highlands: The approach in this area is first to collect and screen existing highland high yielding corn varieties in order to determine if any of them carry the high lysine gene. Assuming that none of them do, acceptable varieties will have to be developed through introduction of high lysine genes into existing or new varieties. This will take considerable time especially because the growing season for a corn crop in this area can approach an entire year. Furthermore, there is little likelihood of locating varieties from other regions that will perform in the altitude without undergoing considerable change. Therefore, it is quite possible that significant commercial production will not take place in this area during the life of the project. On the other hand, work will continue on corn yield improvement which offers strong potential for increased productivity.

Eastern Area: In general, the same procedure will be followed as that for the Coastal region; CIMMYT seed will be adapted to local conditions. While the basic thrust is corn, work has been initiated to increase production and improve the quality of sorghum. Two high yielding varieties have been released that are open pollinated and adapted to the coastal and eastern areas. Selections have also been made of genetic materials considerably higher in protein than of the sorghums normally grown.

To support the commodity groups, ICTA will sign a contract with INCAP under which INCAP will conduct chemical analyses and bio-assays on grain samples submitted by ICTA. This testing is designed to determine the lysine and protein (amino acids) content of grains and beans being developed and introduced.

Project funds will finance the continuation of the following personnel now providing assistance to ICTA in the above activities:

2 specialists in the organization and implementation of multi-crop, integrated research and extension programs.

1 specialist in bean research and extension

1 specialist in research and extension programs aimed at crop diversification, with emphasis on vegetables.

Full-time contract personnel needed to expand research and delivery activities for high lysine corn are:

2. specialists in corn breeding and corn production technology.

In addition, TDY support for the above programs estimated at 12-man months over the life of the project will be necessary.

A key step in the process of introducing new crop varieties at the farm level is the existence of a well-organized seed service to produce the large quantities of improved seed needed to expand plantings of new varieties. Ordinarily, financing of this activity would have been included hereunder, but because the IDB has indicated to the GOG that it is interested in providing the necessary financing, the Mission eliminated this from the program proposal. However, if the IDB project is not approved, supplemental financing will be required. It is possible that a portion of the funds required could be made available under the Mission's proposed FY 1976 Rural Development loan. The Mission will closely follow this aspect of the project.

Another possible issue is the question of INCAP participation in the project. As noted above, INCAP will be contracted to carry out chemical analyses of new grain and bean varieties. However, during project development, INCAP proposed much more extensive studies be undertaken, including food technology studies to incorporate high lysine corn in bread and pasta products, animal nutrition experiments especially with swine and poultry, and a study to evaluate the nutritional impact of introducing high lysine corn. This last activity would, as a minimum, include a dietary survey of coffee farm workers who would be given the new corn varieties in lieu of the traditional varieties now being given as partial pay. An initial base line survey, followed by two other surveys during the course of the program, would be required.

The USAID has not included the above activities within this PROP for the following reasons:

1. Mission experience gained in attempting to prepare a scope of work for a proposed rural health services evaluation program indicates that the problem of isolating one variable affecting nutritional well-being is extraordinarily difficult to resolve. Over time, other factors besides the eating of high lysine corn could, and probably would, affect individual health levels. The availability of better medical facilities, an increase in pay, changes in relative price relationships among various foods could all have an impact. Thus the Mission concluded that a conclusive study is not feasible.

2. The Mission questioned also the need to again prove that high lysine has a positive impact on health. Presumably, the project was proposed by AID/W because it has been determined that increasing lysine intake in poor diets is desireable.

3. The food technology aspect is a part of INCAP's present mandate. Ordinarily, it could be anticipated that INCAP would explore these possibilities in the normal course of events. If so, AID-financing would be tantamount to providing budget support. Even if this were not the case, the greatest impact on the target group will not come from improving bread or pasta because this group consumes corn directly.

4. While the animal nutrition study might be of interest, it is our impression that extensive work has already been done in this area. Furthermore, the improvement of animal nutrition should only be undertaken as part of a comprehensive program to improve animal production.

IV. PROJECT DESCRIPTION *

A. The Project Goal

1. Statement of the Goal

To improve the quality of life of rural Guatemalans by increasing the quantity and nutritional quality of food available for consumption and by increasing the incomes of small farmers.

2. Measurements of Goal Achievement

a. Average daily consumption of rural Guatemalans will increase by 20%, from 1772 calories and 41 grams of protein to 2126 calories and 49 grams of protein. Rural Guatemalans, for purposes of this indicator, are defined as those living outside urban areas of 10,000 or more.

b. Net farm income of producers of basic food crops (in 1974 Quetzales) will increase an average of approximately 20%.

3. Basic Assumptions of goal achievement

a. The GOG and USAID continue to maintain close collaborative relationships and retain mutual interest in improving the lot of the rural poor.

b. Present support from other international agencies for essential activities will be continued and projected new activities will be authorized in a timely fashion.

B. The Project Purpose

1. Statement of purpose

a. Accelerate the annual rate of increase in productivity of land devoted to production of basic food grain, beans and vegetables.

*Note: The Means of Verification used to measure progress towards project targets are described in The Project Evaluation Plan.

b. Increase the nutritive quality of basic food crops.

c. Improve the capacity of public entities to sustain the higher rates of productivity increase and in turn to address other problems of agricultural development

2. Conditions expected at the end of project

a. Productivity of corn, sorghum and beans increasing at the rate of 4% annually by 1980. Now?

b. One-fourth of total area under corn production and one-half of total area under sorghum production will be producing crops of improved nutritional quality.

c. A fully functioning basic crop development program in ICTA capable of sustaining, and with the potential for increasing, the levels of outputs targeted for 1980. Such a program will: ?

1. Reflect the farming systems of its clientele.
2. Integrate research and extension activities.
3. Address both short and long term limiting factors.
4. Closely link programs of domestic and international entities involved in agricultural development.
5. Integrate crop research programs.
6. Test and develop crop varieties on a continuing basis to improve nutritional quality and productivity.

3. Basic assumptions about achievement of purpose

a. Price/supply relationships will be adequate.

b. Input prices will be fairly stable at or near 1975 levels, and adequate supplies will be available.

c. GOG will continue to facilitate delivery of inputs to farmers and set reasonable floor prices for corn, sorghum and beans.

d. Public agricultural sector agencies and cooperative federations will continue their interest in and support for increasing basic food crops production by small farmers.

C. Project Outputs

1. Statement of Project Outputs and Output Indicators *

a. Output: Improved varieties of corn bearing high lysine gene developed and generally available to small farmers.

*An annual schedule of outputs and output indicators is attached as Annex C.

Indicators: 37,500 cwt. of high lysine, high yielding, lowland corn seed planted on 150,000 hectares by 1980; and several high lysine, high yielding highland corn varieties in full-scale field testing (10 farm experiments and 50 farm tests/demonstrations at different highland locations) by 1980.

b. Output: Improved varieties of sorghum with high protein content developed and generally available to small farmers.

Indicator: 13,300 cwt. of high yielding, high protein sorghum seed planted on 40,000 hectares by 1980.

c. Output: Improved varieties of beans developed and generally available to small farmers.

Indicator: At least three high yielding bean varieties developed and 35,000 cwt. of improved bean seed planted on 35,000 hectares by 1980.

d. Output: Technological demonstration program for increased high quality vegetable production underway.

Indicator: Fifteen vegetable demonstration plots in full operation in at least three experiment stations and at least fifty farm test-demonstrations in operation by 1980.

e. Output: Trained professional research and extension staff will be developed and on-board at ICTA.

Indicator: At least 43 professionals will have completed training, 13 of whom will have received two or more years of advanced academic training, with the balance receiving one year of specialized training.

f. Output: Data on nutritive content of basic food products will be developed.

Indicator: During the first year of project operation, chemical and biological analyses of the following samples will be carried out by INCAP: Corn (550) sorghum (50), beans (400), and rice (50). Levels of analyses in the following years appropriate to the numbers of varieties selected will be undertaken.

2. Basic Assumptions

a. GOG will allocate high priority to increased production of basic food crops including a determined effort to stimulate the use of improved seeds developed by ICTA.

b. ICTA's budget will be increased to support its expanded technology development program.

c. The variety of lowland high lysine corn being field tested in 1975 will be ready for release to farmers in 1976.

d. The Rockefeller Foundation will send two people per year for two years or more of advanced academic training, and ICTA will send five people per year for one-year specialized training, using its own or other donor (non-AID) funds.

e. IDB will provide technical assistance and funding necessary for the commercialization of the basic improved seeds which ICTA develops.

f. A prolonged breeding and production process for high lysine corn varieties suitable to the highlands will not be necessary.

D. Statement of Project Inputs

1. A.I.D.

a. Contract Services

Two corn breeders - 10 Man years (MY)
Regional Research Coordinator (Coast) - 4 MY
Regional Research Coordinator (Oriente) - 4 MY
Bean Research Coordinator - 4 MY
Vegetable Research Coordinator - 4 MY
TDY Support - 12 Man Months
Contract with INCAP for analysis of food crop samples

b. Commodities

Three pick-up trucks
Field equipment consisting of:
- three corn shellers
- three threshers
- three seed cleaners
- two hand operated tractors
- miscellaneous equipment and repair parts.

c. Participant Training

Two years graduate training each for:
- two plant breeders
- one plant pathologist
- one entomologist
- one agronomist

d. Other Costs

Reference materials for professional staff.
International travel for consulting purposes.

2. Other Inputs

a. TAB

TAB assistance over life of project.
One centrally funded resident water management technician, to work on increasing productivity of irrigated grains, beans and vegetables.

b. Rockefeller Foundation

Resident Professional Staff - 20 MY.
Participant training. (2 professionals per year for two or more years of advanced academic training).

c. IDB

Grant and loan assistance for ICTA basic seed program and commercial seed industry.

d. ROCAP

Continued support to North Carolina State University soils fertility program.

e. CIAT CIMMYT, other International Research Institutions

TDY technical assistance.
Participant training.
Genetic materials.

f. ICTA

Budgetary allocations for the managerial planning, organizational and administrative support required to conduct the project in an effective manner. Professional staff will include approximately 50 people located in the central and three regional offices.

3. Budget

a. Technical Assistance	$
10 man-years, plant breeders, at $60,000 per man-year including all support costs.	600,000

		$	
	8 man-years of multiple cropping, integrated research and extension specialists at $60,000 per man-year including all support costs.	480,000	
	4 man-years of bean specialist at $50,000 each including all support costs.	200,000	
	4 man-years of horticulture specialist at $60,000 per man-year.	240,000	
	1 man-year equivalent of TDY to assist above specialists	70,000	1,590,000
b.	Participants		
	Ten years of graduate training at U.S. and/or Mexican institutions at $12,500 annually per student.		125,000
c.	Commodities		
	Three pick-up trucks at $4,500 each.	13,500	
	Corn Shellers, three at $500 each.	1,500	
	Seed Cleaners, three at $3,000 ".	9,000	
	Hand Tractors, two at $1,250 ".	2,500	
	Grain Threashers, three at $2,000 each.	6,000	
	Miscellaneous equipment and repair parts.	3,500	35,000
d.	Other Costs		
	i. Contract between ICTA and INCAP for laboratory analysis estimated at $10,000 annually.	50,000	
	ii. Reference materials for the ICTA library.	10,000	
	iii. International travel and per diem for consulting purposes, fifteen trips at $800 each.	12,000	72,000
	T O T A L		$ 1,823,000

4. Implementation Schedule

See Annex B.

5. Basic Assumptions about Management of Inputs

a. ICTA's organizational and administrative capacity, which has been satisfactory in the past, will continue to improve, and the management of this expanded program will be well within its capacity.

b. ICTA will enter into contracts with qualified institutions, firms or individuals for the provision of services stipulated on a timely basis.

c. ICTA will purchase commodities specified in a timely fashion.

d. Participants proposed by ICTA will meet AID participant selection criteria.

E. Course of Action

The implementation plan for this activity is divided into two elements for the purpose of clarity. The first has to do with the actions required in order to get the project underway, and the second deals with what is to be accomplished over the life of the project on a crop basis.

1. Project Initiation

Assuming PROP approval in December 1974, a Project Agreement will be consumated with ICTA by February 15, 1975. The grantee will recruit and contract the two corn breeders, with the assistance of Rockefeller and CIMMYT and attempt to have them on board by April 1, 1975. We recognize that this is not much lead time, but with the contacts established, we believe that it can be accomplished.

Orders will be placed for the pick-up trucks by April 1, 1975 and for the balance of the commodities by July 1, 1975.

Participants will be selected and scheduled for training as follows:

August 1975		One to study plant breeding
		One to study plant pathology
August 1976	-	One to study entomology
August 1977	-	One to study agronomy
	-	One to study plant breeding

The ICTA/INCAP contract will be negotiated and signed by March 15, 1975.

Reference material will be purchased as it becomes available from CIAT, CIMMYT and other international research network centers throughout the life of the project.

2. Crop oriented actions will be dealt with according to the following schedule:

a. Corn, Coastal - 1975

(1) Select hard endosperm seed from the Tuxpeño variety planted in 1974 and plant this seed on 800 hectares for increased seed production.

(2) Conduct uniform yield tests at the La Máquina Experiment Station on all available high lysine varieties that might be adaptable to this region.

(3) Carry out similar tests with improved varieties of standard corns.

(4) Consult with experts, obtain lines from available sources, and start a breeding program to increase productivity of both high lysine and current corn.

b. Corn, Highland - 1975

(1) Select high yielding current varieties and screen to determine if any of these carry the high lysine gene. This will be done by quick test and/or by chemical analyses.

(2) Obtain from other sources, to the extent possible, seeds of high lysine corn that might be adapted to the area.

c. Sorghum, Coastal and Eastern - 1975

(1) Conduct standard yield trials of all varieties determined to be adapted to the Coastal and Eastern areas from previous screening tests. (The world collection obtained through Purdue and other sources has been screened annually over the past few years).

(2) Determine protein content of the higher yielding varieties.

(3) Plant the higher yielding, high protein varieties in a second yield test to measure performance. Include in this test any new varieties that have become available.

(4) Distribute enough seed of the two existing high yielding varieties to plant 2,400 hectares and render technical assistance to the producers of the area of plantings.

d. Beans, Highland and Eastern Areas - 1975

(1) Collect and screen all available varieties for disease resistance and yield capacity. (This phase is already underway. One good variety is being increased for release, and two or three developed at Turrialba show promise).

(2) Determine protein content and quality of the beans.

(3) Conduct standard yield tests of the most promising varieties in at least one lowland and one highland location.

(4) Distribute 1,000 cwts. of seed of the best presently available variety and provide technical assistance to the producers of these beans, whereby their production will be suitable for use as seed.

e. Vegetables, Eastern and Highlands - 1975

(1) Carry out demonstrations of properly managed production of five vegetable crops requiring irrigation on the Eastern experimental farm. (Previous efforts to help the small farmer have been thwarted by inadequate marketing channels. Therefore, in order to avoid this problem and ensure the optimum return to small vegetable producers, this activity will be closely coordinated with local food processors producing for Guatemala and the Central American market, as well as with LAAD which is, under an AID loan, providing financing for food processing and packing firms involved in export beyond the CACM area).

(2) Develop detailed plans for experiment station tests and farm demonstrations on two experiment stations and on ten farms to be initiated in CY 1976.

(3) Render technical assistance to the producers of irrigated vegetables in the Eastern area and to the rainy season vegetable producers in the Highlands with emphasis on obtaining high yields of acceptable quality.

(4) Develop a plan for the initiation of a vegetable seed production program and explore the feasibility of such an enterprise.

3. 1976/79 Period

The activities on all crops addressed in detail above will be continued through this period. Scientific breakthroughs will be taken advantage of as they occur and international research network materials that become available will be incorporated. ICTA's entire effort will be directed at increasing the productivity and nutritive quality of these crops.

IDB grant support for the ICTA seed improvement program will be initiated by mid-1975 with SPTF repayments to be followed by a loan in 1976 for seed production, processing and distribution facilities.

The above actions should make it possible for project objectives set forth in Annex C, Output Schedule, to be achieved by the end of project.

F. Other Considerations

1. Project Evaluation Plan

Evaluation of progress toward achievement of the project goal and purposes has been included as an integral part of the project. The primary responsibility for evaluation will rest with the Government of Guatemala although supplemental assistance will be provided by the USAID, TAB, the Rockefeller Foundation, and the IDB.

The two basic evaluation techniques which will be used over the life of the project are described below:

a. Sample surveys: Under the Small Farmer Improvement grant project, the USAID plans to provide assistance to the Ministry of Agriculture and the General Directorate of Statistics to establish a data collection and analysis system based on the stratified sample survey technique used by the U.S. Department of Agriculture. Under such a system, national estimates can be derived from a relatively small number of scientifically selected geographic sample units. In this project, it is planned that sample data will be collected at least annually to determine increases in calorie and protein consumption, changes in average net farm income, and changes in production and productivity of basic food crops.

b. Chemical/biological analyses of basic food crops:

Under this project, USAID financing will be provided to allow ICTA to enter into a contract arrangement with INCAP to perform chemical/biological analyses of the nutritive quality (protein and amino acid content) and storage characteristics of corn, sorghum, beans, and rice. As existing varieties are screened and improved varieties are developed by ICTA, samples will be selected and analyzed by INCAP to determine whether nutritive quality is in fact being improved.

Quite apart from the specific evaluation activities described above, there are two other primarily GOG evaluation efforts which will, over time, provide good data with respect to changes in rural areas. The GOG's National Planning Council has recently completed the agricultural section of its 1975-1979 Development Plan. The developmental strategy for the sector stresses the need to increase food production for internal consumption and gives, at the same time, equal emphasis to the need for increasing the income of the rural poor. The Planning Council plans to mount an intensive evaluation effort over the life of the Plan to measure progress in achieving its objectives. The USAID will provide funding for technical assistance to assist the Council in formulating evaluation plans for the agriculture and education sector.

Another source of evaluation data arises from the GOG's budgetary system which requires each governmental agency to submit annual operational targets on a fiscal year basis. Then, by law, the Executive Branch is required to provide the Congress each year with a report which compares actual achievement with the targets which had been set for budgetary purposes. The foregoing efforts will provide a basis for determining progress in achieving input and output goals within the total package of public sector activities impacting on the well-being of small farmers. Other sources of data will be utilized to measure progress towards production of outputs and achievement of project purposes and goals in the following manner:

a. Reports from ICTA, DIGESA and BANDESA will be analyzed to determine:

(1) Area planted, production and yields for corn, sorghum and beans.

(2) Credit extended and seed and fertilizer sales to small farmers.

(3) Change agent contacts with small farmers.

b. ICTA reports on:

(1) Screening of existing corn varieties.

(2) Production of improved corn, sorghum and beans basic seed.

(3) Participant and in-service training.

(4) Number and type of farm experiments and farm/test demonstrations.

c. Rockefeller Foundation reports on:

(1) Technical assistance to ICTA.

(2) Participant training.

d. IDB reports on:

(1) Technical assistance for basic seed program.

(2) Loan assistance for establishment of a commercial seed industry.

TAB assistance is contemplated over the life of the project in terms of periodic assessments of progress in project implementation and identification of limiting factors requiring resolution.

2. Ecological and Environmental Considerations

No adverse environmental impact is foreseen as a result of this project.

Additionally, while changing the environment is not a primary focus of this project, general benefits to the environment should result if project objectives are accomplished. The use of agricultural chemicals is essential in order to produce economic yields in Guatemala, and they are widely used. One of the responsibilities of the regional and commodity teams is to teach the proper use of agricultural chemicals, thus minimizing the environmental damage which can result from their misuse. It is further anticipated that the teams will be instrumental in influencing a reduction of soil erosion through provision of training to small farmers in proper cultivation practices. Teams will likewise be charged with instructing farmers on the proper use of irrigation techniques thereby reducing water waste and unnecessary soil movement.

3. Section 113 Considerations

Women in rural Guatemala do not generally play a significant role specifically in basic food crop production (as opposed to ancillary activities such as marketing). It is beyond both the scope and the potential of this project to produce noteworthy change in this cultural pattern. Other elements of the Mission's program do address this situation, however. In particular, our present and planned activities in education assist the GOG to provide a more relevant education, including instruction in food production techniques, to a growing number of rural boys and girls on a completely non-discriminatory basis.

The Mission sees no evidence to indicate that ICTA discriminates against women in its selection of staff. However, neither in the United States nor anywhere in Latin America are women attracted to the professional research and extension aspects of crop production, although Guatemalan women are actively professionally engaged in the improvement of rural life in many of its other aspects relevant to better nutrition. At present, we do not believe that the Faculty of Agronomy in the National University has any women students. Therefore, it is unlikely that women will participate in large numbers on ICTA's research and food crop development staff, and also unlikely that many, if any, academically qualified women will be found for the advanced academic or specialized technical training proposed under the project. To alter this situation would require action at the level of undergraduate university education, which is beyond the scope both of this project and overall Mission/AID priorities. If women do apply for ICTA professional positions, the Mission will strongly encourage ICTA to consider such applications on a non-discriminatory basis.

Since adequate protein intake is of particular importance to pregnant women and lactating mothers, the nutritional improvement of basic foods which should result from this project will be of particular benefit to rural women.

Women do play a major role in determining the acceptability of new products for family consumption. Recognizing this, ICTA, with support by other GOG agencies, will gear its efforts to gain acceptance of nutritionally superior food produced from varieties it develops toward the rural woman. Other Mission-supported activities which deal in part with nutrition education, such as the rural health technician and basic village education projects, will also integrate this approach into their program.

AID 1025-1A (7-71) (NARRATIVE DESCRIPTION)

PROJECT NO.	SUBMISSION	DATE	
520-11-130-232	☑ ORIGINAL ☐ REVISION (Number) _____	12/11/74	PAGE 1 of 8 PAGES

PROJECT DESIGN SUMMARY - LOGICAL FRAMEWORK

PROJECT TITLE & NUMBER : FOOD PRODUCTIVITY AND NUTRITIONAL IMPROVEMENT

520-11-130-232

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS
Program or Sector Goal: The broader objectives to which this project contributes:	Measures of Goal Achievement:
To improve the quality of life of rural Guatemalans by increasing the quantity and nutritional quality of food available for consumption and by increasing the incomes of small farmers.	1. Average daily consumption of rural Guatemalans will increase by 20% from 1772 calories and 41 grams of protein to 2126 calories and 49 grams of protein. Rural Guatemalans for purposes of this indicator are defined as those living outside urban areas of 10,000 or more. 2. Net farm income of producers of basic food crops (in 1974 Quetzales) will increase an average of approximately 20%.

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Life of Project: From FY 1975 to FY 1979
Total U.S. Funding: $1,527,500
Date Prepared: 12/11/74

MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
1. INCAP studies of nutritional quality of basic food crops.	1. The GOG and USAID continue to maintain close collaborative relationships and retain mutual interest in improving the lot of the rural poor.
2. Periodic dietary consumption sample surveys.	2. Present support from other international agencies for essential activities will be continued and projected new activities will be authorized in a timely fashion.
3. Periodic net farm income sample surveys.	

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS
Project Purpose:	Conditions that will indicate purpose has been achieved: End of project status:
1. Accelerate the annual rate of increase in productivity of land devoted to production of basic food grain, beans and vegetables.	1. Productivity of corn, sorghum and beans increasing at the rate of 4% annually. now?
b. Increase the nutritive quality of basic food crops.	2. One-fourth of total area under corn production and one-half of total area under sorghum production will be producing crops of improved nutritional quality.
c. Improve the capacity of public entities to sustain the higher rates of productivity increase and in turn to address other problems of agricultural development.	3. A fully functioning basic crops development program in ICTA capable of sustaining, and with the potential for increasing, the levels of outputs targeted for 1980. Such a program will:
	a. Reflect the farming systems of its clientele.
	2. Integrate research and extension activities.
	3. Address both short and long term limiting factors.
	4. Closely link programs of domestic and international entities involved in agricultural development.
	5. Integrate crop research programs.
	6. Test and develop crop varieties on a continuing basis to improve nutritional quality and productivity.

MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
1. Agricultural public sector and cooperative reports on (a) area planted, production yields for corn, sorghum, beans; (b) loans extended to small farmers; (c) fertilizer and seed sales; (d) farmer contacts by change agents.	Assumptions for achieving purpose:
2. ICTA reports on (a) improved corn, sorghum and seed sales; (b) location and nature of on-farm experiments and on-farm tests; (c) participant, other agency and in-service training.	1. Price/supply relationships will be adequate.
3. INCAP reports on analysis of food crop samples.	2. Input prices will be fairly stable at or near 1975 levels, and adequate supplies will be available.
4. USAID, TAB, IDB and Rockefeller Foundation reports on ICTA Food Crops Technology program.	3. GOG will continue to facilitate delivery of inputs to farmers and set reasonable floor prices for corn, sorghum and beans.
5. Site visits by USAID and TAB personnel.	4. Public agricultural sector agencies and cooperative federations will continue their interest in and support for increasing basic food crops production by small farmers.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS
Outputs:	Magnitude of Outputs:
1. Improved varieties of corn bearing high lysine gene developed and generally available to small farmers.	1. 37,500 cwt. of high lysine, high yielding, lowland corn seed planted on 150,000 hectares by 1980; and several high lysine, high yielding highland corn varieties in full-scale field testings (10 farm experiments and 50 farm tests/demonstrations at different high-land locations) by 1980.
2. Improved varieties of sorghum with high protein content developed and generally available to small farmers.	2. 13,300 cwt. of high yielding, high protein sorghum seed planted on 40,000 hectares by 1980.
3. Improved varieties of beans developed and generally available to small farmers.	3. At least three high yielding bean varieties developed and 35,000 cwt. of improved bean seed planted on 35,000 hectares by 1980.
4. Technological demonstration program for increased high quality vegetable production underway.	4. Fifteen vegetable demonstration plots in full operation on at least three experiment stations and at least fifty farm test-demonstrations in operation by 1980.
5. Trained professional research and extension staff will be developed and on-board at ICTA.	5. At least 43 professionals will have completed training, 13 of whom will have received two or more years of advanced academic training, with the balance receiving one year of specialized training.
6. Data on nutritive content of basic food products will be developed.	6. During the first year of project operation, chemical and biological analyses of the following samples will be carried out by INCAP: Corn (550), sorghum (50), beans (400), and rice (50). Levels of analyses in the following years appropriate to the numbers of varieties selected will be undertaken.

MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
1. Agricultural public sector and cooperative reports on (a) area planted, production yields for corn, sorghum, beans; (b) loans extended to small farmers; (c) fertilizer and seed sales; (d) farmer contacts by change agents.	Assumptions for achieving outputs: 1. GOG will allocate high priority to increased production of basic food crops including a determined effort to stimulate the use of improved seeds developed by ICTA.
2. ICTA reports on (a) improved corn, sorghum and seed sales; (b) location and nature of on-farm experiments and on-farm tests; (c) participant, other agency and in-service training.	2. ICTA's budget will be increased to support its expanded technology development program.
3. INCAP reports on analysis of food crop samples.	3. The variety of lowland high lysine corn being field tested in 1974 will be ready for release to farmers in 1975.
4. USAID TAB, IDB and Rockefeller Foundation reports on ICTA Food Crops Technology program.	4. The Rockefeller Foundation will send two people per year for two years or more of advanced academic training and ICTA will send five people per year for one-year training, using its own or other donor (non-AID) funds.
5. Site visits by USAID, and TAB personnel.	5. IDB will provide technical assistance and funding necessary for the commercialization of the basic improved seeds which ICTA develops.
	6. A prolonged breeding and production process for high lysine corn varieties suitable to the lowlands will not be necessary.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS
Inputs:	nplementation Target (Type & Quantity)
1. A.I.D.	2. Other Inputs
a. Contract Services Two corn breeders - 10 man years(MY) Regional Research Coordinator (Coæt) 4 man years Regional Research Coordinator (Oriente) 4 man years Bean Research Coordinator - 4 MY Vegetable Research Coordinator - 4 MY TDY Support - 12 Man Months Contract with INCAP for analysis of food crop samples	a. TAB TAB assistance over life of project. One centrally funded resident water management technician to work on increasing productivity of irrigated grains, beans and vegetables.
b. Commodities Three pick-up trucks Field equipment consisting of: - three corn shellers - three threshers - three seed cleaners - two hand operated tractors - miscellaneous equipment and repair parts	b. Rockefeller Foundation Resident Professional Staff 20 MY Participant Training (2 professionals per year for two or more years of advanced academic training.)
c. Participant Training Two years graduate training each for: - two plant breeders - one plant pathologist - one entomologist - one agronomist	c. IDB Grant and loan assistance for ICTA basic seed program and commercial seed industry.
d. Other Costs Reference materials for professional staff International travel for consulting purposes.	d. ROCAP Continued support to North Carolina State University soils fertility program.
	e. CIAT, CIMMYT, other International Research Institutions TDY technical assistance Participant training Genetic Materials.
	f. ICTA Budgetary allocations for the managerial planning, organizational and administrative support required to conduct the

project in an effective manner. Professional staff will include approximately 100 people located in the central and three regional offices.

IMPORTANT ASSUMPTIONS

Inputs:

ICTA from its budgetary allocations will provide the managerial, planning, organizational and administrative support required to conduct the project in an effective manner. Professional staff will include about 100. people with adequate office and field support located in the central and three regional offices. Transportation, office and experiment station facilities are believed adequate to carry out the project as planned with the outside assistance specified.

Assumptions for providing inputs:

1. ICTA's organizational and administrative capacity, which has been satisfactory in the past, will continue to improve and the management of this expanded program will be well within its capacity.

2. ICTA will enter into contracts with qualified institutions, firms, or individuals for the provision of services stipulated on a timely basis.

3. ICTA will purchase commodities specified in a timely fashion.

4. Participants proposed by ICTA will meet AID participant selection criteria.

Annex A - AGRICULTURAL SCIENTIFIC AND TECHNOLOGICAL INSTITUTE OF GUATEMALA (ICTA) - ANNEX A

ICTA is a decentralized autonomous organization of the Agricultural Sector of the Government of Guatemala. It is a new institution, inaugurated in May of 1973, for the purpose of contributing to agricultural production and rural development. The commonly used letter designation is ICTA, which in Spanish stands for the Instituto de Ciencia y Tecnología Agrícolas.

ORGANIZATION

ICTA is governed by a Board of Directors headed by the Minister of Agriculture of Guatemala. In addition, ex-oficio members are the Ministers of Economics and Finance, the Head of the Economic Planning Council, and the Dean of the School of Agronomy, and one citizen at large, named by the other members of the Board.

The chief executive officer is the Director General (Gerente General).

Sub-Directors can be named as needed. The Administrative Services, headed by the Administrator, include officers of personnel, purchasing, accounting, cashier and budget.

A program office will be established and will include preliminary or feasibility studies, programming and evaluation, although how best to conduct this latter aspect has not been decided. The principal program operating arm of the institute is the Technical Unit, headed by the Technical Director.

RESPONSIBILITIES

It is the responsibility of ICTA to carry out research to solve agricultural problems which are related to the welfare of the rural population, to produce materials and determine methods to increase agricultural production, to promote the application of technology at the farm level and to contribute to rural development.

It is also the responsibility of ICTA to contribute to training of personnel at all levels needed for agriculture.

AREAS OF ACTIVITIES

As previously mentioned, ICTA is a new organization and its programs are not fully developed.

Initially, ICTA will concentrate on production of basic grains (corn, beans, rice, wheat, sorghum), horticultural crops and swine.

ICTA operates as the main technological arm of the Government of Guatemala for agricultural production. It conducts research on its own experiment stations and on private farms. The aim is to determine technological packages for economic production and promote their application, working directly with farmers.

ICTA has a major education and training plan to improve capabilities of its own personnel in universities and international institutions through short

courses and longer term academic programs financed by foundations, funding agencies, international institutions and their own funds.

ICTA is developing a plan for agricultural production training in Guatemala starting in 1975.

POLICY AND PHILOSOPHY

ICTA is a member of the governmental sector and determines its programs in collaboration with the Ministry of Agriculture, the National Planning Council, the Sector Planning Office, and other institutions of the Agriculture Sector.

The programs of ICTA are directed toward contributing to increased production and the welfare of the small and medium sized farmer.

ICTA scientists are not only responsible for developing technology but also for its utility and its application.

ICTA believes that the appropriate technology can only be developed by studying the problems at the farm level and in consultation with the farmer, and by testing the technology with farmers before practices are recommended.

ICTA must concern itself not only with the technology of agriculture, but also the customs of the farmer and his family, availability of inputs and credit, markets, economic feasibility, infrastructure, and the general quality of rural living.

ICTA must coordinate its programs and activities with the National Agricultural Bank, the National Marketing Organization, with the General Services of the Ministry of Agriculture and other groups related to the rural sector, and other sectors such as health and education.

PRESENT STAFF

The technical staff of ICTA is small; at present there are (November 1973), among the Guatemalan personnel: 1 Ph. D. and 5 M.S. and about 28 University graduates.

PROGRAMS AND MAJOR AREAS OF WORK

Principal Areas and Products

As previously mentioned, ICTA will initiate work principally on production of basic food grains, horticulture and swine. The activities related to each product will be largely concentrated in selected areas of the country within four geographic and ecological areas, the principal areas of production as follows:

--Central Highlands: corn, wheat, and beans and horticulture, the latter two of lower priority;
--Eastern foothills and plains: beans, corn, sorghum, rice and swine;
--Northeastern lowlands: horticulture and rice;
--Pacific Coast: corn and sesame as an associated crop.

Specific Zones

More specifically, field work is being carried out on experiment stations and private farms as listed below. This work is designed largely to test and identify available technology.

--Quezaltenango: corn, wheat, potatoes;
--Chimaltenango: corn, wheat, potatoes, beans;
--San Jerónimo: corn, beans, horticulture;
--La Fragua: no work being conducted but horticulture under irrigation is being planned for 1974.
--Los Amates: rice;
--Monjas and Ipala: beans, rice, sorghum;
--La Máquina: corn, sesame.

The headquarters for the swine work and production training will be established at Cuyuta.

Soybean adaptation trials were seeded in 1973. A modest sum will be budgeted for further preliminary studies during 1974.

Production Work with Farmers

No major activities in production work with farmers have been initiated as yet. It is planned to organize production teams to work in limited areas of the Highlands, the Eastern foothills and plains, and the Pacific Coast to test technological packages in collaboration with farmers starting early in 1974. It is projected that this work will be expanded into major thrusts to increase production.

TECHNICAL AID AND NATIONAL AND INTERNATIONAL COOPERATION

Technical assistance and cooperation with national and international organizations was taken into consideration since the beginning of the planning of ICTA.

1. Agreement for Technical Assistance with CIAT

Even before ICTA was inaugurated, an Agreement for Technical Assistance was signed between the Government of Guatemala and the International Center of Tropical Agriculture (CIAT) of Colombia.

Under this Agreement, CIAT has assigned two professionals to Guatemala to work with ICTA, a technician assigned to CIAT by the Rockefeller Foundation to work with the General Manager, and another technician, using donation funds of that Foundation to work as Technical Director. CIAT has named the first technician mentioned as its Representative in Guatemala. In this way, strong relations are maintained with CIAT. Other CIAT professionals from the Colombian headquarters are actively participating in technical projects and the training of ICTA personnel.

2. Collaboration of USAID/Guatemala

The Agency for International Development has collaborated closely since the early planning stages of ICTA. The loan of USAID will be an important part

of the budget of ICTA. Furthermore, ICTA has utilized funds of this organization for advisor's trips and for training purposes. During 1973 and 1974, a grant from AID will make possible the contracting of additional foreign technicians.

At the present time, there are two active contracts with the Universities of Mississippi, North Carolina and Texas A&M, sponsored by USAID, in the areas of Basic Grains, Soils, and horticulture, respectively.

3. Collaboration of Peace Corps

The Peace Corps of the United States has been collaborating in studies of the fertility of soils in the Research Division of DIGESA of the Ministry of Agriculture.

This work has been now transferred to ICTA and consists of a group of young college graduates who live in the rural areas of the country, conducting trials on the use of fertilizers.

It has been decided to request the extension of this collaboration with the addition of Peace Corps Volunteers with experience and knowledge of Agricultural Sciences in order to test technological packages, working directly with farmers in 1974.

4. Collaboration with INCAP

At present, the collaboration with INCAP is limited to studies on the nutritive value of sorghum, especially new varieties for which seed is being increased. It has been agreed that further collaboration is indicated as the programs of ICTA are developed.

5. Other Collaboration Sought

Discussions are being conducted with agencies and institutions, national and international, interested in agricultural production and rural development. Some short-term consultants are needed but the greatest need of ICTA at this time is for active participation in its operating programs, wherein the foreign technician participates as a member of the ICTA team.

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INSTITUTO DE CIENCIA Y TECNOLOGIA AGRICOLAS
Edificio Galerías España - 5º Piso
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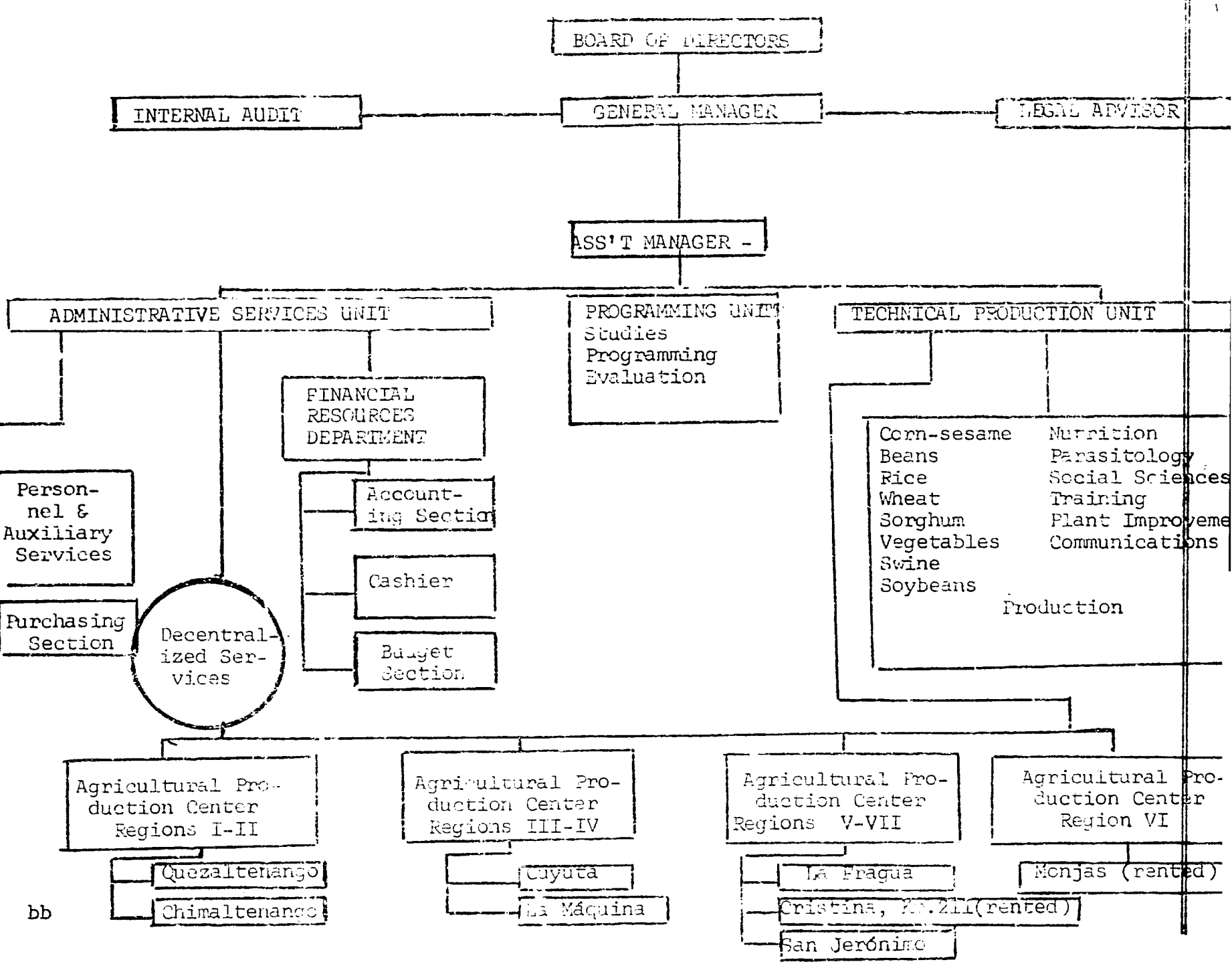
Guatemala, C.A.

NOTE: This statement was prepared by ICTA in November, 1973.

AGRICULTURAL SCIENCE AND TECHNOLOGY INSTITUTE (ICTA)



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SUBMISSION ☐ ORIGINAL ☐ REVISION (Number)
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ANNEX B.

IMPLEMENTATION SCHEDULE

1. A.I.D.

a. Contract Services (in man months)

	CY 75	CY 76	CY 77	CY 78	CY 79
2 Corn Breeders	18	24	24	24	30
Research Coordinator (Oriente)		12	12	12	12
Research Coordinator (South Coast)		12	12	12	12
Bean Research Coordinator		12	12	12	12
Vegetable Research Coordinator		12	12	12	12
TDY Support	3	3	2	2	2
TOTAL	21	75	74	74	80

b. Participants Training (in man months)

Plant Breeder	5	12	7		
Plant Pathologist	5	12	7		
Entomologist		5	12	7	
Plant Breeder			5	12	7
Agronomist			5	12	7
TOTAL	10	29	36	31	14

c. Commodities (in US $)

Pickup Trucks	$13500				
Corn Shellers	1500				
Seed Cleaners	9000				
Hand Tractors	2500				
Threshers	6000				
Miscellaneous Equipment & Repair parts	-	500	1000	1000	1000
TOTAL	$32,500	500	1000	1000	1000

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Annex B.

ANNEX B. IMPLEMENTATION SCHEDULE (CONT'D)

	CY 75	CY 76	CY 77	CY 78	CY 79
d. Other Costs (in US$)					
ICTA/INCAP contract	10,000	10,000	10,000	10,000	10,000
Reference Materials	2,000	2,000	2,000	2,000	2,000
International Travel	2,000	4,000	2,000	2,000	2,000
TOTAL	14,000	16,000	14,000	14,000	14,000
2. Rockefeller Foundation					
Management Specialist	12	12	12	12	12
Technical Director/Food Crops	12	12	12	12	12
Physical Plant/Equipment Specialist	12	12	12	12	12
Agricultural Economist	12	12	12	12	12
TOTAL	48	48	48	48	48
3. Inter-American Development Bank					
Seed program grant project (US $000)	200	100	100	100	100
Seed Loan (US $000)		1,500			
4. Cooperating Country					
Experiment Station Professional Staff	20	28	28	35	35
Regional Production Team Prof. Staff.	21	28	35	42	45
Commodity Group " "	16	20	26	24	28
TOTAL	57	76	89	101	108

ANNEX C. OUTPUT SCHEDULE

1	1975	1976	1977	1978	1979	1980
1. Improved corn varieties						
a. High-lysine, high yielding lowland variety corn seed produced (cwt.)	200	2000	6000	12,000	22,000	37,500
b. Lowland area planted to high lysine, high yielding corn (has.)	800	8000	24,000	48,000	88,000	150,000
c. Percentage of lowland corn area planted to high lysine, high yielding corn (has.) (Total area = 240,000 ha.)	.3	3.3	10.0	20.0	36.6	62.5
d. Percentage of total corn producing area planted to high lysine, high yielding corn (Total area = 600,000 has.)	.1	1.3	4.0	8.0	14.7	25.0
e. Farm experiments to test high lysine, highland corn varieties	-	-	2	4	6	10
f. Farm tests/demonstrations to test high lysine, highland corn varieties	-	-	10	20	30	50
2. Improved Sorghum Varieties						
a. High protein, high yielding sorghum seed produced (cwt.)	800	2000	3700	5700	8300	13,300
b. Area planted to improved sorghum (has.)	2400	600	11,000	17,000	25,000	40,000
c. Percentage of total sorghum area planted to improved seed (total area=64,000 has)	3.8	9.4	17.2	26.6	39.1	62.5

OUTPUT SCHEDULE (CONT'D)

ANNEX C. Page 2

	1975	1976	1977	1978	1979	1980
3. Improved bean varieties						
a. Improved bean seed produced (cwt.)	1000	4000	9000	16,000	25,000	35,000
b. Area planted to improved beans (has.)	1000	4000	9000	16,000	25,000	35,000
c. Percentage of total bean producing area planted to improved varieties Total area = 100,000 has.	1.0	4.0	9.0	16.0	25.0	35.0
4. Vegetable Technology Demonstration						
a. Vegetable demonstration plots on experiments	5	10	15	15	15	15
b. Vegetable farm test demonstrations	-	10	20	30	40	50
5. ICTA Personnel Trained (cumulative)						
a. AID long-term training		-	- 2	3	5	5
b. Rockefeller Foundation (long term)	-	-	2	4	6	8
c. Specialized training (ICTA funded)	5	10	15	20	25	30
TOTAL	5	10	19	27	36	43
6. Number of food crop samples analyzed by INCAP						
a. Corn	550	400	400	400	300	300
b. Sorghum	50	50	50	50	30	30
c. Beans	400	300	200	150	100	100
d. Rice	50					
TOTAL	1,050	750	650	600	430	430