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9. ABSTRACT

The agricultural development program is considered an important factor for improving income distribution by raising the income levels of small farmers and lowering the cost to the consumer of certain basic articles. The program seeks to increase the productivity of the agricultural sector of the Guatemalan economy by encouraging farmers to diversify their grain crops, by developing human resources (e.g. vocational schools) and by aiding the financing of artisanry activities. The background and development of the program, the target group, reasons for not meeting programmed credit input goals, and output evaluation are discussed. Other analysis projects for consideration are also suggested.

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**Intercountry Evaluation of  
Agriculture Sector Programs**

**Colombia  
Costa Rica  
Guatemala**

**Vol. 4  
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AGENCY FOR INTERNATIONAL DEVELOPMENT

BUREAU FOR LATIN AMERICA

PROGRAM EVALUATION STUDIES

INTERCOUNTRY EVALUATION OF  
AGRICULTURE SECTOR PROGRAMS

Colombia  
Costa Rica  
Guatemala

Vol. 4: Guatemala

by

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Charles Montrie  
James Hawes  
Fred Mann

June 1974

A.I.D. Evaluation Studies represent the views of their authors and are not intended as statements of official policy.

## TABLE OF CONTENTS

INTRODUCTION .....	i
CHAPTER 1 - SUMMARY APPRAISAL AND RECOMMENDATIONS .....	1
I.    SUMMARY APPRAISAL .....	1
II.   RECOMMENDATIONS .....	4
CHAPTER 2 - THE AID PROGRAM .....	12
I.    SUMMARY .....	12
II.   BACKGROUND AND DEVELOPMENT .....	17
III.  THE RURAL DEVELOPMENT LOAN AND ASSOCIATED TECHNICAL ASSISTANCE .....	19
IV.   THE TARGET GROUP OF SMALL FARMERS .....	22
CHAPTER 3 - OVERALL ANALYSIS OF CREDIT AND TECHNICAL ASSISTANCE COMPONENTS OF THE BASIC GRAINS AND DIVERSIFIED CROP PROGRAMS .....	25
I    ACTUAL CREDIT INPUT TO DATE .....	25
II   REASONS FOR SHORTFALLS IN MEETING PROGRAMMED CREDIT INPUT GOALS .....	26
III  OUTPUT EVALUATION .....	30
IV   RECOMMENDATIONS .....	35
CHAPTER 4 - ANALYSIS OF CROP AND PRODUCTION COMPONENTS OF THE BASIC GRAINS AND DIVERSIFIED CROP PROGRAMS .....	39
I.    BASIC GRAINS .....	39
II.   AGRICULTURAL DIVERSIFICATION PROJECT .....	53
CHAPTER 5 - OTHER LOAN SUPPORTED PROGRAMS .....	57
I.    HUMAN RESOURCES .....	57
II.   ARTISANRY PROJECT .....	60
CHAPTER 6 - NATIONAL DEVELOPMENT PLAN, 1971-75 .....	62
I.    SUMMARY .....	62
II.   AGRICULTURAL, SECTOR DEVELOPMENT .....	65
ANNEX I - AGRONOMIC-ECONOMIC STUDIES NEEDED .....	70
ANNEX II - SUGGESTED FARM ANALYSIS PROJECT .....	76
ANNEX III - OTHER ANALYSIS PROJECTS FOR CONSIDERATION .....	84
ANNEX IV - SUGGESTIONS AS TO CONTENT OF TA PROGRAM.....	87

This volume is one part of a four part report on evaluation studies of the agricultural "sector approach" as it has been applied in Colombia, Guatemala, and Costa Rica. The purpose of this program of studies is to provide, through comparative analyses of the experience and of the approaches and methods utilized in each of three countries, a basis for (a) development of general policy and guidance as to the use of an agricultural sector approach in other Latin American countries, (b) possible adjustments in current program and projects and for consideration of future programs in each of the individual countries, and (c) consideration of possible changes in procedure and methods for analysis and processing of sector loans.

In conducting this evaluation we have sought to examine the substantive and analytical issues in the sector approach as applied in Guatemala and the results of its application rather than to evaluate the effectiveness of particular projects or programs. We have considered our task to be one of studying and appraising (a) the nature and content of the sector program and its objectives, (b) the analysis used to arrive at and support the strategy and programs adopted, and (c) the likely contribution of the strategy and program to the accomplishment of their objectives and to improvement of economic conditions in the sector, and especially of the income of the target population.

Our approach in this Guatemala section of the report has been to make appraisals in terms of accomplishments or lack of accomplishments of the program in relation to its own purposes rather than attempting comparisons with programs and approaches which have been followed elsewhere. We have avoided drawing conclusions as to whether the program and analytical

methods are better or worse than those used in other programs. Instead, we have attempted to reach conclusions as to strengths, accomplishments, weaknesses, and shortcomings within the context of the program's own purposes and objectives to provide a basis for considering future sector strategy, program content, and analytical methods.

No conclusions are reached in this or the other country reports as to lessons to be learned from the experience with a sector approach in Guatemala which might be generally applicable to use of such an approach or of its use in particular countries other than Guatemala. Neither are comparisons made with approaches and programs adopted in other countries. Those tasks are, however, a part of the entire study and comparisons made and general conclusions drawn are incorporated into an overall report.

In view of the limitations of time and availability of data, we have been able to reach only a few general and unquantified conclusions as to actual results in terms of overall production and income as compared with projections made in connection with development of the program and consideration of the sector loan. These constraints, as well as the difficulties of establishing cause and effect relationships, have likewise made it impossible to reach definitive conclusions as to effects of the program on the production and income of individual farmers, or types of farmers, included in the program. It has, however, been possible to obtain some indications as to possible positive effects or the lack of such effects. It has also been possible to reach some conclusions with respect to the influence of the approach on the institutional structure for dealing with sector problems and the ability of the Government of Guatemala agencies to plan, coordinate, manage, and evaluate sector programs and projects.

This report is based on an examination of documents and reports prepared in connection with development of the program and the making of the rural development loan, of programs conducted under it, as well as on discussions with LA Bureau, USAID/Guatemala, and Government of Guatemala personnel. There is no single document which sets forth the sector strategy and program and the analytical basis for it. We have thus been dependent upon a number of sources, and especially the Rural Development Plan and the Iowa State University study for information as to program objectives and analytical support. Similarly, there is no functioning system for reporting of information as to program results. We have thus had to rely upon such individual reports and documents, usually prepared for other purposes, as we were able to locate which might give some indication or be suggestive of possible results. About 3 weeks were spent in Guatemala during September, 1973, including 2 days of visits to regional offices, experiment stations, and farms involved in the program.

The report consists of a first chapter in which major findings and recommendations are summarized and a number of chapters describing the program and its developments, appraising its analytical base, and evaluating its results. The individual chapters are usually summarized at the beginning and also frequently contain specific recommendations. This method of presentation involves a certain amount of repetition, but it has been adopted to permit users of the report to examine it in such depth as their needs and interests require. In addition, the report contains four annexes which outline suggestions as to studies and analyses considered by the Team to be needed and a list of suggestions as to the possible content of a technical assistance program.

Drafts of the report have been reviewed and commented on by USAID/Guatemala and staff of the LA Bureau. To accommodate suggestions, we made such changes as we considered appropriate. The findings and conclusions, however, are ours.

The evaluation was conducted by a team made up of personnel from AID and the American Technical Assistance Corporation (ATAC). Team members were:

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The findings, conclusions, and recommendations reflect the collective judgment of the team and are not intended to represent the official views of the Agency for International Development, any of its constituent units, or of the Guatemala government.

## CHAPTER 1

### SUMMARY APPRAISAL AND RECOMMENDATIONS

#### I. SUMMARY APPRAISAL

1. The Rural Development Loan has been largely successful in accomplishing the purpose of providing support to the Government of Guatemala in its desire to reorganize institutions in and improve the administration of the agricultural sector. A reorganization has been accomplished under which all governmental organizations operating in the sector were brought into a "Public Agricultural Sector" subject to policy control and coordination by the Minister of Agriculture. A regional organization has also been set up under which the activities of the various agencies operating in a region will be coordinated by a Regional Director.

The organizational structure established is generally well conceived and has high promise for achieving the necessary degree of coordination and integration of program planning and execution and for bringing project administration closer to the farmer. We use the term "promise" because organizational changes, shifts in function, and development of administrative methods are still in progress and the various institutions have been too recently formed or reorganized to have worked out all the needed forms of coordination, integration, and administration.

2. The program seems to have been successful in stimulating an increase in budgetary allocations to the sector by the Government. Contributions to AID supported subprojects have been made as required.

3. A further achievement under the program has been the development of an approach under which activities are directed toward common, although not very precisely defined, objectives and under which the number of individual projects has been reduced in favor of more integrated programs.

4. While maintaining its original basic orientation, the loan has changed its character in terms of the subprojects involved, the program targets, the type of support provided, and, to some extent at least the target groups being supported. The Loan mainly finances contributions to the local currency costs of reform of the public service institutions, and funds for production credit for specified crops produced by medium sized farmers and those at the upper size levels of the small farmer category.

5. The primacy of purpose of the program as between increased production and increased income has not been clearly defined, nor the relation of the program to the characteristics of the target groups (small subsistence farmers, small commercial farmers, or medium-sized farmers, highland farmers or lowland farmers). This makes difficult the choice of criteria for evaluating accomplishments.

6. Specific targets for income increases for those participating in the program have not been established. Programs have emphasized production and production methods, with little emphasis, both in terms of practices recommended and credit provided, on the effects on the farmers' income, both with respect to the relation between total income and total costs and to consideration of the different income effects of alternative crop or enterprise mixes.

7. Because of the time required to accomplish the organizational changes, recruit personnel, and establish new administrative arrangements and because

of relatively low farmer response, the program has touched fewer farmers than was projected.

8. There is insufficient evidence as yet to serve as a basis for evaluating the efficiency of the approach at the farm level, or the potentials for increasing aggregate production of the crops involved. Production responses to increased inputs financed with credit have been lower than projected, due at least in part and to some undeterminable extent to the effects of the drought.

9. There is a need for more specific technological "packages" of inputs and cultural practices designed to provide incentives in the form of increases in income, as well as output, to the farmer and adapted to his particular situation and capacities.

10. Preliminary analysis of returns realized by farmers financed with credit programs suggests that returns may provide too small a margin to protect against the risks of shortfalls in production from weather damage and other losses, and in some instances yields may be insufficient to cover increased costs of planned inputs.

11. Further analysis needs to be undertaken to clarify the relevant cost benefit ratio, to analyze and compare alternative ways of attempting to help the small farmers, and to develop more specific programs differentiated by small farmer characteristics and specific needs.

12. A continuing evaluation process is needed to provide a basis for strategy revision, program redesign, and course correction.

## II. RECOMMENDATIONS

### A. LOAN ADMINISTRATION

1. Attempting to relate Guatemalan Government operations and AID allocations and fund releases in the framework of the original loan program provisions has led to differences about how the cash release system should operate as well as to unnecessary work in trying to explain or evaluate implementation progress. We recommend that AID seek to arrive at a clearer understanding with the Government on how the Loan program is to be operated and evaluated, and to embody this understanding in a supplemental agreement.

2. The first element in such an agreement should be a recognition that the Rural Development Loan is primarily a device for financial support of a selected segment of the Government's agricultural sector program, namely small farmer development. This recognition would involve:

- a. Removal of the reservation of loan funds for dollar imports, and
- B. provision for flexibility in the amount of AID local currency financing to be provided by AID to various program categories so as to accommodate the need for continued adaptation in the program. Categories to be supported might be such functional/institutional categories as credit, marketing, training,

research, analysis and evaluation, and improvement of administration. A limit of a 50% AID budget support contribution to specified categories or institutions might be reasonable, reflecting the matching shares in the total program.

- c. As program revisions are made, updating of implementation plans and agreements so as to specify criteria for fund release and use.

2. The second element should be provision for a system of evaluation which can serve as a basis for program and project management, examination and analysis of program results, making indicated program adjustments, and for reconsideration of goals and strategies. We believe that the system established should provide for periodic joint review of programs and results related to revised program categories and targets. Evaluation of primary outputs should be in terms of results of the total integrated program rather than in terms of attempting to attribute such results to component parts. Primary outputs should be considered principally in terms of effects (especially income effects) upon individual farmers, or types of farmers, reached, rather than in terms of averages or aggregative effects (See also Section B. 9., below.)

#### B. PROGRAM SUBSTANCE AND REAPPRAISAL

The simplification and clarification of administrative arrangements should be the occasion for review and reconsideration by AID and the GOG of various substantive aspects of the rural development program and AID's support of it. Such a reconsideration should include the following as major elements:

1. Clarification of the goals and objectives of the program.

We recommend that such objectives and goals be expressed in terms of increased income of the farmers and farm families reached rather than in terms of increased production. Assistance would be provided in connection with those crops whose production the GOG desires to have increased, but increased income, not increased production per se, would be the primary objective.

2. Immediate assessment, on a sample survey basis, of whether the production credit and technical assistance program is increasing net income of farmers in the program commensurate with the very considerable risk the farmer undertakes in borrowing to finance increased inputs. In the event that such a survey were to show that returns in some cases may be too low, steps should be taken to limit the current assistance programs to those types of farmers for which the assistance is producing returns sufficient to justify the costs and risks involved. This may require consideration of relating the types of assistance provided to particular farmer characteristics. It might further lead to consideration of significant program adjustment in the new Plan.

3. An analysis of alternative means of increasing the incomes of smaller farmers (especially those at or below the lower limits of eligibility for participation in the program). The current kind of program cannot reach many of the smaller, subsistence-type farmers. Even if reached, their incomes might not be improved in amounts sufficient to contribute adequately to their welfare. An attempt to find means to improve the lot of this large group of the rural population seems clearly in order. In making such an analysis, the possibility should be examined that programs for increasing

employment opportunities off the subsistence farmer's own plot may, under appropriate conditions, be more efficient and offer more promise of increasing the farmer's income than will providing credit and technical assistance.

4. The whole research and field experiment program should be given the priority task of designing more specific practical, workable, reliable, and profitable "packages" using known and feasible material inputs and cultivation practices.

As mentioned above, our brief examination suggests that the program may not be giving sufficient attention to profitability with respect to choices among options in helping the farmer choose his improvement plan. Partly, this is because the Government institutions have not worked out the necessary variations of improved technology, tested for reliability and profitability, to be provided to small farmers. Without such packages carefully introduced, results can be endangered. (See recent Colorado State University report of Puebla project experience.)<sup>1</sup>

5. The farm-level advisory system should not only propose use of and supply the packages discussed above, but should work with the farmer in analyzing his whole income situation and deciding how best to improve it, including choice of alternative crops and livestock products, cultivation practices, investment in land preparation and implements and the amount of credit to apply for, if any. It may be necessary to provide the "promoters" with further training to enable them to handle this task. In the short run, insistence on carefully designed farm plans, including cost-benefit calculations, would help avoid the worst mistakes and reports based on such calculations should make it easier to evaluate the effectiveness of the system.

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<sup>1</sup>The Puebla Project: Progress and Problems, Water Management Technical Report No. 22, Council of U.S. Universities for Soil and Water Development in Arid and Sub-humid areas, Huntley H. Biggs, Dept. of Economics, Colorado State University, July 19, 1972.

6. In case that known combinations of improved seeds, herbicides, pesticides, fertilizer and cultivation practices feasible for the small farmer may not provide yields and profits adequate to improve appreciably the welfare of the small farmer clients, longer-range research and experimentation should seek ways to raise the limits on productivity and income per unit of land in most of the smaller holdings. Where the cost of reaching the smaller producers by supervised credit exceeds the income benefits that are obtainable from small holdings, more economical substitute methods should be explored. Subsidized inputs might provide at least a temporary means to increase family income significantly at a cost proportionate to the benefit.

7. There does not seem to be a current appraisal of the extent to which the manner in which deficiencies in the marketing system may be operating as a constraint on program accomplishments. Such an analysis should be undertaken and the possibility of an increased emphasis on marketing programs should be examined.

8. Given the large number of farmers needing help and limitations on resources, consideration of cost effectiveness is essential to the task of reaching the required population with effective programs. As the program proceeds, and as the reports of results start coming in, close examination of data is needed to spot incidences that produce high pay-offs at low cost, as well as high-cost successes and failures. Careful evaluation should lead to the design and testing of various alternatives, especially lower-cost possibilities so as to increase benefits and reduce costs.

9. For all aspects of the program, a system should be established for monitoring results which can serve as a basis for adjustment and course correction, both for program and project management and for targets, goals, and strategies. The system should include these major elements:

- a. results achieved in terms of income of farmers in the programs;
- b. effects on production of assisted crops;
- c. intermediate outputs such as organizational changes and improvement, personnel trained, farmers reached, area affected; and
- d. inputs by farmers and by public agencies.

From this information, the government would be able to calculate the cost/benefit relationships and examine the cost-effectiveness of various programs and program methods, and derive conclusions and guidance for the selection of future program strategy and methods, and a firmer base for relating investment requirements to goals and targets.

Information with respect to the items listed above might be provided by appropriate tabulation and summarization of data now being or planned to be obtained by the management information system developed and installed by DIGESA with AID assistance. In principle, that system could be adapted and expanded to provide the data required for the substantive output evaluations.

We would recommend, however, that especially with respect to (a) and (b), a selection be made of a sample of farmers assisted and farmers not assisted in the program, differentiated by farm size, location, crops produced, technologies, type of assistance received, and other relevant farmer characteristics, for which detailed records would be kept of income and production experience. These records would then be analyzed and compared. Alternatively, we would recommend a system of periodic sample surveys made independently of the DIGESA management control system.

10. Provision should be made for a continuing analysis process. In what has preceded we have, in effect, outlined some of the elements which should be included in a "small farmer sector analysis." When these have been incorporated into an overall and continuing analysis process and when the tools of helping the small farmer have been tested and their potentials known, planners will be able to judge the role that the farmer can play in the longer run in agricultural development, and move toward policies and programs that may raise rural incomes to a more adequate welfare level. Planners will be able to calculate with more confidence the levels of resources needed for various program goals, to establish specific goals to propose alternative policies relating to income, production, land development and distribution, and generation of employment. That task will constitute what we would consider to be the more comprehensive phase of sector analysis to which the subsidiary and preliminary investigation and experimentation we suggest are the prerequisite and essential inputs. We recommend that an effort be made to lay out the whole analysis process so that it can be rationally planned to avoid gaps and to provide for economies in data collection and analysis.

#### C. USE OF AID FUNDS

1. AID and Guatemalan government funds already released for the production credit program are sufficient to meet requirements under current conditions for probably a year or more. Subsequent AID releases for funds in support of that program should be related to the outcome of an analysis of the effects of the current program on the incomes and production of particular types of farmers such as we have recommended.

2. Loan and grant funds should continue to be used to support improvement of sector organization and administration.

3. If, by the end of 1974, loans under the artisanry project have not increased at a rate and to a level which indicates that funds disbursed for the project are likely to be productively utilized over the life of the loan, the balance remaining in the GOG account for the project should be transferred to other agreed upon uses.

4. Because the kinds of studies proposed are so essential to the support of agricultural strategy development, we suggest that it would be particularly appropriate to use current AID Loan funds and technical assistance funds to cover the costs of filling in the missing links, of analyzing, evaluating, designing, and implementing more comprehensive and pointed research and testing programs and an expanded analytical effort generally. Inclusion of such activity in the present five-year program and Loan would be an appropriate way also to help both the AID and GOG to decide what they may want to do in the subsequent period. We recognize that all that we have suggested cannot be done at once and when begun, will require time for completion. It appears to us, however, that the careful planning and early beginning of such activity is essential for the analysis which AID should make of any GOG requests for further assistance.

## CHAPTER 2

### THE AID PROGRAM

#### I. SUMMARY

##### A. THE ORIGINAL PROGRAM

The Guatemalan Rural Development Loan, at the time of its presentation, was understood to be an integrated package of projects in support of that part of the Government of Guatemala's Rural Development Program which was designed to attack the problem of small farmer agriculture. The stated major objective was the increase of the production of food by small traditional producers, especially in the highlands. Basic grains and diversified crops were the areas in which production increases were to be attempted. Increases in the incomes and well being of this target population was the ultimate purpose of the program.

Four subprojects to be supported by the Loan -- basic grains, diversified crops, human resources, and artisanry -- were established, and the amount of AID and Guatemalan financial support of each was specified. Support was to be provided by the financing of both local and foreign exchange costs up to a specified limit for local costs and by the provision of grant financed technical assistance. The program envisaged a substantial increase in the supply of production advice, credit, and marketing services to the target group as the means of accomplishing its objectives.

Development of the sector was considered by the GOG and AID to require an integrated approach which in turn required an integrated organization for its planning and execution under the policy direction and control of the Minister of Agriculture. The Loan was expected to serve as a catalyst in

bringing about the organizational changes contemplated by the GOG Development Plan. The process of tooling up to provide the public services was expected to require a substantial expansion and strengthening of the Government's agricultural service institutions. A significant part of the cost of the program was thus planned to go for the training of a suitable corps of technicians and advisors. Provision for assistance in meeting such costs was made both in the AID loan and in the program of grant financed technical assistance.

Finally, an increase in the amount of funds being invested in agriculture was considered necessary and requirements for increase in the total Ministry of Agriculture budget and of amounts to be provided in support of the Rural Development Program were negotiated with the Government.

The Loan Authorization and Loan Agreement required that there be established a system for joint review of progress and for the development of remedial action. Implementation Letter No. 3 required the periodic submission of evaluation and progress reports and suggested the establishment of a joint evaluation committee.

B. IMPLEMENTATION EXPERIENCE

1. Reorganization of Sector Institutions

As contemplated when the Loan was made, a reorganization was accomplished under which all governmental organizations operating in agriculture were brought into a "Public Agricultural Sector" subject to policy control and coordination by the Minister of Agriculture. Subsequently, additional changes were made so that the organization now consists of a sector planning unit, a committee for coordination of the Public Agriculture Sector, and five operating

agencies responsible for natural and human resources development (DIGESA), research and technology development (ICTA), marketing (INDECA), land reform and colonization (INTA), and national agricultural credit (BANDESA), respectively. Further shifts of functions among these organizations are contemplated. A regional organization also has been set up under which it is intended that activities of the various agencies in a region will be coordinated by a regional director. A corps of "promoters" (agriculture secondary school graduates given special training), in addition to traditional extension agents, has been established to serve as the primary contact with farmers receiving production assistance and credit services.

This organization structure is consistent with the purpose of the loan and follows the reorganization contemplated by the Rural Development Plan.

## 2. Subprojects

There have been substantial changes in the subprojects as they were contemplated when the Rural Development Plan was prepared, and when the Loan agreement was negotiated.

## 3. Financing

There have been changes in the financing of subprojects from that which was originally contemplated which parallel the changes in subprojects indicated above.

As of June 30, 1973 only minimum amounts of the loan had been used for imports. The COG has proposed that the Loan agreement requirement for use of \$10.8 million for imports be reduced to \$1 million. Among the factors which have led to this short fall are the improvement in Guatemala's balance of payments position, Guatemalan and AID procurement procedures and

requirements, and the world demand situation which reduces the interest of U.S. suppliers in relatively small AID-financed Guatemalan procurements. It is clear that if the program is to proceed in the magnitude contemplated, the limitation of \$12.2 million on local currency financing will have to be substantially increased or removed.

#### 4. Evaluation and Reporting

A comprehensive management information system has been developed and installed by DIGESA for its programs with assistance under the AID grant program. Primarily, this system gathers input data such as numbers of farmers visited, loans made, hectares planted, and the like, related to management of personnel, procedures, etc. rather than being concerned with output measures useful for evaluation of program and project results. Such data as have been received have not yet been summarized in a way useful for evaluating results except for administrative and management purposes. Needed data with respect to employment and income effects have not been collected.

Considerable attention has been given by AID to the establishment of a formal system for self-evaluation within the program. The proposed system of periodic joint AID/GOG evaluations has not been set up.

#### C. ANALYTICAL BASE

Neither the Government nor AID has prepared a single document in which the Guatemalan agricultural sector is described and its problems analyzed in an integrated and coordinated manner. Further, most of those persons who worked on development of the strategy and the AID loan, both in the Government and AID, are no longer involved in the program and were unavailable for interviews. We have thus had to rely on a number of individual documents and the memories of a few people who had some association with development of the

program and the loan for information as to analysis which served as the basis for the strategy and projects adopted.

As far as we have been able to determine, those developing the program and the loan relied upon a number of individual studies of particular problems in Guatemala and other countries, earlier feasibility studies of particular projects, and, particularly in the case of the loan, the Iowa State University Study, Agricultural Development and Policy in Guatemala, April 1969. That study also brought together the results of a number of earlier studies. In addition to the Iowa State study, the following studies and reports are referred to in various supporting documents: C.I.A.P. report of the Guatemala review of February 1969; the University of Wisconsin Land Tenure Center Report on U.S. and Host Government Strategies for Agriculture Development in Latin American (AIDTO CIRC A-2141); a study by the Inter-American Institute of Agricultural Sciences of the administrative organization of agricultural services; a 1967 ICAITI feasibility study relating to basic grains; feasibility studies relating to diversified crops by GOG personnel in 1966, 1967, and 1968; various AID reports on handicraft development in Mexico, Peru, Ecuador, and Bolivia and a report of the Bank of Guatemala; and the Batelle Memorial Institute 1968 study, "Projections of Supply and Demand for Selected Agricultural Products in Central America through 1980."

## II. BACKGROUND AND DEVELOPMENT

In the early years of U.S. assistance to Guatemala, activity in agriculture consisted of a few loans for individual capital projects and a more or less traditional technical assistance program. Program loans were not utilized as an assistance approach. Capital assistance provided included a DLF loan for development of farmer production of rubber and a loan to private financial institutions which could be used for relending for a number of purposes, including livestock development. Loans were made for feasibility studies in general which could include studies of agricultural as well as other projects. The technical assistance program involved a number of projects and included assistance in the organization of agricultural research and development programs and the training of technicians and farmers. Areas covered included marketing; production of general crops, fruits, and grains; livestock development; food processing; and drainage and irrigation.

By 1966 discussions had begun among the Ministry of Finance, the Planning Council, and the USAID concerning the development of a more coordinated program for alleviation of problems in the rural areas. In April of 1967 the National Planning Council issued a three-year Rural Development Plan. In June of 1967, the USAID prepared and discussed informally with AID/Washington, a possible program of which major elements were:

(a) concentration first in a particular region which had been the subject of a task force report; (b) decentralization of authority to permit participation by the rural population in the decision making process; (c) establishment of a specified level of total investment and participation by AID and other assistance-providing organizations in

financing the investment estimated to be required; (d) establishment of improvement of the economic base of rural life and stimulation of the establishment of locally-based democratic organizations as purposes; and (e) specification of improvement in rural production and rural income, and an increase in food production and lower food prices as economic objectives.

The 1967 statement of objectives of the technical cooperation program for 1969 shows the approach to assistance during that period. Objectives are stated to be "to promote the institutional changes and technical operations required to promote the greatest possible implementation of the revised sector development plan which emphasizes particular regions, especially the northeastern zone." Activities to be supported included:

- (a) Organization and development of markets for increased and diversified production;
- (b) Continued production of basic foods;
- (c) Stimulating rural group action through cooperatives, credit unions, and farmer-group action;
- (d) Support for coordinated public and private effort in the rural sector; and
- (e) On-the-job training of government personnel to provide greater opportunity to small farmers.

A loan for construction of primary education facilities was made in 1968 which was expected to have an impact on rural development and the Iowa State University study of agricultural development and policy was begun (See Chapter 3). After completion of that study, a government Rural Development Committee was activated to review the report. Apparently at the same time, the Government was involved in formulating its five-year Development Plan as a parallel effort. Working groups were then established to develop projects in the areas of grains, diversified crops, handicrafts, land tenure, infrastructure, human resources and institutions, an effort culminating in the Rural Development Loan of 1970.

### III. THE RURAL DEVELOPMENT LOAN AND ASSOCIATED TECHNICAL ASSISTANCE

#### A. RURAL DEVELOPMENT LOAN

The 1970 Rural Development Loan was made in support of the Rural Development Program, which is a part of the "Agricultural Development Plan - 1971/75." The major components of the 1971/75 Plan and the Rural Development Program, and the amounts and anticipated sources of funding were as shown by the following table:

Table 1

Agricultural Development Plan 1971/75<sup>1</sup>  
(Millions of dollars)

<u>Programs and Projects</u>	<u>Sources and Amounts of Funds</u>			
	GOG	AID	International Organizations	Total
I. Rural Development Program	45.2	25.0	31.5	101.7
A. Basic Grains	4.1	8.1	-	12.2
B. Diversification	13.9	8.5	-	22.4
C. Human Resources	3.1	5.6	-	8.7
D. Artisanry	.6	.8	-	1.4
E. Infrastructure	12.0	-	25.0	37.0
F. Land Tenure	11.5	2.0	6.5	20.0
II. Remainder of Agriculture Sector	17.0	-	23.5	41.5
A. Livestock	4.5	-	13.5	18.0
B. Institute of Marketing	3.5	-	3.5	7.0
C. Forestry	5.0	-	-	5.0
D. Other, including Technical Assist.	4.0	-	7.5	10.5
III. Total	62.2	25.0	55.0	143.2

<sup>1</sup> Constructed from a table, Agriculture Development Plan 1971/75: Preliminary Estimate of Public Costs," pp. 7,8, Exhibit 2, Annex III, Guatemala Rural Development Loan, AID-DLC/P-881.

The 1971/75 Plan specified a number of goals for the agricultural sector and emphasized increasing productivity per hectare as an important element in the strategy for accomplishing these goals. A goal which is of particular significance in connection with the AID loan was that of obtaining a substantial and sustained growth of agricultural product through increased production of foodstuffs, primary materials, and export products in both traditional and new products, based on preferential assistance, especially at the level of specific projects, to small and medium farmers.

The Rural Development Loan (\$23 million) was designed to provide assistance to 4 of the 6 projects included in the Rural Development Program, namely basic grains, diversified crops, human resources, and artisanry. No funds were provided for the land tenure project. Amounts for each project were as shown in Table 1 above (minor variations exist due to rounding). The basic grains project was designed to assist in increasing the production of corn, beans, rice, wheat and grain sorghum. The diversified crops project was intended to assist in increasing the production of vegetables, plaintain, citrus, sesame, deciduous fruits, avacado, and flowers. Both projects involved the provision of funds for production credit loans and for the extension of technical assistance to farmers. Specific acreage and production goals were established for each project. The human resources project provided funds for training of farmers, agricultural advisors, credit officials and others in carrying out the Rural Development Program and for building institutions necessary to accomplish that program. The artisanry project provided funds for credit and technical assistance related to the production and marketing of handicrafts. Details as to the nature, purposes, and goals of these projects are contained in Chapters 3, 4, and 5.

The loan agreement authorized the financing of both foreign exchange and local currency costs but placed a maximum limitation of the equivalent of \$12.2 million on the latter.

B. TECHNICAL ASSISTANCE

The grant financed technical assistance program was designed to assist in accomplishment of the same purposes to be supported by the Rural Development Loan. Activities to be carried out were designed primarily to encourage the efficient use of loan funds. Activities are carried out in connection with production, credit, marketing, and human resources. Total funds to be provided were estimated to be in the order of \$5 million.

#### IV. THE TARGET GROUP OF SMALL FARMERS

The Human Resources Section of the Five Year Plan<sup>1</sup> states that the program is directed principally at the development of holders of land ranging from 4.2 to 45 hectares. Since the recent census has not yet been tabulated, we have to rely on 1964 data to place this target group in the perspective of the whole economy.<sup>2</sup>

In 1964, 861 thousand persons were "economically active" in agriculture, forestry, and fishing, or 65% of a labor force of 1.3 million. Land in farms totalled over 3.4 million hectares, divided into 417 thousand units. Of this total, some 313,000 units or about three fourths were smaller than 3.5 hectares while about 8,800 or about 2% were larger than 45 hectares. The intermediate group of about 95,000 included an unspecified number of holdings of 3.5 to 4.2 hectares. Thus the target group would consist of something considerably less than 95 thousand farms, while excluding something like four times that number of smaller operators.

On the basis of similar calculations, we can estimate that the farm area operated by those in the target group would be about one fourth of the total land in farms, or some 800,000 hectares, while those small-holders outside the program would have about one-eighth the land or about 450,000 hectares. This division implies an average size of holding of 10.5 to 12 hectares for the target group, and 1.4 hectares for the smaller holders.

In the absence of related income data, we can only speculate on the incomes derived from these holdings. About 185 thousand of the smaller holding

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<sup>1</sup>Programas Especificos del Plan de Desarrollo Rural pg. 5

<sup>2</sup>From Segundo Censo Agropecuario 1964. Summary tables appear in Chapter 4 of the Iowa State Report.

group, or about half, had holdings below the 1.4 hectare mean. If the return from traditional farm practices and crops is, say only about \$20 per hectare, their incomes from cultivation of their land would be low indeed. If improved practices and multiple cropping would produce returns of \$40 to \$100 per hectare, 10 cultivable hectares could yield a much more adequate family income. Unfortunately, only 43% of the area in farms is counted as cultivable, with 29% as pasture, and 28% not usable. This reduces the national mean to about 3.6 cultivable hectares per farm, with another 2.5 hectares of pasture. The 43.7 thousand holdings in the 7 to 45 hectare groups (the half of the target group with the largest holdings) contained an average of about 7.5 cultivable hectares and 4 pasture.

The number of farmers receiving production credit under the program was projected to reach 26 thousand, or a quarter to a third of the target group. The programmed 54,000 hectares of crops would be something like 10% of their cultivable acreage. These totals would amount to roughly 5% of the farmers and 3.7 percent of the cultivable area of the country. If we allow for possible further land division with population growth in the past 10 years, and some expansion of cultivable area, we can conclude that the program is aimed at about 4% of the farmers with about 4% of the crop land.

Because this initial phase will directly reach so small a part of the rural population, it should be used as a base to design, conduct, and evaluate the overall program so as to measure: 1) the effectiveness of alternative program methods of increasing income and production; 2) the capacity of various sizes and types of farm operations to generate income.

The levels of welfare found to be obtainable from the target farms -- and their limits -- will have major implications for Guatemala's overall development strategy. With so large and rapidly-growing a rural population, it would be most helpful for overall planning to have at least some general idea of: 1) how much redundant labor needs to be provided with employment off the land; 2) how rapidly or slowly the process of reduction of the agricultural labor force should or can proceed; and 3) what factors should guide the choices of strategy and methods.

In order to make the experience as useful as possible, it may be desirable to review the characteristics of the target group and to make special efforts to ensure that the group actually included in the operational program is a suitably representative sample. As soon as ICTA is organized and equipped, it should begin a program of research into the problems of the sub-marginal groups and into potential methods of helping them to increase their incomes and gain access to more productive employment. The entire public sector agriculture program over the coming years needs to provide for exploring alternative methods in a systematic way so as to obtain the maximum benefit from the limited resources available.

## CHAPTER 3

### OVERALL ANALYSIS OF CREDIT AND TECHNICAL ASSISTANCE

#### COMPONENTS OF THE BASIC GRAINS AND DIVERSIFIED

#### CROP PROGRAMS

##### I. ACTUAL CREDIT INPUT TO DATE

As of June 30, 1973, the Mission showed a total disbursement of loan funds to BANDESA for use as production credit under the Basic Grains and Diversification projects of \$2,000,000, while the Government of Guatemala (GOG) had disbursed \$5,581,000 for an AID-GOG total of \$7,581,000. As of June 30, 1973, BANDESA had approved sub-loans for a cumulative total of \$6,099,000 of which \$657,000 had been repaid, leaving a net commitment against their production credit account of \$5,442,000. Thus, there remained in the BANDESA account a balance of available funds for sub-lending of \$2,139,000.

As of July 31, 1973, BANDESA showed total loans made in the amount of \$3,885,518. In order to achieve DIGESA goals through September 30, 1973, an additional \$5,786,524 would need to be loaned. Thus, in 7 months, the program had achieved 40% of the 9 month goal of DIGESA. In terms of hectares, however, almost 80% of the goal had been achieved. This appears to be mainly due to the considerable shortfall from DIGESA goals for diversified crops in favor of grain crops. Diversified crops generally require much higher loans per hectare as compared to basic grains.

## II. REASONS FOR SHORTFALLS IN MEETING PROGRAMMED CREDIT INPUT GOALS

Major reasons put forward by the Mission and the GOG for the shortfalls from programmed goals can be summarized as follows:

1. Delays in implementation due to the fact that the reorganization of the agricultural public sector took longer than originally anticipated, thus causing roughly a one-year lag in realizing goals.

2. Reduction in relative emphasis on diversified crops brought about by the changed prices and demand for traditional crops, and the "more serious than anticipated" difficulties in achieving entry into external markets (and finding interested growers) for several diversified crops.

3. Difficulty in recruiting farmers into the program, due to lack of experience of field staff and unwillingness of the farmers to change their ways.

A considerable amount of the shortfall in use of credit can be explained by the relative shift from hectares of diversified crops to hectares of basic grains. On the basis of DIGESA 1973 programmed relationships

each hectare of basic grains on the average requires \$138 of credit, while each hectare of diversified crops, on the average, requires \$460. Additionally, when one examines the actual loans made, a further substantial shortfall can be explained since the average amounts per hectare loaned are slightly over 50% of that programmed for diversified crops.<sup>1</sup> The reason why actual loans are so much smaller per hectare than that programmed, appears to be that a much smaller amount of capital inputs (mainly fertilizer) is being used than that estimated.

One must ask why the program has had such difficulty in getting farmers to sign up and why even those who sign up do so only at a considerably reduced level of input use. On the basis of our conversations with Mission staff and with Ministry officials and technicians both in Guatemala City and in the field, as well as with participating farmers, we have arrived at the following conclusions:

1. The major restraint is that the program does not have a sufficiently reliable and realistic (from the farmer's viewpoint) package of income and yield increasing<sup>2</sup> technology for corn available to present to the farmer.

2. The "promoters" who serve as the contact element with the farmers are not sufficiently knowledgeable nor experienced (either through background or training) to be able to properly show the farmer how to use the pieces of technology that are available, not to assist the farmer in calculating his potential comparative income position.

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<sup>1</sup>\$138/hectare programmed as compared to \$85/hectare on loans made for grain crops, and \$460/hectare programmed as compared to \$243/hectare on loans made for diversified crops.

<sup>2</sup>Or per unit of production cost reducing.

Not only are farmers not convinced that the program will make them better off, but many of the field staff, from Regional Chiefs right on down to the promoters, remain skeptical.

3. A critical element of achieving acceptance (and of reassuring the implementors of the program) has, to a large degree, been overlooked. There are virtually no demonstrations of what the improved technology can do under field conditions similar to those faced by the recipient farmers.

For example, experiment stations which we visited in the highlands and on the south coast, had several plots testing one or two variables such as fertilization levels, seed varieties, plant populations, insecticides, herbicides, etc. They also are mechanized for land preparation, and the like. Nowhere did we see a plot of corn (or other crop) planted with tools the farmer uses, under the conditions he faces, with a package of technology (inputs, cultural practices, and so forth) which would be available to him in the program. Neither does the "promoters" program concentrate on applying any complete package of technology to properly located "key" typical farmers, in order to capitalize on a demonstration effect.

The main reason, apparently, goes back to our original conclusion: there are no reliable improved technology packages for corn (which both increase yields and significantly increase farmers' incomes) yet ready to be taken to the farmer.

4. There appears to be relatively little attention given to the issue of profitability.<sup>1</sup>

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<sup>1</sup> See Section III which follows for some preliminary examination of this question.

Neither the initial program plan data, nor subsequent information obtained from the farm operation by the "promoter", is very helpful in this respect. Since farm level "profitability" of the program is so central, it would seem logical that an important component of the promoter's activities would be to keep (together with the farmer) a simple Farm Records Book, so that costs and returns can be documented and compared.<sup>1</sup>

At the experiment station level, the same problem seems to exist. The question of "farm conditions" profitability is not a criteria being used in design of experiments, or for analyzing the results.

This lack of concentration on profitability at the field level appears to be a reflection of the general orientation of the program toward production, which carries the implicit assumption that production increases automatically mean profitability, and therefore improved incomes to the farmers.

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<sup>1</sup>The information collected by DIGESA for Management Purposes provides a limited amount of this type of information but in a generalized estimating format with little utility for determining individual profitability.

### III. OUTPUT EVALUATION

The program urgently needs economic analysis of considerably greater depth than we have been able to apply due to both time and data constraints. Such an analysis should be made both for the program level and the farm level, in order to verify the effectiveness of the project: (1) as a model for extending assistance efficiently to a large number of farmers, (2) as a model for increasing total production, or (3) as a model for increasing individual farmers' incomes (or production) significantly.

#### A. Returns to the Participating Farmers

Cost and returns data were not available to permit comparison of participating farmers' new income position with their previous position, or with that of similar non-participating farmers. The management information system implemented by the DIGESA programming unit falls short of needs for costs and returns analysis, in the following respects:

- The pre-program situation record of the farmer does not include adequate input detail.
- Information recorded during the farmers' participation in the program includes actual production costs, but it is not sufficiently distinguished by soil type, area planted, technology, etc., to assure that the promoters are taking it in a uniform manner.

- Although information such as costs and yield data is obtained, there is no way of assuring its proper relationship to areas, technology used, inputs, and labor. The data aggregation process does not appear to protect the data from distortion due to missing items, unrealistic entries, etc. Also, income data is not collected.
- The data is collated for management and control purposes rather than for analysis. Its collated form does not lend itself easily to economic analysis of the farmers' income situation.

B. Efficiency of the Technical Assistance Program

It is difficult with the data made available to us to make a very useful analysis. However, some programmed cost relationships can be derived that shed some light. Based on DIGESA 1974 programming goal figures, the direct cost of the promoter per hectare and per farmer in the program is as follows:

	<u>Per Hectare</u>	<u>Per Farmer</u>
Corn	\$11.86	\$60.27
Beans	14.77	51.41
Wheat	22.25	51.63
Sesame	11.95	68.33
Rice	26.58	133.43

We have been unable to make any estimates concerning overhead costs to the GOG per promoter, but total direct costs for the production and research part (called Technical Assistance) of the program (not counting marketing and credit) are budgeted at \$1,527,700 for 1973. About 8,000 loans will be made with the cost per loan made being approximately \$200.<sup>1</sup> This does not include a charge for existing GOG installations and overhead costs. Clearly, per farmer costs must be reduced many times before the program could be considered for expansion on a larger scale.

An attempt was made to determine to what extent the present production credit program generated new loan funds for small farmers, to what extent it substituted for funds previously available from other sources, and to what extent participating farmers were new credit subjects. We found only the following indicators:

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<sup>1</sup>This would be less than 8,000 farmers, since some have loans for more than one crop.

As explained elsewhere, the Interamerican Supervised Agricultural Credit Cooperative Service (SCICAS), the National Agrarian Bank (BNA) and the National Institute for Stimulating Production (INFOP) were all merged into BANDESA.

SCICAS provided credit only to small and medium sized farmers. In 1968, SCICAS programmed a total of 3,800 loans for a total of \$3,712,019.<sup>1</sup> These loans were to be distributed 45% to agrarian reform beneficiaries and 55% to small and medium farmers.<sup>2</sup>

In 1969, the BNA had outstanding a total of 3,455 loans under \$5,000 each for a total amount of \$1,699,935.<sup>3</sup> INFOP also carried on some credit activities among small and medium farmers.

In 1972 BANDESA made a total of 4,855 loans to small and medium farmers (from their trust department) who could not qualify for commercial bank loans, for a total amount of \$5,708,357.<sup>4</sup> This compares with a total amount of \$5,411,954 made by the two predecessor institutions in recent years. In 1973, it is expected that BANDESA will reach some 8,000 small farmers with a total of about \$7,000,000 in credit.

Finally, we observed that the GOG 1971-1975 plan called for the merger of the credit institutions because they had become "highly decapitalized."

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<sup>1</sup>It is reported that they made loans to 8,760 farmers in 1967. See ISU Report, Chapter 6, p 19.

<sup>2</sup>Presupuesto General, Ejercicio Fiscal 1968 SCICAS, Guatemala, pp 12-13.

<sup>3</sup>Memoria anual de BNA, 1969.

<sup>4</sup>BANDESA, Estadísticas, #19, December 1972.

We conclude that there probably has been considerable use of new credit funds to replace previous credit funds that have become, in effect, "transfer payments" to former borrowers. We further speculate that many of the present farmer-borrowers also received loans previously.

#### IV. RECOMMENDATIONS

Based on the foregoing findings and analysis, the evaluation team makes the following recommendations:

1. The Mission and the GOG should undertake immediately an in-depth analysis of experienced and projected effects of the program on the income of participating farmers. Such an analysis should be differentiated by types of farmer, with particular attention given to smaller farmers whose production and income is below the average for the group participating in the program. It should include a comparison with farmers not participating in the program. The immediate purpose should be to determine whether there are significant numbers of farmers for whom the program does not produce results sufficient to: (a) cover their added cost, or (b) provide a return which justifies the risk of production goal short falls and losses from weather damage and other causes. The longer run purpose should be to lay the basis for development of new programs differentiated by farmer characteristics, should the analysis show that the current program is not beneficial to large numbers of the target group. At the request of the Mission, we have prepared and left with it a rough outline, attached as Annex II, of a possible scope and method for such a study.

2. The GOG and the Mission should consider adjusting their information system to accommodate, on a continuing basis, farm analysis requirements or should consider alternatives for obtaining such data and incorporating it into program appraisals. In the short run, the small sample survey (suggested above) of participating and similar non-participating farmers (just after harvest) stratified by size, technology level, crop and location, to fill in the gaps in present data, would provide a beginning. This would

necessarily entail reliance on farmer (and promoter) recall, which has some difficulties. For establishing a continuing data supply for evaluation of what happens to the farmers' income position, a simple farm record keeping system should be made a part of the promoter's activity, preferably for all participating and a small comparable sample of non-participating farmers, If this is not considered to be considered to be practical, at the least records should be kept for a representative sample of participating farmers, distinguished by size of farm, crops grown, technology used, cultural practices, location, etc.

3. The Mission should explore with the GOG alternatives to the present program that would incorporate the following elements:

- a. Highest priority on analyzing and packaging present accumulated information on technology to derive a series of packages of technology for different production areas and types of farmers. Simultaneously, a significant amount of experimental work should be oriented toward testing alternative packages under varying field conditions. Longer run, more basic reasearch that tests only one or two variables should be oriented toward what is considered to be the major limiting factors in bringing about unit cost reductions, rather than focusing so heavily on production increases in isolation from the economics of the situation. For example, in the Quezaltenango region, the promoters are attempting to present a package of technology to farmers that utilizes the seed the farmer presently uses, whereas, the impression that we had from the GOG technicians in the area (and from our own observations) is that the basic

limiting factor to unit cost reduction is improved varieties adapted to the area, in order that fertilizer response can be improved (as well as other factor responses).

- b. Instead of setting as goals for promoters a high number of farmers, utilizing the best promoters to concentrate on increasing the net incomes (and secondarily increasing output) of a small number of dispersed "key" typical farmers who show promise as progressive and aggressive producers. Other promoters might continue a role as "Supervised Credit Agents" for a larger number of farmers, if an unalterable objective is to immediately distribute credit as widely as possible, although such a program could have negative longer-run effects until a reliable package of income-increasing technology is in place.
- c. Treating a farmer and his farm as a single operating unit from the moment he enters the program. A farmer in Guatemala generally raises at least two kinds of crops at a time, and some probably could make more efficient use of their (and their family's) time if they added additional enterprises (crops or livestock operations) to their farm operation. The BANDESA-DIGESA program compartmentalizes each farm enterprise, selecting one or two for assistance and ignoring the rest. This does not make good economic sense from the viewpoint of whether the farmer is better off in terms of making best use of his factors of production for optimizing his returns. Again, a simple Farm Record system maintained by the promoter together with the farmer, would be a positive step in this

direction. Allowing the financial plan (and credit program) to consider all of the farmer's productive enterprises would be another.

4. Rather than relying on the ad hoc annual reprogramming now being done by DIGESA, the Mission should propose a complete reprogramming of the unexpired loan in order to establish more fully relevant program goals.

## CHAPTER 4

### ANALYSIS OF CROP AND PRODUCTION COMPONENTS OF THE BASIC GRAINS AND DIVERSIFIED CROP PROGRAMS

#### I. BASIC GRAINS

This sub-project of the Loan has as its objective: "The introduction of modern technology to the processes of basic grains production in Guatemala." It provides for inputs in training, supervised credit, technical assistance, research, marketing, and price stability for increasing production of the five basic grains: corn, beans, rice, wheat and sorghum. The Five Year Development Plan costs were estimated to be \$12.3 million with \$8.2 million provided under the Loan. In terms of output goals, crop lands to be "technified" within five years totaled 35,000 hectares of corn, 10,000 hectares of beans, 6,000 hectares of wheat, 3,000 hectares of rice, and 6,000 hectares of grain sorghum. A rapid phased increase in achievement of planting goals was planned for the first to the fifth year. Table 3 indicates the anticipated yields and "costs and values" per hectare of the five basic grains under the traditional practices and with improved practices.

Entities involved in overall implementation of the program are BANDESA for credit, DIGESA for technical assistance, training and supervision of credit and INDECA for marketing and price stabilization functions. CITA has recently been organized to assume research functions.

The Iowa State University study contained estimates of supply and demand projections to 1970 and 1980 for corn, beans, wheat and

Table 3

Summary of Projections of Surpluses or Deficits

Product	Year	Surplus (000 MT)	Deficit (000 MT)	Surplus or Deficit Percentage of Total Production
Corn	1970	--	--	--
	1980	--	87.4	(8.9)
Beans	1970	8.0	--	6.0
	1980	17.0	--	9.1
Wheat	1970	--	70.7	(152.7)
	1980	--	109.2	(161.1)
Rice	1970	3.0	--	11.5
	1980	2.6	--	6.5

Source: Agricultural Development and Policy in Guatemala, Iowa State University, April 1969.

rice as well as diversification crops, and animal agriculture products<sup>1</sup> (including fruits, vegetables, cattle, hogs, poultry products, dairy products and sheep production). These projections provided an estimate of what the basic grain balance would be in 1970 and 1980 if the trends of the 1950-1966 period continued. Such estimates of the supply and demand balance were assumed to serve as useful information to help in determining what types of government programs would be needed to meet consumption requirements or could serve to provide opportunities for export of basic grains and other agriculture products. The Iowa State University assessment estimated (Table 3) that if current trends continued Guatemala would be able to export small quantities of beans and rice and would need to import large quantities of corn and wheat.

The Iowa State report concluded that there was need for emphasis in the basic grains; particularly corn, because of its traditional importance in the diet of the people. The National Development Plan, however, put major emphasis on promotion of diversified crops because of strong views

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<sup>1</sup> Supply projections from Banco de Guatemala (base period 1964-1967). Demand projections from National Planning Council (1967 base information) assuming rates of increase in population, future income and income elasticities. Other supply and demand projections from Battelle Memorial Institute study for USDA in 1969.

regarding the need for expansion of diversified crops for export and internal markets. In implementation of the Plan emphasis was shifted to the basic grains rather than diversified crops. In our opinion, corrections in the general course of program execution were justified and realistic.

Discussion of implementation of the program by crop follows.

A. CORN

Credit provided by RANDESA under the loan for corn production in 1973 is estimated to be approximately \$3 million. A lower level of credit (approximately \$2 million) was provided in 1972 due largely to the newness of the credit program and the relatively low numbers of Promoters to arrange supervised credit with corn farmers. Credit is usually provided only for fertilizers and seed, but depending upon circumstances, may be provided for other input costs. Loans are normally provided only to farmers with three to 28 hectares in corn production but variations may occur in different regions. Only a miniscule percentage of total corn farmers can be reached because of the large numbers of corn growers with 2 hectares or less. A high percentage of total production by small farmers is destined for subsistence consumption with only a small percentage of production being marketed.

In the case of intermediate-sized farmers, who are provided with BANDESA credit and assistance from Promoters in development of a farm plan of operations and technical assistance, the use of fertilizer and other improved farming practices is limited due to several factors. The 220 Promoters are widely scattered throughout the country and are working on other crops also, not just corn. The program is in its infancy, having begun only recently after reorganization of the Ministry of Agriculture in 1970-1971. Approximately two years were required to recruit, train, and assign Promoters, <sup>and</sup> organize and develop detailed programs and methods of work.

The principal problem stems from the fact that an adequate package of technology for increasing corn production has apparently not been developed either for the lowlands, intermediate altitudes, or the altiplano. Yields which average perhaps less than one metric ton per hectare in most corn growing regions of the country are a valid indication of both the need to increase production and the present lack of application of known technology to corn culture in Guatemala. The most apparent deficiency is the lack of seed of high yielding varieties with adaptation to the respective corn production environments. Economic rates of fertilizer application by quantity, type, method and time of application have not been determined for the various types of corn needed in the various ecological zones, nor have adequate improved cultural practices been developed as an integral part of the package. Simple benefit/cost analyses of various elements of the package need to be made under farm conditions to determine if benefits are dramatic enough to motivate farmers to accept a part of a package or a complete package of technology. Also needed is accurate economic analysis based upon

program-wide yield data, cost of production, and credit, comparing the situation before the program was commenced with results expected after five years of program implementation.

In 1972, 829 corn farmers received technical assistance and credit for production on 5,920 hectares. The average area per farmer was 7.1 hectares for which he was provided credit averaging \$600 per farmer.

Programmed increases in yield and magnitudes of planting goals seem overly optimistic especially in view of the large numbers of farmers to be reached, the technical deficiencies of the package, the lack of adequate economic data to support expectations and the organizational inefficiencies that are a part of any new program.

It appears to us that the production/promotion phase of the program for providing supervised credit and technical assistance was not based upon sufficient research and integration of research efforts into the program per se. There is no doubt that much research in corn has been performed to develop composites, lines and hybrids and to determine improved agronomic practices, but these efforts have not been incorporated into a program to dramatically change corn production technology on either small or medium sized target farmers.

While ICTA expects to make a significant impact in the near future in attempting to coordinate its corn research/promotion work with DIGESA, many working arrangement details are yet to be decided upon, requiring more time before a more integrated approach to production problems will have an impact upon production within the project. The Team is of the opinion that AID's

support to ICTA's efforts in on-farm adaptive research and training is an essential pre-requisite for re-directing the program toward a more sound technological approach for increasing production.

INDEACA's essential role in corn marketing and price stabilization appear to be realistic and economically sound. Its activities of increasing grain storage capacity by approximately 46,000 additional MT will help eliminate supply-demand-fluctuations over time, decrease physical losses and provide many economies. Its policies of corn pricing are expected to provide not only better and motivating prices to farmers but more stable and fair prices to other consumers of maize. The Program identified the following restraints in order of priority for improving the basic grain situation:

1. Lack of production credit.
2. Inadequate systems of marketing.
3. Paucity of agronomic research information and inadequate mechanisms for delivering information to farmers.

In the opinion of the Evaluation Team, these priorities are in reverse order. It seems illogical to begin an agricultural promotion program if there is a paucity of research data on which to base a program. We feel that the Program has given less emphasis to marketing and price stabilization than it logically warrants since price policy is paramount in providing incentives to use improved practices for increasing production and farmers profit. We conclude that a restructure of the program goals and yield expectations are essential and that this restructure should include more comprehensive integration of research information, marketing and price stabilization policies.

## B. BEANS

Since beans are the second most important staple in the diet of the Guatemalans it has been given emphasis for promotion under the Loan and the National Development Plan. The Loan and the Plan provided for a planting goal with credit and technical assistance on 10,000 hectares to be achieved by the fifth year (1975). In 1972, 307 farmers received \$186,273 in BANDESA loans for the cultivation of 1,978 hectares of beans. This represented an average of \$606 per farmer who grew an average of 6.4 hectares of beans. Beans are normally planted in rotation with corn before the corn is harvested. Vines are allowed to climb corn stalks for support. Farmer's yields with traditional practices have averaged 387 kg/ha.

The limiting factor in increasing bean production in Guatemala as in most other Latin American countries is the problem of virus diseases which reduce production. The most obvious need, therefore, is improved, virus-free bean varieties which exhibit some degree of resistance to insect transmission of virus diseases. This problem can be overcome eventually but requires long-range basic and adaptive research, plant material introduction, testing, selection, seed multiplication and development of improved cultural practices. The package

of improved technology for beans has definitely not been developed, nor can it be developed in the immediate future.

From a realistic standpoint, if credit is provided to farmers who grow beans, such credit might be justifiably used for the purchase of the best bean seed available in the country to produce as high yields as possible under good cultural conditions but this certainly not to be interpreted as "improved cultural practices". Most of the current credit is probably being used for hired labor costs of land preparation, planting, weeding and harvesting. The present traditional practices of bean culture are employment generating and tend to distribute income. In this respect, it helps to meet overall objectives of improving the economic situation of those employed in small farm enterprise.

There is an obvious need for future emphasis by ICTA in performing the necessary research in beans, taking full advantage of the related work being conducted by the International Center for Tropical Agriculture (CIAT) in Colombia and the work of the International Institute for Agricultural Sciences (IICA) in Costa Rica. ICTA's responsibility lies in the adaptive research necessary to develop the agronomic technology, test varieties and multiply seed of the best varieties developed by the international and regional institutes.

Marketing and price policy is important to assure honest and incentive prices to bean farmers. The eventual provision of additional 40,000 MT capacity in grain storage facilities over the existing 17,000 MT capacity will help assure that storage and marketing facilities are available over and above private bean market systems.

### C. WHEAT

Wheat is traditionally grown in the highlands of Guatemala by small farmers. This production flows to internal markets to meet needs principally of the urban centers.

The current level of production provides for about one third of the country's needs. Since the type of wheat grown is a soft bread spring wheat with relatively low gluten and low protein levels, importation of hard, high gluten, high protein wheat is considered necessary for blending and making bread with acceptable characteristics.

The supply and demand projections provided in the Iowa State university assessment indicated increasing trends in both supply and demand between 1970 and 1980 with an anticipated deficit of 109,000 MT by 1980. Presumably on this obvious need basis, the plan strategy provided for emphasis in increasing wheat production. Planting goals with credit and technical assistance were established at 1000 hectares in the first year increasing to 6000 hectares in the fifth year.

An average of \$380 per hectare was provided to 725 farmers in 1972 who applied improved inputs on an average of 4 hectares of wheat per farmer.

Traditional wheat yields average 1000 kg/ha compared with a current U.S. average of approximately 1700 kg/ha and a Mexican average of about 1700 kg/ha, both of which are the result of improved technology application on a wide scale. Thus, the "traditional" level of production is

actually not traditional at all. The current yield of more than 1000 kg/ha is a result of a successful wheat program that has been in effect since 1958.<sup>1</sup> Many farmers are currently employing improved technology (fertilizer, chemical weed control, improved varieties and related cultural practices). This observation does not negate the possibilities of further yield increases by further improvement in wheat culture, but the magnitude of increases may be relatively modest.

Future developments in increasing wheat production in Guatemala will depend upon improving wheat technology and continuing to provide guaranteed prices to farmers to assure their profits.

ICTA is already engaged in a sound research program involving development of improved cultural practices and variety testing of improved wheats available through the International Center for Maize and Wheat in Mexico, and the University of Nebraska's International Wheat Nursery Trials. Types of wheat are being sought with disease resistance, high yielding capacity, semi-glutinous grain characteristics and high protein levels. If such types could be found and increases in production could be achieved, Guatemala would be able to meet a higher proportion of its own consumption

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<sup>1</sup>A cooperative program of the Asociacion Nacional de Productores de Harina, Gremial Nacional de Trigueros and the Oficina de Control de la Importacion de Trigo which provided technical assistance and floor prices of \$6.00/cwt.

requirements in the future. In view of rising world prices for wheat, this approach appears to be a rational strategy for pursuit.

#### D. RICE

Rice is traditionally not as important in the Guatemalan diet as corn, beans, and wheat, its consumption level being less than 5 pounds per capita per year. During the last two decades, both imports and exports of rice have been small with Guatemala providing for its own internal consumption requirements in most years and exporting only small quantities to other Central American countries in other years.

Supply and demand projections for rice<sup>1</sup> indicated that by 1980, Guatemala will be a net exporter of from 3,000 to 10,000 MT of rice.

The National Plan provided for credit and technical assistance to increase traditional rice production area yields from 1837 kg/ha to 3250 kg/ha on 3000 hectares by the fifth year. This was estimated to provide a total increase in production of 4,600 metric tons.

While it is considered technically feasible to achieve these yields per area unit, especially under irrigated conditions, the Plan apparently does not take into consideration that the two supply and demand projections mentioned above showed that achievement of increased total production would be accomplished even if things continued as they have in the past. In 1972, 224 rice farmers received an average credit loan of \$771 to be applied to an average of 5.1 hectares of rice. The slight increases in total rice production during the last two decades, it appears, have been achieved principally by putting new areas into production on the South Coast and in

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<sup>1</sup>Battelle Memorial Institute and Consejo Nacional de Planificacion estimates.

the Northeast near Lake Izabal. This trend of putting new areas into production will probably continue in the future since there is a considerable amount of land on large farms that can be diverted to rice production if the market exists and the margin of profit is adequate.

The question arises whether rice should be included in the Basic Grains Project, especially in view of the magnitude of technical assistance and credit resources that will be required on a priority basis to increase corn production to levels adequate to meet consumption requirements.

#### E. GRAIN SORGHUM

Grain sorghum, like rice, is a relatively minor cereal among the crops being promoted under the Basic Grains Project, only 5% of the total farms planting basic grains grow grain sorghum. This is partly because it is a relatively new crop for Latin America and is not a traditional human food crop there.

More than one half of the grain sorghum is grown on farms of less than seven hectares. In recent years, Guatemala has exported sorghum in quantities ranging from 22,000 MT during 1953-1957 to 8,500 MT in the 1963-1967 period. There is an increasing trend in the use of sorghum as animal feed (poultry, pork and dairy). It has been estimated that by 1975 the sorghum demand will be 331,000 MT, the supply 261,000 MT with a deficit balance of 70,000 MT.

The Plan makes provision for increasing the yield per hectare of grain sorghum from 704 kg (under traditional practices to 3,175 kg, an increase of 450%) on 6,000 hectares by 1975. This expected average level of production per hectare is 71% of the yield/ha reported on the best

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<sup>1</sup>Battelle Memorial Institute, Projections of Supply and Demand for Selected Agricultural Products in Central America to 1970 and 1980, May, 1968.

Guatemalan farms. While such average yield/ha goals are technically possible, they seem unrealistic and impossible of achievement within the relatively short timeframe of the program. This opinion is supported in part by the fact that during 1972 only 40 loans averaging \$2050 each had been provided to sorghum farmers whose plantings under credit averaged 38.8 hectares. This suggests that if production credit for sorghum is needed by these larger farmers, it might best be provided from sources other than the supervised credit program (perhaps from BANDESA's commercial credit window).

## II. AGRICULTURAL DIVERSIFICATION PROJECT

This sub-project funded under the Loan provided for a budget of \$22.5 million of which \$8.5 million was to be financed by AID. Its implementation plan provided for credit to farmers from BANDESA-controlled funds and technical assistance from DIGESA Promoters for the increased production of vegetables, flowers, sesame, plantain, deciduous fruits, avocados and citrus fruits. While these crops are already grown on an extensive scale in Guatemala, the objective of the sub-project was to "technify" with credit a total area of 36,980 hectares of diversified crops thereby increasing their production within the Five Year Plan period.

The rationale for the promotion of diversified crops as presented in the National Development Plan (1971-1975) was based on the need to look at alternative crops as a source of export earnings and employment rather than relying heavily upon coffee, bananas and cotton. These three crops along with beef products and sugar have accounted for 70 percent of export earnings in the past. The Iowa State University assessment observed that future increases in demand for cotton, coffee and sugar in the world market looked bleak, implying a future leveling off or decline in employment alternatives in Guatemala. Coffee and cotton alone were reported to use 90,000 to 110,000 full-time employees and 400,000 part-time employees supplied largely from the highlands subsistence sector.

Progress reports of BANDESA indicate that in 1972, 1,104 loans totaling \$1,347,880 had been provided to promote increased production of diversified crops on 4,836 hectares. Of these loans, 698 were for vegetables, 144 for sesame, 95 for plantain, 71 for deciduous fruits, 43 for avocado, 36 for flowers, and 17 for citrus.

Several problems involving implementation of the Diversified Crops Sub-Project were identified by the Evaluation Team during the brief study period. In the case of the tree fruit crops (citrus, deciduous fruits, and avocados), there was reported reluctance and inability on the part of the small farmers to make long-term, heavy investments in crops that would not begin to produce profits until five years or more after being planted. Such farmers preferred to engage in short-term crop enterprises instead, for example, in vegetables or sesame production.

In the case of flowers, the level of technology, the intensity of culture and the high magnitude of investment required for meeting export market quality standards suggests that this crop can most appropriately be handled by the agro-business sector, private capital and/or specially interested individuals. Such individuals, companies, or perhaps in some cases, cooperatives, must have or develop through experience the management capabilities necessary to solve the serious transport and marketing problems that exist with floricultural crops. Furthermore, the Team viewed it as highly doubtful that the inexperienced promoters of DIGESA would be able to provide technical assistance of any value to flower growers or even perhaps to the more sophisticated or experienced vegetable growers.

In the case of the less knowledgeable vegetable and sesame producers, there appears to be a need for credit and technical assistance on a priority basis especially in view of their importance for internal consumption (in the case of vegetables) and export earnings (for both sesame and for those vegetables where export quality standards can be achieved).

Recent modifications in both the financing and implementation of the program have provided for reduced emphasis in the diversified crops and increased emphasis in the basic grains in 1973 and later years. These modifications appear to be sound especially in view of recent upward changes in world prices for cotton, coffee, sugar and bananas which are usually grown by the larger farmers. Emphasis in increasing the economic production of the important basic grains is justified on the basis of present conditions of world supply, demand, and price.

In future implementation of the credit and technical assistance to basic grains and diversified crops, the Team suggests the possibility of formally breaking down the distinction between these two groups of crops. Such a distinction is artificial and would be better replaced by a "whole farm" approach.

The foregoing judgments on the relative importance of some crops compared to others are intended only for consideration in possible future readjustments in program emphasis. They ought to be considered as guides only until further more detailed analytic work suggested previously bears out the economic and technical feasibility of such redirection in the program.

## CHAPTER 5

### OTHER LOAN SUPPORTED PROGRAMS

#### I. HUMAN RESOURCES

In addition to the technical assistance and training included in the production and research projects, the program included \$8.9 million (in the Loan Agreement) for a variety of manpower training programs, both for farmers, Government staff, and teachers. Up to \$5.6 million was to be covered by the AID Loan, including rather anomalously, \$2 million to be loaned to farmer cooperatives to strengthen them. Thus, a total of \$3.3 million was to be contributed by the GOG.

Subsequently, the Five-Year Plan reduced the program to a total of \$8.704 million. Aside from the \$2 million for cooperative credit, the Human Resources Project consisted of the following sub-projects:

<u>Item</u>	<u>5-Year Cost</u>
<u>Agriculture Training Centers</u>	
To give short courses to 24,000 farmers	\$1,643,000
<u>Agricultural Youth Groups</u>	
To organize 50,000 youths in 1200 "4-S" Clubs	1,200,000
<u>Mobile Schools</u>	
To give instruction to 12,000 farmers	230,000
<u>Agriculture Information Service</u>	
To publicize agriculture information program	334,000
<u>Secondary School Training</u>	
Training of several hundred rural change agents ("promotores") and rural school teacher	2,340,000

<u>Item</u>	<u>5-Year Cost</u>
<u>Training Grants for Agricultural Ministry</u>	
Train 70 - 100 persons	\$250,000
<u>Higher Education</u>	
Scholarships for 45 per year	<u>707,000</u>
TOTAL	\$6,704,000

The GOG has expended \$1,614 million out of a scheduled 3.133 million while AID has expended \$1.515 million out of \$3.569.

We have not attempted to evaluate this part of the program in any depth. In general, the training programs have progressed in volume at a reasonable pace. The overall numbers of technical staff aimed at are certainly modest relative to ultimate or ideal needs. Probably Guatemala should aim at training larger numbers of "peritos agronomos" graduating perhaps as many as 100 per year, in post-secondary level education programs rather than expecting to depend on the secondary-school training of the field promoters.

While this present program may be a reasonable temporary expedient, we have considerable doubt that the promoters are properly equipped to deal dependably with the small farmers' problems. As the system is now operating, the promoters appear to be playing the role of bank representatives more than of technical and managerial advisors. However, this does not mean that the system is basically not well conceived or that training and experience cannot make the promoters into proficient purveyors of more advanced methods. As discussed elsewhere in this report, these enthusiastic young men of limited experience can have relatively little useful advice to offer the farmers until effective improved promotions have been worked out. Obviously, training needs must be derived from the manpower

requirements of the overall program. In view of our findings and recommendations for the program in general, we conclude that the first step needed is to improve the design of the program's larger goals and methods. In the meantime, the various staff training programs can reasonably proceed, since it is not likely that output will exceed Government agency needs.

Continuation of the farmer training programs can reasonably be supported too, although courses should bring the farmers' attention to the cost-benefit problems involved in adopting more modern technologies.

Feedback and evaluation is as imperative for the farmer training courses as for the rest of the program, in view of the more than \$3 million budgeted for these activities in the 5-year period.

## II. ARTISANRY PROJECT

The Rural Development Loan contained \$750,000 to be used for production and marketing subloans and technical assistance to small artisans engaged in the production of handicrafts. The GOG was required to provide an additional \$500,000. The objective of the program was stated to be to modernize handicrafts production and marketing in order to permit an increase in exports.

Since other parts of the program were expected to have a limited effect on rural employment, the possibility of increasing employment through production of handicrafts was an important motivation in undertaking the project. Funds provided were to be used for the production of raw materials and equipment and for the provision of technical assistance in production and marketing. It was estimated that approximately 2,000 artisans would be involved in project and that their returns would be increased by over \$300,000 a year. It was also estimated that some \$2.4 millions in foreign exchange would be generated from exports. It was further estimated that there were some 40,000 artisans in the Highlands with a potential for annual production of 20 million quetzales.

The analytical base for the project seems to have consisted of a memorandum of the Bank of Guatemala, "Situacion y Desarrollo de las Industrias Artesandas en Guatemala," and a number of AID memorandums concerning handicrafts in Mexico, Peru, Ecuador and Bolivia. We found no careful analysis of market potential.

The GOG has shown little interest in the project since the loan was made. Conditions precedent to disbursement were not met until early 1973. The Director of the operation only serves part-time and the GOG

has not responded to requests to name a full time Director. While  
AID has disbursed to the GOG the entire amount of the loan, as of  
June 30, 1977, only 94 loans to artisans had been made in an amount  
of 38,596 quetzales. Of this amount 22,879 quetzales had been drawn down.  
The loans made are for the purchase of raw materials.

## CHAPTER 6

### NATIONAL DEVELOPMENT PLAN, 1971-75

#### I. SUMMARY

The National Development Plan for 1971-75<sup>1</sup> was completed prior to July 1, 1970, when the Arana government took office. The plan was accepted by the government as the basis for its development activities.

In the plan, highest priority is assigned to development of the agricultural sector.<sup>2</sup> It summarizes the strategy for agricultural development as a frontal attack on the following problems:

1. Historical growth rate insufficient to improve living conditions for the rural population.
2. 30% participation by agriculture in gross product with growth based mainly on five products (coffee, cotton, banana, sugar and beef) making up 75% of total exports and 5% of the economically active population earning their livelihood from the sector.
3. Insufficient growth rate and economic base of the agricultural sector to bring about needed growth in other sectors.

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<sup>1</sup>Plan de Desarrollo, 1971-1975, Secretaría General del Consejo Nacional de Planificación Económica, Guatemala, Junio de 1970. This plan consists of over 2,000 pages of text and hundreds of pages of tables, divided into two volumes of the plan itself and five annexes of sector programs. Future reference will be to "The Plan."

<sup>2</sup>Ibid. p. 4.

The following short run goals are specified:

1. A substantial and sustained growth of agricultural product through increased production of foodstuffs, primary materials and export products in both traditional and new products, based on preferential assistance, especially at the level of specific projects, to small and medium farmers.
2. Maximum utilization of labor in agriculture when technologically viable.
3. Gradual but substantial incorporation of subsistence groups into the market economy.
4. Strengthening of the base for future agricultural development through research and training programs and massive development of youth clubs.

These short term goals are specified by the plan to be in harmony with the following longer term goals:

1. Redistribution of agricultural incomes.
2. Reduction of regional disparities.
3. Massive integration of the indigenous economy into the monetary economy.

An overall plan objective with which the goals are said to be consistent is that of reducing vulnerability of the economy to the vagaries of the export sector.<sup>1</sup>

In Chapter 1 of Volume I of the Plan, a discussion of how to improve income distribution puts "production policy" at the top of the list.

The agricultural development program is considered to constitute an important factor for improving income distribution by raising the income levels of small farmers and lowering the cost to the consumer of certain basic articles.

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<sup>1</sup>Ibid. pp. 7-9.

Other policies listed for achieving improved income distribution  
are (in order listed):

1. Price and wage policy
2. Fiscal policy
3. Employment policy
4. Land tenure policy
5. Education
6. Health

## II. AGRICULTURAL SECTOR DEVELOPMENT

Since the plan places highest priority on development of the agricultural sector, considerable space in the plan is dedicated to a discussion of the problems, strategy, programs and projects for the sector.<sup>1</sup>

The strategy for agricultural development is conceived as a package of policy, program and specific project measures tending to achieve a gradual but substantial transformation of the sector by incorporating technological advances and altering the actual structure of income distribution.

Increased agricultural product is the objective. This increase is to be achieved through :

1. Consolidation and diversification of export activities and
  2. Development of activities dedicated to production for the internal and Central American markets.<sup>2</sup>
- The plan considers that this strategy will, by expanding agricultural product, stimulate the other sectors by increasing demand for agricultural inputs, and due to resulting increased rural incomes, increase demand for consumer goods.

More specifically, the strategy is designed to:

1. Provide the agricultural sector with a larger share of GNP through application of advanced technology.
2. Provide a greater proportion of that increased share of GNP to small and medium farmers through development of structures more favorable to them.

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<sup>1</sup>Volume II, Section two, Chapter I, A, with 217 pages, plus two large annexes with 275 pages and 430 pages respectively.

<sup>2</sup>Volume II, Section two, Chapter I, A, pp. 1-2.

Since non-agricultural sectors have made a poor showing in the past in absorbing redundant agricultural labor, the short run strategy is to create jobs within the sector, through intensifying production, basically through use of improved inputs, with low priority on mechanization.

The most important element of the plan strategy is to increase productivity per hectare.<sup>1</sup>

Through increasing productivity per hectare three sub-purposes are expected to be accomplished;

1. Substantial production increases.
2. Improved labor absorption.
3. Generate demand for industrial products (agric. inputs).

Some production projects and programs are designed to preferentially favor small and medium farmers, including in some cases, subsistence farmers.

Thus, there is to be a favorable impact on income distribution both from the direct effect of certain projects and from increased labor absorption of the others.

Another element of the strategy is to mount an objective and systematic effort to create conditions that facilitate agricultural development in the long run through:

1. Development of human resources.
2. Institutional reform.
3. Evaluation and Research on developable resources.
4. Agricultural research.
5. Regional development.

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<sup>1</sup>op. cit. p. 6.

The five year cost of implementing the agricultural plan is estimated at 143.2 million quetzales.<sup>1</sup>

The Breakdown of financing for the investment budget by years is planned as follows:

Table 5  
Agricultural Sector Investment Budget\*

Year	INTERNAL			EXTERNAL			TOTAL
	Millions \$	%	% of Total Internal Budget	Millions \$	%	Millions \$	% of total investment budget planned
1971	9.18	49.7	15.5	10.03	52.3	19.21	19.6
1972	8.32	43.6	13.5	10.76	56.4	19.08	18.7
1973	9.32	42.1	15.6	12.81	57.9	22.13	18.8
1974	9.74	42.2	12.8	13.34	57.8	23.08	18.4
1975	11.41	47.4	12.8	12.64	52.6	24.05	18.4

\*Source: National Development Plan, 1971-1975, Volume II, Tables I-1 to I-5 and II-1 to II-5, Public Investment Plan, 1971-1975.

Actual Expenditures

Means for executing the plan are as follows:

- a. Technical assistance
- b. Credit
- c. Marketing
- d. Agricultural research
- e. Training
- f. Provision of infrastructure:
  - (1) Irrigation

<sup>1</sup>op. cit. p. 10 - One Quetzales equals U.S. \$1.00

- (2) Drainage
- (3) Secondary roads
- (4) Marketing infrastructure (storage, etc.)

Instruments:

- a. Rural development plan:
  - (1) Basic Grains program
  - (2) Agricultural Diversification program
  - (3) Human Resources program
  - (4) Artisanry development program
- b. Other agricultural sub-sector activities.
- c. Institutional Reform;

A short-run plan of action is specified as follows:

- (1) Institutional reorganization.
- (2) Formulation of short-run policies.
- (3) Mobilization and training of human resources.
- (4) Mobilization of Financial Resources.
- (5) Programming

Several hundred pages are dedicated to suggestions and prepared laws for institutional reorganization. Discussion of short-run policies is limited to two pages, with the suggestion that the agricultural sectoral planning unit should develop (in the short-run) policies related to 1) INDECA marketing and price stabilization activities, 2) general price policy; 3) export policy for products that also have an important internal demand (such as beef); 4) agricultural development policy vis-a-vis industrial development, and 5) export policy for traditional exports (coffee, cotton, bananas).

A specific program is detailed for Human Resource development. One page is dedicated to discussion of mobilization of Financial Resources. Mention is made of 1) the consolidation of agricultural credit resources from three existing (then) institutions (SCIGAS, BNA, INFOP) into BANDESA; 2) request for assistance from the World Food program for capitalizing INDECA; 3) request for assistance from AID to finance the Rural Development plan, and 4) request for assistance from the World Bank to finance other sub-sector activities (specifically the Livestock program on the South Coast).<sup>1</sup>

The sectorial planning office is charged with mounting an intensified programming activity for the following priority specific action areas:

1. Consolidation of development of the agrarian parcels distributed by INTA.
2. Development of cooperative farms.
3. Colonization of Ixcán.
4. Drainage on the Southern Coast.
5. Small irrigations.
6. Development of the dairy industry.

<sup>1</sup>Ibid. p. 30.

### AGRONOMIC-ECONOMIC STUDIES NEEDED

The Evaluation Team has been requested by the USAID to suggest types of economic studies to provide information on which to base production programs. One obvious need is basic information related to the economic profitability of a "package of technology" approach in any particular crop. There has apparently been little or no work on this aspect of crop production problems in Guatemala except some macro-analyses employed for estimating anticipated results from fertilizer use.

An example of such a study was the Iowa State University report which addressed the question "Where should a corn production program be located, in the lowlands or the central region?" The analysis attempted to show that an investment of \$2.5 million in fertilizer would produce more economic returns in the highlands than in the lowlands. It considered that fertilizer would be the only additional input to existing practices. We note that the Iowa State University analysts had some reservations as to their conclusions since they suggested that further in-depth analysis was needed to assess more accurately the economic feasibility of this approach.

Other work by D. Albert U. Plant (USAID Contract) analyzing data of 181 FAO fertilizer field trials/demonstrations, has shown the relative importance of nitrogen over phosphorus and potassium for increasing yields of corn. The "best combinations" of NPK resulted in benefit/cost

ratios of 3.1 to 1 and 2.7 to 1 in the Western Highlands and Central Highlands respectively. Yield increases from fertilizer were influenced highly by plant population. This emphasizes the need for inclusion of at least the most limiting components in a package or a partial package of technology. We thus pose a different and more important question that requires attention -- "What are the best economic packages of technology or partial packages of technology and crop mixes that will provide the most profit for a farmer from his overall operations?" This fundamental question is the basis of all decision making on the part of the farmer.

The principal lesson that we have learned from the many production programs conducted in LDCs in recent years is that one specific technological package does not serve all conditions and is not readily accepted by farmers because of the inherent risks involved in the investment of the high cost inputs. Even if yields from the improved package on experiment station plots are dramatic, the farmer must be convinced that he can also obtain dramatic yield results and profit from a minimum and economic use of inputs on his own farm. This flags the need for the basic information concerning a given package or its variations on which to design programs, establish production goals and determine program methodology.

Basic guideline information should include response of variable levels of the economic inputs under varying ecological conditions. Variations in the package must be developed through research to allow the farmer to make his own decision regarding variety, fertilizer, level, type, time and location of application, type and level of weed control, plant, population, row spacing, depth of planting and other practices. Decisions will be made by the farmer incorporating his own knowledge and experience

regarding his soil and the specific environmental conditions which may change from season to season beyond his control. Research conducted on experiment stations in the past can serve as guides to conduct further research on farmers fields to develop a series of variable packages of technology for each crop in low, intermediate and high altitudes, in varying soils employing more than two of the best varieties for each ecological zone. Agronomic economic data is needed on the benefits to be achieved from out-of-pocket investment of variable rates of inputs (fertilizer, pesticides, weed control, seed, etc.).

It has been determined from other studies that if benefits do not exceed costs by 2.5 times, farmers are usually not motivated to risk possible monetary loss from the input of improved (but still unproven to the farmer) practices.

Research to be conducted must determine the B/C ratio of each input individually when all other inputs are provided at a standard rate considered to be optimum. Each input in turn is thus tested as to its relative importance in the package with an optimum economic level established for each. A modified package is thus developed for each important variety of crop, for each major ecological zone and soil type. In each zone several alternative packages may be required to allow alternative decisions to be made by the farmer. The optimum package would be one to maximize yields but still be in the B/C ratio range from 3:1 to 2.5:1. A simple approach would be to provide low, medium and high levels of the various input components to the package depending upon their relative known cost and proven expected benefits. For example, in a specific area let us suppose that from on-farm

research result the following package was determined to be optimum for corn.

Location: Zone I  
Variety: "X"  
Fertilizer: 100 kg N/ha, 50 kg/P<sub>2</sub>O<sub>5</sub>  
Plant population: 40,000/ha  
Weed control: Q7.25 for chemicals  
Application: 1/2 at planting time  
1/2 at 30 DAP (days after planting)

An alternative package for corn with a lower level of input might be one preferable to a farmer for initial acceptance because of its lower input cost, but its still relatively high effectiveness for increasing his total income. For example:<sup>1</sup>

Location: Zone I  
Variety: "X"  
Fertilizer: 75/kg N/ha  
35/kg/P<sub>2</sub>O<sub>5</sub>/ha  
Plant population: 30,000 ha  
Weed control: by hand at Q4.00/ha for labor (or his own labor)  
Time of Fertilizer: 1/2 at planting  
- 1/2 at 30 DAP (to be eliminated at farmer's  
choice, perhaps, in case of severe dry conditions.)

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<sup>1</sup>The above examples are suggestions of the Methodology to be employed only and are not specific recommendations. Quantitative details must be determined by on-farm research and known price data of inputs and outputs.

In the first case the farmer's total yield and profit may be maximized under a satisfactory B/C relationship. In the second case the economic efficiency of inputs would be maximized sacrificing some total production and profit but minimizing his risks. Many farmers may elect this latter alternative or even one with a lower level of inputs and investment.

While farmers do not usually understand the detailed complexities of the economic relationships of inputs to outputs, they usually do have enough knowledge and experience on which to make sound judgments which make economic sense to them. As new plant materials are developed with higher yield potentials, the farmers' judgments are not as valid as they were with older varieties. This requires re-educating the farmers to help them readjust their values in the decision making process. This type of activity is one that should be initiated by ICTA involving promoters or extension agents of DIGESA who would help arrange such on-farm research with leading cooperating farmers in typical and accessible production areas. Some financial arrangements would most likely have to be made to assure cooperative assistance for providing land and necessary labor inputs for the field trials. These field trials would also serve as demonstrations throughout the growing season to show the response of the various packages being developed and perfected for the specific area. Follow-on activities of all types would be needed to propagandize results of the trials-demonstrations.

Besides serving as demonstrations for farmers, these activities would promote the integration and coordination of technical personnel (agronomists, economists, entomologists, weed control specialists, extension specialists, etc.) in solving the problems of profitable crop production. These activities would do much to re-orient the research, extension and credit

and training efforts toward more unified objectives of increasing production, employment and income of farmers.

The economics of the farmers' crop enterprise described above must further include some assistance in helping to determine the relative benefits that he will receive from his enterprises involving other crops animal production, off-farm income and other activities relating to his well-being. Overall economic aspects of total farm operations are described in Annex II, "Farm Analysis Project."

## ANNEX II

### SUGGESTED FARM ANALYSIS PROJECT

#### I. SUMMARY

##### A. PURPOSE

The purpose of this project would be (1) to determine the income effects on individual farmers (and classes of farmers) participating in the Basic Grains and Crops Diversification projects of the Rural Development Plan 1971-1975, and, (2) to determine the employment generation effects of participation by different classes of farmers.

##### B. TECHNICAL EXPERTISE REQUIRED

One full-time expert in Farm Records and Analysis. Some short-term expertise might be required from time to time. For example, a sample frame might need to be drawn, requiring specialized assistance.

The full-time expert should be fluent in Spanish, should have experience with farm record-keeping and Farm Costs and Returns Analysis both in the U. S. and Latin America - Experience with small and illiterate farmers would be particularly helpful.

##### C. SCOPE OF WORK

Assist the Ministry of Agriculture as follows:

1. Determine data requirements.
2. Determine preferable method of obtaining data for both participating and non-participating farmers.
3. Determine feasibility of keeping records for all participating farmers.
4. Determine who should be Record-takers (promoters, Extension agents, specialized staff).
5. Design and test data schedules for taking field data.
6. Develop instructions for Record-makers.

7. Train and monitor Record-takers.
8. Set up data compilation and testing procedures.
9. Set up and supervise cost and returns analysis.
10. Interpret and report results, (a) back to individual promoters and farmers, and (b) to Ministry management staff.
11. Suggest adjustments to the Basic Grains and Crop Diversification projects based on analysis results.
12. Train (on-the-job) a corps of Ministry technical and statistical clerk staff in all aspects of Farm Records and Analysis.

D. PERIOD OF PROJECT

Two to four years.

E. DETAILED DESCRIPTION AND SUGGESTIONS

If the farmer does not have a significant net income response from participating in the program, he cannot be expected to continue. As a general rule of thumb, if his average annual net return per hectare over a five year period is not doubled (or even tripled), it is doubtful that he should be expected to take on the extra risks involved in utilizing significant amounts of credit for cash inputs.

Data Requirements

a. The only way to determine income effect with any degree of confidence is to obtain accurate data of all costs and returns involved in the enterprises<sup>1</sup> actually carried out by the farmers under the program.

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<sup>1</sup>The word "enterprise" is used here to distinguish the farm operation by separate production activities such as a field of corn, a vegetable patch, a cow or cows, a field of beans, etc., each one being an enterprise. "Activity" will be used to distinguish each separate step involved in the production process for the enterprise, such as preparation of land, applying fertilizer, planting seed, weeding, etc., for one enterprise. In some Latin countries, the equivalent terms are: Enterprise: Actividad, Activity: Tarea.

In fact, costs and returns for all of the farmer's enterprises should be included.

The farmer's net "whole farm" position may be unfavorable despite the fact that the improved enterprise shows acceptable net returns. This may be endemic in the farmer's other enterprises (i. e., they may be unprofitable) or it may be the result of neglect of his other enterprises, due to shifting family labor to the improved enterprise, or shifting of other factors away from his other enterprises to the improved enterprise.<sup>1</sup> In some cases, the farmer may blame the new improved enterprise for his real or imagined unimproved or worsened income situation, when, in fact, there are other causal factors not related to the improved enterprise at all.

It is recommended that costs and returns data be kept on all income or production enterprises of the farmer and his family, not just the improved enterprise.

b. Three sources of costs and returns data are needed:

1. The participating farmer

- a. the crop year just prior to his entry into the program.
- b. each crop year he participates.

2. "Control" farmers. A group of farmers who have farm characteristics (size, location, soil type, enterprises) similar to those who participate.

One way of choosing control farms is to randomly go to farms adjoining participating farms, rejecting those which do not roughly match farm characteristics of the participating farm.

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<sup>1</sup>In income terms, if added attention to his farm, due to the improved enterprise, forecloses the family opportunity (totally or partially) to work part-time - on a neighboring larger farm, selling produce at the local market, etc. - the income thereby foregone is a "cost" to the "improved activity", which can be accounted for by recording total labor use in the improved enterprise.

The control farmer group need not be as large as the total participating farmer group; probably a ratio of about one to ten would be satisfactory.<sup>1</sup>

The control group of farmers might need to be paid in order to obtain participation. It might be that control farmers cannot be induced to cooperate in a disciplined way. In such case, one would need to rely on the Record-takers' observations and conversations with non-participating farmers.

c. Cost Data should be kept separately for each distinguishable enterprise, i.e., each crop, each field and farm, i. e., each input, and, for labor, machine, or implement use. For example, if a farmer has (a) 10 manzanas of corn; (b) 15 manzanas of wheat, (c) three pigs and (d) a small vegetable patch, he has at least four enterprises. If his 10 manzanas of corn is in different fields (or the same field with considerably different physical characteristics such as slope, soil type, fertility level, etc.), it should be treated as separate enterprises. If the farmer has a generally uniform field of corn, but, on part of it, he uses one combination of factors, (type and amount of seed, type and amount of fertilizer, type and degree of weed control, etc.) and on another part, another combination, he has two distinguishable enterprises in the one field of corn, and the data thereon should be kept separately.

Within each enterprise, the amount and cost of each input should be recorded. Inputs are of three general types:

- (1) Cash or capital inputs: seed, fertilizer, and other chemicals -- if seed is used from last year's crop, a market value should be estimated.
- (2) Implement and machine use (direct costs and depreciation)

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<sup>1</sup>If records are kept only on a sample of the participating group, the control group sample probably will need to be about the same size, in order to cover the major stratifications.

(3) Labor (paid-hired, and family-unpaid) (paid family labor should be treated as paid-hired)

Items (2) and (3) must be recorded by activity step (tarea). For highland corn the steps might be:

- mulching or removing last year's crop debris
- land preparation
- starter fertilizer and other possible chemical application
- planting
- cultivating (weeding - perhaps post-emergence herbicide application)
- further fertilizer applications
- breaking over stalks for drying
- harvesting and carrying to storage
- shelling and restoring
- marketing (hauling, loading, unloading, etc.)

The Record-taker also should make a brief description as to how the farmer carried out the activity step (i.e., he used a hoe, a machete, a hand wheel cultivator, to do the weeding).

The exact steps will vary depending on the particular technology package and agronomic practices being applied. The ICTA and DIGESA technical personnel in each region can identify the specific steps.

d. Returns Data requirements appear to be very simple at first blush, but it is important to keep production records separate by each enterprise as defined above. Otherwise (for example) field data will be mixed from corn enterprises where different technologies were applied, etc.

e. How to collect the data is somewhat difficult to decide at this time. We would feel more comfortable with the advice of a farm records

collection and analysis expert, who has had recent experience both in the U.S. and in developing countries.

Based on our collective judgments, we feel there are three or four alternatives that should be considered:

1. make adjustments in the existing management information systems of DIGESA. The information forms would need to be modified to be able to obtain more disaggregated and more reliable data distinguished by enterprise.<sup>1</sup> A decision could be made, at least for the first year, to obtain data only on the improved enterprise, although this would be considerably less than satisfactory for the subsequent analysis.

Also, the forms should be designed in a booklet, with each input, each activity step, and each implement or machine use separately identified - perhaps, in order to provide the management information required on a timely basis, the farmer could keep a booklet in his possession, which is filled in as appropriate, each time the promoter visits him. The farmer having been instructed on the previous visit as to what information he will need to remember or note down. In the case of literate farmers, (he) might be able to enter the information right in the book. This booklet could have removable duplicates, which the promoter can remove once completed, and send in as his management report. This would require that each activity step be on a separate page, or at least grouped on pages to coincide with the promoter schedule of visits.

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<sup>1</sup>Both the initial data form and the progress data forms would need modification.

We have not attempted to make up a sample page since we have no background materials at hand for reference. There are examples of such data schedules for Latin small farmers,<sup>1</sup> and normal U.S. farm Record Books also would be useful in assisting on lay-out and design. The promoters will need to be trained as to the purpose of the data and how to take it, in order to assure as much data uniformity as possible. A set of Record-taker instructions will be required.

2. not try to obtain compatibility between the management information system and the analysis data requirements. Instead, there would be developed a separate Farm Record booklet which the promoter keeps for every participating farmer, plus a sample control group. This may be the more practical alternative in order that the present excellent management information system is not unduly distorted or diverted from its major purpose.
3. same as 2. above, but select a representative sample of participating farmers and a control group.
4. keep records only on a sample of participating farmers.

Alternative 2. is the one we feel should be attempted; 3. and 4. do not fulfill one of the major objectives of keeping records; i.e., allow each farmer to have access to knowledge of how improved technology and practices on his farm affects his income position.

#### Immediate Steps to Consider for Obtaining Results from the 1973 Crop Year

We see two possible approaches:

- a. Design the Farm Record Booklet and take data from the management

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<sup>1</sup>One which we have seen was developed in Peru by Dr. Enrique Viques, now with IICA in San Jose, Costa Rica.

information raw data forms for all (or a group of) participating farmers' "before" and "after" situations. Analyze that data for individual farms, rejecting those that appear to have patent gaps, duplications or inconsistencies. Do an aggregate analysis of the acceptable records.

b. Stratify participating farmers in the following order: location, size, crop, technology level used. Randomly select a sample from each stratification. Complete a farm record booklet to the extent possible from the management information. Then go to the field (promoter and farmer) and obtain recall information to fill in gaps, clarify questionable information, and to confirm information that on the face looks to be correct.

## ANNEX III

### OTHER ANALYSIS PROJECTS FOR CONSIDERATION

#### INTRODUCTION

The analysis projects suggested here probably would be carried out primarily by the Unidad Sectorial de Planificación of the Ministry of Agriculture, in collaboration with studies units of operating agencies.

#### 1. Employment Generation Analysis

This project is a logical policy analysis extension of the Farm analysis project described in Annex II. The Farm analysis should provide fairly good information for determining the on-farm employment generation prospects, and the group which will be benefited. Alternatives for employment generation possibilities should be oriented to those needing work in the central region, and analyzed for absorption potential for those who will not be absorbed on farms of the target group under the Basic Grains and Diversification projects.

Two groups of alternatives come to mind:

- a. Employment opportunities within the region,
- b. Employment opportunities elsewhere, both part-time migratory possibilities and permanent transfer.

Under the first, (a) potentials to be examined would include:

1. Medium and larger farm intensification in the area, using labor intensive technology.
2. Agro-industry (food processing, canning, etc.) Market analysis is important here. To the extent agro-industry of intensified crops is possible, there is a significant multiplier effect on employment back to the producer.

3. **Public Works** - a short-run alternative for carrying out planned (and accelerating execution of projected) road building, public buildings, engineering works, etc., with an intentional policy of using labor intensive methods (Note, for example, the Caminos Vecinales project in Colombia).
4. **Other industry** - especially small (even cottage type) industry based on primary materials of the region.
5. **Small farm intensification** - especially livestock such as hogs and chickens.

Under the second, (b) the employment generation effects of implanting a set of policies shifting coastal agriculture into labor intensive methods for intensive production. This would involve analysis of alternatives in land use policy, taxation policy, mechanization policy, resulting in shifts out of extensive agriculture (such as beef) on lands suitable for more intensive crop production. Forward and backward linking negative and positive impacts would need to be analyzed to determine net production, income and employment effects. For example, could beef production increase in areas not suited to intensive crop production, to offset the possible beef production loss caused by shifting into intensive crops on the south coast.

## 2. Price and Marketing Analysis

This includes analysis of comparative price relationships for basic grains, and perhaps other crops important for domestic consumption. Direct and cross price elasticities of both supply and demand would need to be developed for determining production price levels required for expanding production, pricing differentials for shifting regional crop mixes, etc.

This work probably should be organized and carried out jointly by INDECA and AID.

3. Risk and Uncertainty Analysis

Determine risk and uncertainty levels for different sizes of farm in different areas, different crops and different risks, for establishing production zoning policies, crop protection insurance, research priorities by zones, etc.

4. Credit Policy Analysis

Determine actual use of credit by different classes of farmers, source of credit and utilization. Examine existing obstacles to expanded commercial bank credit for crop production for domestic consumption, and analyze effects of alternatives for overcoming such obstacles.

5. Analysis of Crop Production Increase Alternatives

a. Area Expansion

On the basis of existing resource inventory information, estimate costs for alternative development and settlement methods by area and type of production.

b. Productivity per Hectare Increases.

Input-output price relationships analysis, discounted for risk and uncertainty. Analysis of subsidy alternatives for promoting input use: interest rate subsidy, input price subsidy, output price subsidy, government services expansion (such as the Basic grains and Diversification projects), etc.

## ANNEX IV

### SUGGESTIONS AS TO CONTENT OF TA PROGRAM

Our analysis suggests the following as the major areas of need to which AID technical assistance might appropriately be addressed:

1. The development of a program appraisal capability which is used for analysis of program results and strategy options and validity, to serve as a basis for course correction, strategy modification, and future planning. Such a function can most appropriately be performed at the Ministry of Agriculture level and, while related to the programming function now being performed by the Sector Planning Unit, should be sufficiently staffed, funded, and emphasized in its own right as not to become lost in the day to day programming activity.

Appropriate forms of such assistance might include:

- a. Budget support under the Rural Development Loan for strengthening the staff of the Sectorial Planning Unit.
  - b. The financing of full time experts on the staff of the Sectorial Planning Unit on the model of the assistance provided in connection with the DIGESA management information system.
  - c. The provision of short-term consultants to advise and assist on particular problems either as they arise or periodically.
  - d. The financing of special studies for appraisal of particular program aspects or problems, e.g. the effects of credit programs upon the incomes of particular types of farmers.
2. Pending the development of the appraisal and analysis capability mentioned above, the conduct of studies of the impact of, or gaps in, the coverage of, the current program. Examples of possible such studies include:

- a. Alternative means of increasing the incomes of small farmers not reached, or if reached not benefited, by the current programs of production credit and technical assistance.
  - b. Marketing as a constraint on accomplishment of plan objectives.
3. Continuation of assistance in the development and installation of internal management and management information systems in DIGESA.
4. Continuation of assistance to ICTA, with particular emphasis on farm and farm tested packages of technology, and economic considerations tailored to the characteristics of particular type farms and farmers which can be offered with confidence as to probable results.
5. Short-term training courses for promoters in farm management and the simplest farm accounting and farm economics.
6. Continuation of the program of technical assistance to cooperative federations.
7. Financing of assistance to BANDESA for experts in examination and processing of applications for credit.
8. Financing assistance to INDECA for short-term experts in the construction and management of grain storage facilities.