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TO: AID/W TOAID A- 57

FROM - GUATEMALA

SUBJECT - Project Evaluation Summary

REFERENCE -

TOR: MO/PA

Following is Project Evaluation Summary for Projects:

a. 520-L-018, Rural Development (Loan 018) 5200204

b. 520-L-024, Rural Credit and Cooperative Dev. (Loan 024) 5200226

c. 520-11-190-197, Agricultural Development (Grant 197)

d. 520-15-150-200.1 and 200.2, Cooperative Dev. (Grant 200.1 and 200.2)

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Put these 6 proj #'s in
rel proj field of BDIF
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BIBID fields

PAGE 1 OF 13 PAGES

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PROJECT EVALUATION SUMMARY

1. Mission or AID/W Office Name
   USAID/Guatemala

2. Project Number:
   a. 520-L-018
   b. 520-L-024
   c. 520-11-190-197 (originally 197.1 and 197.4)
   d. 520-15-150-200.1 and 200.2

3. Project Title:
   a. Rural Development (Loan 018)
   b. Rural Credit and Cooperative Development (Loan 024)
   c. Agricultural Development (Grant 197)
   d. Cooperative Development (Agriculture) (Grant 200.1 and 200.2) (Savings & Credit)

4. Key Project Dates (fiscal years)
   a. Project Agreement Signed:
      (1) 018: FY 1971: (July 17, 1970)
      (2) 024: FY 1974: (April 30, 1974)
      (3) 197: FY 1971: (Original PROPs dated Jan. 20, 1971)
      (4) 200: FY 1971: (Original PROPs dated June 1, 1970)
   b. Final Obligation Dates:
      (1) FY 76 (3) FY 75
      (2) FY 76 (4) FY 76
   c. Final Input Delivered:
      (1) FY 77 (3) FY 77
      (2) FY 76 (4) FY 77

5. Total U.S. funding - Life of Project:
   a. 018: $22,846,503.60 (Loan)
   b. 024: $ 4,500,000.00 (Loan)
   c. 197: $2,410,000.00 (Grant)
   d. 200: $2,232,000.00 (Grant)

6. Evaluation No.
   77-11

7. Period Covered by this Evaluation
   From: June, 1970 to August, 1977

8. Date of this Evaluation Review
   11-22-77

9. Action Decisions Reached at Evaluation Review, including items needing further study	10. Officer or Unit responsible for follow-up:	11. Date action to be completed:

12. Signatures: Project Officer
    Signature: [signature]
    Typed Name: Carl D. Koone
    Date: November 28, 1977

    Mission or AID/W Office Director
    Signature: [signature]
    Typed Name: Frederick H. Schieck
    Date: Nov. 29, 1977

13. SUMMARY -

This is a final evaluation of four interrelated projects (two loan and two grant - see Items two and three for project numbers and titles) for which final disbursements have been completed. These projects were to contribute to the general goals of increased production of food by small producers and improved small farmer incomes and well-being, especially in the highlands. Major project purposes included 1) substantial increase in the supply of production advice, credit and marketing services, 2) assist in strengthening of the cooperative movement to contribute to the objectives, and 3) assist in the re-organization and strengthening of the public agricultural sector (PAS), as a means to achieving the stated objectives.
Substantial progress has been made under the projects in achieving a reorganization of PAS institutions and in improving administration of the sector. Significant increases in budgetary allocations and substantial staff expansions are evident. Further, activitees of the PAS institutions are directed toward the common goal of improving the production and incomes of small and medium farmers. In addition, the Savings and Credit Federation (FENACOAC) and its affiliated cooperatives appear to have been substantially strengthened and expanded, and the scope and quality of their services considerably enhanced. An agricultural cooperative federation (FECOAR), and six regional affiliates have been established and are providing credit, input supply and some marketing and technical assistance services to their small farmer members. These activities have resulted in substantially increased numbers of small farmers receiving greatly enhanced amounts of credit and inputs, and, for wheat production only, marketing services.

It appears that the projects have been successful in achieving their institutional reorganization and development objectives both in the PAS and the Cooperative movement. However, available evidence does not permit a similar conclusion with regard to objectives of improving production, incomes and well-being of small farmers. The lack of an effective measuring device makes it difficult to determine with any precision exactly what the impacts have been on production and incomes on small farms. Data from several surveys is conflicting and inconclusive.

The inability of some institutions to provide effective marketing services and technical assistance responsive to income improvement needs of small farmers are identifiable shortcomings of the sector. In the PAS, there also remains considerable scope for improvement in the process of macro and micro information generation, analysis, and policy and investment planning for the sector.
These shortcoming appear to be critical constraints to the design and implementation of programs to continue the improvement of small farmer productivity, incomes and well-being. In summary, advances that have been made are <u>necessary</u> but not <u>sufficient</u> to achieve the overall goal of substantially increased production, incomes and well-being of small farmers in Guatemala.

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14. EVALUATION METHODOLOGY -

Various formal evaluations have been carried out for the projects in addition to Mission evaluation of activities and progress on a continuing basis. The formal evaluations to date include: a) A 1973-74 agricultural sector program evaluation carried out by an AID/W - outside consultant team which examined program effectiveness at the institutional level of the PAS, and observed apparent effects at the farm level. See "Inter-country Evaluation of Agriculture Sector Programs" Vol. 4, Guatemala, AID/LA/DP, June, 1974. b) Analysis of the results of a 1973/74 crop year representative sample survey of farmers receiving credit (and other services) under project assisted programs through the PAS. Several reports resulted from analysis of these survey data, the major ones being: (i) "Guatemala Farm Policy Analysis", Analytical Working Document No. 10, AID/LA/SA, April, 1975. (ii) "Descriptive Tables from the Guatemala Small Farmer Credit Survey, CWD No. 50. (iii) "A Closer Look at Some Statistics from the 1974 Guatemala Small Farm Survey, SWD No. 18. c) In 1975, an Institutional Study and a Farmer Survey were conducted to evaluate the effectiveness of AID assisted programs for cooperative and pre-cooperative groups. This resulted in a three Volume Report "Rural Cooperatives in Guatemala", American Technical Assistance Corporation, OAD-A-CR-132:
Volume I - Summary and General Recommendations, March, 1975.

Volume II - Evaluation Study team papers, November, 1975.

Volume III - Farmer Survey analysis (unpublished). d) In October, 1975, the Mission, with special consultant assistance, carried out a comprehensive evaluation of prior assistance as a part of project paper preparation for a proposed loan/grant program. This drew on previous evaluations plus an analysis of available reports and documentation of the various implementing institutions and agencies, interviews with GOG and cooperatives officials and staffs and visits to implementing agencies, offices and field locations.

The present final evaluation is an up-date of the October, 1975 evaluation, and a further review of program and financial documents and reports, both of AID and of the implementing institutions of the GOG and the Cooperative movement. A list of the major program and Evaluation Documentation is included as appendix A.

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15. LOOKING TO THE FUTURE -

These projects have been completed. However, findings of evaluations of this project have been and will be utilized in the design and development of the following new and proposed projects:

a. Small Farmer Improvement Project
Project paper submitted on 7/6/75, and authorized as Project 520-T-026
b. Small Farmer Marketing Project Paper, approved for funding on 7/29/77.
c. Rural Electrification (Pr approved by AID; pending loan authorization.
d. Small Farmer Diversification Systems (PID approved).

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16. External Factors -

The major factor, external to the projects, that has affected the potential to achieve the goal of improved production and incomes of small farmers, has been the world-wide substantial increase in relative prices for fertilizers, due to increased petroleum prices. This has resulted in 1) reduced net returns to fertilizer use in the production of basic grains, thereby making the profitability of the adoption of fertilizer-using technologies in basic grains production during most of the period more marginal than under previous price relationships, and 2) reduced margins and greater price risk to cooperatives in providing fertilizer to their members.

The cumulative effect of these factors, combined with overoptimistic initial costs and returns estimates, has been that earnings of cooperatives in the sale of fertilizers have not been as high as expected, and small farmer adoption of improved technology in basic grains production has not been as rapid as projected.

These facts, taken together with improved information concerning other constraints to small farmer income improvement, lead to the conclusion that significant improvement in small farmer incomes can be achieved more readily by shifting a part of their land to higher value, labor intensive (in terms of land) crops, developing accessible and stable markets for such production, and generating additional rural employment for those not sufficiently benefitted by such production shifts.

It also should be noted that the earthquake and subsequent reconstruction efforts have had a disrupting effect on on-going small farmer improvement programs, at least in terms of expanding production. However, it is likely that in terms of increasing incomes jobs created in the rural areas by massive reconstruction investments probably have had a greater positive effect than uninterrupted agricultural production improvement programs could have had.

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17. Findings Related to Goal/Sub-Goal Achievement -

The Sector Goal of substantially improved foodstuffs production and rural incomes, especially of small farmers in the Highlands, has remained basically unchanged, since the beginning of these projects in 1970/71. The predecessors

to the 1971 Agricultural Development PROP (i.e. 520-11-190-197.1 and 197.4) stated sub-goals as successful implementation of (1) production aspects of the basic grains and diversification program, and (2) human resources and institutional development aspects of the Guatemala rural development plan 1971-75, including the AID financed Rural Development Loan (520-L-018), but these were eliminated as sub-goals in 1973.

Evidence to date is inconclusive as to the nature and extent of project impact in terms of goal achievement. 1/ It is evident, however, that the experience gained under these projects has contributed greatly to an understanding of additional critical constraints to achievement of these goals for a significant part of the target group. Further, this evidence indicates that much of the progress on purposes of the projects has resulted in the establishment of conditions that are necessary for achieving the goals, although it appears that they have not been sufficient.

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1 Findings Related to Purpose Achievements -

Although the projects being evaluated are closely interrelated, purposes are sufficiently project-specific that they are listed separately below:

a. To develop a viable, effective and producer-oriented Guatemalan Savings and Credit Cooperative federation principally serving rural communities (520-15-150-200.1)
b. To develop available, effective, and farmer owned Guatemalan agricultural cooperative system in the Highlands area integrated into a federation, (520-13-150-200.2)
c. To increase the capability of the MinAg institutions to implement certain phases of the National Rural Development plan by providing Key inputs of technical assistance to public institutions whose performance is critical in reaching small and medium-sized farmers (520-11-190-197).
d. The introduction of modern technology to the processes of basic grains, diversified crops, and handicrafts production (520-L-180).
e. To assist in increasing rural productivity and income of small farmers; assist cooperative federations and development foundations attain their autonomy and financial viability and stimulate economic activity among small farmer groups; contribute to development of a rural financial infrastructure (520-L-024).
The evaluations of specific projects conclude that purposes (a),

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1/ Major findings of three project-related small farmer surveys conducted and analyzed between 1973 and 1977 are inconclusive in this respect. Summaries of the major findings of these surveys are included as Attachment I. These purpose achievements will be discussed in the next section.

(b), and (c), have been substantially achieved. The cooperative federations involved (FENACOAC and FECOAR) and their affiliates largely have achieved viability in financial terms and are providing extensive credit and input supply services to some 40,000 small farmers, primarily in the Highlands.

There is some doubt that these federations and their affiliates can sustain growth and viability unless they expand the scope and nature of their services in order to more effectively meet the expanded needs of their small farmer members. For example, presently the FECOAR cooperatives market only wheat for their members, and FENACOAC has marketed small amounts of garlic, and some apples. It appears that the most severe constraint to small farmer crop diversification, and resulting income improvement, is the lack of an accessible and stable market for such production. Thus, improved marketing services should be a high priority for future cooperative development.

Additionally, appropriate technical assistance in production, soil and water conservation and farm management still is not reaching cooperative members. Although some of the cooperatives are making more efforts to provide at least minimal technical assistance, they have taken little or no initiative to work out a system with the PAS to assure that their members receive the best available information, and guidance on how to apply it to their own unique conditions.

In order to capitalize on the progress cooperatives have made to date, and to maintain a viable expansion trajectory, they must offer services which address these constraints to their members. USAID has two recently approved projects and one proposal on the drawing board that will assist the cooperative movement to deal with these constraints. 1/

Only limited success has been achieved in realizing purpose (d). More fertilizer is being sold - 2/- and more farmers are using improved seed in basic grains production. However, the economic returns for these inputs appear to be marginal, especially for the smallest farmers. Further, since the smaller farmers generally consume the major basic grain (corn), instead of selling it, their production does not generate cash from sales to cover the cash cost of fertilizer and improved seed bought on credit. Thus, they are very reluctant to borrow in order to adopt improved technology for corn production.

Based on credit volume, diversified crop production has not increased significantly. However, based on vegetable seed use, area planted to warm and cool season vegetables has increased from 17,600 manzanas in 1967 to 31,600 manzanas in 1977. Actual loans for diversified crops under Loan 018 have amounted to less

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1/ a. 520-T-026, Small Farmer Development
b. 520-T-0238, Small Farmer Marketing System
c. 520-0255, Small Farm Diversification Systems

2/ Except in 1974-75 when high fertilizer prices temporarily reduced use.

than 50% of that originally programmed. The shortfall has been taken up in increased basic grains lending. There are indications that many small farmers are not willing to shift to diversified crops without assurance of a ready, stable market.

Lending for Artisanry production also suffered shortfalls. Although $625,000 originally had been allocated from Loan 018 for credit for artisans, less that $200,000 were loaned as late as 1974. By 1976, this amount had increased to slightly over $400,000.

Achievement of the institutional development aspects of project purpose has been largely successful, whereas attempts at measuring achievement of increased productivity and incomes for small farmers have been inconclusive. Reasons have been stated in the discussion of other purposes.
Specific information on rate of achievement of end-of-project status for each project is given in the attached evaluation reports. 1/

1[illegible]. Findings Related to Outputs and Inputs -

a. Outputs: In 1976, the last full year of operation of the projects to date, some significant results of project related efforts are as follows:

Outputs of BANDESA/DICFSA Credit/TA Program			
	Received Technical Assistance		Amount of Credit
	# Hectares	# Farmers	($000's)
1. Basic Grains	75,000	18,000	13,000,000
2. Diversified Crops	8,000	2,500	2,000,000
TOTALS	83,000	20,000	15,000,000 *

* Another $4,000,000 was outstanding in medium/long-term loans or overdue short-term loans.

In addition, FENACOAC and FECOAC provide services to nearly 40,000 farmer members. Of these, approximately 20,000 have received credit for agricultural production purposes. Approximately $[illegible],000,000 of AID loan funds were used for this purpose.

The most serious difficulty in the credit aspects of the projects has been delinquency rate. In BANDESA that rate runs approximately 75% of total loans outstanding.

1/ a. Evaluation of Prior Assistance, Guatemala, October, 1[illegible]
b. Rural Cooperatives in Guatemala, Vols I and II, ATAC, 11/75 and 3/76.

The situation is better in the cooperatives but still runs as high as 10% or more in several cooperatives. At the Federation level, overdue rates appear to be manageable at 5% to 8% (more than 60 days overdue), except that more recently, FENACOAC overdue rates have been increasing.

In the case of BANDESA lending, the AID assisted small farmer credit fund could quickly become decapitalized with such a high delinquency rate. To avoid this problem, such programs should be designed to include adequate bad debt reserve, collection and write-off policies, and should provide for host-government replacement of any capital losses from bad debts. In the short run, in Guatemala, BANDESA appears to have sufficient credit funds available for satisfying demand for credit demand not being met under present programs.

Another problem relates to interest rates. BANDESA, a state-owned bank, makes loans at highly subsidized rates (5% and 8% for basic grains and other small farmer uses, respectively). The GOG makes up any current operating losses to the bank, or the bank uses regular banking operations income to offset trust fund operating costs. The Cooperatives, on the other hand, must charge interest sufficient to cover operating costs. Although their nominal interest rate is 10-12% when other charges and mandatory share purchases are taken into account, the true rate is 16% or more. Thus, farmers who have a choice will tend to go to BANDESA, whereas other things being equal, they might be expected to do business with cooperatives. This impedes the normal development of the cooperative movement, and has little (and perhaps negative) long-run economic advantage for the farmer. A study commissioned by BANDESA reported the problem, but made no recommendations that would alleviate it. 1/

b. Inputs - Total AID funding to the projects are as follows:

(1)	Loan 018:	$ 32,846,503.60
(2)	Loan 024:	4,500,000.00
(3)	Grant 197:	2,410,000.00
(4)	Grant 200:	2,232,000.00
	Total Loan	27,346,503.60
	Total Grant	4,642,000.00
		$ 31,988,503.60

20. Unplanned Effects -
No significant unplanned effects were noted by the evaluations.

21. Changes in Design or Execution -

Although these projects now are terminated, the experience suggests certain design execution changes for future projects aimed at improving welfare of subsistence farmers.

1/ Memorandum from Commission named to study interest rates to BANDESA, No. 20, 1975.

a. For credit components, the problem of loan delinquency and subsidized interest rates should be taken into account at the program design stages as suggested in Section 19, a., above.
b. Where comprehensive institutional development is a necessary component of an overall development program effort, operational priority should be focused on information generation and analysis designed to provide detailed understanding of the characteristics of the target groups (geographic, resources, economic, social, attitudinal), a detailed profile of the nature of the constraints they face in attempting to improve their condition, and the development of policy and investment plans based on such information.
c. Operating programs should be initiated on a pilot basis, designed to include a strong target group participatory bias in implementation decisions, with base line and continuing performance data generation being a major component of resources use. As such pilot programs show workable systems for expanded operating programs, personnel should be trained by the pilot program personnel, both through formal and on-the-job means.

Implementation horizons must be expanded to a minimum of 5 to 6 years, permitting 2-3 years of pilot program experience and another 2-3 years of program expansion experience, before specialized technical assistance and funding inputs begin to be phased out.

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22. Lessons Learned -

Lessons learned have been summarized in Section 21, above. Suggestions for follow-on already are embodied in the project activities now being implemented (or designed), listed in the footnote in Section 13.

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23. Special Comments or Remarks -

The experience in Guatemala in carrying out these projects demonstrates that the Small Farmer Development Process is a long-term undertaking. It requires the recognition of multiple constraints and the implementation of activities that will alleviate these constraints to achieving improvements in productivity, income and well-being.

The nature of such constraints, and alternative solutions to alleviating them, can be determined only through a process of information generation, analysis and pilot testing on a continuous basis, with incremental improvements being achieved

in program effectiveness over considerable lengths of time. Expectations of measurable impacts on goals for the small farmer as a whole in less than five years is unrealistic, and significant changes, except perhaps for small numbers of direct beneficiaries, cannot be expected in less than ten years or more. For many LDC's the high initial costs associated with information generation, analysis and pilot testing will be difficult to accept. Similarly an incremental process from pilot project to full operation will tax the patience of nations who are being judged by their peers and their populace on development results.

APPENDIX A - MAJOR PROGRAM AND EVALUATION DOCUMENTS

1. Program documents

a. 520-L-018
- "Guatemala: Rural Development Loan"
Capital Assistance Paper, AID-DLC C/P p.881,
January 23, 1970.
- "Guatemala: Rural Development Loan," Loan agreement
No. 520-L-018, July 17, 1970.

b. 520-L-024
- "Guatemala, Rural Credit and Cooperative Development"
Capital Assistance Paper, AID-DLC/p/ 1080,
February 21, 1973.
- "Guatemala Rural Credit and Cooperative Development"
Loan Agreement No. 520-L-024, April 30, 1974.

c. 520-11-190-197
- "Agricultural Development (production)"
PROP, Project No. 520-11-190-197.1, Jan. 20, 1971.
- "Agricultural Development (Human Resources Training)"
PROP, Project No. 520-11-190-197.4, Jan. 20, 1971
- "Agricultural Development, Guatemala",
PROP, Project No. 520-11-190-197, Nov. 31, 1973

d. 520-15-995-200 (520-15-520-200.1; 520-15-150-200.2)
- "Cooperative Development" PROP, Project No. 520-15-995-200,
June 1, 1970.
- Cooperative Development (Savings and Credit)"
PROP, Project No. 520-15-150-200.1, Sept. 10, 1971
- "Cooperative Development (Agriculture)" PROP,
Project 520-15-150-200.2, Sept. 10, 1971
- "Cooperative Development (Agriculture)" PROP
revision, Project No. 520-15-150 - 200.2, Oct. 31, 1973

2. Evaluation Documents

a. "Intercountry Evaluation of Agriculture Sector Programs"
Vol. 4, Guatemala, AID/LA/DP, June, 1974 (attached)

b. "Guatemala Farm Policy Analysis", analytical Working Doc.
No. 10 AID/LA/SA, April, 1975 (attached)

c. Rural Cooperatives in Guatemala, ATAC, AID/CM - O.T. -
C-73, 198 w.o. 15.
- Vol. I "Summary and General Evaluation" March, 1976 (attached)
- Vol. II "Evaluation Team Study Papers", November 1975 (attached)
- Vol. III "Farm Survey Analysis" (unpublished)

d. "Evaluation of Prior Assistance" USAID/Guatemala, Oct. 1973 (attached)

ROSTER

ATTACHMENT I

SUMMARIES OF MAJOR FINDINGS OF THREE PROJECT RELATED SMALL FARMER SURVEYS CONDUCTED AND ANALYZED BETWEEN 1973 AND 1977.

USAID
Guatemala
September 1, 1977

I. Small Farmer BANDESA Credit Survey, 1973-74.

A. Summary of Sampling procedure.

A statistically representative sample by sub-region of 800 matched pairs of BANDESA credit clients and non-BANDESA small farmers were selected. BANDESA credit clients were randomly selected from lists maintained by BANDESA, but with a minimum of 50 for each sub-region. The DIGESA promotores who were responsible for the technical assistance to the selected BANDESA credit clients were asked to match them with similar non-BANDESA farmers nearby.

A large sub-sample of 3,000 BANDESA and 3,000 non-BANDESA farmers first were selected and then were randomly reduced to the 800 paired farmers for interviewing.

It should be noted that information from this sample is capable of demonstrating an association between credit and differences in income or output, but it cannot be relied upon to demonstrate that credit caused differences in such variables.

B. Summary of Major Findings

1. Small farms (under 3 hectares), with credit consistently show substantial output superiority over non-credit farms. This implies that higher output on smaller farms is associated with credit use, but it cannot be concluded that the higher output was caused by credit use.

2. The most significant source of increased output is derived from differences in crop composition, i.e., credit farmers raised substantially more higher value crops than did non-credit farmers.

3. Credit is instrumental in bringing idle cropland into production.

4. Yields on credit farms were, on the average, slightly lower than on non-credit farms.

5. Those farmers on the lowest end of the income scale make the most impressive income response to credit, i.e., the smaller credit farms in the poorest regions obtained much more income per person than did the comparable non-credit group.

6. Crop mix has a considerably greater potential impact on net income and employment generation among small farmers than does technology level. Therefore, technical assistance to promote crop diversification should be much more effective in improving the well-being of the rural poor than would be tech-

nical assistance to improve technology levels for basic grains. This leads to the conclusion that more priority should be given to investigating the feasibility of growing and selling alternative high value crops and encouraging crop diversification.

II. Small Farmer Survey - Rural Cooperatives, 1974-75

A. Summary of Sampling procedure

A sample of 601 small farmer members of Cooperative organizations in the Altiplano and 200 members of match groups (neighbors of coop members with farms of similar size), were interviewed.

The sample of coop members was drawn essentially randomly from cooperatives (or local groups within cooperatives) of FENACOAC, FECOAR, Fundación del Centavo, and independent coops with each farmer member then being selected from membership lists by use of random numbers. All coop members selected for interviewing had to meet three requirements: 1) Be a coop member (or Fundación del Centavo Association) in the Altiplano, 2) Have received a loan from the cooperative in 1974, and 3) Not own or farm more than 30 manzanas of land.

One non-member farmer was interviewed for every third member farmer interviewed. He was selected on the following basis: A farmer located nearest to the last member farmer interviewed and who (1) had a farm not more than 1/3 larger in size, or less than 1/3 smaller than the farmer member, and (2) was not a member of any agricultural cooperative or credit union.

Information from this sample is capable of demonstrating an association between membership, credit, technical assistance and/or perhaps other factors, and income or output, but it cannot be relied upon to demonstrate a cause and effect between such variables.

B. Summary of Major Findings

1. The average amount of total small farm family income earned from the farming operation varies from 46% for Fundación del Centavo members to 67% for FECOAR members.

2. For Fundación del Centavo members, higher use of fertilizer did not pay in net income terms as compared with non-member match group, although nearly all farmers in both groups use some fertilizer. The same conclusion applies to FECOAR and FENACOAC members when compared to their match group.

In the case of independent cooperative members, higher use of fertilizer did appear to pay when compared to the match group. However, their net income per manzana was less than that of FENACOMC and FECOAR members.

3. Agricultural diversification and credit do not appear to be strongly associated.

4. Average net income per manzana is four times higher for farmers whose principal crop is vegetables as compared to farmers whose principal crop is corn or wheat.

5. Farmers who used chemical fertilizer averaged less net income per manzana (average for all crops), than did those who used no fertilizer.

6. There appears to be no relationship between proximity to roads and income per manzana.

7. More than half the farmers studied expressed an interest in receiving kinds of technical assistance other than that related to cultivation of corn.

8. No close association was found between credit and amount of labor used per manzana although credit users do hire somewhat more non-family labor.

III. Farmer Survey, 1977 (O'Sullivan Study)

A. Summary of Sampling procedure

Two municipalities in each of three departments (Sololá, Quezaltenango, San Marcos), with the highest (and two with the lowest) percentage of male population between 15 and 45 years of age that had been "attended" during the 1975-76 crop by DIGESA, DANDESA, Gremial de Trigueros or a cooperative were selected. The two highest were classified as "attended" and the two lowest as non-attended. Two communities (from each of the attended municipalities), showing the highest percentage of attended, as defined above, were selected, and two communities were selected randomly from the non-attended municipalities.

250 attended farmers from the resulting 14 attended communities, and 350 non-attended farmers from the resulting non-attended communities, were selected randomly for interviewing.

Information gathered from this sample is of questionable utility in determining the effect of technical assistance on farmer output and income.

Other variables such as access to markets, size of farm, quality of land, etc., would need to be held constant in order to determine the impact of technical assistance.

B. Summary of Major Findings

1. Of the attended groups, 54% lived in a community that had been visited by an agricultural technician at least once, and 40% had personally talked to the technician. Only 11% (about one-fourth of those who had personal contact), felt they had been helped significantly by the technician.

In the case of non-attended farmers, 83% said there had been no visit by an agricultural technician, and only 6% said they had talked to one, with 2% (one third of those with personal contact) indicating they had been helped significantly.

2. Preliminary analysis indicated that 50% of the attended farm families have an average net annual income per capita sources of Q50.00 while the non-attended have only Q30.00 per capita.

3. Average gross income (from the whole farm) from crop and livestock production for attended farmers was Q476 and for non-attended farmers Q117. The average cultivated area for attended farmers was 59 cuerdas and for non-attended, 20 cuerdas. Their average income per cuerda was Q8.00 for attended and Q5.85 for non-attended farmers.

4. 20% of attended and 44% of non-attended farmers reported losses in their farming operation, with the range of losses for attended farmers being the greatest. The level of agricultural income for a considerable segment of small farmers is similar for attended and non-attended. This seems to indicate that attended small farmers appear to improve their incomes mainly from sources other than farming.

5. 92% of attended farmers use chemical fertilizers whereas only 56% of non-attended farmers do so.

6. Despite the use of appropriate technology and modern inputs, significant changes in the living condition of a small farmer who raises only basic grains cannot be achieved.