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Appraisal of an Integrated Rural Development Project - Pider II Mexico

May 31, 1977

Agriculture and Rural Development Department

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CURRENCY EQUIVALENTS

US\$1	=	Mex\$22.5
Mex\$1	=	US\$0.04
Mex\$1 million	=	US\$44,444

WEIGHTS AND MEASURES

1 hectare (ha)	=	2.47 acres=10,000 m ²
1 kilometer (km)	=	0.62 miles
1 square kilom. (km ²)	=	0.39 sq. miles = 100 ha
1 kilogram (kg)	=	2.20 pounds
1 liter (l)	=	0.26 gallons
1,000 kg =1 metric ton	=	0.98 long ton

GLOSSARY OF ABBREVIATIONS

BANRURAL	-	National Rural Credit Bank
BANXICO	-	Bank of Mexico
CAFFCE	-	Administrative Committee of the Federal Program for Construction of Schools
CFE	-	Federal Commission for Electricity
CIDER	-	Research Center for Rural Development
CONAZA	-	Arid Zones Commission
CONAFRUT	-	National Fruit Development Commission
CONASUPO	-	National Company for Popular Subsistence
FIRA (FONDO)	-	Guarantee Fund for Development of Agriculture, Livestock and Aviculture
Hacienda	-	Ministry of Finance
IDB	-	Inter-American Development Bank
INI	-	National Institute for Indian Affairs
INIA	-	National Institute for Agricultural Research
NAFIN	-	National Financiera
Patrimonio	-	Secretariat of National Patrimony
PIDER	-	Investment Program for Rural Development
PRONDAAT	-	National Program for Extension in Rainfed Areas
SAG	-	the ex-Secretariat of Agriculture
SAHOP	-	Secretariat of Human Settlements and Public Works
SARH	-	Secretariat of Agriculture and Water Resources
SOFE	-	Sub-Department of the Ejidal Development Office
SPP	-	Secretariat of Programming and Budgeting
SRH	-	the ex-Secretariat of Water Resources
SRA	-	Secretariat of Land Reform
SSA	-	Secretariat of Health and Social Assistance

FISCAL YEAR

January 1 - December 31

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This appraisal report is based on the findings of a mission which visited Mexico in July-August 1976, composed of A. Schumacher, D. Lindheim, C. Lindahl, N. Barry, S. Draper, B. Mitchell and R. Skolnick (Bank) and C. Chisholm, E. Cifuentes, L. Jarvis and G. Schramm (consultants). Messrs. Schumacher and Lindheim visited Mexico with J. Austin (consultant) in November 1976.

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MAP

IBRD 12783 Rural Development Project - PIDER II

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER II

SUMMARY

i. Mexico has requested further Bank support for its ongoing national rural development program (PIDER). PIDER, established in 1973, is one of a number of Mexican efforts to raise incomes and improve living standards of its rural poor. To date about US\$471 million has been invested through PIDER in 86 micro-regions ^{1/}, about 1.8% of the total public investment budget during this period. A further US\$700 million is programmed for the 1977-1982 period making the total investment about US\$1.2 billion over the full 1973-1982 period. A considerable number of the approximately 4 million persons who live in these regions have already benefited directly or indirectly from PIDER investments. The Bank PIDER I Project (Loan 1110-ME) provides US\$110 million in support of development programs in 30 micro-regions; an IDB loan provides US\$40 million in support of a further 15 micro-regions. Disbursements from these loans financed the equivalent of about 12% of the PIDER budget in 1975 and 1976. The second Bank loan now proposed would raise the level of external support to the PIDER program to about 25% over the 1977-1979 period.

ii. PIDER was initiated as part of a wider Mexican effort to address the economic imbalances created during the past decades. Mexican agriculture achieved a 4% annual rate of growth between 1940-1965 - among the highest in Latin America. Since 1967, however, the growth rate in agricultural production has slowed markedly to about 1.8 percent per year. Even during the period of rapid growth, the bulk of the rural population was little affected. Most growth came from larger farmers, many with irrigated holdings, among whom agricultural investment and services were largely concentrated. The productive potential of smaller producers especially those farming rainfed plots in more isolated areas, was largely ignored. The PIDER machinery was created to integrate and expand government rural development activities to develop this smaller producer potential. Actions under PIDER now encompass productive infrastructure, credit, inputs, extension, all-weather roads, and marketing facilities, together with education and other amenities, such as safe drinking water supplies. The basis for investment programming is a micro-region plan. Eighty six plans are currently being implemented, a number expected to increase to 100 by the end of 1977.

iii. PIDER has been instrumental in securing considerable institutional change. A major accomplishment was the reform of the agriculture extension service that PIDER succeeded in introducing in its micro-regions. This reform is now being institutionalized as a pilot program for the entire Mexican extension service. Further institutional reforms include: strengthening of the federal level Secretariat in which PIDER operates; decentralization of resource control to the state level; improved inter-agency coordination at

^{1/} Micro-regions comprise an average of 50,000 persons located in two to seven contiguous rural municipalities within a state. They are selected using criteria that balance poverty levels (per capita incomes averaging below US\$100) with potential for income increasing productive activities.

the local level; the creation of a professional evaluation agency (CIDER); and the increasing participation of local communities in the investment decision-making process. PIDER has also supported various technical innovations designed for small farmer use including trickle irrigation systems (with buckets), maize silage storage units, and small stock programs.

iv. Despite PIDER's early success, there is scope for improvement. PIDER management and staff are aware of the deficiencies and are taking actions to remedy them. The Bank has established and maintained an effective dialogue on the PIDER program through project preparation of PIDER I and PIDER II and through supervision of PIDER I. The proposed project would strengthen the basis for this dialogue with the new Administration and help introduce a number of further reforms in PIDER.

v. The proposed project would help finance programmed investment and associated requirements in some 20 micro-regions additional to those 30 whose development is already supported under PIDER I. The programmed investments, and the development plan for each micro-region, were prepared by PIDER for Bank appraisal. The scope of the proposed project is in line with support provided under PIDER I; however, a rural industry element has been added. For institutional reasons, and poor performance under PIDER I, it is not proposed to support investments in the rural health system under this PIDER II project. The major part (70%) of the project would be channeled into productive investments in livestock, irrigation, rural industries, fruit production, soil and water conservation, and associated farm development credit. Support would also be extended for the development of feeder roads, markets, extension services, electrification, and farmer organization efforts (20%). Investment in social infrastructure (9%) would include construction of primary education facilities and drinking water facilities, and provide materials for self-help projects on a local initiative basis. The Project would also include evaluation and training of project management.

vi. The project would be carried out by some 14 federal and state agencies. At the Federal level, PIDER policy is developed and coordinated through the Directorate of Promotion and Regional Operations of the Secretariat of Programming and Budgeting (SPP). This Directorate is supported by a Sub-Directorate for Rural Development (i.e., PIDER) with a staff of some 95 technicians responsible for: reviewing investment plans, management operations, and investment monitoring. At the state level, coordination of the PIDER program is handled by a Coordinating Committee consisting of the state level directors of the participating agencies under the chairmanship of the state governor. Management is the responsibility of the new state level SPP representative who is the technical secretary of the State Committee. The SPP representative is assisted by a technical secretariat of professionals including a state level PIDER Coordinator and resident Coordinators for each of the states' micro-regions who work closely with local elected officials and community leaders.

vii. Total costs of the project are estimated at US\$255 million equivalent, including US\$46 million of foreign exchange component. The proposed loan of US\$120 million would finance the full foreign exchange costs plus US\$74 million in local currency, equivalent to 35% of local currency requirements. International competitive bidding would be restricted to single

contracts over US\$250,000. Local competitive bidding, negotiated contracts and force account would be applied for individual works below this amount in accordance with established government procedures which are satisfactory.

viii. The project would benefit areas with a total rural population of about 1 million. Beneficiaries targeted for project support have family incomes ranging from US\$250 to US\$750, placing them in the lower 50% in the rural sector. Under the proposed project, about 46,000 farm families would benefit from directly productive activities. Some 32,000 farmers (190,000 people) would be expected to achieve a near doubling of income over a period of eight years. The incomes of an additional 14,000 farmers benefiting from the 34,000 ha to be irrigated would be expected to triple from present levels at full development. Some 200,000 people would have access to improved rural infrastructure; about 65,000 man-years of temporary employment and 30,000 permanent jobs would be created. Annual production increases resulting from project investment have been estimated as follows: maize (200,000 tons), beans (40,000 tons), beef (25,000 tons), honey (200 tons) and fruit and vegetables (10,000 tons). About half of the increment of maize and bean production would be consumed by the producers, the remainder being marketed for internal consumption in Mexico. Typical village development models in representative micro-regions show financial rates of return on directly productive activities averaging 21%, varying from 11% to 33%. Economic rates of return on productive investments average 24%, and from 13% to 36%. Social infrastructure such as schools and drinking water would improve basic literacy and health levels. Beneficiaries would contribute between 10% and 30% of investment costs for the productive investments in cash, labor or kind, 15% to drinking water supplies, and would meet all operation and maintenance costs. Contributions would be made toward the cost of education facilities. In all, some 39% of total project cost would be recovered from beneficiaries.

ix. The project has risks. First, while the estimated micro-region rates of return embody reasonable expectations about outcomes, the caliber of state and local leadership and staff involved under the program bears importantly on these outcomes. This conclusion is based on PIDER I experience where results varied between regions. Second, after only two years of experience since program inception, farmer response to the new technological packages is still not definitive. In some micro-regions under the ongoing program, response has exceeded expectations; in others not. Improved field demonstration, closely tied with strengthened extension efforts, would help improve farmer response rates and would be supported under the project now proposed. These risks are substantially reduced, however, by strong management. Experience to date indicates considerable PIDER management capability to respond to problems and to take appropriate actions. Also, CIDER, the Rural Development Research Center, will continue to undertake a substantial evaluation effort. The Government has shown a high degree of flexibility in the execution of the program.

x. The expanded PIDER program represents a reinforcement of Mexico's commitment to raise levels of living among a relatively large number of rural poor. Major new efforts towards increasing small farmer productivity have been initiated, with PIDER taking the lead in generating improvements in the key agencies dealing with the rural poor. The Government is expected to continue this commitment to improving conditions of the rural poor through PIDER and other rural development programs.

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER II

I. INTRODUCTION

1.01 The Government of Mexico continues to give priority to raising the productive capacity of many of its 12 million rural poor (per capita incomes less than US\$100) who make up over 50% of the rural, and 20% of the total population. Emphasis is being given to making investments in regions where there are large numbers of small farmers and where sufficient productive potential has been identified for raising farmer incomes. A program to integrate and focus agency activity on specific micro-regions of rural poverty is being implemented. This program, PIDER (Investment Program for Rural Development), was initiated in 1973 and is now in operation in some 86 micro-regions.

1.02 Early in PIDER's development (1973), the Government requested IBRD support to the PIDER program. A loan for US\$110 million was approved by the Bank in May 1975 to assist activities in 30 micro-regions (PIDER I). ^{1/} The Government has now requested a second loan to support activities in an additional 20 micro-regions (PIDER II). With this loan, a total of 65 micro-regions would be receiving external assistance. The Government would continue to provide the major resources required, however, as external support provided by the IBRD and IDB covers only a small proportion of the PIDER program's overall costs. PIDER's 1973-1976 total investment was US\$471 million of which external agencies provided US\$30 million or 6%. For the 1977-1980 period, with the Project, the external share in the overall PIDER program would rise to about 25%. The IBRD share in the 1973-76 program was 5.7%. For 1977-1980, with the proposed loan, it is projected at 20%.

1.03 Fourteen IBRD projects totalling US\$904 million have been previously approved for agricultural and rural development projects; 35% of Bank lending in Mexico. The bulk of these loans have been for the development of irrigation and the provision of agricultural credit. Performance under these projects with two exceptions has been satisfactory.

^{1/} The Inter-American Development Bank (IDB) is supporting the program in an additional 15 micro-regions.

II. BACKGROUND

A. Development of the Rural Sector

2.01 Mexico's efforts to develop its rural areas have featured two major themes in recent decades: growth in agricultural production and consolidation of land reform efforts begun following the 1910 revolution. In the period from 1940 to 1965, Mexican agricultural production more than tripled, making its growth rate among the highest in Latin America. In addition, more than half of all arable and pasture lands were distributed to previously landless families. Income inequalities widened, however, as the economy was unable to provide employment for the poorer sectors of the rural population, particularly those living in rainfed agricultural areas. Since 1967, the growth rate in agricultural production has slowed markedly to about 1.8% per year despite a continuing increase in internal demand. Mexico has become a major importer of milk powder and dairy stock and, over the last three years, a net importer of basic grains, especially corn.

2.02 In 1973, when the last full survey was undertaken, the average family income in Mexico was estimated at US\$2,700. Over 50% of the rural, and 20% of the total population, however, had incomes of less than US\$500 per family. 1/ At least one half of the agricultural labor force is now landless, with many others having rights in ejidos 2/ too small to provide an adequate living. 3/

2.03 In the early 1970s, the Government began to reassess its rural growth and development strategies. As a result, government budgets were re-programmed to provide substantial increases in allocations for technical assistance, research, infrastructure and credit toward the rural sector. Producer price incentives were also substantially increased.

1/ Government estimates that a minimum acceptable living standard for rural families requires the equivalent of US\$960 per family per year.

2/ The term is derived from the Spanish equivalent of the village common, based on the concept that the land reform returned the usurped village lands to their rightful owners - the farmers, called "ejidatarios".

3/ Government will not resolve the rural employment problems through PIDER or related rural development programs. The potential for the expansion of arable land is limited. Current estimates indicate that Mexico can only increase its land under cultivation from the present 22 million ha. to 30 million ha. (rainfed), and from 4 million ha. to 8 million ha. (irrigated). Over the longer term, off-farm rural or ultimately urban employment is required. The project includes a pilot program for rural industrialization (para. 3.19).

2.04 The major efforts were undertaken by five groups: (i) the President's office commissioned task forces to develop policies for achieving self-sufficiency in basic grains and for investments to assist the rural poor. These study groups were later institutionalized as major coordinating entities (COCOSA and PIDER) within the office of the President; (ii) the Secretariat of Public Works (SOP) began implementation of a nation-wide program of labor-intensive feeder road construction in 1971. Five years later some 70,000 miles of roads had been constructed, giving temporary employment to some 190,000 rural persons; (iii) the Secretariat of Hydraulic Resources (SRH) further extended its major program to develop the irrigation potential of substantial numbers of small farmers. SRH developed new criteria and adapted technologies for small scale irrigation; (iv) the Agrarian Reform Department undertook a complete review of legislation affecting ejido farming and reviewed its own procedures affecting the granting of titles. A new Agrarian law was passed in 1971 and a new Secretariat of Agrarian Reform (SRA) was created in 1974; finally, (v) the Bank of Mexico, operating through its agricultural credit agency, FIRA, following a study of credit systems oriented to small farmers, promulgated new regulations to encourage the banking system to intensify its actions with smaller farmers. Other agencies, such as CONASUPO (food marketing) and CFE (Federal Electricity Commission) also reworked their investment and operating criteria to increase their efforts in poorer rural areas. In summary, creative talent in many agencies was released to focus on the problems of rural development.

The PIDER Program

2.05 To coordinate and focus these efforts in the most needy areas, a new rural development program was developed. Micro-regions ^{1/}, with a high concentration of the rural poor, were chosen and specific micro-regional plans and investment programs prepared. A goal was set to develop 100 such regions, and a capital expenditure of US\$1.2 billion was programmed. By 1977, investment programs were being implemented in 86 micro-regions, and expenditure had amounted to US\$471 million; this represents about 1.8% of Mexico's public investment budget during this period. These investments cover a variety of activities, principally directly productive and productive support activities, but also including social infrastructure. In total, some 6,500 communities, representing some 4 million persons, are in regions already benefiting under the program. Over the period 1977-1982 an additional US\$700 million of public investment is to be allocated to further develop the microregion program. Some 5 million rural persons are expected to benefit when the program is complete: about 25% of the rural population.

^{1/} Micro-regions comprise an average of 50,000 poor persons located in two to seven contiguous rural municipalities within a state. They are selected using criteria that balance poverty levels (per capita incomes averaging below US\$100) with potential for income increasing productive activities.

2.06 PIDER has been instrumental in bringing about far reaching and much needed institutional change. The implementation capacity of the many agencies involved under PIDER was increased and activities were directed towards improvement in the productivity and living conditions of the rural poor. The program is now well known and is viewed as highly successful both at local and federal governmental levels. Its continuation under the new Administration is assured. Applications are pending from municipalities and states for the creation of substantial numbers of additional micro-regions. PIDER, however, has now embarked on a period of consolidation with expansion of micro-region programs to be halted at the 100 micro-region level. As a result of PIDER, for the first time inter-agency coordination is occurring at the local level; both for PIDER and now also for the traditional agency programs. Control of PIDER funds has been decentralized to the state level increasing flexibility in program execution and making the program more responsive to local farmer needs. The success of PIDER decentralization led the new administration in early 1977 to decentralize control over the execution of most public investments. In addition, as a result of initial PIDER experiences, agencies have undergone internal reorganization. For example, the reorganization of the national extension service was initiated in response to PIDER efforts. PIDER has been a vehicle for facilitating the testing and introduction of a variety of new technical packages developed for small farmer applications including: (i) the PRONDAAT 1/ extension system, now underway in 15 micro-regions; (ii) improved farm storage, irrigation, pasture development and soil management techniques in drier areas; and (iii) wider introduction of small stock, especially rabbits, chickens, goats and beekeeping on project farms.

C. Progress Under PIDER I

2.07 Assessments of PIDER I performance are interrelated with assessments of the performance of the entire PIDER program. With few exceptions, actions taken to improve on PIDER I micro-regions have been applied program-wide. Similarly, improvements in program-wide actions directly affect the PIDER I micro-regions. Moreover, the intent of the PIDER I Project was not only to achieve success in the 30 PIDER I micro-regions; but also to bring about improvements in the program as a whole.

2.08 Since loan signing in May 1975, three Bank supervision missions have reported on project progress. These have deemed progress satisfactory, though various factors external to the Project (elections, budget reduction, devaluation) caused a slowdown in 1976. The perception of PIDER at both community and governmental levels is positive and the program's role in the new Administration is assured with a substantially increased budget from Mex\$2 billion in 1976 to Mex\$3.3 billion in 1977.

1/ PRONDAAT is a National Program for Development of Agriculture in Rainfed areas.

2.09 Thus far, with project implementation only half completed, over 14,000 ha have been irrigated. Over 100 cattle and smallstock units have been constructed including the establishment of 5,000 ha of improved pasture. Additionally, some 220 beekeeping units have been provided. In the majority of cattle units assisted through the project, additional pasture development and infrastructure are being financed directly through credit - public expenditures being limited to an initial pilot area of about 4 ha of pasture per family. Over 1,700 km of feeder road have been constructed; 270 villages electrified; and 260 villages provided with drinking water. Infrastructure investments in many areas have provided considerable temporary rural employment and in some cases have also resulted in substantial wage increases.

2.10 In general, it is too early to assess the full impact of the project on farmer production and income; only two years of an estimated eight-year period to full development have elapsed. In areas where the reformed extension service (PRONDAAT) is in operation, production and income increases are apparent and generally above appraisal estimates. In areas still served by the traditional extension systems, progress is slower - in many cases the PIDER supported services represent the first contacts small farmers have had with technical assistance. However, these efforts - and the PIDER investments they generate - are creating the basis for the organization of small farmers to enable them to gain a greater share of the value of their production. In a number of instances, farmgate prices and farmer incomes have substantially increased following feeder road investments.

2.11 Despite early PIDER success, there is scope for further improvement. The program has given primary attention to establishing new micro-region programs and to implementing investments in these regions. Less attention has been given to the participation of communities in the decision-making process, and less still to the operation and maintenance of investments once construction is finished. Insufficient emphasis has been given to the marketing aspects of the expected production increases resulting from PIDER investments, especially for products other than the traditional corn and bean crops. Credit made available through the banking sector needs to be better integrated with PIDER investment activity.

2.12 PIDER and CIDER staff are aware of the deficiencies and recognize that continued improvements in the organization and training of the extension and agrarian reform staff are needed to achieve full use of PIDER-financed physical investment. Important changes are being made in the operations of both SRA and SAG Extension, the principal groups responsible. Allocations to these agencies are now contingent on PIDER approved annual work programs and projections of expected results. CIDER has also recommended that commitments be made by community beneficiaries for the operation of both production and social infrastructure investments prior to construction. CIDER insists that the root cause of poor operation and maintenance is the lack of small farmer participation in the early stages of programming. They also insist on

the need for formal participation of FIRA in PIDER programming and execution to ensure the availability of credit for the operation and expansion of productive investments.

III. THE PROJECT

A. General

3.01 The principal project objective is to reinforce PIDER efforts to raise income, production and employment levels of the rural poor living in 20 selected micro-regions. 1/ The project would also improve social services and facilities for persons living in these regions.

3.02 Under the project, attention would focus on reforms which affect the PIDER program as a whole, including: (i) increasing effectiveness of extension, credit and farmer organization services; (ii) improving the operation and maintenance of existing infrastructure; (iii) strengthening PIDER capability to address specific sectoral issues; and (iv) providing resources for feasibility studies for productive investments and evaluation services. In addition, as compared with the first PIDER project, the proposed project would include a larger portion of directly productive investments, a rural industries component would be included, and soil conservation efforts would be strengthened.

3.03 Micro-region Selection Criteria and Programming. For selection and support under the Project, micro-regions are required to be poor, have productive potential, and lack basic infrastructure for exploiting this potential. PIDER uses various threshold levels involving population density, poverty, unemployment, and productive potential in the selection process. Selection of the 20 micro-regions to receive Bank support was based on a number of factors including: the quality of the micro-region investment program (i.e. the nature and composition of the programmed investments); quality of micro-region staffing and organization; the potential for innovative yet replicable programs within and between micro-regions; and the expectation of acceptable economic returns to investments.

1/ PIDER started operations in 17 of these regions during 1975 and 1976. Three are being started in 1977. None have received external financial support to date. All were reprogrammed or programmed in 1976 to qualify for such support.

3.04 The micro-region plans involve inputs from local and federal technicians and from the local communities. Detailed baseline surveys are undertaken by agency staff involving socio-economic data, technical data and surveys of resources and existing infrastructure. During visits to the village communities, the relevant data are checked and refined. At the same time PIDER objectives and strategies are explained and local priorities established. The investment program is then assessed through analyses of need (income, employment, and basic services) and available resources, both human and natural (e.g. existence of groundwater, soils, etc.). After review, the village programs are aggregated to form the micro-region development program.

3.05 A number of improvements in programming methodology have been made with CIDER assistance during the first PIDER project. CIDER is now training PIDER field teams in a revised programming methodology which gives more local control to determining the annual investment programs. As part of PIDER II, more frequent reprogramming of micro-region plans would be undertaken and additional emphasis given to detailed project feasibility studies.

B. Brief Description

a. Directly Productive Investments (70%)

3.06 The project would intensify support for infrastructure for livestock units (including smallstock development), small-scale irrigation, soil and water conservation, fruit production, forestry and fisheries development, and rural industries; and through development credit support to on-farm development, especially relating to livestock, fruit production and irrigation investments.

b. Productive Support Investments (20%)

3.07 Investments are included to reinforce improvements in the agrarian reform and extension services (including field demonstration plot development), marketing, store construction and electrification. The project would also support funds for feasibility studies for further project development.

c. Social Infrastructure (9%)

3.08 Improved drinking water supplies, materials for self-help village improvement projects and construction of primary schools would be provided.

d. Evaluation (.4%)

3.09 The activities of CIDER would be supported. CIDER would carry out inter alia project-related evaluation, field research, and field staff training.

C. Detailed Features

1. Directly Productive Activities

3.10 Irrigation (16%). Currently, some 50% of Mexico's crop production and between 90-95% of such basic food crops as wheat, soybeans and tomatoes depend on irrigation. About 60% of total public agricultural investment has been allocated to irrigation.

3.11 The project would develop 34,000 ha of irrigated land at an average cost of US\$1,400 per ha (see Annex 3c) and would directly benefit some 14,000 families. Construction would be carried out mainly by SARH, using the specialized OHDR (Rural Development Irrigation Works) Department. The principal activities to be supported include small dam construction, tubewells, pumps, and distribution facilities. In some cases, existing facilities are to be rehabilitated, old gas engines replaced by electric powered pumps following village electrification, and earth canals lined with concrete for improved water efficiency.

3.12 Prior to construction, technical and socio-economic feasibility studies would be carried out for each proposed irrigation project in accord with existing SARH guidelines, which are acceptable. Assurances that these procedures would continue to be followed by SARH would be sought at negotiations.

3.13 Under PIDER I, irrigation investment criteria were developed to avoid expensive investments and to ensure an equitable distribution of project benefits. For small irrigation projects up to 25 ha., investment was limited to the peso equivalent of US\$4,000 per family with total project costs not to exceed the equivalent of US\$32,000 with a minimum of eight family beneficiaries. The average investment cost for irrigation under PIDER I was US\$3,600 per family (equivalent to US\$1,200 per ha with an average hectareage per family of three hectares).

3.14 Under the project a total cost ceiling of US\$32,000 would be continued for small-scale irrigation projects of 25 ha or less - and a US\$5,000 equivalent per family limit would be imposed. For all projects a per ha cost ceiling of US\$2,500 equivalent would be introduced. Eligibility would be limited to families with pre-project net agricultural incomes not to exceed the equivalent of US\$2,500. Assurances were obtained at negotiations on these limits.

3.15 Maintenance would be the responsibility of investment beneficiaries who are organized in "irrigation units" and assisted by SARH. Government would generally recover about 10% of the investment cost of irrigation works; and where reasonable based on beneficiary repayment capacity, Government would seek to recover additional amounts of the investment cost: cost of pumps and pipes, for example, would be recovered through credit.

3.16 Farm Development Credit (24%). Increased lending to small farmers has been supported under the Bank's fourth and fifth credit loans. Both public (BANRURAL) and private banks have made loans to small farmers under the criteria established by FIRA, and supported by the Bank. Under the first PIDER loan these same criteria were followed. Credit was provided to the micro-regions supported by the loan; it was not, however, restricted to supporting infrastructure investments made by PIDER. This policy would be continued under the proposed project. While the number of small farmers receiving credit has substantially increased over the last four years (from 20,000 to 80,000), over 75% of Mexico's small farmers are still without access to institutional seasonal or investment credit.

3.17 Under PIDER I, the performance of the credit component was adversely affected by the poor coordination between PIDER and FIRA offices. FIRA was not formally included in the monthly state-level PIDER meetings and felt itself only a marginal participant in the program. PIDER staff saw credit as important but not their responsibility and thus not directly related to the PIDER program. Bank supervision missions brought both groups together on various occasions in attempts to bring about a better mutual understanding between the groups. Considerable progress was eventually made and, as a result of the first PIDER loan, investment agency and bank coordination was begun at the state level. Increasingly, PIDER has been adopting FIRA investment criteria in the programming of on-farm directly productive investments, such as livestock projects. PIDER field staff now find such coordination indispensable for the proper operation of the program and are insisting on the formal participation of the FIRA at the state and local levels to ensure that investments programmed and implemented by PIDER meet FIRA criteria for additional financing. A formal agreement, defining the obligations and responsibilities of each group, has now been signed between PIDER and FIRA which provides inter alia for: (i) mechanisms for formal coordination including periodic meetings, information exchange, integration of FIRA into the State Committees; (ii) procedures for resolving intergroup disputes regarding investment criteria; and (iii) arrangements for training PIDER staff on FIRA regulations and procedures. Seasonal production credit (currently at 14% interest) would be provided under the project from existing credit lines, but would not be reimbursable from the proposed loan.

3.18 Development credit reimbursable from the proposed loan would be used primarily for livestock and for land leveling and associated investments needed to support new irrigation works. Interest rate and re-discounting arrangements would correspond to those applicable to low-income producers under other Bank loans through BANXICO for agricultural credit. Repayments of principal will range from 3 to 15 years and will include grace periods of 1 to 3 years with FIRA rediscounting no more than 90% of the original credit amount. Interest and rediscount rates would be as follows:

	<u>Rediscount Rates to Participating Banks</u>		<u>Interest Rates to Beneficiaries</u>
	<u>Private</u>	<u>Public</u>	
(i) Loans to beneficiaries receiving institutional credit for the first time and whose net annual family income does not exceed 250 times the daily minimum rural wage for the regions where they are located	6.50%	7.50%	9.50%
(ii) Loans to other low income procedures in Project micro-regions.	8.00%	9.00%	11.00%

During negotiations, assurances were obtained on these arrangements.

3.19 Rural Industries (7%). The project would provide about US\$14.0 million in support of the development of rural industries. Because this represents a new component, not available under PIDER I, the funds would be available for projects both in the 20 micro-regions financed under the proposed project and in the 30 micro-regions supported under PIDER I (Annex 3b). About 86% of the amount would be used for financing investment through the banks and through Government agencies. The remaining 14% would finance technical assistance for rural industry development including financing of feasibility studies, specialized agency staff and training. The basic strategy would be to: (i) develop industries for exploitation of natural resources of the micro-region in order to strengthen small-farm and ejido production; and (ii) to finance small-scale village industry to serve local markets and to provide employment at low cost by utilizing intermediate technology. The strategy would support the new Government's policy for the development of rural industries. The project would finance:

- (a) Development credit for about 50 rural industries located within the micro-regions and owned by ejidatarios and small farmers. Credit granted by official bank or the private banks would be eligible for re-discounting by FIRA at the same terms as established under the low-income producers component of the Fifth Agriculture Credit Project to Mexico.

- (b) Investments in about 300 small scale, labor intensive rural industries (village industries). Such investments would be limited to US\$35,000 equivalent per enterprise. Government is preparing a plan, to be submitted to the Bank before June 30, 1978, for village industries specifying agencies and eligibility criteria.
- (c) Technical assistance to identify, prepare and assist rural industries as well as to train staff of participating agencies or institutions. Technical assistance would comprise:
 - (i) expansion of technical staff and training programs for technical staff in participating agencies; and
 - (ii) financing for preparation of rural industry projects in the micro-regions and for assistance to already established enterprises.

3.20 Livestock Development (8%). The project would support livestock development on some 500 ejidos. Under PIDER I, in 1975 and 1976, some 250 ejidos received livestock investments with an estimated 8,000 persons likely to benefit. The strategy was to provide a small pilot livestock unit (300 ha or about 4 ha per family) with a minimum technical package involving land clearing, an improved pasture, minimum fencing, and a simple dip and corral. All cattle, and any expansion beyond the pilot infrastructure package, had to be financed by development credit. Most projects were organized on a semi-collective basis, enabling many ejido members to benefit from the investment. In many areas the success of the initial PIDER investments stimulated an expansion of the pilot units to much larger areas of the ejido, financed solely through medium-term development credit. Beef cattle development would continue to receive the major share of investment support under the Project: dairying, sheep and goat raising, and pork units would also be continued.

3.21 Under PIDER II a modified approach would be adopted under which FIRA staff would review the viability of sub-projects and provide development credit for the expanded unit from the outset. This approach has the advantages (a) that credit is tied to the project from the beginning, thus serving to increase beneficiary interest and commitment while assuming higher standards of technical appraisal and (b) the scope of the program would be expanded, since in some cases an expanded unit would be viable where a pilot unit would not be.

3.22 Soil and Water Conservation (5%). The project would support the construction of soil and water conservation works using labor intensive

methods. The equivalent of US\$10.4 million has been budgeted for a three year period for conservation, sufficient to cover some 80,000 ha.

3.23 Under PIDER I, some 24,000 ha were improved at an average per ha cost of US\$130, with per ha costs varying from US\$110 in Nuevo Leon to US\$180 in Oaxaca, depending on slope and erosion severity. This represents some 40% of all soil and water conservation efforts in Mexico equivalent to an annual average of US\$3.2 million over the 1974-1976 period (see Annex 3e). Since the economic return from terracing partly eroded hills is much greater than from erosion control on already seriously deteriorated land, the program would concentrate on improving partly eroded slopes with simple contouring and terracing rather than restoring totally eroded slopes.

3.24 To improve the program, assurances were obtained during negotiations that (i) conservation works in Bank supported micro-regions would focus on labor intensive improvement of partly eroded slopes rather than machine restoration of fully eroded hills; and (ii) technical and economic conservation plans would be prepared prior to construction.

3.25 Fruit, Forestry, and Fishery Production (4%). Some US\$9.2 million are budgeted for fruit production. As in the livestock development component, the strategy would be to provide farmers with a small pilot technical package (2 ha per family) which would include land clearing, provision of trees, fertilizer, sprayer and technical assistance from CONAFRUT. ^{1/} The expectation is that the success of the initial investment would spur the farmer to expand operations which would then be financed by credit.

3.26 The project would provide support to the development of orchard infrastructure and fruit tree planting on some 7,500 ha. Under the Project, CONAFRUT would be responsible for farmer demonstration, nursery development, orchard preparation, plant distribution and technical extension. The types of fruit production supported under the Project vary according to ecological areas, ranging from apples in Nuevo Leon to avocados in Oaxaca.

3.27 The project would also support limited investments in beekeeping, forestry, and fishery development. Beekeeping is a labor-intensive activity carried on by small farmers in many parts of Mexico. Under the project,

^{1/} The National Commission for Fruit Production (CONAFRUT) is an autonomous agency operating under SARH charged with developing fruit production in rural Mexico.

hive improvement and expansion, honey gathering equipment, and fencing would be provided. Reforestation and afforestation investments on selected ejidos would also be supported, especially where ejidos have already established small sawmills. In one micro-region, fishery infrastructure in the form of cold storage facilities would be assisted. SARH would be responsible for supervising forestation and maintenance of fishery cold stores. Beekeeping activities would be the responsibility of INI and SARH.

3.28 Feasibility Studies (2%). The project would also include a new component for feasibility studies for micro-region productive investments. Currently, PIDER only supports studies by SARH. There is a need to undertake more complex studies not only for irrigation feasibility work, but for the identification and detailed preparation of productive projects in such areas as livestock, fisheries, and forestry. Under PIDER II, funds would be provided to initiate project feasibility work to be undertaken by either private consultants or government agencies. Individual studies up to US\$15,000 would be contracted at the discretion of the state level SPP representative, while studies over US\$15,000 would be subject to the approval of the PIDER Director in Mexico City. A total of US\$3.6 million is provided - sufficient for an average of 10 studies per micro-region. Assurances on feasibility study cost approval limits were obtained from government during negotiations.

2. Productive Support Activities

3.29 Feeder Roads (7%). The project would continue support to the innovative labor-intensive feeder road program of the Secretariat of Public Works and Human Settlements (SAHOP, ex-SOP). Under the project, the Bank would provide about \$15.9 million toward the construction of approximately 2,000 kilometers of all-weather roads. These are estimated to cost about US\$8,700/Km with unskilled labor accounting for an average of 60% of construction costs. Equipment is generally used where earth movement exceeds 4,000 m³ per km. of new feeder road. Roads are constructed to all-weather standards, to an average width of 7 m and with drainage ditches on each side. Rural communities would continue to play the major role in both construction and maintenance (see Annex 4-e).

3.30 SOP directed a nation-wide feeder road program since 1970 and has established an organization for dealing with the construction, maintenance, and evaluation of rural roads. So far, it has supervised the construction of 73,000 kilometers of rural roads which link 7,000 communities and over 6 million people to the national road network. In addition, SOP made road construction and maintenance a focus for community organization.

3.31 The cost of the nation-wide rural road program from 1970 to 1976 has totaled about US\$425 million and the average cost per kilometer about US\$6,000. Unskilled labor averaged about 60% of the direct construction costs and the program provided seasonal employment for an average of 55,000 workers per year. SAHOP monitors the costs of its program, uses labor-intensive techniques when appropriate, and trains its staff to play an active role in rural development efforts.

3.32 During negotiations, assurances were obtained from Government that adequate arrangements be continued for maintenance, that labor intensive techniques be continued where technically and economically appropriate, and that construction be scheduled to minimize conflict with agricultural tasks.

3.33 Extension Services (5%). Under PIDER I a major effort was made to improve the effectiveness of the extension services operating in PIDER micro-regions. While improvements have increased the effectiveness of the extension service, neither PIDER nor the Bank have been satisfied with extension operations. Through PIDER, the Secretary of Agriculture recognized officially that substantial improvements were required -- something no prior administration has been willing to accept. In a new "operational plan" 1/ finally approved by the Bank in October 1975, the government made a commitment to extend the PRONDAAT 2/ extension system to all Bank supported micro-regions. Progress, however, has been slow in extending the reforms in the extension services.

3.34 In the early months of the new administration, considerable attention was given to re-organizing the extension services. With the consolidation of the Secretariat of Water Resources and the Secretariat of Agriculture, all extension services in each Secretariat were brought under a national Director General for Extension. Two major departments were created, one to service the extension needs of farmers in rainfed areas, the second to service the farmers with irrigated lands. This administrative change represents a radical change from the previously fragmented and ill-organized extension services available to Mexican farmers.

3.35 PIDER has funded a major expansion in the rainfed extension service. Some 1400 professionals are now being supported (Annex 4-a) - nearly half of all personal working for the consolidated Department of Rainfed Extension. PIDER management, early in the new Administration, drafted a far-reaching agreement 3/ to initiate improvements in micro-region extension activities.

1/ This Operational Plan was submitted to the Bank in November 1975 as a condition for declaring the PIDER I loan effective.

2/ PRONDAAT is a new system of extension derived from the lessons of the well-known Plan Puebla program. Unlike traditional extension programs in Mexico, PRONDAAT field staff support an intensive program of adaptive research and evaluation designed to produce technical packages for basic grain crops appropriate for the ecological conditions of each micro-region. The new system emphasizes diagnosis, applied research, application and evaluation of results on the farmers' own plots (see Annex 4-a). This system has already proved successful in a number of pilot micro-regions.

3/ A formal agreement between the SPP (for PIDER) and the SARH was signed at the Under-Secretary level.

Under this agreement, PIDER will not finance any extension work in PIDER micro-regions unless extension workers are closely supervised and work to a monthly schedule of training and visits (using essentially similar procedures to those that are working well in Bank projects in India and Turkey). PIDER has appointed a senior professional to supervise the execution of this agreement.

3.36 To support PIDER efforts to carry out these changes, assurances were obtained during negotiations that PRONDAAT operations be put into effect in the 20 micro-regions supported under PIDER II no later than December 31, 1980.

3.37 Farmer Organization (3%). Support for the expansion of farmer organization and agrarian reform (SRA) activities in the project areas was provided under PIDER I for: (a) organizational and development assistance; and (b) resolution of land tenure conflicts. PIDER supported the establishment of SRA teams to orient communities to development opportunities, to reorganize ejido committees, and to ensure participation in a jointly agreed development program. A close liaison was to be maintained with agency staff, especially extension staff, to ensure farmer awareness of government services and of farmer obligations during the implementation of the micro-region development programs. The resolution of land tenure issues, a prerequisite for the provision of both short- and long-term credit, was also considered an important development activity.

3.38 In most micro-regions, however, the more politically urgent land tenure issues often took precedence over the organizational activities especially in such states as Sinaloa. In December, 1975 there was a reorganization of SRA which reduced the effectiveness of the ejido development branch of the department. PIDER has now signed an operational agreement with the new head of SRA which spells out the conditions under which PIDER would continue to fund the activities of SRA organizational staff in PIDER micro-regions. This agreement outlines the priority areas of assistance SRA needs to provide PIDER investment recipients, both prior to investment and follow-up, and also specifies procedures that SRA micro-region staff would need to follow.

3.39 Rural Marketing/Nutrition. In recent years CONASUPO has developed an improved capability for expanding and servicing its network of rural stores and warehouses. In rural areas it pursues two basic activities: one involves buying the grain surpluses of small farmers at fixed prices, (generally favorable relative to other market outlets); the other provides a line of basic products to rural consumers, most of whom are poor, at prices about 25% below those charged by the limited private marketing network in rural areas. These basic products include essential foods such as corn, beans, sugar, and cooking oil as well as nonfood items

such as soap, candles, aspirin, and tissues. While CONASUPO's procurement activities have worked fairly well, its marketing of basic goods in rural areas has suffered from a tendency to stock items suitable for urban consumers. Recognizing this, CONASUPO has now organized a basic staple product line with a better distribution system. Known as the basic staple program, it includes only corn, beans, cooking oil, rice, and sugar. By 1975, this program involved 5200 distribution points with sales of nearly Mex \$500 million (Annex 4-e).

3.40 Under the Project, rural marketing would be developed within the PIDER II regions so that better prices and more and higher quality food would be made available to the rural poor. The project would support CONASUPO activities in purchasing (warehouses) and sales (stores).

3.41 Rural Electrification (3%). The project would bring electricity to some 131,000 rural people living in 300 villages at a total cost of US\$7.3 million (Annex 4-d). 30% of the demand is estimated to be associated with directly productive investments, and the rest with improving the living standards of the population. The average cost of village electrification is estimated at US\$60 per beneficiary. CFE builds, operates, and maintains electricity generation and distribution facilities throughout Mexico and is implementing a national six-year plan for rural electrification involving connection of villages to the existing grid. This program is now more than 50% completed. During negotiations, assurances were obtained that installation costs would not exceed US\$150 per person, and that villagers would pay installation charges and rates for the sale of electricity as are generally applied in Mexico which include the full cost of operation and maintenance.

3. Social Infrastructure

3.42 Village/Ejido-Level Educational Facilities (2%). The Project would improve education opportunities by renovating, constructing and furnishing 1,500 primary level classrooms accommodating some 60,000 students. New construction of each classroom would cost about US\$4,800 including furniture (Annex 5-b). CAPFCE (the school construction agency) has established a sound system of rural school siting and construction, choosing low cost building designs and methods, and coordinating closely with the Ministry of Education to ensure staffing arrangements. Siting and construction would continue to be closely coordinated with the Ministry of Education to ensure adequate provision of teaching materials and staff. In carrying out the program, CAPFCE requires benefiting ejidos and villages to provide a free site and encourages local contribution of building materials and teacher housing. During negotiations, assurances were obtained that these facilities would be adequately staffed and maintained by the Government.

3.43 Rural Water Supply (5%). The project would provide rural water systems for approximately 214,000 persons at an average cost of US\$45 per person (Annex 5-a). In the past both SSA and SRH provided rural water systems, with SSA concentrating on smaller villages and SRH on larger towns. Both agencies were also responsible for operation and maintenance. In early 1977, the new government re-allocated all rural water supply responsibilities to the Secretariat of Public Works and Human Settlements (SAHOP). Since the Secretariat has successfully carried out the feeder road component, there is the expectation that major improvements in the provision of village water supply systems will also be achieved. During negotiations, assurances were obtained that a minimum contribution of cash, labor or materials of 15% to investment costs during construction be made by villagers, that full payment for operation and maintenance costs be obtained, and finally that there be a limit, except with IBRD approval, on government's share of system costs of US\$100 per person benefited.

3.44 Self-Help (2%). PIDER has supported a number of efforts at self-help in its micro-regions. From 1974 to 1976, some 200,000 persons have contributed labor and local materials for the improvement of village streets, plazas, workshops, latrines and homes. The Agencies involved, mainly SSA, SOP and INI, supplied technical assistance, organizational help and materials not locally available. A program ceiling of the equivalent of US\$40 per beneficiary was established under the first PIDER Project. The self-help program has proved so popular that program funds have already been exhausted. Two problems of the first phase were: (i) insufficient emphasis on latrine and workshop construction; and (ii) overly strict eligibility criteria which required that villages have basic water, electricity and road transport. Assurances were obtained during negotiations that eligibility criteria would be relaxed to include villages without potable water and electricity, and that a maximum equivalent to US\$40 of materials per beneficiary would continue to apply.

Health

3.45 Under PIDER I the Bank was reluctant to include financing for health services infrastructure because of weaknesses in the organizational arrangements for rural health services delivery. Financing for such facilities was included only after commitments were made by the Mexican Government to seek alternatives to the current provision of rural health services. A verbal commitment was made to establish pilot health programs in three of the thirty PIDER I micro-regions; and a written commitment was made to establish a work group to study and define alternatives for health services provision in PIDER micro-regions.

3.46 Under PIDER I, neither of the commitments was carried out. The programmed infrastructure was constructed generally in accord with expectations. In a few cases mobile health units were established and are working well. In most cases, however, the health posts and centers are not providing appropriate, cost-effective health services.

3.47 As a result, no funds are recommended under PIDER II. Attempts to introduce reforms in the rural health system will, however, continue through the supervision of PIDER I and possibly through the Family Planning Project currently proposed.

IV. ORGANIZATION AND MANAGEMENT

4.01 Much of PIDER's early success can be attributed to its innovative organizational approach which stresses both strong coordination of budgetary authority, and monitoring at the top level and active planning and participation at the state and local level. Coordination is critical since 14 agencies 1/ are involved in the program with 2,700 PIDER-paid professionals working full-time in the execution of the PIDER program throughout the country. Most of these are deployed either at the state or local level. At the local level they are generally employees of the executing agencies, carrying out specific tasks as part of a PIDER micro-region development plan. At the top level, there is a core staff of 95 PIDER employees, within the Secretariat of Programming and Budgeting (SPP). SPP was created under the new administration in December 1976 as successor to the Secretariat of the Presidency. SPP has authority over the public budget and control over investment planning and monitoring. Under the new arrangement, PIDER will now report to the SPP Director of Promotion and Regional Operations instead of to the Director for Public Investment. This should strengthen the operating efficiency of PIDER.

4.02 During 1977, the new administration is moving to create a new structure to execute federal programs at the state level. A senior SPP official is now assigned to each state with full authority over federal spending in his state. As the highest ranking federal civil servant at the state level, he reports directly to the SPP Secretary in Mexico City. In addition to planning federal expenditures, the job entails full authority to reallocate money and to authorize payments at the state level. The creation of this new position should facilitate coordination between PIDER and the normal operating and investment program funded from federal sources.

A. Organizational Levels

4.03 PIDER operates at the federal, state and local levels as follows:

1/ Federal institutions participating at the federal and state levels include: Secretariat of Agriculture and Water Resources, Finance, Public Works and Human Settlements, Health, and Agrarian Reform; in addition to the Federal Electric Commission, National Corporation for Basic Marketing, Committee for Administration of the Federal School Construction Program, National Arid Zones Commission, National Indigenous Institute, National Institute for Rural Community Development and Low Cost Housing, and the BANRURAL.

Federal Level. PIDER policy is developed and coordinated through the Directorate of Promotion and Regional Operations of the SPP. This Directorate is supported by a Sub-Directorate of Rural Development (i.e., PIDER) with a staff of some 95 technicians responsible for: reviewing investment plans, management operations, and investment monitoring.

State Level. Coordination of the program is handled by a Coordinating Committee consisting of the state level directors of the participating agencies under the chairmanship of the state governor. Actual management is the responsibility of the new state level SPP representative who is the technical secretary of the State Committee. The SPP representative is assisted by a technical secretariat of professionals including a state level PIDER coordinator and resident Coordinators for each of the states' micro-regions who work closely with local elected officials and community leaders.

Village/Ejido Level. Local participation, essential to the implementation of PIDER investments, is achieved through a variety of schemes which depend on the political, social and administrative characteristics of the sector and micro-region. In some cases such programs as feeder roads or small irrigation works have served to launch permanent village committees which then undertake additional PIDER activities. As a rule, SRA field personnel take the lead in organizing communities at the start, involving municipal chiefs, ejido presidents, teachers, or other appropriate persons. These local leaders in turn generate community participation as well as provide an independent information link to the state-level technical secretariat.

4.04 Since the start of PIDER in 1973, major improvements have been made in PIDER organization and management. A PIDER headquarter reorganization was implemented in early 1976 which has led to an improved integration of the planning, programming and supervisory functions. The new organizational structure has two regional Departments, North and South, which combine the former Departments of Studies and Supervision. A major change was the creation of a Special Studies Division through which PIDER will attempt to undertake a much closer review of the criteria used by the 14 PIDER supported executing agencies. An Authorization and Control Department is in charge of budgeting, budget control and monitoring. Under the Deputy Manager (Coordinator), special units were established for the IDB and IBRD projects.

4.05 The system described has worked satisfactorily and without undue inter-agency friction. There are, however, areas that require improvement.

- (i) Functional Staff. The total number of staff in PIDER headquarters has now reached 95, with 40 supervisors in the Regional Departments and 55 Administrative/managerial staff. An attempt has been made to form inter-disciplinary teams for each of the sub-regions, but the teams comprise mainly civil engineers and economists. PIDER is short of functional expertise in agriculture and rural industries. This would not be serious if PIDER's role could be limited to overall micro-region programming, supervision, and monitoring. However, PIDER experience indicates that such a role is too

limited. PIDER involvement in the review of rural development policies and investment criteria of the line agencies, particularly the weaker ones, is imperative. PIDER's management has recognized this and has now taken action. For the proposed PIDER II project, PIDER would appoint staff for its new Special Studies Division with sector and project appraisal capability especially in the agricultural and rural industry sectors to undertake this line agency review process when assessing agency investment requests.

- (ii) Need for Resident PIDER Coordinators in Micro-Regions. There are resident PIDER staff in only 15% of PIDER micro-regions while in the other 85% the coordinator lives in the state capital and periodically visits the regions. Those micro-regions with resident coordinators have better records both in coordination of investments and of operations since the coordinators take the initiative in advising on re-programming, in generating local understanding of the PIDER approach, in supervising line agency operations, and in insisting on proper operation and maintenance of completed investments. The resident PIDER coordinator has become an effective locally-based "change agent", whereas those who only visit the micro-regions normally only perform monitoring functions. It is now PIDER policy for all micro-regions to have PIDER appointed resident staff managers.
- (iii) Staff Training. PIDER management has given insufficient priority to organizing training courses for the three groups of staff employed under the PIDER program: the State PIDER Directors, the State and micro-region PIDER coordinating staff, and the persons paid directly by PIDER in the 14 agencies working full-time in PIDER micro-regions. PIDER recently submitted to the Bank for review a detailed program for multi-tiered training for all PIDER Personnel involved in executing the PIDER program.
- (iv) Operation and Maintenance. PIDER has not made adequate provision to guarantee proper maintenance of its investments. Once an agency completes a project such as an erosion control work, a domestic water supply installation, or an irrigation work, it turns the installation over to local committees representing program beneficiaries for operation and maintenance. Provision for continuing supervision after investment completion and arrangements with beneficiary groups have been inadequate. During negotiations, assurances were obtained that new investment commitments for individual projects would include written agreements with beneficiaries to provide adequate operation and maintenance arrangements.

- (v) Reprogramming. PIDER does not have a policy for the re-programming of its four-year micro-region plans. Annual investment authorizations are prepared, but where major changes occur during this process, the implications for the overall micro-region program are not fully assessed. Assurances were obtained during negotiations that the annual investment programs would be agreed upon by the Bank.

B. Evaluation

4.06 The evaluation of PIDER has been carried out by CIDER. With 22 professionals, CIDER's main task is to evaluate the impact of current programs of rural development and to develop policy recommendations for future efforts. Its main focus is on PIDER, though CIDER has reviewed other rural development programs. CIDER's other principal task is to develop rural development training programs for PIDER federal and state level staff. CIDER began this training in late 1976 with six regional review seminars for PIDER field staff.

4.07 CIDER, financed through the Secretariat of Programming and Budgeting (as is PIDER), has institutional autonomy from PIDER management and freedom in the choice of research topics. The CIDER director reports to the Secretariat of the Programming and Budgeting and to a CIDER board comprising various Secretaries. PIDER is not represented on the Board. CIDER also has an advisory council for methodology and research design.

4.08 CIDER does not undertake on-going program monitoring, which is done by PIDER. Instead, CIDER is geared towards the evaluation of specific aspects of the PIDER program. CIDER has placed much emphasis on public administrative and sociological aspects of public investment. During supervision missions, Bank staff have urged CIDER to increase its efforts to assess the agronomic impacts of PIDER investments and services as they affect farmer yields and farmer income. The non-economic evaluations are of great interest, and should be encouraged. CIDER should however strike a better balance in its evaluation program between the economic and non-economic aspects of the program.

4.09 Various deficiencies and problems in PIDER activities were detected in initial CIDER evaluations. The basic cause was generally attributed to weaknesses in the original village program and programming process. Rather than passively transmit conclusions to PIDER, CIDER has joined PIDER in re-programming a number of micro-regions. CIDER is thus directly introducing recommendations for improving the PIDER programming process. CIDER also concentrates on analyses of structural changes generated by the development program. Two principal issues which are central to CIDER evaluations, but generally neglected in evaluations carried out elsewhere, are analyses of: the effectiveness of institution building under the PIDER investment and

organization strategy, and the degree and quality of village participation in the programming and execution of the investment program. This difference is in part accounted for by the philosophy of the rural development program in Mexico, and in part by the Bank's insistence on such issues as part of its new style approach to rural development. During negotiations it was agreed with Government that the effects of the Project on micro-region development, including changes in crop yields and beneficiaries' income, would be evaluated.

V. PROJECT COSTS AND FINANCES

A. Cost Estimates

5.01 The total cost of the Project is estimated at US\$255 million, of which US\$44 million, or 18% represents the foreign exchange costs. Cost estimates are based on detailed plans for the proposed 20 micro-regions. These plans were reprogrammed during the first half of calendar year 1976 and cover estimated expenditures over a four-year period. The PIDER II project would support investments made as of mid-1977. As the PIDER II project was appraised before the period of major monetary adjustment in Mexico (September-November 1976), base line project costs were increased by 30% for the estimated inflation between mid-1976 and April 1977.

5.02 To these adjusted base line costs (expressed in dollars) were applied 10% physical contingencies for all items except credit. Further, expected international price contingencies were added at the rate of 10%, 9% and 8% for the three year project expenditure period, April 1977-April 1980. In using these price contingencies, the assumption is that over the project disbursement period the peso/dollar exchange rate would broadly adjust itself to the difference between domestic and international inflation. Indications are that the peso would be allowed to float freely in response to market forces. Details of project costs are shown in Annex 7-a and are summarized below.

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER II

Estimated Project Cost

	Local	Foreign	Total	Foreign Exchange	Unskilled Labor	Baseline Cost
	-----US\$ million-----				%	
<u>Directly Productive</u>						
<u>A. Infrastructure</u>						
Irrigation	25.4	8.5	33.9	25	30	16
Soil & Water Conservation	9.0	1.4	10.4	14	75	5
Livestock	14.1	3.5	17.6	20	20	8
Fruit, Forestry & Fisheries	8.3	0.9	9.2	10	30	4
Rural Industry	3.0	2.0	5.0	40	20	2
<u>B. Development Credit</u>						
Agriculture & Livestock	40.0	10.0	50.0	20	15	24
Rural Industries	5.4	3.6	9.0	40	20	4
<u>C. Incremental Production</u>						
<u>Credit</u>	11.7	1.6	13.3	12	20	6
Sub-Total	116.9	31.5	148.4	21		70
<u>Productive Support</u>						
Feeder Roads	14.8	1.1	15.9	7	70	7
Rural Electrification	5.5	1.8	7.3	25	21	3
Farmers' Organization	5.3	0.2	5.5	4	0	3
Extension & Field Demonst.	9.4	0.6	10.0	6	0	5
Rural Marketing/Nutrition	0.8	-	0.8	0	10	0
Feasibility Studies	3.6	-	3.6	0	-	2
Sub-Total	39.4	3.7	43.1	9		20
<u>Social Infrastructure</u>						
Education	4.5	0.8	5.3	15	27	2
Rural Water Supply	8.2	2.1	10.3	20	40	5
Self-Help	3.9	-	3.9	0	100	2
Sub-Total	16.6	2.9	19.5	15		9
<u>Evaluation</u>	0.9	0.1	1.0	10	0	0
<u>Total Baseline Cost</u>						
Physical Contingencies	10.7	2.4	13.1			6
Expected Price Increases	24.5	5.4	29.9			14
<u>Total Project Cost</u>	209.0	46.0	255.0			

N. B. With the floating peso, peso project costs were converted to the equivalent of US\$ at a rate of US\$1 = Mex\$22.5.

B. Financing

5.03 The proposed Bank loan of US\$120 million would cover foreign exchange costs of US\$46 million, plus US\$74 million of local currency costs. It would be made to Nacional Financiera, S.A. (NAFIN S.A.), one of two Government borrowing entities authorized to borrow from the Bank. The Government contribution of US\$127.8 million would represent 50% of project costs. Beneficiaries would contribute US\$7.2 million in cash to the costs of water, electrification and development credit. In the case of self-help projects, up to US\$40 in materials would be provided by the project, and labor would be provided by the householder or villager. Incremental production credit required for the Project, amounting to US\$13.3 million, would be financed by the Government. Assurances on this cost financing were obtained during negotiations.

C. Disbursements

5.04 The Bank would reimburse at the rate of 51% of total expenditures for civil works, equipment, vehicles and technical services of agencies participating in the program, against appropriate documentation, and 56% of the rediscounts of the development credit and rural industry components administered by FIRA, against certificates of expenditure. As agreed for PIDER I, documentation for the Credit component and for Civil Works by force account, would be retained within Mexico and held available for inspection by the IBRD during the course of supervision missions. The statements of expenditure, certified by the Secretariat of Finance, would reflect the expenditures made by each agency in each approved micro-region. Any undisbursed loan funds remaining after Project completion would be cancelled.

5.05 A disbursement period of four years is contemplated (Annex 7b). Regional banks, selected on a state basis, act as the financing agents of PIDER. The selected banks receive, at the beginning of each fiscal year, comprehensive investment plans for the approved micro-regions in their command areas, on the basis of which they will disburse against vouchers from the executing agencies. The participating banks will, in turn, be reimbursed by the Secretariat of Finance. The recommended disbursement period for the loan would be from mid-1977 to mid-1981, with a recommended term of 17 years including 3-1/2 years grace, compared to a term of 25 years including 5 years grace under PIDER I.

D. Procurement

5.06 The Project would include a diversity of relatively small projects in many locations throughout the country, involving at least 14 government agencies. Thus, only a small part, if any, of the Project would be suitable for international competitive bidding, in contracts of US\$250,000 and above.

Contracts less than this amount, such as for construction and equipping of classrooms, feeder roads, markets, stores and other buildings which are all small, of varied design, and geographically scattered, would not be of sufficient size to attract international bidders and would be constructed by a combination of local competitive bidding, negotiated contracts and force account in accordance with Government's regular procedures. These agencies would then undertake the work themselves (force account) or select the private contractor best qualified to do the job.

E. Accounts and Auditing

5.07 Separate accounts for the PIDER program are kept by the SPP, PIDER staff, the Ministry of Finance and each participating agency to ensure there is no overlap with the normal budgetary program. In addition, the Ministry of Finance would keep separate accounts to cover the external financing of the program. Assurances were obtained during negotiations that these separate accounts would continue to be maintained.

5.08 To ensure that expenditures are actually carried out as programmed and approved, separate supervision and authorization/control divisions are established within PIDER. The supervision division is divided into three zones, the authorization/control group into an authorization and a control and statistics section. The supervision division staff spend considerable time in the field, especially in checking expenditure against estimates.

5.09 Each agency has its own auditing section where all vouchers and documents are checked and approved before payments are made. The accounts of each agency are subject to independent auditing by the Ministry of Finance, the SPP and the Ministry for National Patrimony.

VI. PRODUCTION, MARKETS, FARMER BENEFITS AND FINANCIAL RESULTS

A. Production, Yields and Marketable Surplus

6.01 The Project would support increases in both crop and livestock production in the selected micro-regions, including maize, beans, beef, milk, vegetables, fruits and honey. Projected crop yields for the principal crops at full development are based on experience in the PIDER I micro-regions and experience under similar ecological conditions elsewhere in Mexico. Yield increases would be facilitated by increased extension service coverage particularly with the improved PRONDAAT training for extension workers, more intensive trials and demonstration of recommended practices on farmer plots, and by provision of credit and input delivery systems, seeds, fertilizers, etc., at the village or ejido level. In addition, development, where feasible, of irrigation facilities on the semi-arid lands would permit major improvements in crop yields. Estimated yield improvements resulting from the Project for major crops in the categories of irrigated, 1,200 mm rainfall and 800 mm rainfall are illustrated below; (Annex 8-a) provides details):

		<u>Unit</u>	<u>Before Development</u>	<u>At Full 1/ Development</u>
<u>Maize</u>	(new irrigation in semi-arid areas)	kg/ha	750	2,500
<u>Beans</u>	(new irrigation interplanted with maize in semi-arid area)	kg/ha	200	500
<u>Maize</u>	(1,200 mm rainfall)	kg/ha	1,200	2,000
<u>Beans</u>	(1,200 mm rainfall)	kg/ha	500	750
<u>Maize</u>	(800 mm rainfall)	kg/ha	900	1,350

1/ Generally 6 to 8 years after project inception.

6.02 Pre-project incomes among the 46,000 farm producers benefiting under the project from directly productive activities average around US\$350 per family. At this low level of income, production for household subsistence accounts for roughly 70% of the output on the farm. As farm output and income rise as a result of the Project, the marketed surplus should increase considerably. Nevertheless, much of the increase would be absorbed by the family. Experience varies greatly regarding the use of newly irrigated lands. In many areas farmers have immediately introduced high value fruit and vegetable crops; in other areas newly irrigated lands have been used as they were prior to irrigation--i.e., exclusively for basic maize and beans crops. For the purpose of the economic and financial analysis, it has been assumed that all incremental irrigation would be used only for maize and bean crops except where specific fruit and vegetable cultivation was being directly supported. Thus, there is a probable underestimate of potential returns from the irrigation investments. Base-year production, incremental production resulting from the project, and the projected increase in marketed output of some major crops are shown below (see also Annex 8-c) for the 20 micro-regions of the proposed Project.

	<u>Base-Year Production</u>	<u>Incremental Production</u>	<u>Incremental Marketed Surplus</u>
	-----1,000 tons-----		
<u>Maize</u>			
Irrigated	10	60	40
Rainfed	80	55	30
<u>Beans</u>	20	30	20
<u>Beef</u>	90	6	6

6.03 Support prices exist for maize and beans through CONASUPO outlets. Many farmers, however, are unable to market surplus produce through such outlets for reasons of distance and inaccessibility and because of obligations to middlemen and money-lenders. A common practice is for farmers to borrow two sacks of corn for family consumption at the beginning of the planting season then to repay at harvest with five sacks of corn plus the obligation to sell any surplus produce to the lender or his designated agents. For financial and cultural reasons, breaking this dependency on the middleman is difficult, and both the incentive for increased production and the amount of real income increase to the small farmer can be easily overestimated.

B. Markets and Prices

6.04 Most of the maize, beef, potatoes and beans produced by the Project would be consumed locally, either directly by the producer or in local towns. Larger neighboring towns, currently supplied mostly from outside the micro-region, also provide a market for extra beef, vegetable and fruit production. Institutional arrangements and facilities relating to marketing would also be strengthened and improved under the Project through the provision of produce stores and warehouses. CONASUPO would undertake to purchase surplus maize and beans at official support prices when necessary, thus providing a price floor. Incremental project output would contribute less than 1% to Mexico's production of maize and beans, an amount too small to affect price levels for either crop.

C. Producer Income and Benefits

6.05 Under the Project, some 32,000 farmers, 20% of the micro-regions' farmer population would be expected to improve their incomes to a level of US\$700 from their rainfed farming activities based on improved extension, seeds and better livestock activities. For those 14,000 farmers in the micro-regions likely to benefit from irrigation, incomes are estimated to increase to US\$1,100. The baseline income is estimated at US\$350 equivalent.

There is likely to be considerable variation in the increase attained, related mainly to the varying agricultural potential of the micro-regions particularly in regard to opportunities for irrigation.

6.06 The dramatic increase in farm incomes from investment in 2-3 ha of irrigation reinforces the PIDER emphasis given to small-scale irrigation under the program. Empirical data indicate that irrigation on small farms may increase net incomes three times and labor requirements from one man-month per ha per annum on rainfed plots to nearly eight man-months per ha per annum on irrigated plots.

D. Cost Recovery and Fiscal Impact

6.07 Government would recover a total amount of US\$99 million of original investments, or 39% of Project costs, leaving a fiscal impact of US\$156 million, excluding interest. The cost of maintaining and operating directly productive infrastructure would be borne fully by beneficiaries. They would also be charged with the full operating costs for marketing, electricity, drinking water and self-help projects, and would contribute to education. At full development, the additional fiscal burden for Government would be US\$8 million per annum, a small part of which (10%) would be offset through additional tax revenues as a result of incremental production and income from the Project.

6.08 In PIDER II, the expansion of the development credit component and the inclusion of rural industries will increase the proportion of the Project investment recovered from the beneficiaries. It was anticipated under PIDER I that repayment requirements would be based on "detailed socio-economic studies" of the beneficiaries' post-project net income situation, but due to administrative complexities, a more straightforward approach to cost recovery is being applied.

6.09 Cost recovery would thus be limited to: (i) productive, direct income-producing investments (credit, livestock, irrigation, fisheries, etc.); and (ii) investments with identifiable private benefits such as electricity. For public-goods-type investments (such as roads, soil conservation, schools, etc.), cost recovery would be limited to the supply of sites and local construction materials.

6.10 For productive investments: (i) cost recovery and/or cost contribution rules would be negotiated and agreed upon with beneficiaries prior to construction; and (ii) beneficiaries would be able to defray their repayment obligations, through labor and material contributions, by either working for nothing, or receiving only partial wages during the construction period. Assurances on these criteria were obtained during negotiations.

E. Ecological and External Effects

6.11 A portion of the Project (9%) is geared to improving range, land and water management. Soil and water conservation works would be directed at reducing soil erosion, a significant problem in a number of the rural areas of Mexico. Some of the materials for the self-help component would be used for the construction of sanitation facilities for villages.

VII. ECONOMIC ANALYSIS

A. Economic and Financial Analysis

7.01 Economic and financial analysis was based on detailed micro-region investment programs submitted to the Bank. Each report contains detailed cost estimates of both investment and operating costs required by the program. Each micro-region report contains financial analyses for "representative" villages (ejidos) of the micro-region. Each report also contains an analysis of micro-region production (itemized by crop) both with and without PIDER investments. Rates of return, both economic and financial, are calculated and are included in each investment program report. In undertaking the appraisal, Bank staff recalculated rates of return, both economic and financial - based on the submitted reports, but various parameters (e.g., yields, prices, area reached by project activities, phasing, uptake rates, shadow pricing of labor, etc.) were modified to meet more stringent tests of reasonableness set by the appraisal team. Financial rates of return were calculated only on the directly productive activities: livestock, irrigation, fruit production, etc., plus the associated development credit. Economic rates of return were calculated on the directly productive activities plus the supporting productive investment and services including the feeder roads, electrification, extension, agrarian reform, marketing, facilities needed to achieve the incremental benefits.

7.02 While the estimated production increases require the inclusion of both directly and indirectly productive investments and services, the calculations do not capture all the benefits arising from the availability of these, since their use is not confined to Project investments or activities. For this reason, the rate of return estimates may be somewhat conservative. Costs associated with the provision of improved public amenities and social services (e.g., education, water supply, self-help, etc.) have not been charged against project benefits. It was not possible to construct plausible estimates either of productive benefits resulting from these services or the monetary equivalent of the direct user benefits associated with the consumption of improved services. Thus, short- and long-term benefits to production arising from the diffusion of functional literacy have not been allowed for in the estimates of productivity increase among the small farmers. The importance of these services as a stimulus to cooperative arrangements and community associations - for example, the Water Users Committees and the village

associations for the construction of feeder roads and soil conservation works, however, merit special mention. The encouragement and support given to such associations is one of the important and innovative features of the PIDER program.

7.03 In calculating the economic cost of labor, shadow prices varying by micro-region from 100% of the minimum government daily wage down to 52% were used. The differences reflect mainly the relative uniformity of officially determined wage minima vis-a-vis variations in the minimum supply price of labor, the latter being influenced by severity of rural under-employment. Details on methodology and assumptions used in calculating the economic rates of return are provided in Annex 8, together with a sample ejido budget.

7.04 The average economic rate of return is 23.7%, varying by micro-region from 13.2% to 36.5%. The financial rate of return is 20.7%, varying from 11.3% to 33.4%.

7.05 Cash flow models were also analyzed for "representative" ejidos in each micro-region to ensure that incremental income expected from project investments is sufficient to repay the principal and interest of development loans, and operation and maintenance expenditures of directly productive and support investments.

7.06 Some 65,000 man-years of work would result from the construction activities under the Project, a portion of which would benefit landless groups living in the micro-regions. The Project would provide access to basic public services in the 20 selected micro-regions. Some people would directly benefit from improved drinking water and from rural electrification. Furthermore, some children would obtain access to improved primary education. The materials for self-help projects would be made available to people in the selected micro-regions. (Annex 8c Table 1 provides details by category.)

B. Project Risks

7.07 The Project has risks. First, while two-thirds of the micro-regions would be in the higher rainfed areas (over 700 mm annually), the remaining third would be located in areas with less rain. In these latter areas, the introduction of irrigation, pasture improvement and water conservation works along with crops requiring less rainfall, such as sorghum, would be emphasized to reduce farmer risks. Improved field demonstration closely tied with intensified extension efforts would be emphasized under the Project to minimize farmer uncertainty. Secondly, while on average the estimated rates of return at micro-region level embody expectations about final outcomes that are reasonable and realistic, nevertheless, the caliber of local leadership and staff involved under the program will bear importantly on these outcomes. It would be unrealistic to suppose that staff and leadership quality will be uniform. In some regions, expectations may be disappointed while in others better than anticipated results should be achieved. Again,

however, PIDER management has demonstrated a capacity to respond quickly and flexibly to problems of execution, and CIDER is undertaking major evaluation efforts as a basis for ongoing adaptation of the program in the light of changing needs and circumstances. Moreover, the Project would emphasize self-help activities, and creation of community-based users' associations and the development of local leadership capabilities in order to improve the probability that the Project investments and services would eventually lead to a self-sustaining development at the local level.

7.08 These risks are acceptable in view of the expected benefits under the Project that would accrue to low income people. To summarize these, farm incomes of about 45,000 farmers -- accounting for a total population of 225,000 with their family members -- would approximately double as result of the Project. For those farmers benefitting from irrigation, their incomes may triple from current levels.

VIII. RECOMMENDATIONS

8.01 During negotiations, assurances were obtained on the following principal points:

- (a) A ceiling of US\$32,000 would be continued for small-scale irrigation projects of 25 ha or less and the maximum investment per family would be US\$5000 equivalent; a per hectare ceiling of US\$2,500 equivalent would be imposed on projects; to be eligible, a family's pre-project net agricultural income would have not to exceed US\$2,500 (para. 3.14);
- (b) For irrigation works about 10% of investment costs would be generally recovered; and where reasonable, based on repayment capacity, additional amounts of the investment cost would be recovered (para. 3.15);
- (c) Prior to construction, technical and socio-economic feasibility studies would be carried out for each proposed irrigation project in accord with existing SARH guidelines (para 3.12);
- (d) interest rate and re-discounting arrangements would be adjusted to correspond to those applicable to low income producers under other Bank loans through BANXICO for agricultural credit (para. 3.18).
- (e) in the soil and water conservation component, conservation works would focus on labor intensive improvement of partly eroded slopes rather than machine restoration of fully eroded hills and technical and economic conservation plans would be prepared prior to construction (para. 3.24);

- (f) feasibility studies for micro-region productive investments would be undertaken; individual studies up to US\$15,000 would be contracted at the discretion of the state level SPP Representative, and studies over \$15,000 would be subject to the approval of the PIDER Director in Mexico City (para. 3.28);
- (g) labor intensive techniques would be continued on road sections where technically and economically appropriate; and construction would be scheduled to minimize conflict with agricultural tasks (para. 3.32);
- (h) to improve the rainfed extension service, PRONDAAT operations would be implemented in the Bank supported 20 micro-regions no later than December 31, 1980 (para. 3.36);
- (i) installation costs for rural electrification would not exceed US\$150 per person and villagers would pay installation charges and rates as are generally applied which include the full cost of operation and maintenance (para. 3.41);
- (j) a minimum contribution of cash, labor or materials of 15% to investment costs of rural water systems would be made by villagers either at the outset or during construction; full payment for operation and maintenance costs would be obtained; and there would be a limit on government's share of system costs of US\$100 per person benefited (para. 3.43);
- (k) eligibility criteria for self-help funds would be relaxed to include villages without potable water and electricity; and a maximum equivalent to US\$40 of materials and equipment per beneficiary would continue to apply (para. 3.44);
- (l) new investment commitments for individual projects would include written agreements with the beneficiaries that provide for adequate operation and maintenance arrangements (para. 4.05);
- (m) for the productive investments: (i) cost recovery and/or cost contribution rules would be negotiated and agreed upon with beneficiaries prior to construction; and (ii) beneficiaries would be able to defray their repayment obligations through labor and material contributions (para. 6.10); and

8.02 The Project is suitable for a loan of US\$120 million repayable over a period of 17 years.

MEXICO

Rural Development Project - PIDER II

Development of the Rural Sector

I. INTRODUCTION

1. Between 1935 to 1965, Mexican agricultural production more than tripled. This better than 4 percent annual growth rate was the highest in Latin America during these decades. During the same period Mexico increased agricultural land in use by nearly 30%, nearly all of which (on a net basis) was distributed to ejidos.

2. After 1965, however, Mexico encountered major problems in the agricultural sector. A population growth rate of 3.5% resulted in a growing rural population, with consequent pressure for further land redistribution. Efforts at collective production were politically sensitive and met with little success. Further, the growth rate in agricultural production slowed markedly, to about 1.8% per year. Meanwhile, as a result of growing population and higher incomes, the demand for agricultural products rose about 4.5% annually and for livestock products at about 7%. Mexico became a net importer of basic grains and a major importer of milk powder and dairy stock.

3. Strategies for rural development have shifted over the years. Land reform dates back to the revolution in 1910, but major efforts in this field did not get underway until the Cardenas period (1935-1941), when massive land redistributions were made, input and credit needs of ejidatarios were recognized, and ejidos were organized. After Cardenas, the emphasis shifted to large-scale irrigated farming and industrialization. Until 1970, Government investment in the rural sector was limited to roads and TVA-type regional river basin development programs (Comision del Balsas, Comision del Papaloapan, Plan Valle del Fuerte, Plan Lerma, etc.), most of which ran out of money after large dams and other infrastructure had been constructed.

4. In the early 1970's, the Echeverria administration began to reassess strategies for fostering growth and development in rural areas and with financial support, encouraged a number of government agencies to step up their efforts to improve the lot of the rural poor. Five agencies responded with major innovations. The President's office itself commissioned staff in its planning and coordination departments to examine ways of achieving self-sufficiency in basic grains and to propose alternatives for assisting the rural poor. These staff members were later to form the nucleus of the major coordinating entities of COCOSA 1/ and PIDER. Second, the Secretariat of Public Works drew up plans for a nationwide program of labor intensive feeder road

1/ Commission on Agricultural Planning.

construction, and over a 5-year period constructed some 70,000 miles of roads, giving temporary employment to some 190,000 persons. Third, the Secretariat of Hydraulic Resources (SRH) developed a program to irrigate ejido areas of 25 to 50 hectares either using available groundwater, existing river and stream flows, or where feasible, providing for construction of small, relatively inexpensive dams. Fourth, the Secretariat of Land Reform undertook a complete review of legislation affecting ejido-based farming as well as a review of its own administrative procedures affecting the granting of tiles. As a result, a new Agrarian Reform law was passed in 1972 and the Secretariat's internal procedures were improved. Fifth, the Bank of Mexico, operating through its agricultural credit agency, the FONDO, commissioned a detailed study of the credit mechanism affecting the small farmer. Credit regulations were altered to provide incentives to the banking system to intensify its efforts with this group. In addition, other agencies such as CONASUPO (marketing) and the Central Electrification Federation redefined their investment and operating criteria for supporting development efforts in the poorer rural areas.

5. While these different agencies were independently carrying out innovations, the Office of the Presidency was drawing up a master plan for the rural sector. This Plan called for the creation of homogeneous micro-regions with populations of some 50,000 poor persons and a management area of some 7,000 square kilometers each, encompassing two to seven municipalities. The initial objective was to develop 100 such regions within a six-year period, with a capital expenditure of US\$1.2 billion, a figure worked out in conjunction with the Secretariat of Finance. By early 1974, detailed micro-region investment plans had been drawn up by appropriate government agencies for 41 of these regions and increased budgets had been approved. By mid-1976, 84 of the regions had approved plans and another 22 were in various stages of study. Due to the substantial local demand for these programs, the original target of 100 micro-regions is now being revised.

6. PIDER, or Investment Program for Rural Development as this program is called, is coordinated by a small 40-man staff in the President's office and executed by nearly two dozen government agencies with a full-time staff of close to 3,000 professionals. This decentralized structure, though unusual in Mexico, evolved naturally from President Echeverria's initial decision to encourage independent agency approaches. Each PIDER program comprises a combination of directly productive investments, productive support, and social infrastructure components. The productive investment components are emphasized, and supporting infrastructure and technical and organizational assistance are designed to make them fully effective.

7. The Echeverria administration is using three other major approaches to encourage rural development. In the river basin approach, efforts are to be made to improve conditions of the poorer groups in river basins where TVA-type projects already exist. The first project will be administered by the Papaloapan Commission and will help finance small irrigation works, technical services to rainfed agriculture, marketing facilities, experimental

farms, feeder roads, potable water, sewerage, electricity, primary schools and workshops, medical centers and community centers. In the functional approach, separate departments of rural development have been set up in such key ministries as Public Works, Irrigation, Industry and the Electricity Board. In the commodity extension approach, the Government is attempting, with external funding, to expand Plan Puebla, which was initiated in 1968 to promote rapid increases in maize production on the smallholdings of Mexican farmers by means of a combination of communications, credit for inputs, extension, and markets.

II. THE RURAL SECTOR

A. Performance of the Agricultural Sector

8. Mexico experienced a sharp decline in its agricultural growth rate in recent years. While agricultural production expanded at a 5% annual pace from 1939 to 1965, the mean annual growth rate between 1965 and 1974 amounted to only 0.7% (Table 1).

Table 1

Gross Agricultural Product in Constant (1969) prices

<u>Year</u>	<u>Millions of Pesos</u>	<u>Percent Change</u>
1965	19,921	
1966	20,241	1.5
1967	20,165	-0.2
1968	20,484	1.6
1969	20,145	-1.7
1970	21,140	4.9
1971	21,517	1.8
1972	20,955	-2.6
1973	20,829	-0.6
1974	21,287	2.2

Source: Comercio Exterior de Mexico.

This performance compares unfavorably with the development of the economy as a whole, which expanded at a 6.6% annual rate. When the population growth rate of 3.4% is also taken into account, it is evident that per

capia agricultural output actually decreased over the last decade. As a result of this deficit in internal production, Mexico has been forced to increase its food imports (Table 2). By 1974 wheat, corn and rice imports amounted 40, 29, 15 and 13%, respectively, of the domestic consumption of these crops. The persistent deficit in corn production is especially serious as it constitutes an important part of the Mexican diet.

Table 2

Mexican Imports of Agricultural Products (tons)

<u>Year</u>	<u>Corn</u>	<u>Wheat</u>	<u>Beans</u>	<u>Rice</u>	<u>Sorghum</u>
1970	786,253	0	0	16,272	12,142
1971	0	219,000	0	0	8,819
1972	189,360	555,250	0	0	165,342
1973	1,964,317	744,975	0	37,626	0
1974	1,400,000	982,528	9,434	70,000	175,000

Source: Conasupo.

Due to price increases, the value of these agricultural imports climbed at an even faster rate, exerting heavy pressure on Mexico's balance of payments. In 1974 Mexico paid a total of US\$506.3 million for its grain purchases abroad which represented 8.4% of total imports (Table 3).

Table 3

Mexican Grain Imports

<u>Year</u>	<u>US\$m.</u>	<u>% Share of Total Imports</u>
1967	1.9	0.1
1968	4.8	0.2
1969	4.0	0.2
1970	64.2	2.6
1971	17.8	0.7
1972	82.6	2.8
1973	226.4	5.5
1974	506.3	8.4

9. The value of agricultural exports has continued to grow but at a much slower rate than for other export commodities or for imports. In relation to Mexico's total exports, agriculture's share has declined from 49.5% in 1960 to only 29.6% in 1974.

10. Although adverse weather conditions has affected crops in some years, the main reason for the continuing slump during the last decade has been a decline of both private and public investment in the agricultural sector. From Mex \$1,684 million in 1950, private agricultural investment had risen to Mex \$3,722 million in 1960, but 1965 it had tumbled to only Mex \$2,914 million. Public spending followed a similar pattern. While fully 20% of all public investment in 1947-1952 was destined for agriculture, this proportion had fallen to only 10.5% in 1971. It has since risen to 19.1% (1975-1976).

11. President Echevarria's administration reversed these policies, increasing public spending in agriculture to the point that by 1976 more than 26% of total public investment went to agriculture. Although it is still too early to measure the full effects of these renewed efforts at stimulating production, it appears that in light of projected increased demand, massive governmental intervention will continue to be necessary. It has been estimated that in the period 1976-1982 the demand for basic agricultural products will increase at a rate of 4.3% per annum (Table 4).

Table 4

Projections of the Demand for Agricultural Products (1976/82)

<u>Crops</u>	<u>Annual Growth Rate</u>
	(%)
Corn, beans, wheat, rice	3.5
Oilseeds	5.6
Livestock feed	5.7
Average for basic crops	4.3

Source: Reuniones Nacionales.

B. Agriculture and Rural Development

12. Cropland: Mexico, with an area of approximately 2 million km², is the third largest country in Latin America. There are great variations in altitude and numerous ecological zones result in diverse agricultural production. About 35% of the total is classified as range or pasture land and supports only a small proportion of the rural population. Another 50% is either forest land or too dry for cultivation. The remaining 15% or about 30 million ha. are considered potential crop land of which only 14.5 million ha. or less than half are currently harvested. The other half, however, is mainly in the tropical zones of Mexico.

13. Rural Population: The population of Mexico, currently just over 58 million, is increasing at about 3.4% annually and will reach approximately 100 million by 1990. About 21 million, or 41%, are rural, and about 13% live in the Federal District (FD). The rural population includes three main groups: ejidatarios, 1/ private farmers, and the landless. There are about 1.5 million ejidatario families farming on 22,500 ejidos, about 1.2 million privately-owned farms, and 1.2 million landless families. The private sector can be broken down further into approximately 0.3 million commercial farmers, mostly in the north, and about 0.9 million minifundistas. The rapid population growth in the face of limited land resources has resulted in one-half of the agricultural labor force being without land; in addition, many of the existing ejido and private plots are too small to provide even a subsistence living.

14. Rural Incomes: Since 1960, Mexico's overall rate of economic growth has been matched by few developing countries, averaging in real terms about 7%. The benefits of this growth have been unequally distributed, however, and the recent slowing in agricultural production coupled with increased inflation has been hardest on those who were already the poorest. In mid-1973, the average family income was estimated at US\$2,700. However, some 2 million families (over 50% of the rural population and 20% of the total population) had average incomes of less than US\$800. The Government estimated at that time that an income equivalent to US\$960 was required to provide the minimum acceptable living standard for Mexican families in the rural areas.

15. The poor quality of landholdings is the root cause for much of this rural poverty. Despite land reform efforts, one-half of Mexico's nearly three million landholdings are today classified as subsistence-type producing only a negligible marketable surplus, if any; 40% are traditional peasant farms producing cash crops with primitive methods; only 10% use modern techniques. This top 10% in 1967-69, accounted for 40% of total agricultural income (including non-agriculture sources), while the lower 50% had only 20% of the total income.

16. Land Tenure: Several steps have been taken by the Government to carry the land reform program further and to promote a more equitable and rational use of agricultural resources. The most important is that some 16,000 of the approximately 20,000 ejidos have by now been given definite certificates of usufruct, with ejidatarios being granted rights to a holding size rather than to a particular parcel so as to facilitate future community action. There are still about 6 million ha. of undistributed state-owned land and private land in excess of legal limits which can together help settle 100,000 to 120,000 small farmers.

1/ The term "ejido" is derived from the Spanish equivalent of the village "common". In present Mexican law, the ejido is basically a group of families with joint - and thus inalienable - tenure rights to land. The head of such a family is called an ejidatario.

17. About 320,000 legal title or certificates of ineffectability have been issued for crops and 1,300 for livestock have been issued so far, covering 8.2 million ha. The possession of these legal titles is intended to stimulate investment and facilitate institutional financing insofar as they would rule out the possibility of a reduction in the land base of the concerned farmers. This process is being speeded up but about 250,000 such certificates are yet to be issued. However, until a more permanent legal arrangement than the such "certificates" is introduced, tenure uncertainty may continue to brake capital formation in the rural sector.

18. The Secretariat of Agrarian Reform (SRA) is implementing a plan to ensure beneficiaries of land reform the supplementary services, supplies, and credit necessary to bring the redistributed land to full productive use. The Ministry is expected to provide technical, promotional and organizational assistance, while credit and inputs will come from the public agricultural plan for 4,500-16,000 banks and marketing support from the CONASUPO. About 2,500 ejidos are already involved in this integrated promotional effort out of a possible 4,500. Together with the public banks, the Ministry hopes to ensure that, by 1976, about 16,000 ejidos would receive institutional support for developing into more efficient production units. This strategy is being supported with an extensive educational and training program.

19. Land reform in Mexico, although vigorously pursued by the Government, remains difficult and uncertain. The principal problem arises from conflicts resulting from unresolved legal titles to land. Apart from issuing certificates, Government has to ensure that they do in fact protect the beneficiary's interest in his land so that he may have the incentive to invest. Secondly, it has to be considered whether the limits on the size of farms, especially for livestock ranchers, should be reviewed so as to encourage the development of unexploited areas like the tropical Gulf Coast. Thirdly, there is need to bestow greater attention on the organizational and other needs of private small farmers (an estimated one million families), as well as the ejidatarios on whom most of the present developmental efforts are being focussed.

20. In 1970, 41 percent of Mexico's labor force was in agriculture, decline from 58.3 percent in 1950. In four of country's major regions, Center, Gulf, Peninsula and Yucatan, 50% of the force are in agriculture and in the South, 69%.

21. Growing unemployment and underemployment are major problems of rural Mexico. Between 1950 and 1970, the agricultural labor force grew from 4.9 to 5.3 million. The labor force engaged in crop production actually declined; the apparent growth in the agricultural labor force of 0.4% per year, or a total of 0.4 million, took place in livestock husbandry and forestry. During the same period, agricultural employment rose from 4.0 to 4.7 million.

Thus, unemployment actually declined from 0.9 million to 0.6 million. Under-employment in the agricultural sector also was reduced, as is shown by a growth of productive days worked of 2.8% per year over this period. However, much of the growth recorded during this period took place before 1965. From 1965 to 1970, agricultural employment declined at about 0.5% per year. Although specific data are not yet available, employment in agriculture continued to decline through 1974. The decline occurred largely as a result of a decrease in the area farmed by certain relatively more labor intensive crops such as cotton, corn, and beans. It appears that an increase in agricultural output in 1975 and 1976 may reverse this trend.

22. Water Irrigation is considered 1/ the most effective permanent employment-generating instrument in agriculture, with one hectare of irrigated agriculture providing about 8 man-months of employment annually compared to less than 1 man-month per hectare on a non-irrigated farm. As of 1974, the 13% of the agricultural labor force employed on irrigated lands supplied 19% of the effective days worked in the agricultural sector. In non-irrigated rural areas, 18% of the labor force could not find employment at prevailing wages and 44% could not find more than three months employment.

23. Rural Infrastructure: Rural Mexico suffers from lack of both basic services and infrastructure. In the poorer rural areas, there are only 55 medical practitioners per 100,000 people (77 is the national average); 24% of the houses have access to pure drinking water (61% nationally); and 55% of the children in the 6-14 years age group are enrolled at school (76% nationally) 2/. Many rural towns also remain isolated, without adequate roads, electricity, or telephone communications.

24. Ecological Diversity: Three ecological zones can be distinguished in Mexico: the Gulf coast, the Pacific Coast, and the central highlands. Along the Gulf coast, maize, sorghum and beef cattle predominate. In the northern part of this coastal area, cotton was important until recently, but has now been replaced by lower risk grain crops. Natural pastures of the dry and wet Huastecas support a large beef herd, while south of Veracruz, the areas produce mostly beef cattle, sugar cane, rice, maize and beans. Further south, the coastal plain narrows to about a 20-km width and has a seasonally wet tropical climate. In Chiapas, the plain is wider, and maize, beans, sesame, tropical fruits and beef cattle are important.

1/ Based on Presidency estimates in the Central Plateau area.

2/ Another indicator of the abysmally poor public services in rural areas is that more than one-third of 600,000 envelopes of educational materials mailed by SRA to ejidatarios in 1973 never arrived.

25. The highlands and central plateau are densely populated and were formerly the most productive areas, but today productivity per ha. is greater in the lowlands, mainly due to irrigation development. The arid and semi-arid zones in the north have good natural pastures, and it is from these areas that the bulk of the male weaners exported to the US. originate. Irrigated areas around Chihuahua and Torreon produce cotton, wheat, beans, alfalfa and fruits. An important dairy industry based on alfalfa is rapidly developing in La Lagunera region around Torreon. The Central altiplano to the south of Jalisco and Michoacan produces maize, beans, sorghum, and other food crops for Guadalajara and the FD. Around the FD, in the states of Mexico, Puebla, and Hidalgo, the altiplano is temperate and dry. This area produces rainfed maize and beans, while small irrigated areas produce fruits and horticultural crops. The dairy industry, centered around the FD, is supplied with alfalfa from this area.

26. Agricultural production contributed about 11% of GDP in 1969, crops accounting for roughly 60% of the total. Major crops are made cereal grains, 33%; fruits, 13%; cotton, 12%, sugar 6%; oil seeds, 6%; beans, 5%; and miscellaneous products 19%. Cattle (beef and dairy) account for 80% of livestock production, although poultry, pigs, and goats are increasingly slightly in importance.

27. Trade: Agricultural production contributed about 65% of Mexico's merchandise exports in 1960, but by 1970 the percentage had fallen to 50%, reflecting the country's poor agricultural performance. In constant 1960 US dollars, Mexico's net agricultural trade balance fell from US\$523 million in 1965 to US\$222 million in 1973, and actually was negative in 1974 at US\$35 million, due in part to bad weather. Although agricultural production has increased in 1975 and 1976, Government policy is emphasizing increase of agricultural exports and achievement of self-sufficient in staple foods production.

28. In 1969, 79% of agricultural exports (total US\$800 million) were crops, in particular cotton (US\$203 million); tomatoes, strawberries and melons (US\$104 million); and wheat (US\$12 million). Livestock exports consist almost entirely of live beef cattle and boned and dressed meat. In 1969, the export of live cattle (mostly male weaners) earned US\$66 million and boned and dressed meat contributed another US\$39 million representing, respectively, 4.6% and 2.7% of Mexico's total merchandise export earnings.

29. The pattern of agricultural commodities trade has changed considerably over the last few years. Imports of grains and oilseeds increased 500% from 1972-74, accounting for over two-thirds of total agricultural imports in 1974. This compares with an only moderate increase in imports such as milk powder and skins. Principal exports were cotton, sugar and coffee.

Feeder cattle and boneless meat exports have declined drastically as a consequence of a temporary decline in prices in the US market and, previously, Government restrictions on exports. Tomatoes are still the most important horticultural export crop but others such as melons, strawberries and chillies have also shown good performance.

30. Crop Farming: Irrigated districts account for 2.8 million ha. of Mexico's total 15.4 million ha of cropland. These irrigated areas are concentrated in the north and north-west. Their yields both for the domestic and export markets have grown substantially, as compared with little progress in rainfed areas. More than 90 percent of public investment in agriculture has been in irrigation works. Even better yields could be achieved, however, if water were used more efficiently and the available water were made to serve a greater area. These goals could be met by on-farm investment in canals, canal lining, and land levelling. Yields in rainfed areas could also be improved through land clearing and minor irrigation works, as well as extension and demonstration.

31. Livestock. Some 47% of Mexico's total land area is used for livestock production. Production, particularly beef, is undertaken predominantly on unimproved native grasslands, but if increased demand both domestically and externally are to be met, pastures will have to be improved and more fodder produced, particularly for those herds in semi-arid and arid areas.

32. Nutrition. Improvements in agricultural methods and increases in the amount of land cultivated have almost doubled Mexico's agricultural output during the last 15 years. But the rapid population growth has kept the per capita product at about the same level and prevented any increase in the per capita food output during the last decade. The nutritional level of many Mexicans is still inadequate, especially in animal proteins. Deficiencies in food supply are most serious in the rural areas, where lower incomes restrict purchasing power. Although an unusually wide range of crop varieties, annual and perennial, can be grown in Mexico, 61% of all cultivated land is still planted with beans and corn, grown mostly by subsistence farmers. The average daily intake per person in these farmer families living on a diet of maize, beans, and chili, is about 2,000 calories and 54 grams of protein per day, one of the lowest levels in the world. Only on the irrigated areas do farms produce a wider variety of crops such as cotton, sugar, sorghum, vegetable oil seeds, fruits and vegetables. The urban diet is better, particularly in the Federal District which with only 17.7% of the total population consumes one-third of all the meat in the country as 8 grams of chicken daily against a national average of 1.5 grams.

33. Rural Public Investment. The proportion of public investment in agricultural infrastructure has decreased steadily over most of the post-World War II period, despite large absolute investments in a number of irrigation projects. The proportion was 19.9% for 1947-52, 13.9% for 1953-58

and averaged 10.5% from 1959-1970. The decline reflected the slower rate at which new hectares were brought into production, as well as a decrease in improvements made to existing agricultural land. Government priorities shifted during 1970-74, with public investment in agriculture rising rapidly until it reached 19% of total public investment in 1975. As in the past, most of this investment went into irrigation, including flood control and drainage, although emphasis on benefitting low income producers has increased. Allotments for supporting services have also grown considerably, primarily to help organize the low income farmers and utilize their scarce resources more productively. The main beneficiaries are i) Secretariat of Agrarian Reform (SRA) whose current budget of Mex\$1 billion, as against Mex\$150 million in 1970, will enable it to implement the Agrarian Reform Law of 1972; ii) the Secretariat of Agriculture (SAG), which received a fivefold budget increase, with emphasis on agricultural research and extension as well as small irrigation works; iii) CONASUPO which has expanded its investment program from about Mex\$100 million in 1970 to nearly Mex\$1 billion in 1975 in order to build up an improved marketing system, including retail stores and warehouses; and iv) the PIDER program which now accounts for 16% of total public investment in agriculture.

34. The Government has taken a number of other steps to increase agricultural production and promote a more equitable distribution of the benefits of growth. These include the enactment of a new Federal Agrarian Reform Law; a Federal Water law; a new National Agricultural Credit Law; the preparation of a National Water Plan; implementation of integrated rural development programs. Other special programs include PLAMEPA (Plan de Mejoramiento Parcelario), the establishment of a national coordination committee for agriculture, and the merger of the three previously existing public agricultural banks into a single institution. (Annex 2)

35. A number of administrative innovations have been undertaken since 1970 better to coordinate activities of the agencies working in rural development as well as to strengthen efforts directed specifically to the rural poor. One important step was the creation of the National Coordinating Commission for Agriculture (COCOSA). Its job is to ensure that the many agencies, which previously worked independently of each other, plan and execute their policies in a coordinated fashion. Much remains to be done in the realm of data gathering, however, to ensure rational planning. In addition, COCOSA's mandate should be extended to include livestock and crops other than the basic agricultural ones. In addition, special rural development departments have been created in a number of Government agencies which previously had directed their efforts solely to large farms.

36. Extension: Extension services were concentrated until recently on irrigated areas of commercial farming, to the relative neglect of temperate and tropical rainfall areas. During the last six years, however, considerable expansion has taken place in organized extension services

provided through the SAG, SRH, State Governments, the FONDO, public agricultural banks and some private organizations. SAG staff alone has gone up from 367 extension agents in 1970 to 3,727 in 1975 and public agricultural banks now employ about 1,800 technicians. The number of farmers served by SAG technicians has increased, between 1971 and 1974, from 202,000 to 369,000 and the area covered from 859,000 ha. to 2,875 ha. The quality of service also improved, as staff has become more mobile, links to research have been strengthened, and staff has worked increasingly through farmers' group. The FONDO also has built up its own technical staff. These technicians are slowly introducing new technologies to small farmers in rainfed areas. Although results of some of the trials and farm demonstrations may not be apparent for some time, others are proven successes. For example, the Plan Puebla developed maize (and bean) technology for sub-humid areas, improved special water conservation measures, and developed new storage techniques of maize silage for livestock feeding in semi-arid areas. The following table shows the recent intensification of Government activities in agriculture.

MEXICO - PROFILE OF GOVERNMENT ACTIVITIES IN AGRICULTURE

	1970	1971	1972	1973	^{/1} 1974	1975	Increase in Percent
Technical Assistance ^{/2}	n.a.	n.a.	148	661	1,078	3,727	628
Promoters							
Professionals	n.a.	n.a.	188	952	442		
Technicians	n.a.	n.a.	181	411	609		
Extensionists	482	664	68	1,795	2,095		335
Professionals	412	566	1,826	1,202	1,459		
Technicians	70	98	243	593	636		
Home-Economists	289	440	487	638	719		149
Total Agricultural							
Credit ^{/3}	4,604	5,601	7,239	9,667	15,072		227
Short-term	3,316	4,174	5,243	6,434	11,031		
Long-term	1,289	1,427	1,328	1,946	3,660		
Other	381		697	1,297	380		
Benefitted Area	2,156	2,360	2,589	2,635	3,989		85
Irrigation ^{/4}	65,534	81,777	97,777	70,070	160,000		54 ^{/5}
New	49,976	68,440	60,332	53,496	n.a.		
Improved	15,558	13,313	37,398	16,574	n.a.		
Rehabilitation	n.a.	n.a.	66,610	112,730	50,000		

^{/1} Programmed.

^{/2} Number of staff. Includes only field staff of Secretariat of Agriculture and Department of Agrarian Affairs. The Secretariat of Hydraulic Resources and CONASUPO have increased their field staff at similar rates.

^{/3} Credit in Mex\$ million, area in 1,000 ha. Public Agricultural Banks only: Banco Ejidal, Banco Agricola, Banco Agropecuario and FONDO.

^{/4} In 1.00 ha. The average of irrigated area p.a. was 65,000 ha under the 41,000 respectively, under the two previous administrations (1965/70 and 1959/64, respectively).

^{/5} Average 1971/1973 compared to average 1965/70.

Source: Secretariat of Agriculture, Secretariat of the Presidency, Department of Agrarian Affairs, Secretariat of Hydraulic Resources, Secretariat of Finance.

37. Much remains to be done, however. For example, SAG currently covers only 20% of the farm area and 14% of the farmers. Further steps have also to be taken to overcome deficiencies in internal coordination and delays in administrative procedures of the services; to reduce staff turnover and improve the professional standards of the extensionists; to make greater use of crop demonstration and extension aids and communication techniques; to derive recommendations from region-specific production development programs; and to promote farmer participation.

38. Agricultural Education: Agricultural education in Mexico has expanded steadily over the last decade, but output of technicians still falls short of demand. In particular, shortages are anticipated for sub-professional professional technicians whose role is critical for the extension and promotional programs of SAG and the Secretariat of Agrarian Reform, and for teachers to man vocational schools.

39. Agricultural Research: Agricultural research in Mexico has traditionally concentrated on the needs of commercial farmers in irrigated agriculture, neglecting both farmers using rainfed cultivation and the unexploited areas like the tropical Gulf Coast whose development will be essential for future production growth. An increase in the National Institute for Crop Research (INIA) budget from Mex\$44 million in 1970 to Mex\$283 million in 1975 is enabling this organization to expand its staff and improve their caliber. Much of its work has been delegated to regional centers, where on-site efforts can be made to solve specific problems. In addition, increased attention is being given to clearing away major bottlenecks which are retarding Mexico's agricultural development. At the National Institute of Livestock Research (INIP), greater emphasis is now being placed on animal-production-management problems, including pasture management and stocking rate experiments, both of which are crucial for Mexico's livestock industry. This is a switch away from earlier concentration on genetics and preventive vaccine.

40. Marketing: The National Warehouse Company (CONASUPO), owned by Government, helps provide storage facilities for many staples produced and has established a network of over 1,000 marketing units for small farmers, facilities for storage, sale of inputs and a variety of related services. Again, however, this meets the needs of only about 10% of small farmers, and lack of financing limits further expansion. All segments of the population, however, benefit from CONASUPO's price support program and its buying operations in the international market, through which it supplies the domestic market with sufficient food grains and helps stabilize domestic prices.

41. Farm Prices: The Government uses farm price supports as a major policy instrument. During the late 1960's and early 1970's, preference was given to keeping prices low for consideration of urban consumers and to increasing agricultural exports, with the result that prices remained nearly constant in nominal terms. This policy was one of the causes of the decline in agricultural production during those years. To redress the balance,

the Echeverria administration moved to improve substantially agricultural support prices, instituting minimum price guarantees for maize, wheat, sorghum, beans and rice. The support prices for these crops during recent years are given below.

Support prices for Agricultural Products in Pesos per Metric Ton

<u>Year</u>	<u>Corn</u>	<u>Wheat</u>	<u>Beans</u>	<u>Rice</u>	<u>Sorghum</u>	<u>Soy</u>
1967	940	913	1750	--	525	1600
1971	940	913	1750	--	525	1600
1972	940	913	1750	1850	525	1750
1973	940	1200	2000	1850	750-950	2700
1974	(1200 (1500	(1300 (1500	(5000 (6000	4250	1000	3300
1975	1750	1750	6000	5700	1420-1600	3500

Consumer Price Index (1970 = 100)

1971	1972	1973	1974	1975
105.7	111.0	123.5	150.7	179.3

Support prices declined in real terms between 1970 and 1972, but were increased in 1973. Output was not substantially higher during 1973 and 1974, principally because of adverse weather conditions, but it rose substantially in 1975 and apparently has risen more in 1976.

42. Mexican authorities are aware that prices affect farmers' choice of crops. Present Government policy is to maintain the support prices at current levels, to provide incentives for further modernization of production methods in the irrigated areas, and to provide some income re-distribution from urban consumers in favor of poorer farmers.

43. Market prospects are favorable for major crops not covered by price supports, particularly off-season United States markets for fruits and vegetables, while domestic demand is increasing for fruit and vegetable production and for oil seeds, notably sesame. An increased market for alfalfa to service Mexico's expanding dairy and poultry industries has also developed.

44. Agricultural Credit. To improve the flow of credit to agricultural producers, particularly those with low incomes, the Government has introduced several policy and institutional changes during the last four years. First, in 1973, loans to low-income producers were facilitated as funds were made available in the Bank's fourth agricultural and livestock credit loan. Over the next two years, the number of beneficiaries rose from 22,000 to 77,000. Those qualifying were defined as ejidatarios or other small farmers whose main source of income is farming and whose annual income does not exceed 1,000 times the daily minimum rural wage for the region. A second innovation was the establishment of FEAGA, a trust fund of the Bank of Mexico, which is provided Government funds earmarked for organizing low income producers to receive credit and to give them technical assistance. These funds are distributed through FONDO and private and public banks. FEAGA also guarantees a substantial part of loans made by private banks to low income producers.

45. A third step was the establishment in early 1975 of a single public agricultural bank (Banco Nacional de Credito Rural - BNCR) to replace the three existing official banks, Banco Ejidal, Banco Agricola, and Banco Agropecuario. The goal was to strengthen policy management and avoid duplication. Finally, the Government ratified a new Agricultural Credit Law in 1975 providing for improved coordination between credit institutions and the Government; the organization of farmers for joint production activity; and new guidelines for agricultural credit policy for both private and public banks.

46. Other Programs. A crop insurance scheme is available for 34 different crops. In 1969, about 460,000 farmers insured 1.5 million ha. of crops with premiums averaging 8.2% of the insured crop value. The farmer pays about 53% of the premium, with the Government paying the remainder. Full or partial coverage of the cost of production is generally provided. These added incentives are particularly important for high-risk crops such as cotton.

47. Various other agencies are involved in providing productive support and social infrastructure in rural areas. Among the more important are the Secretariat of Public Works in charge of a countrywide labor-intensive feeder road program, the Secretariat of Health (SSA) charged with providing health services to rural areas, the SRH which supplies rural water, and the Federal Electricity Commission which has substantially expanded its efforts in rural electrification.

MEXICO

Rural Development Project - PIDER II

Performance Under PIDER I

I. INTRODUCTION

1. This assessment looks at three levels of PIDER I performance: (i) what has been done--i.e., physical and financial progress; (ii) how has it been done--i.e., organization, management, and execution; and (iii) what has been achieved. Assessments of PIDER I performance are interrelated with assessments of the performance of the entire PIDER program. With few exceptions, actions taken to improve on PIDER I micro-regions have been applied program-wide. Similarly, improvement in program-wide actions directly affects the PIDER I micro-regions. Moreover, the intent of the PIDER I Project was not only to achieve success in the 30 PIDER I micro-regions, but also to bring about improvements in the program as a whole. This view is taken into account throughout.

2. The overall PIDER program is in its fourth year of planning and implementation. Some US\$471 million was invested in 86 micro-regions located in the 31 states. This represents 1.8% of Mexico's public investment budget and 13.5% of Mexico's total rural investment during this period. The vast bulk is invested for directly productive (58%) and productive support (30%) activities; the remainder is for social infrastructure (12%). PIDER staff report a total of about 5,240 communities (4.1 million persons) as initial beneficiaries of this investment, about 46% of the total micro-region population and 86% of the people living in villages from 300 to 3,000.

3. Since loan signing in May 1975, three Bank supervision missions have reported on project progress. These have deemed progress satisfactory, though various factors external to the Project (elections, budget reduction in 1976, recent devaluation) caused a slowdown in 1976. The perception of PIDER at both community and governmental levels is positive and the program's role in the new Administration is assured with a substantially increased budget from Mex\$2 billion in 1976 to Mex\$3.3 billion in 1977.

4. PIDER has had a number of major successes. They have included: (i) the institutionalization of the program; (ii) the decentralization of program funds to the state level; (iii) the first real coordination of the various public sector executing agencies at the operating level; (iv) the

beginnings of significant community and village participation in both programming and execution of public investments and services; (v) the establishment of an evaluation system for rural programs; (vi) the reform and redirection of various executing agencies; (vii) the training of a large group of now experienced rural development technicians, in addition to, (viii) the construction of program infrastructure, the provision of program services, the creation of temporary employment, and the increase of rural wage levels. Despite the successes, various improvements in PIDER are still needed: (i) PIDER should take a more active role in the analysis of the long-term viability and successful operational needs of investments proposed by the sectoral executing agencies, rather than acting primarily to monitor and coordinate such investments; (ii) community participation, while increasing, is still inadequate for ensuring that the programs are relevant to community needs and that they will be properly operated and maintained; (iii) although major steps have been taken to reform the extension and agrarian reform agencies, these changes are not yet fully apparent at the local level and considerable effort must still be given to their proper implementation; and (iv) FIRA-PIDER relations still require improvement. All of these concerns have been discussed with PIDER and agency staff during the course of PIDER I Supervisions and during the PIDER II Appraisal; real progress has been made on each of the issues, but covenants have been included to further this change process.

II. Physical and Financial Progress

A. Physical Progress

5. Physical progress on the PIDER I Project appears to be running close to estimates made at appraisal in early 1975. The table below compares appraisal estimates for the three-year PIDER I period to works completed for 1975 and 1976 as reported by the PIDER monitoring unit for the 30 micro-regions supported by the Bank. Only progress in soil and water conservation works, health centers, and in fruit tree establishment appears to be behind schedule (e.g., below 66% completed). Feeder roads, electrification, drinking water investments, etc., all appear to be somewhat ahead of appraisal completion targets. Construction on irrigation works is substantially advanced but, in a number of cases, works have not as yet been handed over to beneficiaries.

	<u>Unit</u>	<u>3-Yr Projected Devel. at Appr.</u>	<u>Actual 1975-76</u>	<u>% of 3-Yr Program</u>
<u>Infrastructure</u>				
Irrigation	Ha	30,000	14,349	47.8
Soil & Water Conservation	Ha	91,000	28,887	31.7
Fruit Production	Ha	9,500	2,778	29.2
<u>Productive Support</u>				
Feeder Roads	Km	1,900	1,773	93.3
Demonstration & Extension	No. of Staff	400	709	177.3
Farmers' Organization	No. of Staff	250	n.a.	n.a.
Marketing	Market/Stores	65	52	80.0
Electrification	Pers. served	160,000	138,709	86.7
<u>Social Infrastructure</u>				
Health Center & Posts	No.	290	71	24.5
Primary Education	Classrooms	1,150	960	83.5
Drinking Water	Pers. served	170,000	131,313	77.2
Self-Help	Persons	85,000	-	-

6. Physical performance, overall quite adequate, has varied considerably across micro-regions, states and executing agencies. These variations have resulted from various factors including: (i) the quality and quantity of PIDER and agency staff in the area; (ii) the priority given to PIDER by the executing agency (generally a function of PIDER's relative importance in the agency's annual investment program); and (iii) government-community relations (often influenced by previous government activity in the area).

7. Overall, the implementation of the electricity, feeder road and much of the irrigation investment has been good (though water pump supply problems caused delays in some irrigation works). Livestock infrastructure works have varied greatly across states (in some cases SARH performed excellently (Yucatan); in others (Sinaloa) it was necessary to transfer execution responsibility to other agencies). Schools and health posts have been constructed, though the staffing of the health posts has caused problems. Village water supply investments also show great variation: SRH works have tended to be better executed than those of SSA, but both have had problems in the proper maintenance of their works. The rural stores are generally constructed according to program, though store stocking has not always been adequate, especially from a nutrition point of view. Soil and water conservation works in some areas have been quite good; in others they have tended to be large and visible, rather than relevant. The most important agencies, however, for the long-term impact of the program are those of extension and agrarian reform. Performance so far has been improving and important reforms have been initiated in both agencies; (in part due to considerable Bank pressure)

and agreements were signed prior to PIDER II negotiations to further ensure the implementation of these reforms. (For more detailed description of PIDER I performance by sector, see the respective sector annexes.)

8. In addition to the 30 Bank-supported micro-regions, PIDER is active in an additional 56 micro-regions. Over the 1973-76 period some 5,242 communities (population: 4.1 million) have benefited by PIDER activities. The benefits, works and communities benefited are shown in Table 1.

B. Expenditure and Financing of PIDER

9. Overall, PIDER expenditure during the 1973-1976 period has amounted to only 1.8% of Mexico's public investment budget. Of total rural investment, however, PIDER accounted for 13.5% during the period on a national basis. However, this average disguises, in a number of poorer states, the importance of PIDER investment as a percentage of that state's investment in rural areas. For example, in the very poor state of Chiapas, PIDER accounted for nearly 40% of that state's federal rural investment. (Table 2 provides the PIDER contribution to rural investment in each of Mexico's 31 states).

10. For much of the first four years of PIDER, expenditure under PIDER was financed from government revenues. Some development credit under the low income producers component of 910-ME was provided to PIDER micro-regions in 1973 and 1974 (for the Bank-supported 30 micro-regions, this amounted to an estimated US\$10 million, of which US\$4.5 million was reimbursed from 910-ME). With the signing of PIDER loan agreements with the Bank and IDB in 1975, and with the proposed PIDER II loan, external financing averaging some 25% of PIDER's overall program for the 1975-1978 period is estimated.

11. Disbursements. Submission of the first disbursement application for PIDER expenditures was delayed by about six months as a result of cumbersome procedures and misunderstandings between PIDER management and Nacional Financiera, the official borrower under the loan. The first disbursement application covering PIDER expenditures for the third and fourth quarter of 1975 was only received in June 1976. The agencies concerned (PIDER, Secretariat of Finance and Nacional Financiera) have now a full understanding of their role in applying for Bank disbursements, however, some of the cumbersome procedures can apparently not be avoided, and future disbursement applications will at the earliest be made some two to three months after the end of each quarter.

12. Disbursements were delayed on the credit component, mainly as a result of FIRA's lack of involvement until recently in the PIDER program. Now that FIRA has a full understanding of its role and of the requirements under the project, disbursements for this component are expected to be improved.

III. INSTITUTIONAL CHANGE

13. The major short-term objective of PIDER management has been to expand the program to guarantee its existence, to administratively decentralize the program, and to bring about a coordination and consistency in the activities of the federal agencies at the local levels.

Program Expansion

14. PIDER management was under great political pressure to expand the program as quickly as possible. A target of 100 micro-region programs in operation was set; 86 are now in operation. In addition to expanding so as to reach as many as possible of Mexico's poorer rural areas, a major objective was to enlarge the program to such an extent so as to have the ability to influence the activities of the executing agencies. The expansion period is now ending, with the priority now one of consolidating program efforts in the already operational micro-regions. This consolidation is closely related to the second major objective of decentralization.

Decentralization

15. Initially, PIDER's system of programming, execution, supervision and financing was strongly centralized. After experimenting with selective decentralization in 1974, most of these functions have now been delegated to the states. Programming for individual years and within the year was then carried out by the state coordinating committees; education of the authorized investments being given to the state offices of participating federal agencies. PIDER Technical Groups at the State level supervise program execution and disburse PIDER funds directly on behalf of the Secretariat of Programming and Budgeting. This arrangement presented a substantial departure from the usual inflexibility. The intention of the new Government is to further this decentralization. In 1977, pilot efforts are being undertaken to have the states themselves be responsible for the execution of selected investments (water supply, roads, schools, health centers) with the expectation that this would be expanded to eventually include all states for most PIDER (and other) investments. It was primarily as a result of this successful earlier decentralization of selected PIDER investments that the major overall decentralization program is now being developed. This decentralization is then related to the third major PIDER objective, that of program coordination.

Program Coordination

16. A major objective and success of PIDER was the coordination of the activities of the various agencies operating at the local level. Prior to PIDER, the various agencies rarely met, and even more rarely coordinated their activities. As a result of the inter-agency programming exercise and the monthly state PIDER committee meetings, agencies began to perform in a more coordinated manner, not only for the PIDER program, but the normal program as well as the implementing agencies were the same for both. With the system proposed by the new government (see Annex 6), the state level SPP delegate will be responsible for coordinating the programming of the various sectors, and the state government for undertaking and thus coordinating the actual infrastructure and service implementation.

Agency Reform

17. In addition to coordinating the efforts of the various executing agencies, it is becoming increasingly important for PIDER to analyze and, where necessary, help reform the activities of these agencies. Therefore, a significant effort has been made in initiating the reorganization and redirection of the national agricultural extension agency. As a result of PIDER efforts, the Secretary of Agriculture went on record as recognizing the need to reform the agency. A special commission was established to study the specific aspects of the required reforms and an action plan was adopted. 1/ While the rhetoric of reform outperformed the actual reforms instituted during the last year of the previous administration, the new administration has analyzed and now adopted this action plan as its own. Now, for the first time, the possibility of reform appears real with the relevant agencies and directorates at both high and lower levels committed to bringing these changes about. Moreover, a special agreement has been established between PIDER and SARH Extension which gives PIDER various powers to ensure that these reforms are implemented. PIDER should become increasingly involved in analyzing the specific activities of the various agencies, and this case of extension as well as new efforts in the Secretariat of Agrarian Reform are promising.

1/ An extension action plan was a condition of effectiveness of PIDER I.

Community Participation

18. There has been increasing recognition of the importance of participation, not only to give more decision-making influence to program beneficiaries, but also to ensure that the program infrastructure and services achieve their original intention. The real participation of village groups in investment programming and decision-making continues to be limited. PIDER, however, is now involved in various special programs to increase beneficiary participation in both the programming and execution of the program. PIDER staff have become increasingly concerned that unless there is real participation in all phases of the program, the potential for proper operation and maintenance of the program investments will be greatly reduced.

Training

19. One of the major indirect effects of the program is to develop an experienced group of rural development technicians throughout the country. Recent graduates, both in the PIDER support group and the executing agencies, have accumulated substantial experience through working in the various micro-regions over the period of the program. These people have a far greater understanding of the nature of rural development issues and are already being lured away from the program to work in the more established groups working in rural areas. While damaging to the program in the short term, this should serve to improve the overall appropriateness, efficiency and results of rural development programs.

IV. PROGRAM RESULTS

20. In addition to the institutional results brought about through PIDER mentioned in III above, some preliminary statements can also be made about project impacts.

Project Impact - Directly Productive Activities

21. The present major emphasis on directly productive activities was only recently begun (1975). In the early years of PIDER basic infrastructure packages (particularly roads) were given high priority. Thus it is still too early to have output data on PIDER impact, especially since many investments take four to six years to reach full development (breeding cattle units, perennial fruits and extension impact on rainfed crop production). Data from PIDER's monitoring unit, however, indicate that much of the programmed productive infrastructure (irrigation works, roads, land clearing, fencing, pasture establishment) in micro-regions started in 1973 and 1974 are now in place.

22. While no national PIDER data will be available for a few more years on the impact of directly productive activities, IBRD missions, PIDER monitoring staff and CIDER have observed that on ejidos receiving new or improved irrigation infrastructure:

- (1) double cropping is occurring, particularly in the Sinaloa region where previously poor pumps and inefficient distribution through earth-lined canals enabled only one crop. New pumps and concrete lined canals enable existing well capacity to serve both an expanded area and a second crop;
- (2) PIDER accompanied this investment with intensified extension on these irrigated areas emphasizing improved land leveling, better timing of water application and, most importantly, liaison with national credit banks to ensure the timely availability of seasonal production credit for seed and fertilizer supplies.

Thus, early experience with the irrigation component indicates the improvement of yields resulting from available water use together with PIDER coordinated extension and credit is likely to result in the production expected.

23. In rainfed areas, however, it is still too early to assess the impact of PIDER. Where the new extension service, PRONDAAT (See Annex 4-a) is operating, early results look promising. In PRONDAAT's first effort in the Zacapoaxtla micro-region in the State of Puebla, the new approach to extension has managed to reach some 28% of the region's small farmers over a three year period. Keeping close record of both acceptors and non-acceptors of a new technical package (seeds, fertilizers, some credit and improved plant spacing), early results seem to indicate an average increase of roughly 50% in small farmers' corn yields (average holding of 2.5 ha) in the three year program. (See Table below). As PRONDAAT staff further refine their recommendations and the region's farmers gain more experience, with the new packages, additional yield gains--one weather year taken with another--equivalent to a further 25% may be achieved. Thus the PRONDAAT data seems to confirm Bank and Government estimates that a reformed extension service, working with the credit system, may be able to increase rainfed yields for basic maize and bean crops up to 75% for some 25% of the farmers in a region.

PRONDAAT FARMER PARTICIPANTS

Ecological Zone	Average Yields (kg)	Minimum Yield/ha (kg)	Maximum Yield per ha (kg)	Number of Farmers
Lowland	2,945	617	4,367	24
Middle	3,029	1,572	5,284	17
Highland	2,030	432	3,829	23
Invierno	2,392	1,546	4,144	6
Average	2,599	1,042	4,406	70

FARMERS NOT PARTICIPATING IN PRONDAAT

Ecological Zone	Average Yields (kg)	Minimum Yield/ha (kg)	Maximum Yield per ha (kg)	Number of Farmers
Lowland	1,681	597	4,018	30
Middle	2,313	1,088	3,587	14
Highland	1,409	462	4,016	19
Invierno	1,949	986	3,132	6
Average	1,838	786	3,688	69

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER II

Summary of Communities Benefited and Works Completed
in PIDER On-going Regions (86) from 1973-1976

<u>Programs</u>	<u>No. of Communities</u>	<u>No. of Works</u>	<u>Benefits</u>
<u>Productive Programs</u>			
Irrigation	887	1,428	73,448 ha
Livestock	551	676	328,225 ha
Soil and Water Conservation	674	744	246,647 ha
Fruit Development	536	536	18,000 ha
Bee Development	487	2,659	6,821 ha
Forestry	54	62	25,606 ha
Fisheries	19	19	721 families
Rural Industries	209	213	199,880 persons
<u>Productive Support</u>			
Agricultural Research	18	18	1,416 ha
Feeder Roads	1,144	961	8,628 km
Electrification	1,087	1,050	501,916 persons
Marketing	357	344	411,365 persons
<u>Social Programs</u>			
Water Supply	1,220	1,139	1,010,000 persons
Health Posts	387	391	568,373 persons
Schoolrooms	1,987	4,213	207,466 students

Number of Municipalities: 613
 Population: 4,116,661
 Number of Communities: 5,242
 Area: 664,871 km²

Source: PIDER

MEXICORURAL DEVELOPMENT PROJECT - PIDER II

PIDER's Share in Overall Rural
Investment, Total and by States (1973-1976)
(Mex\$'000)

States	Total Rural Investment	%/1	PIDER Investment	%/1	%/2
National Total	46,602,173.9	100	6,671,861.6	100	13.5
1. Aguascalientes	476,195.3	.96	114,407.7	1.71	24.0
2. Baja California Sur	525,853.4	1.06	111,487.8	1.67	21.2
3. Baja California Norte	1,662,306.6	3.35	137,920.6	2.07	8.3
4. Campeche	636,732.9	1.28	116,816.1	1.75	18.4
5. Chiapas	927,885.6	1.87	357,830.6	5.36	38.6
6. Coahuila	1,116,724.3	2.25	123,070.9	1.84	11.0
7. Colima	623,662.7	1.26	85,315.4	1.28	13.7
8. Chihuahua	1,893,900.1	3.82	130,644.8	1.96	6.9
9. Durango	1,370,975.3	2.76	241,845.8	3.62	17.6
10. Guanajuato	867,521.2	1.75	257,233.1	3.86	29.7
11. Guerrero	1,806,500.9	3.64	369,402.4	5.54	20.5
12. Hidalgo	1,586,594.6	3.20	200,926.9	3.01	12.7
13. Jalisco	2,245,377.3	4.53	683,876.7	10.25	30.5
14. Mexico	2,189,387.0	4.21	58,930.5	.88	2.7
15. Michoacan	1,608,304.9	3.24	374,094.9	5.61	23.3
16. Morelos	363,234.4	.73	129,537.4	1.94	35.7
17. Nayarit	1,313,291.8	2.65	136,430.0	2.04	10.4
18. Nuevo Leon	681,477.8	1.37	234,652.1	3.52	34.4
19. Oaxaca	1,576,339.8	3.18	504,234.3	7.66	32.0
20. Puebla	1,036,012.7	2.09	198,961.0	2.98	19.2
21. Queretaro	707,373.5	1.43	225,730.0	3.38	31.9
22. Quintana Roo	428,479.4	.86	137,402.0	2.06	32.1
23. San Luis Potosi	1,591,251.1	3.21	162,907.3	2.44	10.2
24. Sinaloa	2,673,999.8	5.39	263,736.1	3.95	9.9
25. Sonora	2,429,066.1	4.90	166,310.9	2.49	6.9
26. Tabasco	1,065,539.6	2.15	97,598.5	1.46	9.2
27. Tamaulipas	3,257,349.7	6.57	190,147.4	2.85	5.8
28. Tlaxcala	483,088.5	.97	176,346.3	2.64	36.5
29. Veracruz	2,609,239.4	5.25	248,457.7	3.72	9.5
30. Yucatan	817,597.4	1.65	139,850.8	2.10	17.1
31. Zacatecas	1,234,440.9	2.49	295,755.6	4.46	24.0
Not geographically distributed	7,796,400.0	15.92			

/1 Column percentage.

/2 Row percentage.

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER II

Development Credit and Pider

INTRODUCTION

1. Expansion of credit availability to small farmers in the PIDER micro-regions is an important component of the PIDER II project. This annex reviews the development of the agricultural credit system in Mexico and the performance and problems experienced in PIDER I. It describes the role of the World Bank in credit activities and reviews the proposed credit component in PIDER II.

DEVELOPMENT OF THE AGRICULTURAL SYSTEM IN MEXICO

A. Government Credit Operations

2. The establishment of the Fondo de Garantia y Fomento para la Agricultura, Ganaderia y Avicultura (FONDO) in 1955, as a trust fund in the Bank of Mexico, was a landmark in the development of agricultural credit in Mexico. It provided a combination of rediscounting facilities and technical assistance to private and official banks, and promoted the use of credit among producers. It also helped train private and official bank staff and organized continuing practical demonstrations and studies of farmers' problems.

3. In 1965 the Fondo Especial para Financiamientos Agropecuarios (FEFA) was established as the international arm of FONDO to channel loan funds from the IBRD and the IDB through rediscounting operations similar to the FONDO's. Although FONDO/FEFA has made substantial headway in increasing the number of low income producers assisted, much remains to be done. In 1972 FONDO/FEFA assisted 22,594 poor farmers; by 1974 the number had more than tripled, rising to 77,159. Meanwhile, there was almost a doubling in the number of commercial farmers aided; the increase was from 8,124 to 13,889. Many farmers, however, remain to be assisted. Currently there are 300,000 commercial farmers, 900,000 minifundistas, and 1.5 million ejidatarios in Mexico. The Bank of Mexico has estimated that approximately 75% of these producers receive no agricultural credit from any source.

4. In 1973, the Fondo Especial de Asistencia Technica y Garantia para Creditos Agropecuarios (FEGA) was created to defray technical assistance costs associated with loans to low-income producers and to guarantee the recovery of loans. It subsidizes banks engaged in financing of low income producers (LIPS) to cover the costs of staff employed to provide technical assistance to these borrowers. This subsidy may total up to 3% (and, in special cases, 6%) of the volume of LIPS loans. The FEGA also guarantees the recovery of up to 60% (and in special cases 80%) of the principal balance owed on farm loans made by private credit institutions to LIPS. Projects so guaranteed must have been

appraised as technically feasible and economically viable and must be suitably supervised. It also provides a financial subsidy to the FONDO/FEFA. By the end of 1974, FEFA had approved payments of Mex\$30.3 million to the FONDO/FEFA, Mex\$0.7 million to private banks and Mex\$1.3 million to public banks for employing technical staff to assist LIPS subloans. FEFA had also guaranteed private bank loans totalling Mex\$239.5 million.

5. The FONDO, FEFA, and FEFA are administered by a common staff; jointly this administration is known as Fideicomisos Instituidos en el Banco de Mexico en Relacion con la Agricultura (FIRA). A director, assisted by two sub-directors, is responsible for day-to-day operations supported by a staff which numbered 1,017 at the end of 1974. The head office is in Mexico City, supported in the field by seven Regional Offices, 35 State Offices, and 80 Branch Offices, providing representation throughout the country.

6. FIRA's funds are provided by both FONDO (from domestic sources) and FEFA (from international sources). With these funds it makes rediscounts to private and public banks which have made development loans to commercial and low income producers in the agricultural sector. These operations are complemented by rediscounts for short term loans and by the provision of subsidies for technical assistance and particular guarantees for loans (private banks only) to low income producers.

B. Role of the Public Agricultural Banking System

7. The ability of FIRA to carry out its mandate of increasing credit to low income farmers depends largely on the willingness of Mexican agricultural banks to cooperate. In recent years, the public agricultural banking system has enlarged its credit operations and its network of offices and staff. Between 1970 and 1975, the volume of credit provided rose from about Mex\$5,800 million to Mex\$13,000 million, the number of offices from 550 to 705, and its staff from 7,700 to 20,600.

8. Until 1975, agricultural credit operations were in the hands of three agricultural banks. Banco Agricola, created first, served all farmers; Banco Ejidal was created later to serve ejidos; and later the Banco Agropecuario was set up as a refinancing bank. The result was duplication of activities and lack of coordination, as well as excessive centralization in decision-making. In addition, none of the banks were doing the job for which they were created. All had a back-log of irrecoverable and other past-due loans and failed to mobilize rural savings, while in some cases resources were diverted into promotional activities for social and political reasons.

9. In July 1975 the Government consolidated the three banks into a single system, the Rural Credit Bank (Banco Nacional de Credito Rural - BNCR)

with 12 affiliated regional banks. The Ley General de Credito Rural (LGCR), drawn up shortly thereafter, provided a blue print of the various aspects of rural credit.

10. The existence of the Rural Credit Bank as one dominant public lending institution to agriculture is expected to provide consistency within the policies of its 12 regional banks and to bring their operations in line with national agricultural policies. The consolidation, however, is proving to be a complex task both politically and organizationally, and the impact so far in many regions has been occasional to slow lending.

C. Role of Farmer Borrowing Organizations

11. Bank activities are complemented on the local level by a variety of farmer borrowing organizations. Since 1976, Mexico has been experimenting with these organizations. At one extreme there have been simple grupos solidarios in which a small group from 3 to 9 members borrows collectively to meet individual credit needs and to purchase inputs and marketing production. Sociedades de Credito is similar to but larger than the grupo solidario, with 10 or more members. There is also Sociedad Semi-Colectiva, a flexible type of organization whose members practice joint cultivation on at least part of their land and who may enter into other collective activities. The Government has most actively promoted a fourth type, the ejido colectivo, in which the entire ejido is expected to evolve into a single organizational unit, obtaining credit and undertaking most activities collectively. Relatively few fully cooperative ejidos now operate. Finally, there are uniones de ejidos or federations of ejidos which undertake the supply and marketing functions for which ejidos are generally too small. These federations may also assist in the organization of new and growing ejidos. Group activity is becoming increasingly common in Mexico. Success will depend, however, on overcoming a variety of hurdles. A number of technical areas need upgrading and must have available management and technical services commensurate with the growing scale and complexity of their operations. Also needed are improved accounting capabilities and internal resources to provide a cushion against possible losses and to reduce dependence on Government. Finally, administration will have to be tightened, and organizational allowance made for differing levels of farmers' abilities. At the same time, various attitudes will need changing, in particular, the basically individualistic attitude of the farmer and his inherent suspicion of any attempt to force group activity. Farmers will also have to be convinced that cooperative activities can be as profitable as wage labor.

ROLE OF THE WORLD BANK IN THE DEVELOPMENT OF AGRICULTURAL CREDIT

12. Over the last 12 years, the IBRD has provided the FIRA with US\$425 million to support its development lending to agriculture. The Bank has also

assisted FIRA in its efforts to upgrade the technical quality of its staff, to decentralize and thereby make more efficient its lending operations, and to introduce improved techniques for the analysis and evaluation of its impact on the agricultural sector.

13. The first three of the Bank's loans (1955-1972) went mainly to commercial farmers. The fourth loan (1973) began a program designed to assist ejidatarios and other low income producers, a program which was expanded in the fifth loan (1976). The producers affected were defined as those who are in legal possession of their land or have titles of usufruct, whose main source of income is derived from farming, and whose net annual family income does not exceed 1,000 times the daily minimum rural wage for the region. The sub-loans were fewer and, on the average, larger than expected at appraisal principally because investment costs rose with inflation, but also because there were more group loans and groups were also larger than anticipated. While there were some sub-loans to associations of commercial farmers, group lending accounted for the bulk of the low income producer sub-loans.

PERFORMANCE UNDER PIDER I

14. PIDER I represents a new approach to increasing the flow of credit to low income producers. Begun originally by the Government in 1973 and assisted after 1975 by loans from IDB and the IBRD, it is designed to provide poor and isolated micro-regions both social and productive infrastructure, as well as increased amounts of technical assistance and producer credit.

15. During 1974, substantial effort was made by PIDER and FIRA staff to assess the credit needs, both seasonal and longer term, of small farmers in the 30 micro-regions which were to be assisted by the Bank's PIDER I loan. In 1974, Banco Ejidal representatives joined FIRA staff to work with the PIDER Coordinating Committee to coordinate credit promotion and availability with infrastructure investments planned under the PIDER program. A snag arose in early 1975, just as the PIDER I structure was being formalized, when funds for credit ran out; all funds available in the fourth agricultural and livestock credit loan for lending to low income farmers had been fully committed. As a result, a credit component was incorporated into the first PIDER loan, to be administered by FIRA under the same terms as those which were to prevail under the fifth agricultural and livestock credit loan (then under preparation). This PIDER credit component was coordinated specifically with the credit needs and resulting from PIDER infrastructure investment and extension support.

16. Sixty-five percent of total PIDER I investments were planned to be productive, and approximately half of these were expected to be financed through sub-loans made by the participating banks, both private and official, and subsequently discounted with PIDER. During 1975 and early 1976 a number of organizational problems arose which inhibited the lending program within the PIDER regions. Efforts to resolve these problems appear to be working,

while the amount of credit disbursed to low income producers in the 30 PIDER I micro-regions has been nearly as high as originally projected.

17. As shown in Table 1, the amount of long-term credit provided to low income producers in these micro-regions (and discounted by FIRA) rose from Mex\$94 million in 1973 to Mex\$207 million in 1975, an increase of 120%. Discounting for inflation during the period, credit increased in real terms approximately 50%. This rise is even more impressive when compared with the much slower rate increase experienced in agricultural credit in Mexico during these two years. Preliminary data for the first six months of 1976 suggest that the credit discounted by FIRA this year will rise in nominal terms by an additional 30% in these regions, or by 10-15% in real terms.

18. Lending within the 30 PIDER I micro-regions has been concentrated within a subset of micro-regions. Six micro-regions located in Nuevo Leon (2), Sinaloa (3) and Aguascalientes (1) received 69% of the sub-loans discounted by FIRA during the first ten months of the PIDER I loan (Table 2). Fifteen of the micro-regions account for 84% of all credit discounted, with the other 15 micro-regions receiving only 16%. The disparity reflects the variations in lending opportunities and in the strength of PIDER, FIRA, and the participating banks in the different areas. In seven micro-regions there has been an absolute decline in the credits discounted since 1973; in several, the appraisal mission was informed by FIRA officials that the reason was difficulties in the official Rural Credit Bank, which resulted from the reorganization of the three official banks into one unit. The most important obstacles to increased lending are being analyzed and steps are being taken to improve the situation.

19. The major end-use categories for development loans granted to low income producers within the 30 micro-regions have been:

<u>Category</u>	<u>Percent</u>
Annual crops	42
Cattle:	27
Beef 15	
Dairy 12	
Fruit trees	15
Agro-Industry	9
Other livestock	4
Poultry	2
Bees	<u>1</u>
Total	<u>100</u>

This breakdown is similar to that which was observed in the fourth loan, but with greater emphasis in the PIDER I loan on annual crops and fruit trees and less emphasis on cattle. The probable reason is that many of the livestock projects planned for the PIDER I micro-regions are at a stage where credit financing would be premature.

20. During the first 10 months of PIDER I, 714 credits were discounted by FIRA, benefitting 3,572 producers. As shown in Table 4, 57% of the beneficiaries were ejidatarios and 43% were small freeholders. The ejidatarios received 26% of the funds disbursed; the small freeholders 74%. Loans made to 183 groups of producers (grupos solidarios and sociedades de credito), including groups of ejidatarios and groups of small freeholders, represented 85% of the total beneficiaries and 52% of the funds disbursed. The other 48% of credit disbursed was received by 535 individual small freeholders. The loans to groups averaged Mex\$524,590 per loan or, given an average of nearly 17 persons per loan, Mex\$31,500 per beneficiary. The loans to individual small freeholders averaged Mex\$170,000. The size distribution of the loans is given in Table 5; when the amounts of each loan category are divided by the number of respective beneficiaries, the size distribution, at least at this level of aggregation of beneficiaries, is more or less equal.

21. The term structure of loans is shown in Table 6. The modal term for the loans is three years, and 59% of the loans have a term of 3-5 years. The remaining 41% range from 6 to 15 years and comprise mostly cattle and fruit tree projects, whose development requires longer term repayment periods.

22. FIRA discounted Mex\$186 million pesos of long-term development loans in the 30 PIDER I micro-regions from May 1975 through March 1976. On a 12-month basis, this would be Mex\$223 million. Preliminary data indicates that FIRA rediscounts in these same 30 micro-regions will exceed Mex\$305 million in calendar year 1976.

ORGANIZATIONAL PROBLEMS IN PIDER I

23. A number of organizational problems have been inhibiting the smooth functioning of the credit component in the PIDER I program. PIDER and FIRA are aware of these issues and are making a major effort to resolve them. They include the following:

Coordination of Activities between PIDER and FIRA. Neither FIRA or PIDER have made sufficient effort to coordinate their efforts. In particular, there has been a failure to coordinate availability with PIDER infrastructure investments. Recently, however, both bodies have agreed to coordinate activities more closely. In particular FIRA has promised to play a more central role in the planning of on-farm investments to expand its promotional activities in the micro-regions.

Organizational problems within the official Banks. The official Banks have been slower than expected to expand their activities within the micro-regions. As mentioned, the consolidation of the three official banks slowed credit operations. In addition, the Rural Credit Bank lacks trained staff, particularly in the most isolated regions which are being newly opened. Here difficult working and living conditions make it hard to attract and keep staff.

The organization of ejidos and communities. Probably the most difficult element in the entire PIDER program is the organizing of ejidos into working groups capable of soliciting, receiving and utilizing credit. The principal responsibility for this job falls to the Secretariat of Agrarian Reform (SRA) whose efforts have had results. Organizationally, it has been one of the weaker Federal departments (Annex 2-e).

The establishment of an extension service. PIDER has been working both with the Secretariat of Agriculture and Livestock (now SARH) and with PRONDAAT (Annex 2-c) to develop extension services in different regions. These are needed to assist in planning, designing and implementing infrastructure components, and also to provide advice once productive investments are in place. Experience to date indicates that it takes about three years to establish an effective new extension service in a micro-region. The time is needed primarily for new agricultural technicians to gain practical experience and familiarity with the region and with producers.

Financing of directly productive investments by PIDER. In some ejidos and communities, the directly productive investments identified by PIDER have not been found viable for credit financing by FIRA and/or the participating banks. One problem

is the short time before repayment is required. Loans are generally given for a maximum of 15 years, with a maximum of three years of grace, at 7.6% interest, a time too limited for some development loans to pay out. In other cases, where the loan may be financially viable, the participating bank may request that PIDER contribute part of the investment as a quasi down payment in anticipation of possible default. Finally, some projects have been deemed socially profitable, but not financially profitable, even with improved loan terms.

24. In each of the above cases, PIDER's practice has been to finance a proportion of the investment package directly, usually by contracting out the design and implementation to one of the federal line departments such as the Secretariat of Public Works, the Secretariat of Hydraulic Resources, or the Secretariat of Agriculture and Livestock. After the original investments are made, the participating banks then will agree to provide sufficient credit to complete the project, with repayment to be made by the beneficiaries for the credit-financed portion. ^{1/} A number of problems arise when PIDER finances productive investments this way. For one, delays occur frequently because federally funded projects must be budgeted and appropriated at the federal level with the result that funds are often not available during early spring when working conditions are best and labor is not occupied with farm tasks.

25. PIDER is considering a new system which it hopes will encourage banks to offer credit at an earlier stage. The Plan would allow participating banks, both private and official, to initiate preliminary planning and design work for on-farm investments. It would also allow individual ejidos, in certain cases, to initiate projects and give them the option of contracting with FIRA agricultural technicians for help. Banks would also be given a voice in determining when a federal contribution might be justified for a PIDER project and what proportion that contribution should represent. Once the proportions were determined, the federal contribution and the credit would be combined into a working fund out of which the construction of the project would be financed in its entirety. Private contractors approved by PIDER, or federal line dependencies, would be eligible contractors, under the joint responsibility of the ejido and participating banks. Ejidos and participating banks would be made liable for a fixed proportion of the planned project and any cost overruns.

26. The proposed process should increase the initiative taken by ejidos and participating banks in the planning of on-farm investments and increase their responsibility for overseeing both the planning and the implementation of projects. Ejidos and participating banks would be made liable for a fixed proportion of the planned project.

^{1/} The Rural Credit Bank has been used as an executing agency for the PIDER financed investments in micro-regions where the Secretariat of Agriculture and Livestock was not able to undertake this work. FIRA has recommended that private banks also be given this authority.

THE PROJECT

27. Under PIDER I credit was provided to the micro-regions supported by the loan; it was not, however, restricted to the support of PIDER-financed infrastructure. This policy would be continued under PIDER II.

28. PIDER I credit performance was adversely affected by the poor coordination between PIDER and FIRA offices. FIRA was not formally included in the monthly state-level PIDER meetings and felt itself only a marginal participant in the program. PIDER staff saw credit as important but not their responsibility and thus not directly related to the PIDER program. Bank supervision missions brought both groups together on various occasions in attempts to bring about a better mutual understanding between the groups. Considerable progress was eventually made and, as a result of PIDER I, investment agency and bank coordination was begun at the state level. Increasingly, PIDER has been adopting FIRA investment criteria in the programming of on-farm directly productive investments, such as livestock projects. PIDER field staff now find such coordination indispensable for the proper operation of the program and are insisting on the formal participation of the FIRA at the state and local levels to ensure that investments programmed and implemented by PIDER meet FIRA criteria for additional financing. A formal agreement, defining the obligations and responsibilities of each group, was signed. The agreement defines: (i) mechanisms for formal coordination including periodic meetings, information exchange, integration of FIRA into the State Committees; (ii) procedures for resolving inter-group disputes regarding investment criteria; and (iii) arrangements for training PIDER staff on FIRA regulations and procedures.

29. The development credit, reimbursable from the proposed loan, would be used primarily for livestock, and for land leveling and associated investments needed to support new irrigation works. Credit would be made available on the same terms applied nationally by FIRA for low-income producers under other Bank loans. Repayments of principal will range from 3 to 15 years and will include grace periods of 1 to 3 years with FIRA rediscounting no more than 90% of the original credit amount. Interest and rediscount rates would be as follows:

	<u>Rediscount Rates to Participating Banks</u>		<u>Interest Rates to Beneficiaries</u>
	<u>Private</u>	<u>Public</u>	
(i) Loans to beneficiaries receiving institutional credit for the first time and whose net annual family income does not exceed 250 times the daily minimum rural wage for the regions where they are located.	6.50%	7.50%	9.50%
(ii) Loans to other low income procedures in Project micro-regions.	8.00%	9.00%	11.00%

During negotiations, assurances were obtained on these arrangements.

30. Seasonal production credit (currently at 14% interest) would be provided under the project from existing credit lines, but would not be reimbursable from the proposed loan.

MEXICORURAL DEVELOPMENT PROGRAM - PIDER IIRURAL INDUSTRIESI. INTRODUCTION

1. Small farmers in Mexico, ejidatarios and smallholders - produce about half of the total national agriculture production but their share in the processing and marketing of this production is less than 1%. Since the 1950's the Government of Mexico has promoted enterprises owned by ejidatarios and smallholders to improve the distribution of the benefits from the production of primary products. Such enterprises are supported so that small farmers receive a higher share of the value of the final product, as well as to break the often monopolistic position of middlemen and traders.

2. In addition, the Government supports rural industries to create off-farm employment in the rural areas and to alleviate the chronic un- and underemployment among Mexico's landless. Among Mexico's 20 million rural inhabitants, about 50% are landless and a large share of those owning land have plots too small to sustain a family. These need additional off-farm sources of employment.

3. The Government has financed rural industries in the PIDER program since 1973. The investments have been small in relation to the total program. At the Government's request rural industries were not included in the first Bank project in support of PIDER. At that time the Government had not established a firm policy for rural industries and had not sufficiently assessed the quality of the programs by the agencies involved. Based on the first years of experience, the Government is now establishing a strategy for rural industry development in PIDER which is the basis of the proposed IBRD support to a rural industry component in PIDER II.

II. THE SECTORA. Agro-Industries

4. Mexico's agro-industry sector accounted for an aggregated value of production of Mex\$144 billion and a total employment of 1.3 million in 1970 ^{1/}. Over the period 1960-70 the industry grew by 10.2% annually in output value and by 7.2% in employment. Mexico's agro-industry is oligopolistic. A few enterprises account for 50% or more of the total value of the production in most sectors. There is also a process of concentration in the industry

^{1/} Agro-industries includes enterprises for marketing of the agriculture products as well as industrialization.

with an increasing share of the total output coming from the larger enterprises. Enterprises owned by ejidatarios or smallholders play only a marginal role. Some 300 ejido-owned agro-industries are estimated to account for a total aggregated production of some Mex\$150 million, i.e. less than 1% of the total output. Only in forestry is the participation of ejido-owned industries more than marginal. Of the total wood production of 6.7 million m³ in 1974, ejido industries accounted for 16.5%. The Government's support to agro-industries owned by farmers and ejidatarios have followed several directions. Small industries for packing and conservation of fruits and vegetables, preparation of meat, coffee grinding, etc., utilizing simple technologies with investments not exceeding Mex\$0.5 million have been promoted, as well as larger plants such as sawmills, cotton gins, feedmills, plants for fruit and vegetable preservation, with investments in the size of Mex\$10-20 million. The Government support has been for agro-industries owned and operated autonomously by the ejidatarios as well as for enterprises jointly owned by the farmers and the Government. The agro-industries are in most cases located in market towns, since access to infrastructure, transport, and markets is less restricted in towns than in more isolated rural areas.

B. Mineral-based Industries

5. The Mexican mining and excavation industry had an aggregated production value of Mex\$5.6 billion and employed some 60,000 in 1970. Over 60% of the mining and excavation take place on ejido land, but with only marginal ownership participation by the farmers or ejidatarios. Until 1975, when a new Mining Law was passed, the ejidatarios or smallholders received few benefits from such exploitation. Various Government agencies have promoted ejido-owned industries for exploitation of minerals. Such enterprises have been established particularly for exploitation of non-metallic minerals, such as excavation of lime, stone, clay (for production of bricks, and tiles) onyx, marmol, gravel and sand. In total some 100 industries were established with an estimated total production of Mex\$150 million, excluding very small investments for production of bricks, tiles and blocks for strictly local demands.

C. Village Enterprises

6. Small industries or artisans producing for local markets are rare in the rural areas and small towns in Mexico. Small towns or villages with up to 5,000 inhabitants often have no craftsmen and the needs for consumer goods, services and agriculture implements are met in the larger regional market towns. Only a few articles are usually produced in the small Mexican market towns, the most common being: tortilla, bread, cheese, ice, materials for construction, wooden furniture, sandals and simple garments. In addition, the small market towns usually have mechanical workshops for various kinds of repairs.

7. The Government has actively tried to establish cooperative village industries owned by ejidos or rural communities with the objective of creating rural employment and additional incomes for the rural population. Some 500 such small village enterprises have been financed the last few years, involving an investment of about Mex\$100 million. These village enterprises are usually very small, employing less than ten persons and with investments of less than Mex\$200,000. They are highly labor-intensive, with investment per job averaging less than Mex\$10,000.

III. PAST EFFORTS

A. The Credit System

8. Until recently the major agency for the financing of rural industries in Mexico has been Fondo Nacional de Fomento Ejidal (FONAFE). Established in 1959 to administer Fondos Comunes (ejido funds created from expropriations of ejido land), FONAFE developed into a Government financed agency promoting various types of ejido owned industries. About 300 such enterprises were directly financed by FONAFE, with a total investment of Mex\$868 million, involving over 70,000 ejidatarios and providing employment to about 12,000 of them. The most important type of industry is exploitation of forestry -- accounting for about 50% of the total aggregated investment. Many of these industries promoted by FONAFE have not succeeded, often due to insufficiency in raw materials, management, and marketing. As a result of increasing problems in FONAFE, the Government announced in late 1975 that FONAFE's role would be reduced to its original function of administering the Fondos Comunes. FONAFE's rural industries credit function would be transferred to a new Government bank -- Financiera Nacional de Industria Rural (FINIR).

9. At the end of 1975, the Congress ratified a new law for agriculture credit. The law includes the form under which credits will be granted to rural industries by the official banks. Two institutions constitute the new official bank system for agriculture credit, Banco Nacional de Credito Rural (BNCR), with its regional offices, and Financiera Nacional de Industria Rural (FINIR). According to the new credit law, rural industry and related investments may in principle be financed by both banks. It is likely that BNCR will be the main financial intermediary for agro-processing industries, while FINIR would concentrate on resource-extracting industries and tourism. 1/

10. Banco Credito Rural (BNCR) was created in 1975 when the three official agriculture banks in Mexico, Banco Credito Agricola, Banco Ejidal and Banco Agropecuario were merged into one bank (See annex 3-a). BNCR is organized in 12 regional banks, with an apex institution in Mexico City. During 1970-74 the official banks approved long-term credits for agro-industrial development amounting to Mex\$469 million, which was 5% of their term lending. Low income producers account for a majority of the borrowing.

1/ FINIR has not yet been established and is not likely to be operational for several years.

11. BNCR's experience in assisting ejido and small farmer industries is mixed. Problems are common due to weak internal organization of producer groups, or difficulties relating to legal status, land tenure or rights of access to raw materials. The bank needs to strengthen its capacity to prepare, evaluate and supervise projects, and to provide technical and organizational assistance to producer-owned agro-industrial projects. Regional rural industry specialists need to be added and the present staff in the central office and in the regional banks require training in appraisal techniques as well as in methods of assistance to ejido and other rural industries.

12. BNCR has recently established a department for agro-industry development with an initial specialized staff of 36 persons in Mexico City. Similar departments will be established in the regional banks with the purpose to strengthen BNCR's financial and technical service to rural industries. BNCR plans a lending for 1977 of Mex\$250 million for rural industries of which most would be for ejidatarios and small farmers.

13. FIRA. An important role in the Government's credit support to agriculture and rural industries is played by FIRA (Fideicomisos Instituidos en el Banco de Mexico en Relacion con la Agricultura), three trustfunds (FONDO, FEGA and FEFA) under Banco de Mexico. (See further Annex 3-a). Agro-industrial lending accounts for a minor share of FIRA's operations. In 1975, FIRA approved Mex\$ 175 million for agro-industrial projects which was 4% of FIRA's total long-term lending. FIRA plans to increase its lending for agro-industries to about 10% of its total lending by 1980. FIRA has not specifically oriented its lending for agro-industries to benefit low income producers or ejidatarios. Of its total portfolio, only 6% of the projects are owned partly or in full by ejidatarios. FIRA is, however, in line with the political priorities in Mexico, trying to increase its lending and assistance to ejidatarios and other low-income groups.

B. Other Government Agencies

14. There are besides the Government banks and trust funds, some 20 Government agencies promoting development of rural industries in Mexico. For most of these agencies, the programs for rural industries are small and often marginal activities. The efforts have often been of mixed results and the lack of coordination between the agencies have created duplication of efforts. Among the more successful agencies in supporting rural industries are: Actividades Productivas and the National Indian Institute (INI).

15. Actividades Productivas is a program for promotion of productive activities in the PIDER micro-regions operated since 1975 by a sub-department of the Secretariat of the President. The program promotes and finances three types of productive activities: (i) rural industries; (ii) rural shops, and

(iii) small-scale agriculture development. The philosophy behind the program is to foster self-reliance among the rural population to meet local needs and to improve local capacity to operate small enterprises. "Pro-motores" financed by Actividades Productivas stationed in the micro-regions promote producer and consumer cooperatives and teach basic production and management technologies. The program is designed after a highly successful rural industry cooperative in Jalisco (Industria de Pueblo). Actividades Productivas had in 1975 a budget of Mex\$100 million and has since it started financed about 150 small enterprises.

16. INI is a decentralized government agency for assistance and development for the Indian population. It undertakes integrated development programs in the Indian areas by coordinating various line agencies and ministries. INI presently operates in more than 800 villages, with a target population of about 6 million. Between 1971 and 1975, INI promoted about 200 small rural industries from which some 4000 artisans have benefited. The workshops INI promotes serve to train the local population in vocational skills, provide basic products at low cost to the local community, and develop handicraft tradition of the indigeneous population.

C. Rural Industries in PIDER

17. PIDER has supported development of rural industries since the program started in 1973, but investments have been only about 1% of the total program. Typical projects financed under PIDER are small workshops for production of construction materials, garments, foods (such as mills for corn, tortillerias, bakeries) and handicraft development (woodcarving, pottery, weaving), averaging about Mex\$200,000 in investment. In addition some medium sized industries have been financed (e.g. ice factories and processing of lime) with investments in the range of Mex\$5-10 million.

18. The enterprises are with few exceptions new and more than 15 government agencies have been instrumental in identifying the projects, preparing feasibility studies, constructing the enterprises, training the workers and occasionally administering the enterprises and actively market the products. In 1975 PIDER authorized about 250 investments in rural industries and handicraft development totalling about Mex\$53 million. The table below gives the types of industries financed:

<u>Type of Industry</u>	<u>No. of Projects</u>	<u>Investment (Mex\$'000)</u>	<u>% of Investment</u>
Agro-industries	57	6,297	12.0
Mineral-based industries	37	15,624	29.7
Handicraft development	17	2,810	5.3
Other Industries (garments, shoes, furnitures, etc.)	132	26,813	51.0
Technical Assistance	<u>n.a.</u>	<u>1,051</u>	<u>2.0</u>
Total	243	52,595	100.0

19. Early Lessons by PIDER. The Government considered its early investment in rural industries in the PIDER program as a trial period. The experience of rural industries in PIDER is mixed. Some of the enterprises have been viable and provided the community with additional employment and earnings, often at low investment costs. However, a considerable number of projects have failed or have problems. The problems are mainly due to:

- (a) the groups of ejidatarios or villagers have not been sufficiently organized, and sometimes lacked legal status.
- (b) many industries have been established without a feasibility study of the project and the industries have proved to be economically not viable.
- (c) Rural industries were often seen as infrastructure investments by the supporting agencies. On-going support to established enterprises was often weak or non-existent. Particularly, access to working capital has been a major problem for the enterprises.

The problems encountered by PIDER reflect the quality of the various Government agency programs for rural industries. These programs were often marginal activities of the agencies. Most of the agencies lacked experience and had not established an efficient support system.

20. A serious shortcoming was that PIDER did not involve the credit institutions in the program, in order to improve the quality of project appraisal and access to ongoing credit.

IV. THE PROJECT

A. A New Strategy for Rural Industries

21. Based on the experience of the first years of investment in the PIDER program, the Government is now formulating a development

strategy for rural industries under PIDER. The basic principles of this strategy are as follows:

- (i) The capacity for promotion of rural industries by the agencies active in this field would be strengthened through: (a) training of their technical staff; (b) funding of preparation studies for new industries; (c) funding of technical assistance for existing industries; and (d) in key agencies, expansion of technical staff.
- (ii) PIDER's direct financing of rural industries would be limited to small village industries promoted by the more successful agencies; all other financing would be through bank credit.
- (iii) Rural industry investments for other than small village industries would be financed through credit and the banks would play the leading role in the support. This would ensure: (a) a more sound evaluation of the various projects; (b) integration between agriculture and agro-industrial development; (c) utilization of the technical capacity of the banks for preparation and evaluation of agro-industrial projects; and (d) access to working capital to the industries once in operation.
- (iv) PIDER would by developing its own specialized staff, take a more active role in the development of rural industries both in the programming stage and in monitoring during the post-investment stage.

B. Brief Project Description

22. The PIDER II Project would introduce support to development of rural industries based on the strategy outlined above. Eligible for financing under the project would be rural industries in the 20 new micro-regions selected for PIDER II as well as in the 30 micro-regions financed under the Bank's first loan to PIDER. The concept of micro-region would be expanded in the case of rural industries to include urban centers and towns located in the micro-region. Owners would however in all cases be ejidatarios and small farmers residing in the rural portion of the micro-regions. Also, the major source of inputs to the plant would be the PIDER micro-region.

23. The following components would be financed under the Project:

- (i) Investment credit for rural industries owned by groups of ejidatarios, small farmers, and landless in the micro-regions. Through FONDO (FIRA) the project would provide rediscounting

for loans to such industries granted by the official banks or the private banks 1/.

- (ii) Investments in small, labor intensive rural industries (village industries) with total investments of less than US\$35,000 equivalent.
- (iii) Technical assistance for the promotion of and advice to rural industries, including financing of feasibility studies, additional staff and staff training to key agencies.

C. Project Cost

24. The cost of the rural industry component of the project are estimated as follows:

<u>Component</u>	----- Cost -----		<u>% of Project Cost</u>
	<u>(Mex\$ mill.)</u>	<u>(US\$ mill.)</u>	
Rural Industry Credit	202.5	9.0	64
Village Industry Development	67.5	3.0	22
Technical Assistance:	<u>45.0</u>	<u>2.0</u>	<u>14</u>
Total	315.0	14.0	100

D. Detailed Features

25. Rural Industry Credit. The Bank Project would finance rural industries in the micro-regions selected in PIDER I and PIDER II under the ownership of the groups eligible for credit from the official Agriculture Banks according to the Agriculture Credit Law 2/. Priority would be given

1/ Of the official Banks, FINIR is not yet in operation and would be eligible under the project only after subsequent appraisal.

2/ For a list of groups eligible for credit from the Official Banks, see Annex 3-a.

to agro-industries and other industries for exploitation of other natural resources in the micro-regions. Emphasis would be given to industries which would attempt to integrate primary production, storage, packaging, processing, transportation and marketing.

26. The Project would provide rediscounting facilities of up to 90% by FONDO of loans for such industries. The terms for rediscounting would be the same as established for FIRA under the IBRD's Fifth Agro-credit project to Mexico. 1/ The project would give priority to smaller and more labor-intensive agro-industries than usually financed by FIRA and the banks. Most of the projects are expected to be financed by the official banks which have been given central roles in financing rural industries in Mexico. The sub-projects would, like other loans for low-income producers rediscounted by FONDO, be eligible for (a) reimbursement of costs for technical assistance of up to 3% of the loan-amount and (b) guarantee on the outstanding amount in the case of projects are financed by the private banks. FEGA would provide these services (See Annex 3-a).

27. PIDER would in certain cases contribute to financing of the rural industries by infrastructure investments for specific projects. In all cases the projects should be approved by a bank and FIRA and the bank credit should have been committed to the project prior to the PIDER investment.

28. Based on PIDER and the banks projections, an expected demand for long-term credit (including PIDER financed infrastructure of Mex\$ 165 million for rural industries would occur over the period 1977-79 in the 50 PIDER micro-regions financed by IBRD. The table below gives a tentative composition of projected project cost for these projects:

1/ IBRD Report No. 961-ME.

<u>Type of Project</u>	<u>No. of Projects</u>	<u>Estimated Project Cost (Mex\$ mill.)</u>	<u>Estimated No. of Producers Participating</u>
Forestry (sawmill-logging)	18	76.0	2800
Fruit/vegetable packing & processing	6	25.0	600
Livestock-based industries	7	29.5	200
Other agro-industries (Feed plants, milling, storages)	8	29.0	400
Mineral-based industries	<u>11</u>	<u>43.0</u>	<u>1000</u>
Total	50	202.5	5000

29. Village Industry Development. The Project would finance small village industries with total investments of less than US\$35,000 equivalent. Investment capital for the enterprises as well as initial working-capital would be financed.

30. In the Project, an estimated 300 village enterprises would be established with a total investment of Mex\$67.5 million. The projects would provide permanent employment to some 6,000 persons of which about half would be women. The types of workshops and enterprises envisaged in the project are the following 1/:

<u>Types of Enterprise</u>	<u>No. of Projects</u>	<u>Investment (Mex\$'000)</u>	<u>Employment</u>
Manufacturing of construction materials	100	35,000	2,500
Food and agro-processing	60	15,000	1,200
Handicraft development	90	13,500	1,500
Other production (garments, furnitures, etc.)	<u>50</u>	<u>14,000</u>	<u>1,600</u>
Total	300	67,500	6,200

1/ The table is tentative based on typical sub-project promoted by Government agencies and PIDER in the past few years.

31. Based on an assessment of the past experience in supporting rural industries, PIDER will formulate a plan for the development of small village industries. The plan will be furnished to the Bank not later than June 30, 1978. The plan should specify the Government agencies that would participate in providing finance and technical assistance to village industries and the criteria for such support. Principal criteria would be:

- (i) the total investment in fixed assets and initial working capital for each enterprise should not exceed US\$35,000;
- (ii) each project should be supported by a simple feasibility study, including financial arrangements (particularly for working capital), an assessment of the market potential, and principles for marketing of the products;
- (iii) the beneficiaries should contribute to the project cost by providing labor and/or materials;
- (iv) before initiating an individual project, a contract should be established between the agency and the beneficiaries, specifying legal status, ownership principle and management structure for the enterprise and a schedule for cost recovery.
- (v) for each industry the supporting agency should facilitate access to subsequent working capital from the banking system once the enterprise is in operation.

32. The agencies participating in the program would establish general principles of cost recovery for the investments in village industries. These principles should include that investment costs should be fully recovered, and each agency should establish a revolving fund from project repayments to be used for future investments in village enterprises and related activities in the regions.

33. Technical Assistance. The Project would provide for technical assistance to the participating agencies to strengthen their capacity to promote and assist rural industries. This would include:

- (i) finance for preparation of rural industry projects in the micro-regions and for technical assistance to already established enterprises;

- (ii) expansion of technical staff in FIRA, the official banks, and other participating agencies; and
- (iii) training programs for technical staff in participating agencies.

34. Financing of Studies. The project would finance preparation of rural industry projects in the micro-regions and specific programs of technical assistance to projects in operation. The project would cover costs of preparation of feasibility studies for rural industries, specific programs for organizing ejidatarios and producers, programs for training of the producers to administrate the enterprises, and other consultancy services which may be needed by the enterprises. The project would cover costs above what is provided by FECA for technical assistance to bank supported industries. The allocation should be approved by PIDER and a bank should, prior to the approval, indicate its willingness to finance the project if it proves to be feasible.

35. Specialized Staff. The project would provide additional marketing and rural industry specialists for FIRA, Banco Rural, and other agencies chosen by PIDER and approved by IBRD. These specialists would work exclusively on rural industry projects in the Bank financed PIDER micro-regions. Most of the specialized staff would be recruited locally since Mexico has a well trained cadre of agro-industry and small-scale industry specialists. The project would finance the staff over three years. In addition, the Mexican Government would be expected to finance a national coordinator and three area coordinators for the PIDER's rural industry program.

36. Training of Staff. The Project would support training for the specialized staff of the participating agencies. One training program would involve FIRA and PIDER organizing sessions at the state level to train representatives of participating agencies in project preparation and evaluation, and to identify concrete possibilities in the PIDER micro-regions in each state. In addition, study tours to assess experience of cooperative farmers enterprises in other countries and seminars in Mexico would be arranged.

MEXICORural Development Project - PIDER IISmall-Scale IrrigationI. Introduction

1. Performance under the PIDER I project in irrigation has been adequate. Originally, some 30,000 ha of irrigated land was to be completed over the project period. At the end of two project years, 1975 and 1976, some 14,349 ha have been completed, 48% of the appraisal estimate. Under PIDER I, some US\$35 million was allocated to this component for the 30 micro-regions. Under PIDER II, an additional US\$37 million for 20 further micro-regions would be provided. The average unit cost for a new ha. of irrigation under PIDER I was estimated at US\$1200, under PIDER II, unit costs are expected to be US\$1400 per ha of new irrigation. Under PIDER II, some 34,000 ha are expected to benefit from the irrigation component.

2. Under PIDER's overall program (1973-1976), some US\$80 million or about 20% of its total program was invested in irrigation systems. This investment benefited some 50,000 ha and 16,500 families. The irrigation sector received the largest share of all sectors support by PIDER. This emphasis on irrigation would be continued under the PIDER II project. Executing departments would be the the new Secretariat of Water Resources and Agriculture, through the new Directorate of Works for Rural Development (OHDR).

3. Although physical limits of water availability in many regions of Mexico may impose serious constraints on further large-scale irrigation developments, studies undertaken by SRH indicate that there is significant potential up to 1.5 million ha for additional small-scale irrigation works over the next 25 years.

II. Background

4. Much of the land suitable for agricultural production in Mexico is subject to occasional, temporary, or permanent drought, particularly in the central and northern parts of the country. Even in regions with generally adequate rainfall of 700 mm or more during the wet season, supplemental irrigation can often be used to advantage to grow a second or perennial crop. While subsistence production under rainfed conditions takes place in many areas where rainfall is as low as 400 to 500 mm, yields per ha in these regions are generally very low, and range from 250 kg to 800 kg per ha

for maize, the staple crop. While some output increases are possible in these areas through the use of better adapted seeds, soil and water conservation, and better farming methods, the potential is limited since farmers traditionally try to minimize the risk of crop failure by planting low-yield, drought-resistant varieties.

5. Of the approximately 16.8 million ha. of agricultural land under cultivation in 1974/75, just under one third or about 5 million ha benefited from irrigation. The value of crops from irrigated land accounted for somewhat over 50% of the total value of agricultural production. Irrigated agriculture accounts for a large percentage (Table 1) of the total output of many important crops.

Table 1

Share of Irrigated Agriculture on the Production of Some Crops
(in percentage)

	1970	Estimated	
		1980	1990
Maize	30	30	32
Beans	18	19	24
Wheat	96	95	95
Sorghum	59	59	64
Soy beans	93	89	92
Saffron	99	78	85
Cotton	97	92	92
Sugarcane	52	52	56
Tomatoes	90	93	95

Source: Plan Nacional Hidraulico 1975, Informe Resumen, Vol. II, Table V-11.

Projections by Mexico's National Water Plan call for the addition of some 5 million ha of irrigated land by the year 2000. The Plan estimates that some 1.5 million of this addition, 30%, would be by small-scale irrigation projects.

SARH

6. SARH is empowered by the Federal Water Law of 1972 to construct, administer and operate irrigation, drainage and flood protection works. Until the late 1960's, the efforts of SRH were concentrated on developing large-scale irrigation districts. In 1967, a new division for small-scale irrigation works was formed to prepare plans for bringing irrigation to many small villages. A National Plan for Small-scale Irrigation (Plan Nacional de Pequena Irrigacion) was designed to provide, during the first phase

(1967-1970), irrigation to 120,000 ha. benefiting 40,000 families. Renamed National Irrigation Plan for Rural Development (Plan Nacional de Obras de Riego para el Desarrollo Rural) the plans for the 1971 to 1976 period called for the development of some 280,000 ha, benefiting some 130,000 families.

7. Construction of irrigation works is carried out by the SARH's General Directorate of Hydraulic Works for Rural Development (Direccion General de Obras Hidraulicos para el Desarrollo Rural or OHDR). Responsibility for operation and maintenance rests with General Directorate of Irrigation Units also within SARH. Since the early 1970s, this Department has been given jurisdiction over privately developed and operated irrigation works. In 1970, SARH estimated that SRH and privately developed small scale irrigation works covered some 1.5 million ha out of which the total area under OHDR's jurisdiction has increased rapidly to about 1 million ha in 1976, benefiting some 288,500 families, or an average of 3.47 ha per family.

Table 2

Small-scale Irrigation Works Under the Supervision
of the SRH (OHDR) Program (Cumulative)

<u>Year</u>	<u>No. of Units</u>	<u>Hectares</u>	<u>No. of Families</u>
1970	189	36,492	14,894
1971	235	77,555	22,512
1972	1,366	296,316	74,380
1973	1,972	450,170	141,343
1974	3,040	642,441	202,133
1975	4,321	853,134	243,441
1976 <u>a/</u>	4,600	1,000,000	288,500

a/ Programmed until the end of 1976, Completion rate was 90% by June 1975.

Source: Direccion General de Unidades de Riego para el Desarrollo Rural.

8. This rapid rate of incorporation of already highly productive irrigation units into SRH's small-scale irrigation program had a positive impact on overall performance figures. Annex 1 illustrates an increase in the value of output per ha. in current prices from Mex\$2,091 (US\$167) in 1969/70 to an estimated Mex\$7,600 (US\$608) in 1975/76, an annual rate of increase of 24% per annum in current prices. When current prices are converted into constant prices, the increase drops to an annual rate of 10.4% from Mex\$1,897/ha (US\$151) in 1969/70 to an estimated of Mex\$3,435 (US\$274) in 1975/76. At the same time, however, for large-scale irrigation districts the real annual rate of increase in the value of output per ha. seems to have been no more than about 0.9% for the five-year period.

9. Projections by the National Water Plan call for the net addition of some 400,000 ha of small-scale irrigation projects during the term of the (1977-1982) administration, thereby creating a viable income basis for some 20,000 farmers each year.

Investment criteria for SARH-Supported Small-Scale Irrigation Projects under PIDER

10. OHDR has developed a procedure to screen and rank applications for developing small-scale irrigation projects in light of economic and social priorities. This procedure applies to both normal and PIDER projects. Requests are preliminarily screened according to such factors as available infrastructure (roads and electricity lines), markets, levels of education and farming capability of the farmers within each community. These are measured through two indices. A socio-economic index was drawn up based on the 1970 National Census to consider the following data:

- the percentage of the rural population, relative to the total population;
- the percentage of the economically active population in the agricultural sector, relative to the total of the economically active population;
- the percentage of the economically active population with incomes below the official minimum salary, relative to the total of the economically active population in the agricultural sector;
- the reciprocal value of the average monthly income from the agricultural sector;
- the percentage of the population which had not eaten meat, eggs and milk during the week before the Census, relative to the total population.

11. A second index was elaborated to consider the availability of water and agricultural land. This was later replaced by an index based on the number of hectares identified as possible projects (in total 683,220 ha) in a nationwide inventory of irrigation projects carried out by SRH in 1972.

12. Finally, a combined index was calculated by simply adding the socio-economic situation in the projects taking into account both poverty levels and and production potential.

13. Applications are then classified into one of eight models ranging from simple installations serving small areas (about 25 ha) to larger and more elaborate schemes.

Model 1. A simple windmill delivering about 16 m^3 a day for watering livestock and utilizing a well 25 to 100 m deep.

- Model 2. A small dam with maximum height of 17 m and impounding up to 200,000 m³. Design is according to a standard handbook.
- Model 3. A pump scheme larger than Model 1 (driven by windmill or diesel motor) and provided with a small storage tank; this scheme is suitable for irrigating a small orchard and/or providing water for domestic and stock use.
- Model 4. A simple small diversion structure from streams with perennial flows.
- Model 5. A small dam impounding from 100,000 to 3 million m³ for irrigating a limited area.
- Model 6. A dam with a height exceeding 17 m, capable of storing more than 3 million m³ and of irrigating up to a maximum of 5,000 ha. (Such a dam must be designed individually rather than from a handbook.)
- Model 7. Pumping station for extracting water from a perennial stream or from a lake; irrigated area 2,000 to 4,000 ha.
- Model 8. A deep well or group of deep wells yielding a minimum flow of 20 lit/sec with each well capable of serving 30 to 120 ha.

14. After screening the applications and selecting priority areas and projects, OHDR enters into agreements called Acceptance Acts with the local users' association which specifies what works and services OHDR will provide. In PIDER micro-regions these Acceptance Acts are drawn up in cooperation with PIDER officials. This agreement binds the users' association to accept conditions concerning operation and maintenance of the works, water use, and water charges. OHDR officials stress that the users' association must commit itself to cover fully the operating and maintenance costs of the works. However, while OHDR provides guidelines that indicate the probable range of costs involved, it is up to the users' association to select the type of tariff that best suits its own needs or preferences. In most cases, tariffs selected by the associations are based on some area measure such as irrigated hectare per year or per season, rather than a water quantity-related tariff structure with the result that no incentive is created to conserve water. This may be a disadvantage in regions where alternative uses of water are growing and where the physical quantity of either surface or groundwater is limited. OHDR should be encouraged to require the use of such water quantity related tariffs wherever such conditions prevail.

15. Before a project is undertaken by SRH, the user association has to sign a second document called a "Use Agreement" (Convenio de la Participación). In this agreement, the members of the association must commit themselves to pay a total of 30% of the overall costs of the project. Of these, 10% must be contributed by the users as part of the initial investment, either in the form of labor or through a cash contribution. The latter frequently is financed through normal bank credit channels. The remaining 20% of the overall investment costs then are repayable in annual installments, usually over a period of 25 years, which begins after a grace period of three or four years.

16. The 30% rate of cost recovery applied by OHDR is the maximum that can be charged according to paragraph 2.32, subsection II of the Agrarian Reform Law of 1971 (Ley Federal de Reforma Agraria). The Law specifically requires that SRH pays the balance of the costs. Furthermore, the Law specifies in sub-section 2.32-III that SRH has to pay 100% of the costs if the 30% repayment requirements exceed the economic capacity of the benefited ejidatarios.

17. Before any actual construction work is undertaken, SRH proceeds with a detailed feasibility study of each potential project which includes hydrology, soil surveys, an appraisal of existing and potential cropping patterns, a survey of present land distribution between ejidos, small proprietors and other types of tenure, preliminary designs and cost estimates, and other pertinent social and economic factors. The costs of this feasibility study, in the case of PIDER-sponsored projects, is charged to PIDER. In the past the cost for small-scale projects of less than 50 ha amounted to an average of about Mex\$37,000 (US\$2,960). These rates were increased recently to about Mex\$48,000 (US\$3,840), which means about Mex\$960 (US\$76.80) per ha for a 50 ha project. All contractual agreements between SRH and the user association have also to be counter-signed by SRA, the Secretariat of Land Reform, because of the frequent need for land-redistribution and the need for clarifying land tenure.

18. Construction of projects finally approved by SRH is carried out by contractors following the usual tendering procedures of SRH with supervision of the contractor by SRH field engineers. The director of OHDR estimates that about 60% of all projects are built under force account contracts, the balance through contracts based on local competitive bidding.

Financial Criteria

19. Public investment in irrigation increased from an annual average of Mex\$1,642 million (US\$131 million) during the 1965 to 1970 period to Mex\$5,080 (US\$406 million) per year in the 1971-1976 period (expressed in 1974 dollars). Of these investments, an average of Mex\$1,228 (US\$98 million) per year was spent for the small-scale irrigation program of OHDR. In 1976, the total OHDR budget amounted to Mex\$2,046 (US\$164 million) ^{1/} in current dollars. The tentative budget for the 1977-1982 period as predicted by the

^{1/} Of this, PIDER contributed the Mex\$310 million, about 15% of SARH's small scale irrigation budget.

National Water Plan projects total expenditures of Mex\$44,394 million (US\$3,552 million) in 1974 dollars for the irrigation/drainage program as a whole and Mex\$9,475 million (US\$758 million), or an average of Mex\$1,579 (US\$126 million) per year, for the small-scale irrigation program of OHDR. This would represent an increase of 29% in real terms over the preceding six-year period.

20. The average investment costs per hectare of small-scale irrigation projects during the years 1968-72 were reported by IDB as US\$960 per ha and US\$2,880 per family. For the 1974/75 period, OHDR reports average costs of Mex\$18,500 (US\$1,480) per ha for deep-well pump projects and about Mex\$25,000 (US\$2,000) per ha for reservoir-type projects and Mex\$13,000 (US\$1,040) per ha for diversion type projects. Within the tentatively selected PIDER II micro-regions, proposed irrigation investments would amount to Mex\$1,113 million (US\$89.1 million), benefiting some 34,000 ha. Costs per ha would range from Mex\$2,300 (US\$184) to Mex\$82,800 (US\$6,624), or an average per ha cost of Mex\$20,600 (US\$1,650). If the rather unreasonable low and high cost estimates are eliminated, the average range of per ha costs appears to lie between Mex\$19,000 and Mex\$42,000 (US\$1,520 to US\$3,360). This range of costs appears to be in line with the average per ha costs as reported by OHDR for the 1974/75 period and slightly below the normal range (US\$2000-4000) in all IBRD supported irrigation projects. Allowing for current rates of inflation, these would translate to some Mex\$23,600 (US\$1,888) per ha for deep-well pump, and Mex\$35,400 (US\$2,832) for reservoir-type projects in 1976 prices.

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Rural Development Project - PIDER II

Small-Scale Irrigation

Value of Output per Hectare, Annual Rates of Growth, and
Comparative Rates of Growth between Small-scale Irrigation Units
and SRH Irrigation Districts 1969/70 to 1975/76

	<u>1969/ 1970</u>	<u>1970/ 1971</u>	<u>1971/ 1972</u>	<u>1972/ 1973</u>	<u>1973/ 1974</u>	<u>1974/ 1975</u>	<u>1975/ 1976</u>
Value of Output per ha							
Current Mex\$	2,091	2,648	3,153	4,744	6,447	6,943	7,600/a
Prices: US\$	167.28	211.84	252.24	379.52	515.76	555.44	608.00
Constant prices /b: Mex\$	1,897	2,468	2,749	3,525	3,705	3,410	3,435/a
US\$	151.76	197.44	219.92	282.00	296.40	272.80	274.80/a
Annual percentage rate of change							
in current prices	-	27	19	50	36	8	10
in constant prices		30	11	28	5	-8	1

<u>Crop Year</u>	<u>Small-scale Irrigation Units Current</u>		<u>SRH - Large-scale Irrigation Districts Current</u>		<u>Value of Output Ratios between Units & Districts</u>
	<u>Mex\$/Ha</u>	<u>US\$/Ha</u>	<u>Mex\$/Ha</u>	<u>US\$/Ha</u>	<u>%</u>
1969-70	2,091	167.28	4,320	345.60	48.4
1974-1975	6,943	555.44	8,351	668.08	83.1

/a Estimated.

/b Calculated on the basis of the Banco de Mexico Consumer Price Index for Agricultural products (1968 = 100).

Source: Direccion General de Unidades de Riego para el Desarrollo Rural.

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RURAL DEVELOPMENT PROJECT - PIDER II

Economic Analysis of Irrigation Investment

Introduction

1. Three basic assumptions were made in analyzing the economic benefits of the PIDER supported small scale irrigation systems. First, economic rates of return were calculated assuming a basic, grain oriented cropping pattern with guaranteed prices and markets. Yield assumptions were projected at the national average for small-scale irrigation areas. The second set of analysis assumed the same basic cropping pattern as in the first set, with the same prices and market outlets, but assumed yield averages 30% above the national averages for on-going small-scale irrigation investments. Finally, a third set of calculations assumed an 80% basic staples (corn, beans, etc.) plus a 20% of higher value crops such as perennial fruits and some vegetables.

2. Thus, the analysis assumes cropping patterns on new irrigation that falls into two major groups; one which consists of basic, relatively low-value crops that face an essentially secure and stable market and relatively low risks in production, while the other consists of higher value crops that, however, require greater input costs, face substantive production risks from pests and weather (e.g. cotton) as well as uncertain markets and high perishability (e.g. fruits and vegetables).

3. In Mexico the relative share of high-value crops on total production has slowly but consistently declined during the last fifteen years. Reasons given for the decline are (1) the saturation with fresh fruits and vegetables of Mexico's major export market, the United States, and (2) large daily price fluctuations for fresh fruits and vegetables are extreme. The unstable domestic market, where average prices are much lower than in the export market. For example, in Mexico City's wholesale market (which accounts for over 60% of the total national markets) these day-to-day price changes range as high as 90% for many types of produce. A further indication of the very large price spreads and attendant production risks can be gleaned from the fact that for almost all higher value perishable crops, regional price variations amount to several 100% from the lowest to the highest. While quality differentials, time of harvest and distance to markets, and existing packing and marketing organizations will be responsible for some of these differentials, such wide differences between high and low prices are indicators of the very high market risk facing a producer. This risk is greater for smaller producers. For the typical PIDER-financed small-scale irrigation project, these risks will be much higher than for almost any other competing producer or producer group. For all these reasons it appears

realistic to include in the evaluation new PIDER-financed irrigation units on various alternatives of crop compositions, both mainly secure staples and also those that contain a proportion of high-value, higher-risk annual perennial crops.

Cropping Patterns on Small-scale Irrigated Areas

4. Summary crop statistics for on-going small-scale irrigation projects (687,000 ha) in 1974/75 are provided in Table 5 with the seven most important crops shown separately. The major cereals, maize, sorghum and wheat together account for 53.3% of the total area planted, beans for another 9.4% followed by fruits 8.2%, alfalfa 4.2% and sugar cane 2.9%. The wide variety of other crops account for the remaining 22%. While the value of the output per hectare harvested of all crops together amounted to Mex\$6,943 (US\$555) the average for the five most important field crops (maize, beans, sorghum, wheat, alfalfa), which account for 64% of the total area harvested, amounted to Mex\$4,977 (US\$398).

5. Somewhat similar relationships hold for the large-scale irrigation districts. According to date for the 1973/74 crops year (the last for which detailed statistics are available) the eight most important crops (wheat, cotton, maize, sorghum, soybeans, saffron, beans and sugar cane) accounted for 70% of the total area harvested, but for only 67% of the total value of output. The average value of output per hectare harvested for all crops combined was Mex\$7,747 (US\$620) while for the eight leading crops it amounted to Mex\$6,491 (US\$519). If cotton, a high-value, but also high-cost and high-risk crops is excluded, the average value of output per hectare falls to Mex\$5,277 (US\$422), or 68% of the overall average per hectare. Nevertheless, these lower-value crops covered some 68.5% of the total area harvested.

6. For this reason, the Alternative I evaluation of the potential benefits of new PIDER-financed irrigation units was based on a standard crop composition that reflects the share of the five leading field crops (maize, wheat, sorghum, beans, alfalfa) planted on OHDR irrigation units in 1974/75, accounting for 67% of the total area harvested.

ALTERNATIVE I

Input costs and net incomes per hectare for maize and beans for 1975 are provided in table below. Yields are based on 74/75 OHDR averages, while prices reflect 1976 price levels.

Table 1

Production Costs and Net Income per Hectare
 Maize and Beans, 1976 Prices 1/

	<u>Mex\$ Hectare</u>	
	<u>Maize</u>	<u>Beans</u>
Labor in Mex\$ 45/day	1,163	1,009
Machinery	683	551
Materials excl. water	857	1,136
Interest	218	225
Insurance	<u>167</u>	<u>199</u>
Total Costs	3,087	3,180
Average yield, tons/ha	2.15	1.12
Average value of output Mex\$	4,085	6,160
Net benefits w.o. water charges and with full labor costs	1,158	3,141
Net benefits w.o. water charges with shadow wage rate of 0.7	1,507	3,443
Farm family income w.o. water charges, assuming that no outside labor is hired	2,320	4,149

1/ Source: Banco Nacional de Credito Agricola S.A. May 1976.

7. As can be seen the economic net return per hectare, before water charges, would amount to Mex\$1,158 (US\$92.64) for maize, and Mex\$3,141 (US\$251.24) for beans. Assuming a shadow wage rate of 0.7, which may be appropriate given the high rates of un- and underemployment in Mexico, these net returns would increase to Mex\$1,507 (US\$120.54) for maize and Mex\$3,443 (US\$275.75) for beans respectively.

8. Farm-family income is considerable higher than net income returns, however, since probably all of the labor is performed by members of the farmer's family. This, at least, should hold true for the crop compositions shown, and for the usual size of the farm units that are being financed under the PIDER program. As Table 1 indicates, net farm family income before water charges would amount to Mex\$2,320 (US\$185.64) for maize and Mex\$4,419 (US\$331.94) for beans respectively. Production cost and net income estimates for the other crops, sorghum, wheat and alfalfa were based on cost estimates contained in various recent IBRD Mexican appraisal reports.

9. Table 2 summarizes the net income data for the representative crop-composition-hectare. The individual crop yields per hectare represent the average yields of all OHDR projects in 1974/75 (Table 2). Prices reflect the 1976 guarantee or market price levels. The cropping intensity of 1.5 for all annual field crops reflects the average cropping intensity of the OHDR projects in 74/75 (Table 2). As can be seen, the average net income per physical hectare before water charges, with all labor accounted for as costs, would amount to Mex\$2,954 (US\$236.32) per year. With a shadow wage factor of 0.7, this net return per hectare per year would increase to Mex\$3,469 (US\$277.52). Net annual farm family income per hectare before water charges, assuming that no outside labor were to be employed, would amount to Mex\$4,625 (US\$370.00).

10. Deducting the estimates water O & M. Costs 1/ from the economic rates of return reduces the annual net income per hectare to Mex\$2,431 (US\$194.48) for reservoir-type projects, and to Mex\$1,387 (US\$110.96) for deep-well pump projects given full labor costs. With a shadow wage coefficient of 0.7, these net returns become Mex\$2,964 (US\$237.12) for reservoir and Mex\$1,901 (US\$152.16) for pump projects respectively.

11. Applying these net returns to the estimated 1976 per hectare investment costs of Mex\$23,600 (US\$1,888) for deep-well-pump and Mex\$35,400 (US\$2,832) for surface-reservoir type projects, the internal rate of return for the former would amount to 4.5% at full labor costs, and to 7.8% with a shadow wage coefficient of 0.7; for surface-reservoir type projects, the

1/ For deepwell Mex\$1,567 (US\$175) per year and for surface irrigation Mex\$523 per year (US\$41). This compares to IBRD gravity system estimate of US\$10-60 per ha and US\$25-150 ha for pumped systems.

respective rates would be 6.0% at full labor costs, and 8.2% with the shadow wage coefficient. All calculations are based on a 30 year life expectancy, and no allowance was made for lower-than-average yields during the early years of the project.

ALTERNATIVE II

12. Utilizing the same crop composition as before, increased yield assumptions by 30%, the internal rates of return for deepwell pump projects increase to 17.4% of full labor costs, and to 21% for project evaluated at a shadow wage factor of 0.7; for surface reservoir type projects the respective rates of return become 14.5 and 16.9% respectively.

13. These findings are highly sensitive to the projected yields per hectare. For Alternative I the actual average yields of small scale projects were used, that much yields could be obtained under realistic field conditions if superior management techniques were to be applied.

14. What this means is that with superior management capability such small-scale irrigation projects, even at higher per hectare investment costs, are quite viable, while they would be rather marginal, if only the observed average yields were to be obtained. In new projects, superior farm management capabilities are unlikely to be found among the project's beneficiaries. Hence, education, e.g. extension, demonstration plots, organization of fertilizers credit and all other required input facilities would be an absolute necessity to bring about the economically required superior yields per hectare. These findings emphasize once again the crucially important role of extension and management services for the viability of the whole irrigation program, whether it applies to PIDER, to OHDR or to SRH as a whole.

15. Another conclusion that follows is that the net benefits of a successful extension and management service could be measured by the net difference in the internal rates of return between projects that produce no more than average yields, and those that reach predicted superior yields. Using the two estimates above it would mean that about 8.5 of the 14.5% rate of return for surface-reservoir type projects, and 12.9 of the 17.4% rate for deepwell-pump type projects would have to be credited to those factors that bring about such superior farm management practices.

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Table 2

Net Income Per Hectare For The Representative
Crop Composition for PIDER-Financed Projects
1976 Prices

Crop	Yield/ HA Tons	Price/ Ton Mex. \$	Percentage Share on Crop Composition	Cropping Intensity Index	Income Per Ha Excluding Water Charges, Mex. \$.		
					Incl. Full Labor Costs	W. Shadow Wage Factor 0.7	Net Farm Family Income
Maize	2.15	1,900	58.7	150	1,158	1,507	2,320
Beans	1.12	5,500	14.1	150	3,141	3,443	4,149
Sorghum	3.43	1,650	12.4	150	3,181	3,583	4,387
Wheat	2.67	1,800	8.5	150	2,320	2,701	3,463
Alfalfa	44.3	247	6.3	100	6,050	6,402	7,106
Average Per Physical Hectare			100.0		2,954	3,469	4,625

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RURAL DEVELOPMENT PROJECT - PIDER II

Livestock in the PIDER Program

Introduction

1. PIDER is expecting to invest about 10% of its overall programmed budget in livestock development. The equivalent of US\$26 million was programmed for the 30 micro-regions in PIDER I and US\$18 million for the 20 micro-regions in PIDER II. In addition, another US\$25 million is expected to be provided for livestock development through the development credit component of the two projects respectively.
2. To familiarize inexperienced ejidos with modern systems of livestock management, PIDER devised a two-phased strategy. Initially, PIDER finances a small technical package of physical infrastructure, the "basic pilot unit" to be run communally by the ejido. For cattle, the package will normally include land clearing and pasture improvement, a perimeter fence and handling yards. For poultry, bees and rabbits, sheds and starter breeding stock are provided. A typical cattle unit would involve such infrastructure for about 300 animal units for an ejido with an average of 85 families (500 persons), equivalent to some 3 to 4 animal units per family. For small stock and rabbits, chickens and bees, 10 to 15 members of the ejido would normally form groups for the joint operation of such units. Cattle, sheep and goats, as well as working capital for the "pilot units", are provided through FIRA lines of development credit (IBRD loan 1217-ME). Substantial technical and organizational assistance is especially important as these livestock units are often the first productive investment where ejido members must work jointly to both construct and operate the venture. Pilot units which prove successful can be expanded through FIRA development credit systems; additional PIDER financing is not provided. Each ejido qualifies for only one PIDER unit.
3. This two-phased strategy was worked well. Initial ejido response has been particularly strong for beef cattle units in higher rainfall areas, silage storage pits in maize areas, goat units in drier areas and beekeeping units throughout most regions.

Performance Under PIDER I

4. Initial PIDER program performance was poorer than performance in other PIDER-supported sectors. However, in the past two years, a number of improvements were made and performance has improved. Initially, PIDER financed only the basic infrastructure unit. These were often over-designed. The stocking of completed units was often delayed as coordination with the banking system (who financed cattle) was not effective. Where land clearing and pasture establishment was required, delays in annual authorizations by the Secretariat of Agriculture (SAG) often meant that work was begun in the rainy season, too late for effective burning and seeding. Finally, SAG did not always fully assess critical marketing arrangements.

5. Faced with these problems, PIDER made a number of improvements in the program. Where SAG performance was inadequate, PIDER commissioned technicians of the new National Rural Credit Bank (BANRURAL) to construct the pilot livestock units. This transfer of construction agent had the added benefit that livestock development credit, to make the unit operational, followed quicker. Also, designs were improved as the banks had more experience with lower cost units. PIDER also encouraged a wider distribution of small stock, such as rabbits, bees, chickens etc. which the banking system heretofore had not encouraged due to problems of collateral among small farmers. These have worked well. PIDER also widely supported the silage pit system of the PRONOFOR department of SAG. These have been widely accepted by small farmers in the PIDER micro-regions.

The Project

6. The project would finance livestock infrastructure development on about 300 ejidos. Additional units would be financed through the development credit component. Expansions to the basic pilot infrastructure units would also be financed through the credit component. Under the component, assistance would be provided for beef, dairy, dual-purpose cattle, pig, goat, poultry and bee development. The composition of the component is shown in Table 1. As in PIDER I, the component would finance the basic pilot unit, which then could be expanded - if successful - to a larger unit through the use of development credit. Technical assistance would be provided through the SARH Extension Service (Annex 4-a) and through the banking system. All cattle would be purchased through development credit.

Small Producer Livestock Systems and National Distribution

7. Livestock production has always played an important part in the production systems of small farmers. Although ejidos and smallholders own a significant percentage of the national livestock resources, they contribute little to production outside of what they consume locally.

8. Cattle are kept mainly for oxen power, with milk, beef and calf sales as residual products. Pigs are often kept as assets, either slaughtered for home consumption, retained for ceremonies (weddings, etc.) or

sold for cash. Chickens provide subsistence egg and meat protein sources, while sheep and especially goats, in the drier parts of Mexico, provide milk and meat and cash income. Beekeeping is a supplementary income source in many ejidos, especially in the Yucatan peninsula. The majority of export honey is produced by ejidos.

9. In the arid regions of the country, data assembled under the Agricultural, Livestock owners and Ejidotal census of 1970 indicate that about 33 million hectares (or 44% of the total arid area) is in ejido-type production, with an average of about 67 hectares per ejidatario. This represents about 48% of the total national area under ejido ownership and production.

10. In the tropic zone, by contrast, about 17 million hectares (or 52% of the total area of the region), allocated in 500,000 plots of land, is held by ejidatarios. This represents about 32% of the national ejidatarios to the country and correspondingly 25% of the present national land area allocated to ejidos.

11. About 47% or 70 million ha. of Mexico's total land area (2 million sq. km.) supports the national livestock industry. Native grassland is used primarily, although improved pastures and intensive fodder production are assuming greater importance in view of overstocking in arid and semi-arid areas. There is an uneven geographic distribution pattern of livestock further complicated by changing marketing patterns in both domestic and export markets. Cattle production is predominant, although sheep and goats are important in the northern areas.

12. Ejido grazing lands are generally overstocked, due mainly to fragmented and undersized landholdings and the uncontrolled build-up of herds and flocks of animals under primitive management conditions. Particularly in the northern rangelands overgrazing has resulted in deterioration of grass species, erosion, and generally unproductive livestock performance. PIDER is making a strong effort to improve production on existing livestock holdings and to introduce cattle and pigs on ejido holdings currently devoted solely to crops.

Production Data

13. According to statistical data of the Secretariat of Agriculture, livestock populations have increased considerably between 1970 and 1974, with the largest percentage gains in poultry, sheep, and cattle. In cattle herds, the off-take rate increased from 14% in 1960 to over 17% in 1974. This indicates more marketing of younger animals and increased efficiency by producers through current credit support programs in animal nutrition, husbandry and , until recently market opportunity. During the same period, production increased by about 19%, and carcass weights increased from about 150 kg to 170 kg.

14. The following table summarizes general trends in livestock population growth patterns and productivity performances of livestock-related products:

Livestock Population and Production Performance (million head) 1970

Livestock Population	1970	Yearly % Increase	1973	Yearly % Increase	1974	% Increase from 1970
Cattle	25.5	7.8	27.5	2.9	28.3	11.0
Swine	10.5	3.0	10.8	2.8	11.1	5.7
Sheep	7.4	10.8	8.2	1.2	8.3	12.2
Goats	8.8	2.3	9.0	2.2	9.2	4.6
Poultry	123.2	10.6	136.3	8.8	148.3	20.4

Livestock Production ('000 m tons)

	1970	Yearly % Increase	1973	Yearly % Increase	1974	% Increase from 1970
Meat	728	14.6	834	4.8	870	19.5
Milk (hecto- liters)	n.a.	n.a.	3,360	3.6	3,480	3.6
Honey	31	19.4	37	8.1	40	29.0
Wool	3.5	5.7	3.7	-	3.7	5.7

Source: Secretariat of Agriculture

Other statistics relevant to livestock production trends are as follows:

Production and Yield of Milk, Wool and Eggs

	Total cow's milk Produced per year 000 ton	Milk per cow per year kg	Total goat milk per year 000 ton	Total greasy wool per year 000 ton	Total hen's eggs per year 000 ton
Average 48-52	1,539	933	93	5.7	77,200
Average 61-65	2,305	948	171	7.0	169,845
1973	3,400	1,104	188	6.7	420,000

Source: FAO (1974)

Meat Consumption Trends

15. Meat consumption in Mexico in 1970 has been estimated by the Economic Commission for Latin America at 14 kg per capital, compared with a

per capital intake for the United States and Canada of 52 kg and 42 kg respectively. According to the national census of 1970, about 17% of the total population (approximately 20 million Mexicans) consumes no meat, with the balance consuming in accordance with income levels. Overall, beef consumption, which represents roughly 70% of total national red meat consumption, increased from 8.4 kg per capita in 1960 to 10.7 kg in 1973 and 13 kg in 1974, probably because cattle not sold for export in 1973 were fattened, marketed and consumed locally.

16. Pork consumption is about 8.5 kg per capita, and the domestic market normally consumes all production. About 87% is consumed as fresh meat while the balance is used for cold meats and processing.

Livestock Production Areas

17. Sixty percent of Mexican livestock production takes place in the arid and semi-arid north - the northern rangelands - which are generally overstocked. The other 40% is located in the wet and dry tropics, including both Gulf and Pacific coastal areas, where understocking is the pattern.

Beef Production Areas

18. The Northern Rangelands. Production patterns in the northern rangelands are oriented towards the US feeder cattle market (weaner calves 6-9 months of age), for which, until late 1974, there was rising demand. In the majority of well-managed herds, breeds such as Hereford, Angus, Brahman, Charollaise and their crosses predominate. The criolla or native breed, mainly owned by smaller cattlemen, ejido communes and colonies, have, however, been able to gain access to this market. Except during drought, when the export of females is permitted, only male weaners are exported. Some cattle in the northern areas are fattened in feed lots and on irrigated pastures for specialized higher prices local and export markets. Weaning percentages range from 35% under low level management, such as ejidos and small livestock owners in overstocked areas, to as high as 90% in well-managed pastures under good management. The area is presently stocked at a level of about 7 ha. per animal unit, with the density rising as high as 1 ha. per animal units. In smallholder areas, this has led to a severe depletion of grassland resources and erosion. If managed efficiently under these conditions, with deferred grazing, the desirable carrying capacity is in the region of 20-30 ha./animal unit. As a result, pasture deterioration has increased rapidly over the past five years. Major steps will need to be taken in the near future to alleviate the overgrazing and to preserve the grassland resources for future generations. One approach is suggested by a successful program in Sonora where rainfed native pastures have been improved by introduction of buffell grass and other adapted species.

19. The Tropics. The tropical areas produce beef primarily for domestic consumption. The most important domestic production area is Huasteca. Under the Government deforestation program presently underway, increasing areas of tropical and coastal grazing areas are being cleared and planted with such palatable improved grasses as Panicum Maximum (Guinea Grass), Para, and Pangola. Although a variety of native legumes persist in these areas, tropical legumes, as part of a pasture mix with fertilizer applications, have not been significantly developed. More research and demonstration are required before a larger scale impact on optimum tropical pasture production can be achieved.

Dairy Production Areas

20. Mexico is a net importer of dairy products. Domestic production supplies about 85% of the national consumption, with the balance imported mainly in powder form. There are about one million (predominantly Holstein Friesian) cows under modern dairy management in the irrigated areas of the central plateau and the arid north. These contribute about 55% of total production. The balance is provided by about 4 million cows milked under primitive conditions, mostly in the tropical regions, where milk and milk products are by-products of the beef cattle industry and generate a supplementary income for livestock owners. For small-scale producers, this is of great importance, as it tends to provide a daily cash flow, whereas their beef off-take is seasonal. About 40% of Mexico City's milk requirement originates within the city boundaries, generally produced by animal under confined conditions fed on irrigated and rainfed alfalfa.

21. Traditionally, dairy farming has been concentrated in the irrigated districts of the Central Plateau, of which the Bajio area has been the main producer for Mexico City. Dairy farming has spread in recent years to the irrigated areas of the north and northwest, particularly around Torreon. Milk from these areas is competing in price with the more traditional areas and has captured about 20% of the Federal Capital market. In most areas of the country, good prospects exist for increased dairy production to service local urban and rural markets.

22. Production is generally based on irrigated alfalfa in the spring and summer, with forage, oats and corn silage in the autumn and winter. Concentrated foodstuffs are also used. Dairy farmers in the Torreon area and elsewhere are integrating operations by establishing pasteurizing plants, storage facilities, and feed mixing plants. Milk production levels of 15 liters per cow per day are being attained under this intensive system. There is some scope for lowering production costs by grazing herds on permanent legume-based pastures. Preliminary studies are being undertaken by the Bank of Mexico's FONDO, but a greater research effort is needed. The basic problems are inadequate pasture and feed. The Government has raised support prices for feedgrains and is providing technical assistance and credit to dairy farmers. The Government also plans to produce improved heifer calves

for herd replacements and expansion. To accelerate this program, it has relaxed duties on imports of high quality heifers and is investing in large dairy operations on ejidos.

Pig Production Areas

23. Traditionally, commercial pig production has been concentrated in the western edge of the Bajio. In recent years, however, it has spread to the irrigated areas of the northwest states as a result of increased availability of low cost feed grain. Additionally, pig production on ejido farms is increasing in the Yucatan. Recent efforts by Japan to import significant quantities of farm products from Mexico, especially pork, has encouraged increased pig production. However, Government agencies are monitoring production increases carefully in view of the dangers of oversupply, price reduction and unsure markets, all of which have plagued the industry in the past.

24. Pig production methods are predominantly (90%) combined breeding and fattening, with off-takes of about 30% per annum. This rate can be improved considerably through better management practices, improved husbandry, and nutrition. About 85% of pigs slaughtered in the Federal District are produced in Guanajuato, Jalisco and Michoacan states, with northwestern states' production increasing yearly. The remainder of Mexico's pig production (15%) is largely family and ejido type for which management standards are low and consumption is local.

Sheep and Goat Production Areas

25. Sheep production is confined mostly to the drier northern range land areas and is usually complementary to beef cattle operations. Rambouillet types are predominant with fleece yields of about 1 to 3 kg per head per annum. Carcasses are consumed mostly locally and provide an additional source of regular cash flow to smallholders. A few Corridales have been imported over the years, but generally the sheep and wool industry has not developed sufficiently to make Mexico self-sufficient in sheep and wool products. The industry could be expanded in a limited and orderly way by introducing palatable browse species of vegetation to improve the carrying capacity of range areas and by instituting modern range management techniques to improve pastures.

26. Mexico presently imports equivalent of about US\$10 million in wool and wool products. Demand for mutton is expected to double in the next few years.

27. Goat production has been traditionally a smallholder subsistence animal resource. Goat milk accounts for about 3% of the total national milk supply. The popularity both of milk and young goat's meat, however, is increasing, with a consequent rise in prices.

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RURAL DEVELOPMENT PROJECT - PIDER II

Cost Analysis of Livestock Component

Type of Livestock	No. of Pilot Units	Average ^{1/} Capacity-in Animal Units (AU)	PIDER ^{2/} Infrastruct. Support-Mex\$ '000/Bas.Unit	FONDO ^{2/} Development Credit-Mex\$ '000/Bas.Unit	Infrastruct. ^{3/} Cost/A.U. US\$	Total ^{3/} Cost/A.U. US\$
Beef	28	331	890	1,098	134	300
Dairy	18	146	1,399	1,559	479	1,013
Dual-Purpose Cattle ^{4/}	63	459	907	1,548	99	267
Pork ^{5/}	7	72	739	758	515	1,043
Goats	12	275	176	324	32	94
Bees	189	30	33	N.A.	54	N.A.
Poultry ^{6/}	44	705	42	N.A.	3	N.A.

^{1/} For beef, dairy and dual-purpose cattle, capacity represents A.U. at full development; for pork and goats, capacity represents breeding animals; for bees, capacity represents number of hives; for poultry, capacity represents number of birds.

^{2/} All costs quoted in reports increased by 20%.

^{3/} US\$1 = Mex\$20.

^{4/} Figures for Costa Chica only and excludes 13 units being financed by PIDER, but at various stages of development; no data available for Litoral Oeste.

^{5/} Figures do not include 15 units in Amuzgos and 5 in Lagunas Litorales

^{6/} 35 units are of 100 birds each; 1 unit is of 20,000 birds

N.A. = Not available.

MEXICORURAL DEVELOPMENT PROJECT - PIDER IISoil and Water ConservationIntroduction

1. Performance under the soil and water conservation component was below expectations. While 27,000 ha. was improved in 1975 and 1976, 30% of the total 91,000 ha. expected for the three year project disbursement period, little institutional improvement in SAG's project planning and selection capability was achieved.
2. Projects financed were largely selected on an ad hoc basis, and not integrated in an water shed development program. In PIDER II, a major effort would be made to improve PIDER's soil conservation activities. Some US\$10.4 million would be programmed to reinforce Soil and Water Conservation Service efforts to follow an integrated approach to soil conservation based on land capability; to select projects on the basis of economic analysis; to concentrate on projects for which adequate maintenance arrangements can be assured and to continue the labor intensive approach.

Background

3. Soil erosion, mainly through the action of water, has reached severe proportions in Mexico. The Secretariat of Agriculture (SAG) ^{1/} estimated that between 47% and 80% of the land area is subject to varying degrees of erosion with 7% to 15% (14 million to 30 million hectares) already destroyed. As erosion is such a pervasive problem in almost all areas, only a small proportion of the land can be effectively protected in the near term. Federal funding of erosion control works increased from US\$0.2 million in 1963 to US\$1.1 million in 1969 to US\$10.6 million in 1976; at the current level, this expenditure is equivalent to the capital costs of protection works over about 50,000 ha./annually. To build up national competence to adequately contain, and thereafter, systematically reduce, erosion, efforts are needed to: reinforce soil conservation staff; prepare soil conservation projects in conjunction with the land users and other agencies on the basis of land capability; set criteria for project selection; develop accountability for effective maintenance of conservation installations; institutionalize soil erosion practices in agricultural extension and farmer land use; and develop credit availability for land users to undertake associated follow-up land improvement activities.

^{1/} 1976 Government estimates. A 1974 SAG Sub-Direction of Soil and Water Conservation Study estimated 47% of land area was affected by erosion and 14 million ha. permanently destroyed; in 1976 the same source estimates the areas could be as high as 80% and 30 million ha. respectively.

The SAG Soil and Water Conservation Service (SSCSA)

4. In 1958, the federal Soil and Water Conservation Service (Dirección General de Conservación del Suelo y Agua) was established in the Department of Agriculture. Systematic attempts to finance erosion control, however, did not get underway until 1969. The agency claims that between 1958 and 1974 protective measures have been instituted on a total of 443,324 hectares (Table 1). Many of these works, however, have not been properly maintained. Budgetary allocations rose from a little over US\$1 million in 1969 to over US\$10 million in 1973 but declined to about US\$7 million in 1974. In 1976, with the addition of PIDER-financed projects which provided about one-third of total funds, allocations reached US\$10.6 million, although in real terms this represents only the level of 1972 expenditures. Even this expenditure level is clearly inadequate in comparison with the magnitude of the problem.

5. In addition to their regular budget and PIDER financed project, SSCSA receive supplementary funds for undertaking soil conservation rural works programs in disaster relief areas. Labor employment is a major objective of these relief programs which sets the pattern for the labor-intensive technology which they employ.

6. SSCSA has its headquarters in Mexico City with "Delegations" in most of the States. At the state level, delegations are responsible for actual project selection and implementation. Each delegation is supposed to be staffed by 8-10 professionals, half agronomists and half engineers, plus a number of job-trained technicians. In practice, professional staffing is generally smaller and the service is facing staff constraints. Staff complements are basically related to the SSCSA regular program and have not been expanded to cater for the PIDER financed and rural works projects. In Puebla State, for example, there are only two professionals plus a few helpers for implementing expenditures of about US\$0.8 million in the current year, which is clearly an inadequate staffing density in relation to the size of the workload. The problem of under-staffing is aggravated by the relatively low pay scales for professionals. Salaries in SSCSA are about 70% of those paid by SAG Agricultural Extension Service and SRH. The results are high staff turnover and low morale. These constraints will need to be remedied in order to improve project preparation, implementation and maintenance supervision.

7. The main focus of the SSCSA efforts is directed at the protection of agricultural and grazing land, although in some states, e.g., Chihuahua and Durango, a significant part of expenditures have been on land improvement activities such as sub-soiling (deep soil plowing), land clearing and initial plowing. Erosion control measures typically consist of construction of ridges, terracing and check dams for gully protection. Additional operations may include planting along the ridges to stabilize the soil, commonly using the species Agave (Maguey) and Opuntia (Nopal), and subsoiling. The latter operation, besides improving general drainage, increases the moisture storage capacity of the soil thus reducing run-off during heavy rains, and to this extent it is a soil conservation measure.

8. There is no established criteria for the selection of projects. Under the regular program and relief programs, projects are often selected on the basis of the degree of erosion rather than an economic evaluation of projected costs and benefits. Preference is frequently given to aiding the marginal producer in areas of poorer soils, steep slopes, little vegetative cover and low rainfall, as for example in the Alta Mixteca in Puebla and Oaxaca states. The costs of these operations are relatively high and incremental benefit often low. Some cultivation is taking place in these areas on land which, because of very severe slopes and shallow soils, is not suitable for annual cropping. These programs also include restoration of heavily eroded slopes close to major highways which have little or no productive benefits. On the other hand, PIDER-financed projects are in some cases concentrating on the productive aspects and neglecting the protective installations necessary to maintain production. For example, in Chihuahua State (Trias Steyo micro-region), PIDER-financed land clearing and levelling operations, but did not support the uphill gully-plugging and terracing works, which are considered necessary to protect the work financed. There is scope for improving resource allocation by developing criteria for project selection which would:

- a) concentrate on areas with long-term productive potential, based on land capability assessment;
- b) within these areas, select projects which yield the highest net benefits -- (but see (e) below);
- c) evaluate the overall project including the non-productive elements (e.g., gully-plugging), maintenance and any capital renewal works which may be needed;
- d) distinguish between:
 - i. conservation expenditures which are directed to maintaining the capital value of the land in perpetuity and may be regarded as a social cost justifying substantial subsidy.
 - ii. land improvement expenditure mainly benefiting the user, e.g. initial ploughing and sub-soiling, for which the owner could be expected to meet all or part of the cost from incremental revenues;
- e) explicitly demonstrate the social considerations entering into the project selection:
 - i. in selecting project areas; as in the case of choosing a project with sub-optimal production benefits on grounds of aiding a particular group.

- ii. in selecting technical method; as in the case of using a relatively high-cost labor intensive method for employment generation.

9. SSCSA presently operates within its own identified project activities with no formal linkages with other departments of SAG or SRA. This results in the expertise of SSCSA being confined to relatively small areas compared with the massive erosion tasks which need to be undertaken. Soil erosion considerations need to be implanted in all land use activities, including simple methods of contour ploughing, market ridges and alternate grass and cropping strips, which can be undertaken by the land users as regular farming practices. Formal linkages between SSCSA and other agencies need to be established so that SSCSA is involved in developing technical packages for extension to landowners and farmers, particularly in the functions of developing least-cost techniques and providing training, e.g. PRONDAAT extension workers.

10. At the same time, the two-day flow of such formal linkages would improve the efficiency of SSCSA projects by enabling the service to incorporate improved techniques and adapt project implementation and maintenance to specific land tenure situations. For example, present techniques used emphasize the "civil works" approach to conservation, whereas there are cases where the incorporation of small scale afforestation could improve the profitability of the projects and at the same time meet a local need. Securing agreement of land owners to initial installation and accountability for maintenance are crucial aspects in all projects which presently occupy a significant proportion of staff time. Interaction with SRA's SOFE Teams should reduce SSCSA input into this aspect of project development whilst more firmly securing administrative institutions responsible for maintenance.

Cost and Benefits of Soil Erosion Measures

11. Table 2 lists some typical current costs for protective programs undertaken in Aguascalientes state and the Alta Mixteca regio of Oaxaca state. Costs per hectare 1/ for terracing and check-dams range between US\$176 to US\$211 for work undertaken by manual labor and US\$111 to US\$139 for similar operations employing tractors. The costs of planting Nopal or Maguey along ridges increases costs by US\$64 to US\$90/hectare, and deep-soil plowing by a further US\$70 to US\$80/hectare. Average yield increases in maize production are estimated to be 25% if only terraces are built, 20% if only sub-soil plowing is undertaken and 40% if both terraces and sub-soil plowing are combined. Besides the protective function of Nopan and Maguey, these plants are expected to yield a small income from fruits and foliage.

12. The data contained in Table 2 have been used to calculate indicative rates of return for the various components of the soil erosion programs; these are summarized in Table 3. The results in all cases are significantly

higher for Oaxaca than for Aguascalientes. The main reason is that the average incremental crop yields for Oaxaca are 63% higher than those for Aguascalientes, although the lower costs in Oaxaca are also a contributory cause. Analysis of the deep soil plowing component which in the present technology is repeated every four years, indicates results of 9% in Aguascalientes and 6% in Oaxaca, which points to the need for careful selection of sites for this operation. Moreover, this is an optional operation in soil conservation works which, on favorable sites, could be largely financed by credit for land improvement. For these reasons, it has not been included in the analysis of the other soil conservation measures.

13. An iterative analysis has been made to calculate the results for hand labor versus tractor construction for terracing and hand labor terrace construction including planting of Maguey along the terrace ridges. This indicates that:

- (a) tractor terracing is more profitable than hand labor; however, economic analysis in which an appropriate weighting is given to labor costs to reflect a low opportunity cost of labor during off-peak employment periods, and/or employment generation in soil conservation works as a preferable substitute to other funded relief works, results in the labor-intensive method being competitive with the tractor method.
- (b) inclusion of costs of ridge-planting substantially reduces profitability when measured against quantified marginal productivity increases only. However, protection of the ridges is necessary to secure erosion control.
- (c) on the basis of financial data, none of the Aguascalientes results would be viable, but see paragraph below.

14. The analysis has been further developed in an attempt to value the soil conservation benefit of the investment, which is additional to the marginal productivity increases in crop production. Unchecked erosion will eventually destroy the agricultural activity of a piece of land (see para. 1). The time over which destruction will take place depends on a variety of factors and there is insufficient data available for presenting any meaningful analysis. However, informed local judgements in Mexico indicate that 20-years is a likely period in which this would occur. On this basis, the analysis includes the additional benefit of the prevention of total production loss, tested for

1/ Cost per hectare relate to the area of improved land; this includes costs of works carried out on land outside the improved land, e.g. up-hill gully-plugging.

15, 20 and 25 years respectively. With this addition, the results obtained are between 9% and 18%. The model setting out these calculations and the main assumptions on which they are based is included in Appendix 1.

15. The additional off-site benefits from erosion control such as the reduction in silting of streambeds, flood plains and harbors down-stream and reduced sedimentation in water supplies, present significant problems in quantification and have not been included in the analysis. Moreover, they are likely to be small because the soil erosion measures are few in relation to the widespread erosion problem.

16. The main conclusions based on this analysis are:

- (a) Higher net benefits from erosion control investment will be obtained from land with the greater basic crop yield potential. For example, within the data analyzed, areas with yields of 500 Kg/ha. of maize or less have marginal returns for the type of conservation costs considered. This would indicate that alternative land use patterns, involving lower cost conservation measures, should be developed for these areas.
- (b) Concentrating on higher yield areas would increase probability of securing follow-up maintenance of the investment, because of land-user will have an incentive to maintain the significant incremental production. Whereas marginal low-yield areas, even with protection, are more likely to be abandoned with the occurrence of a prolonged drought-cycle or alternative employment opportunity.
- (c) Projects are highly sensitive to yield improvement, costs and rate of soil destruction, which vary considerably inter and intra region. Therefore, assembly of accurate base data for specific project areas is necessary for project evaluation, rather than relying on regional or state-wide information.
- (d) Maintenance programs for the regular upkeep of the protection measures are necessary to justify the initial investment.
- (e) Deep soil plowing at the four-yearly interval indicated, is unlikely to yield satisfactory profitability except on the most productive sites. Inclusion of this operation as an erosion control measure in needs further justification. In areas where the practice can be shown to be profitable, consideration should be given to providing credit facilities to farmers for this work as part of productivity increase investment.

PIDER and Soil Conservation

17. The costs of the proposed soil conservation program in PIDER II is expected to be US\$10.4 million which is equivalent to about 5% of the overall US\$240 project costs, and would provide for the protection of some 90,000 hectares of farm land. Most of these works will be executed by the SSCSA and will account for a significant proportion for the SSCSA work program.

18. In the past, PIDER has only reimbursed the SSCSA for construction expenditures, leaving SSCSA to cover cost for project preparation from its regular budget which has been insufficient for adequate feasibility studies to be made. Farmer education in appropriate soil conservation and maintenance practices is also an activity which is not presently provided for in fund allocation.

19. PIDER would actively assist in providing for these present deficiencies and also in supporting SSCSA in introducing other measures discussed to strengthen soil conservation programs. Specific aspects, for which it is recommended PIDER should give support, are:

- (a) Staffing - working out with SSCSA adequate staffing:
 - (i) for project preparation and implementation;
 - (ii) in conjunction with SAG, staffing for training programs for extension workers and promoting soil conservation practices.
- (b) Project Preparation - projects should be prepared for sub-watersheds based on land capability and should include detailed schedules for maintenance and upkeep. This will need an integrated approach involving:
 - (i) local land owners and farmers;
 - (ii) SRA for land title and farmer participation;
 - (iii) other agencies of SAG and SRH to include agriculture, livestock forestry and irrigation, to work out basic approaches to land use and cropping patterns;
 - (iv) provision for maintenance and continued extension advice and supervision.
- c) Project Selection - develop methodology for project selection along the lines discussed in para. 8 and Appendix 1, with follow-up monitoring of results.

- d) Maintenance - at present investment costs are borne by the government with local participating beneficiaries being paid at the going minimum wage rate. An undertaking is given by the beneficiary ejido or village community to maintain the works at their own expense. In practice, maintenance is not generally being properly undertaken. A major reason is failure to clearly specify maintenance tasks, quantify these into schedules showing input requirements and costs and institute accountability practices either by self-help systems or by appointing local people to carry out the work for cash wages. The latter alternative has the advantage of greater probability of work being undertaken. This could be implemented by a system in which the ejido or village managing committee levied beneficiaries to fund wage and material maintenance costs, with payments being handled through the local agricultural bank. Soil conservation would be an integral part of the sub-watershed development plan, and specific follow-up inspection and advice should be provided for, with the objective of firmly establishing these practices in normal land use.
- e) Land Improvement Credit - in consultation with SAG agencies and SSCSA, distinguish land improvement activities, which are primarily for increased crop production and not soil conservation, e.g., some of the deep soil plowing and land clearing; establish relationships between the farmers, agencies and Banks for supplying credit for these types of operations which have been demonstrated to be profitable.
- f) Research and Development - in consultation with SSCSA and other related institutions, provide support for developing improved soil conservation techniques, e.g. possible alternatives to Nopal and Maguey for ridge planting; introductory trials of tree species, grasses, etc. on difficult sites which have large potential replicability.

Employment

20. It is estimated the PIDER financial program will generate some three million man-days of additional employment, which will have significant direct income and multiplier effects. In phasing soil conservation works, special attention needs to be given to concentrating these during off-peak seasons (generally December to mid-May) and fund allocations scheduled with this objective.

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Authorized Budgets of the Department of Water and Soil Conservation;
Hectares Protected and Number of Beneficiaries; 1958 to 1976.

Year	Budget authorized US \$ 1 US \$ = Mex\$12.50	Hectares of Land Protected	Number of Beneficiaries
1958	80,000	1,530 has.	2,295
1959	120,000	2,290 has.	3,425
1960	120,000	2,186 has.	3,279
1961	120,000	2,020 has.	3,030
1962	120,000	2,140 has.	3,210
1963	199,000	3,687 has.	5,530
1964	317,000	6,000 has.	9,000
1965	-----	-----	-----
1966	110,000	2,083 has.	3,125
1967	146,000	2,758 has.	4,137
1968	298,000	5,640 has.	8,460
1969	1,172,000	19,177 has.	28,765
1970	3,328,000	44,796 has.	68,194
1971	4,616,000	62,137 has.	93,205
1972	5,763,000	77,585 has.	116,377
1973	10,681,000	126,600 has.	189,900
1974	6,891,000	82,695 has.	124,042
TOTAL 58-74	34,100,000	443,324 has.	664,984
1975	7,200,000	n.a.	n.a.
1976	10,640,000*	n.a.	n.a.

Source: Direccion General De Conservacion del Suelo y Agua.

* US \$3,440,000 of these funds came from PIDER.

Between 1958 and 1963, 58% of the budget was spent on actual works, the balance for administration. Between 1964 and 1968, 62% were spent for construction, in 1969, 64%, between 1970 and 72 some 70%, and between 1973 and 74 some 72%. Of the 28% spent on administrative costs in recent years 6-7% are required for headquarter costs, while the remaining 22% finance the Soil Conservation's Delegations at the state level. Average costs per hectare protected, which, between 73/74, amounted to only \$60.00, have risen more than fivefold since then (See also Table 2).

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TABLE 2

Physical Characteristics, Current Costs, and Effects of Agriculture Productivity
of Soil Conservation Measures in Aguascalientes and Oaxaca*

	<u>Aguascalientes</u>	<u>Oaxaca</u>
Average Slope	6-8%	8-10%
Maximum rainfall in 24 hr. period	70 mm	75-78 mm
Soil depth	15-30 cm	10-30 cm
State-wide average maize yield/ha.	463 kg.	754 kg.
Average costs per ha. terrace construction by manual labor w. gully check dams	\$211/ha.	\$176/ha.
Average costs per ha. terrace construction w. tractor incl. gully check dams	\$139/ha.	\$111/ha.
Planting costs of Nopal or Maguey	\$94/ha.	\$64/ha.
Deepsoil plowing (by tractor)	\$70/ha.	\$80/ha.
Estimated increase in production of maize:		
- Terraces only	25%	25%
- Subsoil plowing on terraces	40% (total)	40%
- Subsoil plowing only	20% ,	20%

Source: Direccion General de Conservacion del Suelo y Agua, July 1976

* All peso costs converted at US\$1.00 = Mex\$12.50

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Internal Rates of Return for Representative Soil Erosion
Control Programs in Aguascalientes and Oaxaca

Basis of Benefit Calculation	Internal Rate of Return, ^{4/} %			
	Aguascalientes		Oaxaca	
	30 Yr. Life	Infinite Life	30 Yr. Life	Infinite Life
Terrace Construction Only; (by hand labor)	2	5	11	12
(by tractor)	6	7	19	19
Terrace Construction by Hand Labor Including Plant- ing of Maguey ^{2/}	1	4	8	9
Terrace Construction by Hand- Labor, plus Maguey Planting, plus Net Allowance for Prevention of Total Soil Loss over 15-Year Period. ^{3/}	11	12	18	18
Terrace Construction by Hand- Labor, plus Maguey Planting, plus Net Allowance for Prevention of Total Soil Loss over 20-Year Period ^{3/}	11	11	18	18
Terrace Construction by Hand- Labor, plus Maguey Planting, plus Net Allowance for Prevention of Total Soil Loss over 25-Year Period. ^{3/}	9	10	15	16
Deep soil Plowing only, 4 Year life.		-9	6	

1/ Data from Table 2. All calculations assume either a 30-year or infinite life expectancy except for ripping operations which, according to the Soil Conservation Service, have to be repeated every four years. Operating and maintenance costs (except for ripping) are assumed to amount to Mex. \$100.00 (US. \$8.00 at old exchange rate) per hectare per year.

2/ Planting costs for Nopal are higher (See Table 2) but would possibly be offset by partial harvesting and utilization when plants mature.

3/ Assumes that continuing soil losses would destroy 6.7%, 5% or 4% of the original area under cultivation every year. Net agricultural income assumed to amount to 60% of gross income. Values of maize per ton = Mex. \$1900 (U.S. \$152.00 at old exchange rate).

4/ Rounded to the closest full percentage point.

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER II

Forestry

Introduction

1. Up to 1976, PIDER's involvement with forestry has been limited. Only Mex\$5 million (US\$0.3 m equivalent) have been spent in 30 micro-regions of PIDER I, mainly for studies and reforestation of some 900 ha. In the 20 micro-regions programmed for the PIDER II, an additional Mex\$6.5 million (US\$325,000) is provided for reforesting an additional 950 ha. Given the importance of forestry in providing incomes to ejidos in a number of states and in generating additional wood and paper productions, PIDER is examining various alternatives to expand its support of forestry activities in its micro-regions. This annex reviews some of the issues facing PIDER in this endeavor.

Background

2. Forests cover about 45 million ha or nearly a quarter of Mexico's total land area of 197 million ha. About 30 million ha or two-thirds of these are coniferous plus some hardwoods located in the colder mountain areas. The remaining third or 15 million ha consists of mixed hardwoods in the hot humid areas. Only about 13 million ha of the total forest area, however, is considered to be commercially productive. Many of the forest areas are poorly stocked, some are located in precipitous and inaccessible country, while agriculture and grazing encroach in other areas.

3. Production of industrial roundwood was estimated at 6.9 million m³/year in 1976, 80% of which is coniferous and 20% hardwoods. This compares with total estimated demand of 9.5 million m³/year. The imported balance of some 2.4 million m³/year is mainly wood pulp and pulp/paper products. The main producing states are Chihuahua, Durango, Michoacan and Jalisco which together produce about 65% of the total. Production of roundwood and sawnwood products including dressed timber, but excluding boards and pulp/paper products, was valued at Mex\$3.8 billion in 1975. Non-wood forestry products of resin, gum, fruits, etc. were valued at Mex\$429 million in the same year. This includes the locally important industries of chicle, used as a base in chewing gum manufacture and babesco rhizomes used in steroids production.

4. There are no reliable estimates of non-industrial wood consumption, including farm timber and fuel wood, although it is likely to exceed industrial roundwood consumption by a substantial margin.

5. National inventory data indicates a potential production of the forests of some 16.5 million m³/year compared to actual production of 6.9 million m³. This assessment may be optimistic, considering problems of inaccessibility, lack of adequate management systems, and the difficulty of arriving at marketing arrangements acceptable to the forest owners. By 1995 the demand is expected to exceed 21 million m³/year. 1/

Forest Ownership and Management

6. Fifty-five percent of the forests are owned communally or by ejidos, 40% privately, and 5% by the Federal and State Governments. The proportion of ejido forest ownership varies considerably between states; in Chihuahua and Durango the proportion is around 70% to 75%, and in Guerrero is reported to be 55%. The 3 million or more people living in the forest areas have not profited from owning trees; rather, the average incomes of forest dwellers is estimated to be in the lowest quartile for the country.

7. All commercial forest removals must be authorized by the Subsecretariat of Forestry (SOF). Upon payment of a prescribed fee by the forest owner(s), SOF prepares a management plan for a specific period, (5-10 years), which authorizes selective felling up to specified volumes/year based on criteria of stocking density of the forest and minimum girth of trees. The objective is to retain sufficient tree cover to protect the soil and ensure natural regeneration.

8. Marketing outlets are also subject to control. Originally, concessions were granted through presidential decrees to private corporations. Generally, these private owners met considerable resistance from the forest owners, with the result that the forest resources were not fully exploited. As a result, in the late 1960's, the Government provided funds and staff for a number of government corporations to develop forests in specific areas. These include at the federal level Proformex in Durango State and Forestal Vicente Guerrero (FVG), and at the state level Profortarah in Chihuahua. Proformex and FVG handle the active spectrum of forestry development themselves, but have guaranteed the local inhabitants that they will develop the economic and social infrastructure in their concessions. Profortarah, on the other hand, gives a freer hand to the local groups already involved in forest exploitation. They plan to retain existing marketing outlets and to permit new ejido exploitation and marketing enterprises. The corporations are still in their infancy. Proformex is at present producing only about 200,000 m³/year of logs out of an estimated maximum production of 1.3 million

1/ Based on estimates prepared by the Subsecretariat of Forestry (Sub-Secretaria Forestal y de la Fauna - SOF) which projects deficits in domestic production to meet roundwood demand of over 4 million m³ by 1995, even assuming full potential domestic production can be realized.

m³/year. FVG₃ is producing about 100,000 m³/year against a potential of over 1.0 million m³/year, and as yet only 25% of the available ejidos are participating in Profortarah.

9. One reason for the slow development is dispute over boundaries between government concessions and private owners, which stems from Presidential Decrees authorizing more than one group to exploit a given area at one time. A second problem is that ejidos in the federal concessions resent not being allowed to secure loans to develop forest industries themselves and as a result are reluctant to cooperate with concession management.

10. In 1975, over 60% more commercial removals of roundwood were authorized than were actually felled. Authorizations totaled 11 million m against 6.9 million m harvested. The breakdown for authorizations included 28% from ejidos and communally owned forests, 21% private owners, and 51% industrial enterprises including federal and state corporations. This compares with 17% actually harvested by ejidos, 63% by private owners and 20% by Federal and State corporations.

Forest Industries

11. Table 1, below, lists the major wood industries operating in Mexico with their installed capacities and current production.

Table 1: SUMMARY OF MAJOR WOOD USING INDUSTRIES - 1974

Type	No.	Installed Capacity	Estimated Production, 1974 Quantity	% of Capacity
Sawmills	643	3.14 m ³	2,120 m ³	68
Plymills	26	210,000 m ³	134,000 m ³	64
Particle Board Mills	9	121,000 m ³	87,000 m ³	72
Fibre Board Mills	2	33,000 m ³	28,000 m ³	85
Resin Factories	31	133,000 tons	73,000 tons	55
Barbesco (Steroids)				
Timber Preservation Plants	10	n.a.	n.a.	n.a.
Wood Pulp Mills	7	473,000 tons	362,000 tons	77
Paper and Paper Board Mills	51	1,483,000 tons	1,254,000 tons	85

Source: Secretariat of Agriculture

12. The main users of industrial wood are sawmills of which 30% are small-scale plants of less than 5,000 m³/year, and 50% are in the medium range of 5,000 to 10,000 m³/year. About 10 to 12% of sawmill capacity is directly operated by ejidos and this type of development is being encouraged. Both Proformex and FVG have plans for establishing new sawmills, while Proformex is planning the establishment of a plymill and pulp/paper mill. In addition to the wood-pulp mills there are a number of pulp mills based on agricultural residues, e.g., bagasse and wheat straw. Fifteen of the paper and paper board mills are integrated with pulp mills.

Need for Controls

13. Most of the richer forests are situated in steep hilly areas, often with shallow soils susceptible to rapid water erosion. Stringent control mechanisms are needed to ensure that their exploitation does not interfere with the watershed protection they provide.

14. It is particularly difficult to enforce rational harvesting patterns in the large proportion of forests owned by ejidos, since these low-income groups have little commitment to long-term watershed management. In addition, in some places there is pressure to convert forests to agricultural lands with an associated high incidence of indiscriminate burning.

15. Many of the forest industries have no direct commitment to maintaining the sustained supply of timber because they do not directly operate the forests. The result is over-exploitation in certain areas to keep factories supplied, particularly since capacities are underutilized and domestic prices are high for timber products. 1/

Government Strategy

16. SOF is currently preparing a national forestry plan to increase production from the existing forests and to develop a reforestation program. So far, plans have been prepared in 12 regions, in collaboration with State Governments. These provide for a federal forestry management team, including agricultural and livestock specialists, to be appointed to each region, to implement the development plan in cooperation with the ejidos. The objective is to involve ejidos in successive stages of the development including their participation in logging, sawmilling and further manufacture based on the existing forests, replanting with fast growing species in downgraded forests or new plantation areas and concurrent agricultural/livestock activities. SOF has set a target of 30,000/ha./year of new plantations to be established in these federal-sponsored projects.

17. A major difficulty being encountered is securing land with a high growth potential for forestry plantations. SOF is seeking assistance to implement the programs under the plan.

18. The SOF program is considered complementary to the private concessions and government corporations and will not be instituted in any of the areas where either of those activities already exist.

PIDER's Involvement

19. There are possibilities for expanding PIDER involvement in forestry in the three major topographic areas of Mexico: the forested, the semi-arid, and the agricultural areas. In the forested, PIDER could help assess whether credit should be extended to small-scale ejido enterprises in logging, sawmilling and marketing. In semi-arid areas, PIDER might look critically at

1/ The current ex-mill prices for construction sawn-lumber of pine are in the range of US\$130/195/m³ (rate Mex\$12.5 to US\$1), which compares with f.o.b. European port prices for comparable timber ex-Scandinavia and N. America of about US\$110 to US\$170/m³.

different research efforts currently underway, extrapolate appropriate portions, and select one micro-region in which to apply an integrated development package. In the agricultural areas, tree planting could be incorporated in watershed/soil conservation projects. In all cases, forestry development should be considered in conjunction with other forms of land use and development.

PIDER Involvement in Forested Areas

20. PIDER could be involved in expanding credit for ejidos' forest industries. Unlike other forested states like Chihuahua and Durango, which have adequate credit facilities, Oaxaca, for example, does not have forestry technicians on local bank staffs to help assess loan applications. There is here, however, considerable interest among ejidos in expanding their logging and sawmilling operations as well as extending sawmilling into integrated furniture and moulding products, and undertaking some reforestation. The existing industries in Oaxaca seem to be operating efficiently. Guidelines to create new enterprises can be based on these on-going businesses.

21. On the other hand, the suggestions for new enterprises in Quintana Roo, for example, where the adequacy of the resource base is doubtful, may need technical analysis before credit is extended.

22. PIDER's role would be to collaborate with banks by funding feasibility studies of small-scale ejido enterprises in logging, sawmilling and marketing. In the process, the following check list should be considered.

- (a) The resource base, including forest type distribution and stocking densities should be adequate, allowing particularly for economic logging costs;
- (b) It must be determined whether labor would be available;
- (c) Technical assistance and credit required to implement improvements in existing sawmilling and as well as specialized industries such as chicle should be assessed.
- (d) Technicians should assess land capability not only for forestry but also for livestock, agricultural crops, and fruit culture.
- (e) The new technologies to be introduced should be selected with technical back-stopping of research institutes (e.g., forestry and fruit).

23. If no forest-based activities are possible, PIDER should make that determination, followed up by suggestions of other possible land-use activities in the area.

Semi-Arid Areas

24. In the arid zones, where population density and average incomes are lowest for the country, there are a variety of activities based on natural scrub vegetation. The two most important are "Lechuguilla" fibre, produced from Agave lechuguilla, and used in rope, sack and mat making, and "candelilla", a wax which is produced from Euphorbia antisyphilitica. Other locally important indigenous species are Yacca carnerosana, used as a substitute fibre for lechuguilla. Its flowers are used as food (human and cattle) and the stems as fuel. Yacca filifera (Palmachina) is used for its fruits and Dasylirium duranguense is used for producing sotol, a local alcoholic beverage.

25. Several proposals exist for development of arid areas, mostly involving shrub exploitation. Two have been submitted to PIDER while the third is still being researched. One was prepared by the National Institute of Forest Research (INIF) and involves improvement of natural tree species and development of new species, particularly for livestock fodder in the micro-region of Francisco Sarabia in Durango.

26. A second project is mainly geared to irrigation for the Ojinaga micro-region in Chihuahua, with the possibility of introducing pistachio nuts and grapes in irrigated areas. The project was prepared by the Secretariat of Water Resources based on a pilot project being undertaken by CNIZA (Arid Zone Commission).

27. It is inappropriate at this time for PIDER to agree to become involved with any of these proposals. Though each have merit, and technical backstopping is available in each case, the real need is to determine which approach will be most effective. The alternative approach which is suggested is that PIDER should act as a coordinator, extracting appropriate segments of these proposals. It should then take the best ideas available to develop a multi-disciplinary technical development package for application in one selected micro-region. The approach should include:

- (a) a study for the assessment and selection of technologies for intensive trials on the basis of research to date;
- (b) formulating a defined trials program in collaboration with participating agencies;
- (c) implementing trials under a coordinated management team representing, e.g., food crops, livestock, hydrology, soil conservation and tree crops, for an initial period of 5 years;
- (d) inclusion of studies, e.g., groundwater availability;
- (e) provision for overseas study tours for staff employed by the project;

- (f) provision for consultants (local and overseas); and
- (g) regular independent monitoring by PIDER-selected team.

Agricultural Areas

28. Many of the agricultural areas are virtually treeless, and tree-planting should be incorporated into soil conservation projects for the dual purpose of improving watershed management and production of forest products particularly for local use. Species can be grown which could be used for poles for local houses, farm buildings, and fence posts, and in some of the remoter areas, possibly for fuelwood. This would help alleviate the overall deficit in wood supply, and could also contribute to industrial wood requirements, particularly for pulpwood. The trees would also substitute for some mechanical works in the projects and in addition provide shade and shelter. For example, shelter belts planted across sloping range land could replace terraces and provide shade and shelter for cattle. Fruits, nuts and fodder might also be grown as well as Christmas trees as an intermediate crop from thinnings.

29. SOF has no subsection with responsibility for addressing the question of forestry as a component part of an integrated sub-watershed development. SOF, SSCSA, and INIF agree a forestry component would make sense in those watershed projects where the need for forest products can be readily identified, and where trees would reinforce conservation measures. INIF volunteered to undertake development of suitable technical packages for new areas. PIDER's role should be to ensure that SOF, SSCSA and INIF in fact, follow up with preparation of integrated projects for selected micro-regions.

MEXICORural Development Project - PIDER IIExtensionI. BACKGROUND

1. One of the major objectives of the PIDER I project was to lay the basis for a major reform of the extension system operating in the micro-regions supported by PIDER. Under PIDER I, the Government was required to develop a new extension system and apply this system to the micro-regions supported by the World Bank. With the exception of the women's home extension program, (para 21) this effort has proven more difficult than expected. However, the consolidation of SAG and SRG in late 1976 into the new Secretariat of Agriculture and Water Resources (SARH) provided PIDER management with a fresh opportunity. All SRH and SAG extension divisions were combined under one Director General. PIDER management has given renewed priority to achieving wider replication of a new extension system.
2. Prior to PIDER, farmers living in the regions targeted for development had virtually no contact with the normal extension system of the Secretariat of Agriculture. This system functioned mainly for the benefit for larger farmers in the high potential rainfed areas and for farmers with access to irrigation. In planning for the initial investment packages in the early micro-regions in 1973 and 1974, PIDER insisted that the Secretariat of Agriculture alter its traditional system and devise a program more suited to the needs of the PIDER client farmers. The Secretariat thus developed a somewhat different approach based on multi-disciplinary "brigades". Each brigade averaged from 20 to 25 persons per micro-region, with a total of 700 members assigned to the Bank's 30 micro-regions by the end of 1976. These teams comprise mixed disciplines. They also include significant numbers of secondary school graduate technicians (peritos). Using a variety of new extension techniques including use of demonstration parcels and close association with official banks providing seasonal credit, the concept was directed at providing one extension person per three villages or ejidos.
3. While this reform of the traditional Secretariat of Agriculture extension service under PIDER was a major departure for the Secretariat of Agriculture, neither the Bank nor PIDER management were fully satisfied. Problems remained, especially with extension and applied research directed at such traditional crops as maize and beans.
4. Thus, under PIDER I, a major effort was initiated to reorganize this traditional extension service of the Secretariat of Agriculture (SAG), operating in rainfed areas. A "Plan of Action", prepared by SAG and PIDER staff,

was approved by the Bank in November 1975. The major objective was to develop a system of applied research and extension based on the ecology of the region being developed. Appropriate technical packages are being derived based on local varieties already adapted to the region's ecology. Pilot programs in the Puebla and Zacapoaxtla regions are introducing better plant spacing, earlier planting, and fertilizer on credit. For such major crops as corn it has been demonstrated that 50% or better yield increases can be achieved. The Plan of Action called for the expansion of this new approach, known as the PRONDAAT system, 1/ over a three year period to the 30 micro-regions supported by the Bank under PIDER I.

5. The target proved over-ambitious. By mid-1976, the PRONDAAT approach had been applied in ten PIDER regions, of which only four are among IBRD's 30, whereas the plan called for application in twelve Bank-financed micro-regions in 1976. SAG's "brigade" extension service operates in the other micro-regions. Although PIDER has supported a near doubling of the SAG extension service during the past three years, less than 5% of new agents have been trained in the PRONDAAT methodology. Under the second phase of PIDER, therefore, a continued effort will be made to expand the PRONDAAT system into all Bank-financed micro-regions, both under PIDER I and PIDER II.

II. Agricultural Extension Provided Through Established Agencies

A. Extension for Non-Traditional Agricultural Activities

6. A variety of extension agencies service non-traditional production activities in PIDER micro-regions. These include livestock, fruit and irrigated grains. Other agencies promote non-traditional approaches including trench silos and home economics. The list of these agencies supported by PIDER includes:

PLAMELPA. A section of the new department of irrigated extension department of SARH, this group provide extension services to farmers receiving new or rehabilitated irrigation works.

INI. Working in the Indian areas, INI applies much of the new extension methodology developed under Plan Puebla.

1/ Based on experience gained under the Puebla Project, PRONDAAT supports an intensive program of adaptive research and evaluation designed to produce technical packages appropriate for each micro-region. It also seeks to involve the extension agent directly in the organization of farmer level institutions for such activities as acquisition of credit and inputs, and produce marketing. The program receives strong support from the Post Graduate College of the Chapingo Agricultural University. (See Section III.)

FIRA and BANRURAL. In 1975 and 1976, the technicians of the credit system have increased their activities, particularly in the livestock, forestry and fruit areas. BANRURAL has been attempting to supplement salaries of the regular extension service in order to tie seasonal credit closer to the recommended maize and bean improvement packages.

CONAFRUT. CONAFRUT technicians work exclusively to provide technical assistance to fruit growers.

PRONAFOR. Operated under the livestock group at SARH, PRONAFOR has successfully introduced a new system of silage making and storage into the micro-regions.

Home Economics. SAG's women home economists work to extend improved home-making skills to the target beneficiaries in PIDER micro-regions (see Section IV).

These extension systems have been fairly successful in introducing non-traditional or new activities to the traditional maize and bean cropping pattern. Yield levels on these livestock, beekeeping, fruit and irrigated vegetables crops have generally been as expected. Also, the home economics extension is exercising a dynamic influence on the target communities going beyond pure home-making skills.

B. Extension for Traditional Rainfed Staple Crops

7. SAG's Directorate General of Agricultural Extension is the principal extension agency for rainfed traditional crops in PIDER micro-regions. The two principal staples are maize and beans. Maize occupies about 8 million ha, i.e. about half of the rainfed crop land in the country. It is particularly important in the tropical gulf, Pacific south and central regions, which contain over 70% of Mexico's maize land. Rainfall deficiency (below 600-700 mm), however, makes one-third of the harvested maize area economically marginal. Beans are second only to maize in the Mexican diet. More than one million hectares of beans are harvested each year; about half of this area is grown interplanted with maize by subsistence farmers. The main producing areas are the north central states and the higher central plateau. The main problems related to bean production are diseases, poor yielding characteristics of native strains and great heterogeneity of seed quality. After a period of significant increases in yields and area under cultivation during the 1960's, production increases have been disappointing during the early 1970's.

8. Resources for Extension. During the past three years (1974-76), the number of SAG extension agents working on traditional crops increased from 2,700 to 5,200. More than half this increase was financed through PIDER, with 1,400 professionals now being assigned to its 86 micro-regions.

PIDER's financial support to the SAG extension service is shown in the table below. 1/

Year	Total PIDER Allocation to SAG (1)	Extension Service			Percentages	
		SAG Normal Budget (2)	Allocation (3)	Budget (4)	(3/1)	(3/4)
----- in Mex \$ million -----						
1973	-	-	-	-	-	-
1974	243	148	60	208	25	29
1975	576	286	139	425	24	33
1976	483	354	170	524	35	32

This table indicates the importance attached by PIDER to SAG's extension service, and shows the impact PIDER has had in recent years on resources available to SAG. The extension service depends now for about one-third of its resources on the PIDER program.

9. With 1,400 extension agents working for PIDER, the extension density is much higher in PIDER micro-regions than under SAG's regular programs. The regions selected for intensive development by PIDER are characterized by lower rain fall and/or difficult access, and typically receive little or no extension support under SAG's normal program. Under PIDER, each micro-region, containing an average of 10,000 farm families, is now served by an average of 20-25 professionals. This works out to roughly one extension agent per 600 farm families or eight ejidos (75 families per ejido). These ratios are more or less correct under Mexico's conditions and the numerical shortage of extension agents that occur outside PIDER is no longer a limiting factor in the PIDER micro-regions. 1/ The key issue that remains is the quality of extension.

10. Quality of Extension. When PIDER was initiated in 1973, the qualitative problems of SAG extension were recognized, and SAG agreed to change its approach in the PIDER regions in several ways. First, SAG agreed to develop a brigade system, 2/ employing sub-professionals or secondary school graduates ("peritos") who would live and work in the region and develop a series of demonstration parcels. Further, SAG agreed to ensure adequate vehicles and gasoline for its extension workers so they could be more mobile in the region assigned to them.

1/ Source: SAG Programming Bureau.

2/ Comprising a team of 20-25 mixed discipline professionals and technicians.

11. Despite substantial criticism within Mexico, these innovations resulted in some improvement of farmer yields particularly where credit from BANRURAL was available for seasonal inputs. For example, in Sinaloa, a near doubling of yields appears to have been achieved over a two-year period in 20% of the rainfed maize and bean area, with the help of credit for fertilizer and improved seed. Where farmers are more isolated and rainfall is below 700 mm, the SAG "brigade" extension approach has not worked as well. The technical recommendations are often drawn from research stations outside the micro-region and are designed both for higher rainfall and more sophisticated farmers. These conditions do not often prevail in the PIDER micro-regions. Thus, SAG extension workers have found it difficult to provide PIDER's low income farmers with appropriate technical recommendations, while at the same time experiencing farmer resistance to overly general recommendations.

12. Also, the expansion of the extension service was probably carried out too quickly. The agents were given very little job-orientation or on-site training and supervision, with a resulting high personnel turnover. This was particularly serious since most of the newly appointed staff were inexperienced with less than a year since graduation. No improvements were made in extension methods, which are still limited to giving advice, supported by general experimental results from nine regional research centers located throughout the country. Very little use is made of crop demonstration and extension aids, and farmer training is almost non-existent. Extension agents receive no formal training either in extension methods or in peasant sociology. Finally, there is wide disparity between salaries and fringe benefits among the various organizations employing extension agents, with SAG offering the lowest remuneration. PIDER, and particularly its field staff, became acutely aware of the need for further quality improvement. With assistance from Bank missions, PIDER insisted with SAG on a different approach to agricultural extension in PIDER micro-regions.

III. THE PRONDAAT SYSTEM

13. Approach. One alternative approach to the traditional SAG extension methods was developed in 1974. It was called PRONDAAT, the National Program for Agricultural Development in Rainfed Areas. With support from the Post-Graduate College of the Chapingo Agricultural University, PRONDAAT operates a training center in Puebla and assists newly trained extension teams in selected regions. The PRONDAAT approach is modeled after a pilot program in the Zacapoaxtla micro-region (Plan Zacapoaxtla) which in turn is based on experiences with Plan Puebla. This method seeks to give the extension agent a development role by directly involving him in the organization of farmer-level institutions, in marketing and in the provision of credit and inputs. The approach is supported by an intensive program of adaptive research and evaluation designed to produce technical packages for each localized ecological zone.

14. Under PRONDAAT specific regions are selected for which maize is the basic subsistence crop. The initial effort is towards increases in maize yields with other basic crops being developed subsequently. For each selected region, a team of seven professionals (agronomists, economists) is trained through a four-month course in the program's training center. The first month is a general introduction for the team as a whole and the remaining three months are devoted to applied research (for two team members), communication (three), evaluation (one), and coordination (one). After the course, the team starts its activities in the region assigned to it under close supervision and guidance by PRONDAAT staff and with direct access to advisers in the Postgraduate College.

15. The team's activities during the first year include:

- (a) a diagnosis of the social and economic conditions in the region including existing cropping patterns;
- (b) determination of appropriate packages for testing;
- (c) the carrying out of on-farm tests to assess yields of experiments to adapt the general alternative technical packages in the various ecological sub-zones of a micro-region;
- (d) measurement and evaluation of the "technical package" yields on farmers' and demonstration plots; and
- (e) coordination with the various agricultural development agencies in the region.
- (f) Promotion of the promising technical packages.

16. During subsequent years, technical recommendations are refined and broadened to include cash crops. Further, the promotion of farmer organization, marketing, and credit is intensified, and evaluation is refined. Supervision by the central PRONDAAT team has gradually been reduced and shifted to new micro-regions. The original approach has been modified slightly to allow incorporation of the PRONDAAT methodology into the regular extension system of SAG. PRONDAAT operates as part of SAG, and is being further adapted to allow eventual large-scale implementation: Government's intention is to gradually reform the entire SAG extension service along the lines of the PRONDAAT methodology.

17. Progress. The increase in the number of PRONDAAT-trained agents has been less than projected. PRONDAAT's initial goal was to train eight to nine regional teams of seven professionals each per year. Only 40 professionals were trained in 1974 during the first course, but the second course produced a total of 57 professionals. Together, 16 regional teams are now operating. In 1976, however, only four 1/ of these were assigned

1/ i.e., Zacapoaxtla, Pue; Valles Centrales, Oax; Mixteca, Oax; and Chiantla, Pue.

in the 30 micro-regions supported by the first Bank project, leaving 26 to be covered by regular SAG agents (see following table). Another four micro-regions are to be added during 1977. This is a large shortfall compared with the original (November 1975) plan of eleven Bank micro-regions in 1976 and twenty in 1977.

<u>Extension Personnel</u> <u>PIDER I Project</u>	<u>SAG Extension</u> <u>(26 micro-regions)</u>	<u>(4 micro-regions)</u>
Supervisors	26	4
Agricultural Extensionists	135	13
Livestock Extensionists	55	3
Other Specialists	<u>20</u>	<u>11</u>
Total, professional staff (Average per micro-region)	236 (9)	31 (8)
Sub-Professional "Perito" Extensionists	161	68
Home Economists (Women)	162	17
Secretaries	26	8
Non-Professional Support	<u>16</u>	<u>20</u>
Total, sub- and non-professional (Average per micro-region)	365 (14)	113 (28)
TOTAL	601	144
(Average per micro-region)	(23)	(36)

1/ i.e., Zacapoaxtla, Pue; Valles Centrales, Oax; Mixteca, Oax; and Chiantla, Pue.

18. An interesting finding from this table is that the more intensive PRONDAAT approach is achieved by a slightly smaller professional staff (which is in short supply), but a much larger number of sub-professionals and non-professionals than under the traditional SAG system. The annual operating costs of a PRONDAAT team is about 20% higher than under the traditional system. The cost-effectiveness of the PRONDAAT scheme is, however, much higher than that of the traditional system because of the incomparably better results achieved by the PRONDAAT teams.

19. The critical issue for PRONDAAT is how this scheme can be expanded rapidly. PRONDAAT's Training Center at Puebla has 16 teachers able to train some 50-60 professionals per year, equivalent to eight to ten field teams. Agricultural agents able to administer another three to five micro-regions could be trained annually at the Agricultural Post-Graduate School. At this rate, only about 40 extension teams could be prepared over the next three

years, which would even be less than needed for the Bank-financed micro-regions (another 26 to be covered under PIDER I and 20 under the proposed PIDER II). In practice, however, the needs of non-Bank micro-regions will have to be met pari passu. If the more than 900 existing livestock specialists, technicians and assistants supported by PIDER were also to be retrained, it would take 15-18 years to finish the job. The entire reform of the existing national extension service would than take up to 50 year, an unacceptable proposition.

20. Clearly, this rate of improvement in the micro-region extension systems was unacceptable to PIDER management. Thus, when the Secretariat of Agriculture was combined with the Secretariat of Water Resources in early 1977, PIDER's management immediately organized a number of meetings with the new Director General of Extension. This person now controls extension programs of the two former secretariats his new department into two principal divisions, one responsible for all extension in rainfed areas, the other for extension in irrigated districts. With support, PIDER concluded a major "Operational Agreement" with SARH under which all PIDER financed extension staff working in PIDER micro-regions would henceforth follow the PRONDAAT basic system of extension described above. The Operational Agreement sets forth the detailed criteria for implementing PRONDAAT, specifies that extension coordination in the State-level be vested in a new SARH Extension Coordinator, lays out a training schedule for re-cycling existing SARH extension staff through the PIDER-financed PRONDAAT training center at Puebla and finally specifies, in unusually strong language, that failure to follow the Agreement will result in suspension of PIDER finance to that micro-region's extension program. PIDER supervisors are instructed to monitor the execution of this agreement monthly.

Women's Extension and Home Economics Program Self-Help

21. Program History. The inclusion of home economists in the agricultural extension service began in 1964, with four teachers assigned to instruct rural women in such areas as nutrition, child care, sewing, sanitation and home improvement. The program grew to 345 home economists in 1970, and reached 796 in 1975. In 1973, the program was changed from a counseling-oriented format to a project-oriented format, with the success of a home economist being measured in terms of the number of women she could encourage to establish vegetable gardens, invest in chicken fattening complexes, and participate in fruit canning ventures and other potential income-generating projects. The counseling functions have been retained and have recently been extended to include family planning. Since 1974, PIDER has been financing approximately 50% of SAG's home economists program.

	1974		1975		1976	
	<u>Total</u>	<u>PIDER</u>	<u>Total</u>	<u>PIDER</u>	<u>Total</u>	<u>PIDER</u>
State Supervisors	32	--	32	--	32	n.a.
Regional Supervisors	47	30	54	31*	61	n.a.
	<u>612</u>	<u>317</u>	<u>710</u>	<u>335*</u>	<u>718</u>	n.a.
	691	347	796	376	811	n.a.

* Includes 166 financed in IBRD micro-regions.

Management

22. The entire program is coordinated at the federal level by a single woman who heads the Section of Rural Home Improvement within the Department of Community Improvement of the General Direction of Agricultural Extension. She directs the operations of 32 state supervisors, one for each state, who in turn are responsible for all the home economists within their states. Within each PIDER micro-region, the most experienced home economist assumes the role of regional supervisor, holding bi-weekly meetings and controlling the only vehicle. Within broad national guidelines, the state supervisor is responsible for the definition of the program within her state and is responsible for the hiring, monitoring, evaluation and firing of local home economists. Two technicians are employed at the federal level to assist state supervisors with project preparation. National meetings of state supervisors are held annually.

Funding

23. In PIDER micro-regions, the average monthly salary was 4,000 pesos in 1975 and 4,800 pesos in 1976, while in the regions handled by the normal program, the average was 4,600 in both 1975 and 1976. Each home economist is supposed to be provided with a supply of equipment to use in each community she visits. This equipment, budgeted at 7,000 pesos in PIDER micro-regions and 3,000 pesos in other regions, may include such items as one sewing machine, one gas stove, kitchen utensils and gardening tools, but due to internal reallocations within the Agricultural Extension Service, it is often unavailable. Only in PIDER micro-regions are funds made available for the purchase of materials to be distributed free of charge to participants who cannot afford to purchase them. These amounts vary from 800 to 10,000 pesos per year. Since women in Mexico cannot receive bank credit, the home economist program may be the place to introduce a revolving fund to finance commercial operations.

Staffing

24. At present, all home economists must be either graduates of 4-year normal schools or 3-year schools of social work. There is no special training for the job. Home economists must pick up what information they can from manuals, discussions with other home economists, and experience once they start working. The typical home economist is in her 20's and single, although a number are married and/or have children. Although a home economist's salary is reasonable (about twice as much as that received by a regular primary school teacher), the number of women willing to live in rural areas, particularly isolated ones, is limited, and therefore the program cannot often be as selective as it might wish with regard to hiring personnel. In addition, 20% of the women recruited stay less than 6 months on the job. However, once a woman stays 6 months, she will normally stay an average of 3 years.

Operational Procedures

25. Using various criteria, including availability of transportation and communication facilities, the state supervisor selects a community of between 50-250 families (300-1,500 persons) to which she assigns a home economist. The home economist must find her own housing, usually a room with a family in the community. Then she must do a community survey to ascertain what interest there may be in the activities she has to offer. Sometimes there is little or no interest. More often the men in the community appear intractably opposed to a non-traditional influence on their women. In either case, after 3 months the home economist will leave the community. Otherwise she should stay one year, and occasionally even longer, teaching groups of women and visiting separate homes to advise on such activities as home improvements, family projects, and personal problems.

Community Coverage

26. At present, the coverage is totally inadequate, with home economists assigned to only 1,000 out of a possible 35,000 communities in PIDER micro-regions. Although home economists could provide more extensive coverage by visiting several communities in a week, most feel their effectiveness would be vitiated. Key to the program's success is the integration of the home economist into the community and even a year may not be long enough firmly to extend new practices into community life. Return visits also seem to have little or no effect.

Community Participation

27. In general, community participation is limited to the younger, usually unmarried women and to the wealthier women who can afford to purchase the required materials. In Sinaloa, for example, about 20% of the eligible

women were considered active participants, with participation rates varying from project to project as follows:

Horticulture	22%
Poultry	8%
Rabbits	5%
Canning	16%
Clothing	32%
Handicrafts	14%

Commercial Prospects

28. Each home economist is required to initiate at least one commercial venture each year. Nationwide about 10% of the projects are designed to make money. Most are not very successful, however, since most women including home economists, have had little or no experience with business ventures.

MEXICO

Rural Development Project - PIDER II

Agrarian Reform

I. INTRODUCTION

1. Under PIDER, the organizational activities of the Secretariat of Agrarian Reform (SRA) have received major financial support. Overall, PIDER funds 12% of SRA's organizational department's (SOFE) budget. SRA micro-region staff are essential in assisting farmers in organizing themselves to participate in the PIDER program and for training peasant beneficiaries to operate and maintain both social and productive investments resulting from that Program. Under PIDER I, the equivalent of US\$6 million was programmed in support of some 250 SRA professionals in the 30 micro-regions. Under PIDER II, an additional US\$6 million would be provided to ensure SRA's continued involvement in the key organizational activities at the micro-region level of the proposed 20 additional regions.

II. BACKGROUND

2. When formulating the PIDER program, the Mexican Government was aware of the key importance for its success of (a) bringing order into the chaotic legal situation of land tenure and (b) assuring a massive input of organizational and developmental assistance to make up for decades of neglect. A new Agrarian Law was drafted in 1970 - the first major piece of agrarian legislation in thirty years - and was enacted by the Congress in March 1971. The law attempted to correct some of the more serious problems which have plagued the agricultural sector for decades by putting new teeth into enforcement measures and mechanisms, providing for a substantial reform of the administrative structure for agrarian affairs, and assigning high priority to assistance for the social and economic development of the country's small farmers.

3. SRA, the Secretariat for Agrarian Reform, was assigned major responsibility for the implementation of this new law. For this purpose, SRA was reorganized and restaffed in 1973. It improved with respect to the number and quality of its staff, its organization and methods, and the pace of work. SRA's budget increased from US\$11 million in 1971 to US\$80 million in 1975, with PIDER providing about 10% of the total. It is headed by a cabinet-level official directly responsible to the President, and is divided into

four functional departments: (a) Agrarian Affairs; (b) Ejido Organizational and Development (SOFE); (c) New Population Centers and Colonization; and (d) Legal Counsel. For the PIDER program, the two most important are Agrarian Affairs, responsible for land tenure, and SOFE, charged with community development.

III. LAND TENURE

A. Distribution of Land Holdings

4. Mexico's rural population consists of three main groups: ejidatarios, (para. 4), private farmers, and the landless. There are about 1.5 million ejidatarios with 44 million ha. of land, 1.2 million privately owned farmer with 125 million ha., and 1.2 million landless families. The Constitution provides that an individual private property holding be limited to a maximum of 100 ha. of irrigated land, or 200 to 800 ha. of rainfed land, depending on the ecological zone and the slope of the land. From the time of the 1915 Revolution to 1965, some 60 million ha. had been redistributed. Yet, the 1960 census still showed considerable inequality in the distribution of the remaining private land, as follows:

Size Distribution of Private Landholdings, 1960

	<u>Percentage Distribution of</u>	
	<u>Farms</u>	<u>Area</u>
5 ha. or less	66.8	1.1
5.1 to 50 ha.	22.0	4.2
50.1 to 100 ha.	4.3	3.3
100.1 to 500 ha.	5.1	11.1
500.1 to 1,000 ha.	0.8	5.9
1,000.1 to 10,000 ha.	0.7	17.7
More than 10,000 ha.	<u>0.3</u>	<u>56.7</u>
Total	100.0	100.0

B. Ejididos

5. The bulk of the 60 m hectares of redistributed land was organized into ejidos 1/. An ejido is essentially a joint and inalienable land holding arrangement for a group of farmers who made a successful claim to all or part

1/ The term is derived from the Spanish equivalent of the village common, based on the concept that the land reform returned the usurped village lands to their rightful owners - the farmers, called "ejidatarios". The ejido community is represented by an elected "comisariado" of three members: a president, secretary and treasurer.

of a former hacienda under the provisions of existing agrarian legislation and the Constitution. Joint tenure was meant primarily to protect the ejidatarios against renewed usurpation of their newly acquired land by former landlords or money lenders. The ejidos were not conceived as production units. In fact, in addition to conferring a limited collective property title to the land to the ejido as a whole, the law also provides that the head of each family is to be issued a certificate of usufruct right to a particular parcel of arable land within the ejido. This right may not legally be rented or sold, nor bequeathed without government permission. Abandonment legally signifies loss of rights. In practice, therefore, the cropland of the vast majority of ejidos has been worked in individual parcels. However, grazing land, forests and other non-arable land have not been parcelled, but are, at least formally, exploited collectively. Owing to the legal provisions regarding the procedure for land claims and ejido establishment, the communities have remained relatively small, comprising typically between 50 and 300 families.

6. There are also about 2,000 Indigenous Communities with a population of some 200,000 Indian families. While the historical basis for their land tenure rights differs somewhat from that of the ejidos, the legal status of those rights is the same. In the culturally isolated communities, vestiges of the traditional tribal community structure are found and the land may, in fact, be farmed collectively. The communities may apply for ejido status. For the purposes of this Annex, they are included in the discussion of ejidos and ejidatarios. A special agency, the National Indigenous Institute, has been taking responsibility for these communities in some areas.

C. Parcel Size

7. The ejidos cover 25 percent of the total farmland, 43 percent of the cropland, and 42 percent of the irrigable land. When all land expropriable under present legislation is redistributed, some 53 percent will be in ejidos. Except for illegally large private holdings which one being expropriated as a result of the new political push in this direction and limited areas of virgin land in the extreme south (where additional "colonies" will be established), the land still available for redistribution in Mexico under present limits on private property would suffice to settle barely five percent of the landless campesinos.

8. Although the Constitution guarantees each ejidatario 10 ha. of irrigated land, or 20 ha. of dry rainfed land, the man/land ratio was never great enough to implement this statute except in a few areas. In 1960, the distribution of cropland parcel sizes on ejidos (cropland comprising 23 percent of all ejido land) was as follows:

1 ha. or less	9.7%
1.1 to 4.0 ha	34.5%
4.1 to 10.0 ha.	40.5%
more than 10 ha.	<u>15.3%</u>
Total	100.0%

9. The average area of cropland per legal parcel in 1960 was only 6.5 ha., and of irrigated land, only 0.95 ha. In most rainfed areas, the parcels have been sufficient to provide a decent living for the average ejidatario family. Only in some of the irrigated areas is there a theoretically adequate resource base.

10. The ejido situation has been aggravated over the years by the growth of the population and their inability to find non-agricultural work. For every ejidatario, there is at present at least one or more grown sons without any formal rights to the land, who must either hire himself out as a day laborer to larger farmers, or share in the meager proceeds of the family parcel. Normally only the eldest son obtains the usufruct rights when the ejidatario father dies the other sons are remain landless.

D. Legal Status

11. The above problems have been aggravated by long-term organizational and legal neglect. The most glaring omission has been SRA's failure to issue the equivalents of land titles to even one-third of existing ejidos and certificates of membership and usufruct to the members of these and other ejidos. In fact, the exact number of ejidos and ejidatarios is not known, despite repeated censuses. At the end of 1972, there were 8,000 unresolved cases of collective ejido tenure certificates. In addition, half the ejidatarios were still awaiting their provisional, individual certificates of membership, and hardly any had received a final certificate of rights to a specific parcel. Some had been waiting for 20 years.

E. Recent Developments

12. Several steps have been taken by Government to carry the land reform program further and promote a more equitable and rational use of agricultural resources. The most important is that some 16,000 of the approximately 20,000 ejidos have by now been given definite certificates of usufruct, with ejidatarios being granted rights to a holding size rather than to a particular parcel so as to facilitate future community action. There are still about 6 million ha. of undistributed state-owned land and private land in excess of legal limits which can together help settle 100,000 to 120,000 small farmers.

13. About 320,000 certificates of ineffectability (certificados de inafectabilidad) for crops and 1,300 for livestock have been issued so far, covering 8.2 million ha. The possession of these legal titles is intended to stimulate investment and facilitate institutional financing insofar as they would rule out the possibility of a reduction in the land base of the concerned farmers. This process is being speeded up but about 250,000 such certificates are yet to be issued. However, until a more permanent legal arrangement is introduced than the "certificates of ineffectability, tenure uncertainty may continue to stall capital formation in the sector.

14. The tasks in the area of land reform in Mexico nonetheless remain so vast and complex that, despite the Government's vigorous action, the situation remains difficult and uncertain. The principal remaining problems arise from conflicts resulting from unresolved legal titles to land. Apart from issuing certificates, Government has to ensure that they do in fact protect the beneficiary's interest in his land so that he may have the incentive to invest. Secondly, it has to be considered whether the limits on the size of farms, especially for livestock ranchers, should be reviewed so as to encourage the development of unexploited areas like the tropical Gulf Coasts. Thirdly, there is a need to bestow greater attention on the organizational and other needs of private small farmers (an estimated one million families), as well as the ejidatarios on whom most of the present development efforts are being focussed.

III. EJIDO ORGANIZATION AND DEVELOPMENT

A. Organization of SOFE

15. While the job of the Department for Agrarian Affairs is to lay the legal foundation for ejido development, the Department for Organization and Development of Ejidos (SOFE) represents a new dimension in SRA's work. Created under the New Agrarian Law in 1971, SOFE's role is to ensure that beneficiaries of land reform receive the necessary supplementary services, supplies, and credit to bring the redistributed land into full use.

16. SOFE is the spearhead for PIDER's development activities at a community level. Over half of its field personnel (552 out of some 1,000), are paid by PIDER funds and are active in the micro-regions.

17. PIDER's funding of SRA's activities in the overall program and the Bank's 30 micro-regions is distributed as follows:

	<u>Total SRA</u> <u>Budget</u>	<u>PIDER</u> <u>Contributions</u>	<u>Bank Supported</u> <u>Micro-Regions (30)</u>
	-----Mex\$ million-----		
1973	-	38.8	-
1974	-	36.3	-
1975	-	96.0	27.0
1976	-	111.0	36.0

18. The SOFE staff act as multi-disciplinary brigades to ensure that ejidos are deeply involved in detailed planning of new investments, that they participate in all new PIDER construction, and that they share equally in all benefits. Their long-term goal is to transform each ejido's general assembly into a planning body which can implement economic programs, a development written into the new Agrarian Reform Law. The brigades use

a three-step approach to involve the ejidatarios. The first step is sensitizing, the second orientation and awareness creation, and the third reorganization and development.

19. The emphasis on sensitizing and orientating farmers is to ensure that the campesino, typically diffident and inexperienced, comes to understand that his role in any communal development activity is crucial. SOFE officials foresee a need to spend from six months to a year on this process with the end result frequently being election of new ejido officers and complete reorganization of the ejido governing structure.

20. In addition to the 550-odd technicians involved in PIDER field work, SOFE consists of another 1,500 staff members of which 500 are in the field in non-PIDER programs and the remaining 1,000 are at headquarters. SOFE is organized into four Directorates General which deals with organization, development, planning and training (National Institute for Farmer Training - INACAP).

21. SRA officials have found that an important mechanism to aid ejidos in becoming economically viable units is to enable them to obtain credit. To this end, SRA signed agreements in January of 1975 with the entire banking community, public and private, to create a credit delivery system for rural development purposes.

B. Problems

22. 1. Role Definition. SRA's ejido-level personnel are not yet fully involving the campesinos in the process of planning and helping execute PIDER investments. Its role up to now has been perceived as just another input, parallel to those of the other agencies, rather than the hub of the entire PIDER program. Compounding the problem is the political resistance at the state level to any involvement of SRA in PIDER programs.

23. 2. Lack of Training. As a result of its rapid growth, most of SOFE's 1,000 brigade members, excluding supervisors, came to their jobs fresh from the university with only one-month orientation. Many of these staffers in addition have had difficulty in adjusting to the conditions of rural poverty and isolation they are encountering. One solution might be further in-service training, provided by SRA's training division. Additional ideas should emerge from CIDER evaluation reports.

24. 3. Lack of Cooperation Between SOFE Brigade Members and Regular SAG Extension Workers. There is considerable friction in the micro-regions between the new SRA brigade workers and the regular SAG extension service teams. The most prickly issue results from the tendency of SOFE staff, half technicians construe this as an invasion of their professional territory. Progress in the rural areas requires both technical and organizational advice, and this progress will be delayed as long as SRA and SAG personnel are working at cross purposes. Both agencies and PIDER are aware of the problem and should make a special effort to achieve an effective solution.

MEXICORURAL DEVELOPMENT PROJECT -- PIDER II
MARKETING/NUTRITIONI. INTRODUCTION

1. The adequacy of a national food system ultimately is reflected in the nutritional status of the people served by that system. Among the rural poor in Mexico, malnutrition traditionally has been a serious problem and a contributing factor to the slow pace of rural development. Under PIDER I, most of the emphasis in planning and execution related to food was given to infrastructure and production investments. Less attention was directed to the marketing implications of the resulting output and the nutritional impact of the investments. In PIDER II, the marketing network will be strengthened in ways that will assure nutritional benefits for those in need.

2. The major vehicle to achieve this will be CONASUPO, a national marketing organization that both buys from and sells to poor rural and urban dwellers. CONASUPO is unique in that it has developed a vertically integrated system spanning input supply, grain procurement (with price supports), storage, food processing, wholesaling, and retail distribution. In recent years CONASUPO has refocused both its buying and selling activities to benefit poorer groups of Mexican society; it now has experience in reaching market segments often ignored in many governmental marketing schemes.

3. Certain elements of the CONASUPO program were supported by PIDER I. During 1975 and 1976, 40 CONASUPO purchasing markets and retail stores and 11 mobile sales outlets were built or put into operation in micro-regions covered by the Bank Project. Construction of 25 additional units was programmed. (Appraisal estimates were that during the Project CONASUPO would invest US\$1 million in the Project areas; 40% of which had been invested by the end of 1976.)

4. By expanding support under PIDER II for the physical infrastructure and marketing personnel, it would be possible to increase the impact of output gains on the poor farmers' standard of living. This would be achieved by extending the low margin marketing operations of CONASUPO, both in procuring farm produce and in selling basic goods at low prices in rural areas.

5. More specifically, PIDER II would add purchasing warehouses, emphasize the addition of a new mode of procurement (buying posts) and

improve and expand the retail network through more stores, mobile units and simple basic food staple distribution outlets.

II. NUTRITION IN MEXICO

The Problem

6. Malnutrition in rural Mexico is a problem of serious proportions, both contributing to and reflecting the state of rural underdevelopment. A comparison of 105 nutrition surveys conducted under the direction of the National Nutrition Institute (INN) between 1963 and 1974 with INN surveys of the preceding five years reflect that despite the significant economic growth experienced by the country during the 1958-74 period, the basic diet and the nutritional status of the rural population has changed very little. The most recent INN surveys show that two-thirds of preschool children are underweight for their age: 49% mildly so, 18% moderately, and 1% severely. The infant mortality rate of 65 per 1000 is three to four times that found in richer countries and 30% higher than that of the general Mexican population. Poor feeding and inadequate sanitation are known to be the major factors in these high mortality rates.

7. An examination of average per capita intakes of rural families (Table I) reveals that on the average the diets are providing nearly enough protein and calories, although some areas are clearly deficient in both. Significant national deficiencies do exist for vitamin A, vitamin C, and riboflavin and these nutrient shortfalls appear consistently throughout the various rural-regions. The foregoing family averages, however, cloak the much more severe protein-calorie deficiencies experienced by the pre-school age group within the families. Calorie deficits range from 10% to 40% with protein shortfalls in some instances being even more severe. Also, riboflavin, niacin, and calcium deficiencies are common. 1/

1/ Source: Encuestas Nutricionales de Mexico, Volume II, INN, 1976.

Table IAdequacy of Rural Mexican Diets
(% of Recommended Intake)

<u>Nutrient</u>	<u>Family</u>	<u>Preschool</u>
Calories	94	70
Protein	93	82
Calcium	147	93
Iron	142	110
Vitamin A	42	33
Thiamin	174	111
Riboflavin	51	61
Niacin	111	81
Vitamin C	43	31

8. The relative adequacy of the total family's diet and the clear inadequacy of the preschool's intake suggests that for many families nutrition education and diet variation through new foods or different uses of existing foods would be particularly fruitful. For others, however, the averages cloak distribution patterns; clearly many families simply do not have sufficient resources to obtain a nutritionally adequate diet, especially in Southern Mexico. For these people a supply-oriented policy will be helpful, but the increase of food production, of itself, will not automatically bring about nutritional improvement. A major agricultural project in La Chontalpa resulted in a sixfold production increase during a 13-year period. Average good intake increased substantially but the consumption of the lowest 30% income class did not improve. The prevalence of second and third degree malnutrition remained roughly unchanged. ^{1/} Thus, improvement of the nutritional condition in rural Mexico would appear to require a combination of increased income and food supply (addressed elsewhere in the project), along with a marketing network allowing those in need to have access to the supply and educational efforts aimed at obtaining maximum nutritional impact from existing resources as well as from those made possible by the expanded marketing network.

The Response

9. Several organizations currently are carrying out rural nutrition programs in Mexico. The main ones are the Health and Welfare Service, providing supplementary foods to preschoolers and nutrition education through

^{1/} Mercedes Hernandez, Carlos Regez Hedalgo, Juan Ramirez Hernandez, Herlindo Madrigal, and Adolfo Chavez, "Effect of Economic Growth on Nutrition in a Tropical Community" Ecology of Food and Nutrition, 1974, Vol. 3, pp. 283-291.

500 nutrition aides; the Mexican Institute for the Protection of Infancy, whose volunteer promoters provide nutritional wafers and nutrition education; the National Indian Institute, which includes nutrition education as part of basic health care for the Indian population; the Agrarian Reform Secretary, whose rural home economists include nutrition education among their activities; the Mexican Institute for Child Assistance/National Institute of Science and Technology for Child Health, primarily a research center specializing in child diseases including malnutrition; the Mexican Social Security Institute, which provides six months of free powdered milk for each new child of families covered by the Social Security system; the National Nutritional Institute, which operates a combined nutrition hospital -- research center - training institute; and the Secretariat of Agriculture, which

10. The totality of these efforts is modest when compared to need. As with most rural nutritional intervention attempts in other countries, a major constraint to these institutions is their lack of a food delivery capability that reaches large numbers of the rural needy. In this regard, however, Mexico may be unique in that it has a large, well-positioned government distribution network, CONASUPO, with the capability to get food to the rural poor. To date, however, CONASUPO has not dealt with nutrition as thoroughly as the need dictates or the potential impact warrants.

III. CONASUPO

Objectives and Strategy

11. The objectives of CONASUPO are to regulate the basic goods markets, increase the income of poor farmers, and increase the ability of low-income consumers to acquire basic goods. Target groups are producers with annual incomes under Mex\$ 12,000 (US\$960) and families with monthly incomes under Mex\$ 2,000. 1/

CONASUPO's rural development strategy is directed to bring about changes in what that institution regards as the primary cause of stagnation in the development of the rural sectors: campesinos pay too much for the goods they buy and receive too little for the produce they sell -- largely because their suppliers and buyers are exploitative and/or inefficient.

1/ About 94% of the farmers have sales under Mex\$ 12,000 a year, but they account for only a third of total agricultural output. The low-income consumer group includes both urban and rural poor. In 1972, 56% of those with incomes under Mex\$ 12,000 were in the rural sector.

13. Credit plays a key role in the maintenance of those unfavorable terms of trade. The farmers are unable to accumulate capital reserves and, therefore, do not have enough funds to support their families for the entire period between harvests. Consequently, the campesinos are frequently obliged to seek credit for the purchase of staples. The two primary sources are either rural store keepers who sell on credit or middlemen who lend to the farmers in return for a promise to sell their crop to the middleman at a pre-set price lower than the government's guaranteed price. Approximately half of the small farmer sales are in exchange for consumer credit and an estimated 40%-60% of rural purchases are on the credit. Prices of goods in rural stores are 20%-23% higher than the prices charged in CONASUPO stores. The difference is attributable to the greater efficiency and lower margins of CONASUPO.

14. Also, the lack of transportation, storage, shellers, or bags often push the farmer into selling crops at relatively lower prices to middlemen who have these facilities or services. These economic relationships represent structural barriers that will not necessarily be altered by channeling increasing amounts of funds into the traditional areas of crop financing, production infrastructure, and technical assistance.

15. Accordingly, CONASUPO has set forth the following general strategy for its rural development efforts: enable the campesino to increase his income, retain it, and invest it in productive means. A probable short run effect of this strategy would be the direct welfare benefit accruing through an increase in effective purchasing power and in consumption. This incremental consumption would most likely be in food, and hence the possibility of enhancing nutritional levels. The thrust of the strategy is toward increasing productivity. The concept is to generate sustained self-development rather than simply adjust income distribution.

16. CONASUPO has designed an integrated strategy aimed at altering the structural relationships in the rural economies by combining various related services and activities in a specific area; the idea is to produce a synergistic effect among resources and services of sufficient magnitude to break some of the key vicious circles constraining rural development. The major components of the CONASUPO strategy are the following:

- (i) regulate the national food system through a vertically integrated procurement, processing, and distribution system which includes facilities, ownership, and operation at each stage;
- (ii) provide improved marketing opportunities to farmers through guaranteed prices, storage facilities, and ancillary procurement services such as transportation and shelling;
- (iii) improve consumer purchasing power and access to basic goods through direct distribution at subsidized prices to rural and urban consumers;

- (iv) increase rural productivity through enhanced incomes and market opportunities, input provision, and training.

Size and Operations

17. CONASUPO's operations in rural areas include, inter alia, 1,267 warehouses (with a capacity of 2.2 million tons), about 2,600 retail stores, 7,400 food staple sales centers and 525 mobile food sale units. Assets in 1975 were Mex\$14.7 billion; inventories were Mex\$7.3 billion and equity capital Mex\$6.4 million. Operating budget was Mex\$35.0 billion and sales were Mex\$ 10.1 billion, up from Mex\$2.9 billion five years earlier. (About half of the increase was due to greater volume, half to inflation.) CONASUPO's growth since 1970 has been sizable, broad, and rapid. Decentralization during this period has increased CONASUPO's abilities to cover broader areas, especially in the rural sector. A more detailed examination of CONASUPO's operations is available in a recent Bank study on that subject. 1/

IV. COMPONENTS - COSTS AND DESCRIPTION

1. Purchasing

18. To expand the purchasing activities of CONASUPO in the Project micro-regions, the construction of eight new rural warehouses (totalling 115,500 tons capacity) would be financed by PIDER II. The warehouses would be built and operated by BORUCONSA, the procurement and storage subsidiary of CONASUPO. For remote areas, the marketing reach of CONASUPO is extended through the Programa de Apoyo a la Commercialization (PACE). This program involves the formation of campesino marketing groups who bring crops they wish to sell to CONASUPO to local collection centers, from which the commodities are sent collectively to the BORUCONSA warehouses. CONASUPO in turn reimburses the farmers for the transport costs. An estimated 2,500 farmers would benefit from the proposed new rural warehouses and an additional 2,000 farmers from the PACE purchasing program.

1/ CONASUPO & Rural Development: Program Description, Analysis, and Recommendations, James E. Austin, December 1976.

2. Sales

19. - DICONSA, the retailing subsidiary of CONASUPO, would build and operate 24 new retail stores, financed by the Project, in PIDER II micro-regions. The stores would make lower cost foods available to approximately 2,700 families. Fixed investment would be Mex\$8.4 million; working capital would be Mex\$2.8 million. To serve small communities, whose sales volume would not support regular CONASUPO stores, 20 mobile sales units, costing Mex\$617,000 each and with working capital of Mex\$50,000 each, would be financed by the Project. The units, also operated by DICONSA, are made in Mexico and can travel over unpaved roads, reaching over a dozen communities a week. They carry a full line of goods, store 3-5 days of sales, and provide cots for the drivers to sleep. Sales are made from the backs of the vehicles. These units add flexibility to the marketing system and are particularly useful during harvest seasons or in conjunction with public works projects, when consumer demand in a particular area is substantially above normal. An estimated 12,700 now unserved families would be reached through these mobile stores.

20 As a means of broadening the sales outreach (and economizing on operating costs) CONASUPO has established Staples Sales Centers in conjunction with and often adjacent to BORUCONSA purchasing warehouses. The low-cost centers sell only basic food staples -- corn, beans, rice, sugar and cooking oil. Originally designed to provide a low-cost food purchase outlet for farmers bringing crops to the warehouse for sale, the program has expanded to include satellite centers located in and run by small rural communities in their villages. Where the sales outlet is located at the warehouse, the locally elected campesino in charge serves as both grain buyer and storekeeper. For the community outlets, BORUCONSA extends the initial inventory on credit and services reorders when the community deposits the proceeds of its sales in the CONASUPO account in the local bank. Five centers would be financed by the Project.

MEXICORURAL DEVELOPMENT PROJECT - PIDER IIRural ElectrificationINTRODUCTION

1. Performance under the rural electrification component has been good. At appraisal, house connections benefiting 160,000 persons costing an average of US\$85 per person was estimated. At the end of two years, 138,700 persons were connected in the PIDER I 30 micro-regions financially assisted by the Bank loan.

<u>Category</u>	<u>Appraisal</u>		<u>1975</u>	<u>1976</u>	<u>Total</u>	<u>Average Unit Cost US\$</u>
	<u>No.</u>	<u>Unit Cost</u>				
Beneficiaries	160,000	85	77,400	62,289	138,700	50

For PIDER II, 131,000 persons are expected to benefit at an average cost of US\$60.

BACKGROUND

2. The Federal Electricity Commission (CFE) builds, operates and maintains electricity generation and distribution facilities. It is a decentralized state agency with a record of competence and effectiveness. It has a large capacity for carrying out investment projects. Over the years 1970-76, it made investments at an annual rate of more than US\$400 million. It has also developed work capabilities in rural areas, as part of a six-year national plan for rural electrification. ^{1/} PIDER resources are presently being channeled through this six-year plan. PIDER provided CFE with US\$39.8 million in the period 1973-76 for the electrification of villages in the selected micro-regions. PIDER funds provided about 23% of all rural electrification resources during this period. Since PIDER finances only distribution and connections, (the single project investment ceiling under PIDER is US\$0.5 million or Mex\$6 million), major additions

^{1/} CFE first started working in rural areas in 1952; since then there have been several rural electrification campaigns.

to the national grids are not be made under PIDER auspices. Where such large investments are needed to implement the PIDER electrification projects, the outlays are made through the CFE's regular programs. 1/

<u>CFE PIDER Expenditure</u>					
1973-1976					
	<u>1973</u>	<u>1974</u>	<u>1975</u>	(Authorized) <u>1976</u>	<u>Total</u> <u>1973-1976</u>
A. <u>PIDER</u>					
1. Mex\$ m spent	83.0	75.0	184.0	156.0	498.0
2. Persons benefited ('000)	144.6	107.3	176.8	167.2	596.0
B. <u>Total CFE</u>					
Expenditure on Rural Electrification (Mex\$ m)	465.0	313.0	726.9	675.9	2180.8
C. <u>PIDER</u> as % of total	17.9	24.0	25.3	23.1	22.9

Source: CFE and PIDER.

General Policies Affecting Rural Electrification

3. CFE's general rural electrification policy is to provide electrical power to all population centers whose population is less than 10,000 inhabitants and more than 500 and whose main occupation is agriculture. So far, at the end of 1975, CFE reported they had installed electrification facilities for almost all population centers larger than 1,500 inhabitants, but still some 3,900 villages (3,700 inhabitants) between 500 and 1,500 inhabitants and 7.2 million persons living in population centers smaller than 500 inhabitants did not have access to electricity.

4. The general policies governing rural electrification are the following:

- (a) Giving priority to projects that will stimulate use of electric power for directly productive activities;
- (b) Supplying electricity to projects designed to bring about an improvement in the quality of rural life; and

1/ For example, all available power in the Yucatan micro-region is being used. Since PIDER investments call for the electrification of 87 wells and 16 villages, a 100 km 110 kv transmission line is necessary. That line is being financed via CFE's ordinary budget.

- (c) Attempting to make electricity available to as many people and enterprises as possible at the lowest possible cost. This implies the integration into a national grid, if at all possible, as centrally generated power is more economical than local thermal power generation.

The Project

5. The PIDER II Project would bring electricity to some 20,000 rural families living in 225 villages throughout some of the poorest areas of Mexico. The total to be invested is the equivalent of US\$7.4 million, of which 10% will be for the electrification of directly productive investments and the rest for servicing the population. The average per capita cost of electrifying villages in the PIDER project is about Mex\$950 (US\$50).

CFE - Unit Costs (1976)

<u>Region</u>	<u>Cost Per Capita</u>	<u>Cost per Km of Line</u>
	<u>Mex\$</u>	<u>Mex\$</u>
Northwest	2,700	45,500
West	900	35,900
Southwest	1,200	49,800
North-central	900	39,400
Northeast	900	43,700
Central	780	42,300
Southeast	900	37,700
Yucatan	2,600	34,200

Source: PIDER Monitoring Unit.

CFE investment criteria under PIDER satisfy the general guidelines governing rural electrification enumerated above and are detailed as follows:

- (a) Eligible villages should have a population of at least 500 inhabitants and an access road; villages with population between 300 and 500 inhabitants would be also eligible either when they are located by the main power line or when electricity will be used to feed some small industry;

- (b) Costs per person would not exceed the equivalent of US\$150;
- (c) Beneficiaries should contribute, in cash, labor or kind, to the relevant distribution and connection costs; these contributions would be collected by CFE;
- (d) In addition to the contribution to investment costs, beneficiaries would also be charged the costs of internal household wiring (equivalent to about US\$25). CFE makes credit available for this purpose where necessary;
- (e) Installation of meters is made in every household and their cost (US\$50) is borne by CFE; and
- (f) Generation, operation and maintenance costs would be fully covered by user charges through electricity rates nationwide as applied by CFE.

Internal Organization of CFE

6. CFE's activities are conducted through a number of General Departments (Gerencias Generales or G.G's), such as rural electrification, operation and maintenance, large scale construction, planning and control. The operating G.G's are divided into a number of regional Divisions, generally 10; each Division is composed of any number of subdivisions (Sub-gerencias S.G's), which actually carry out the work.

7. The G.G. for rural electrification carries out the National Rural Electrification Plan by designing and building necessary works and then turning them over to the Operation and Maintenance G.G. This G.G. contains sub-divisions that carry on specific functions such as generation, transmission, distribution and supply to commercial users. A state-level body, the Electrification Junta, is involved in most steps during the planning and implementation stages and supplies assistance to the local populations and administrative matters (e.g. billings, collections, accounting, dealing with CFE administration for repairs, etc.) and centralizes such activities at the state level. A special department of CFE deals with State Electrification Juntas.

Justification

8. The justification for this component of the project are the benefits to be derived from productive uses of electricity in modernizing and expanding industry, improvements in living standards of rural households, and provision of basic social services. The breakdown of electricity usage in the rural areas of Mexico which are already electrified has been estimated

as follows: 45% for irrigation and small-scale industry; 40% for household services (almost exclusively lighting); 10% for public services (i.e. schools, hospitals, etc.); and 5% for public illumination.

9. Mexico already has an extensive network of transmission lines, and therefore the incremental costs of rural electrification involving connections to the nearest transmission line, are relatively low. Alternative sources of energy for the majority of the purposes for which electricity is used are either impracticable or more expensive. For example, electricity does not compete with firewood where the latter is most appropriate, i.e. for cooking and heating. On the other hand, electricity displaces expensive kerosene for household lighting.

10. The only feasible alternative for steady loads associated with rural industry, public services, etc. is local auto-generation. Other energy sources such as windmills and solar energy converters are not reliable enough, and further investigation is required regarding their feasibility. The capital cost of auto-generation is about US\$500 per KVA installed. Assuming a price of US\$22/barrel for fuel oil, the cost of supplying the project villages through auto-generation is considerably higher than via the main grid.

MEXICO

RURAL DEVELOPMENT PROGRAM - PIDER II

FEEDER ROADS

INTRODUCTION

1. The feeder road program has been one of the more successful components of the PIDER program. Quantitatively, road construction has exceeded appraisal estimates. Qualitatively, the administering agency, the Secretariat of Public Works (SOP) made major improvements in the program which both increased productivity of construction and tied the planning and execution more closely to the benefitting villages. Progress for the first two years in the Bank supported 30 micro-regions is:

<u>Category</u>	<u>Programmed at Appraisal</u>	<u>1975</u>	<u>1976</u>	<u>Actual</u>	<u>%</u>
km	1900	1065	708	1773	93

BACKGROUND

2. In the two decades up to 1970, Mexico's investment in road construction centered almost exclusively on primary and secondary road improvements. During this period the road net increased from 22,000 km in 1950 to 45,000 km in 1960 and 71,500 km in 1970. Rural roads were a negligible part of the net in the 1950's and 1960's and amounted to only 12% in 1970.

3. Starting in the early 1970's, the Mexican government instituted a nationwide program of rural road construction as part of an integrated policy program to improve conditions of the rural population. The roads program was designed to reduce the geographical isolation of rural communities in Mexico, promote productive and basic social service investments in rural areas, and provide employment whenever feasible through the use of labor-intensive construction techniques. By the end of 1975, the road net had grown to 185,000 km, 35% of which were rural roads.

4. Implementation of the rural road construction program is the responsibility of the Ministry of Public Works (Secretaria de Obras Publicas - SOP). This agency, previously geared exclusively to the construction of high standard roads by equipment-intensive methods, developed in a remarkably short time an organizational and institutional framework for successful implementation of a large scale program of labor-intensive road construction covering all 31 states of the country.

5. Financing of the program has come from two sources: normal budgetary allocations to SOP ('Normal Program') and supplementary discretionary funds from the Programa Inversiones Desarrollo Rural (PIDER) made available by the Presidencia to SOP for allocation to severely deprived micro-regions requiring priority assistance. World Bank involvement in rural road construction has up to now solely been through the 'Integrated Rural Development Project - PIDER' loan which has financed PIDER rural development efforts in 30 micro-regions. Out of the total Bank loan funds of US\$110 equivalent, US\$7.2 million were allocated to feeder road construction. At 1975/6 prices, this amount provides funds for the construction of approximately 650 km of low standard roads. (Table 1 of the Statistical Appendix details Bank-financed PIDER I road expenditures and proposed financing of roads under a follow-on (PIDER II) project. (Table 2 puts Bank project road expenditures in the context of planned rural road construction in Mexico for the 1977-82 period.)

The Project and the Rural Road Construction Program

6. The project is a subcomponent (9% of total loan) of a national Rural Development Project. It provides US\$14 million to finance 1900 km of rural roads in 20 selected micro-regions. PIDER II roads will be constructed as part of a national rural road construction program. SOP uses the same criteria and standards in the selection, construction, supervision and maintenance of the rural roads constructed under its Normal Program and for PIDER. The analysis will therefore focus on the program-level experience. Special reference to Bank-financed PIDER roads which represent only 1% of planned investments in labor-intensive road construction over the 1977-82 period, is made only where the analysis points up relevant distinctions.

Scope of the Program: 1971-1976

7. The scope of the Mexican rural road construction program during the six-year period 1971-76 is impressive in both expenditures and achievement. More than Mex\$5 billion were invested over this period, and a total of 73,000 kms of all-weather feeder roads were added to the road net. For 7,000 communities and six million people, these roads were a first year-round link with the rest of their country. The program provided 327,000 man-years equivalent of employment. In fact, a considerably larger number of villagers (only a few of whom were employed for a full year) have participated in road-construction and enjoyed the opportunity to earn additional income during periods of underemployment in agriculture.

8. A year-by-year breakdown of the development of the program over the 1971-76 period is shown in Table 3. The figures reflect some of the difficulties that were encountered in implementing the program and SOP tried to solve them.

9. Once the decision to use labor intensively for rural road construction had been taken, the program expanded at a striking pace. From 1971 to 1972, budget allocations to the program more than quadrupled from Mex\$178 million to Mex\$755 million. So, almost, did kilometrage of roads constructed (rising from 2,740 to 10,540 kms), while man/year equivalents of employment went up from 10,800 to 44,400. In the following year (1973), the program reached its peak: it employed 176,600 people and expenditures were just under Mex\$2 billion. But only 28,000 km of road were completed and it took 6.3 man/years equivalent per kilometer in 1972. The program had grown faster than SOP's organizational ability to cope; with less careful supervision, productivity of labor dropped almost by half.

10. At the same time, the program was having an unanticipated impact on agricultural production. At the wage rate paid in road construction (the legal minimum daily wage was roughly double that obtainable locally in agriculture), so many villagers in marginal areas offered their services for construction work in 1973 that agricultural output in many regions was significantly curtailed. In 1974, therefore, the road construction budget was cut back to about the 1972 level. At the same time, SOP changed the payment system from daily based payments to task based payments. This, together with improved supervision, resulted in a remarkable improvement in labor productivity to 3.5 man/years equivalent per kilometer constructed in 1974, and 2.6 man/years equivalent per kilometer in 1976. 1/

11. Considering the inflationary increase in Mexican price levels over the 1973-76 period, (the consumer price index rose from 135 to 215 during these years), Table 3 indicates a gradual cost reduction (in constant terms), per km of road constructed - a reflection of increasingly efficient methods by SOP of mobilizing local labor while paying an output-related wage reasonably close to the going return to labor in agriculture. Even in financial terms, labor-intensive construction remained economically competitive with equipment-intensive alternatives (see para 53 below).

12. In achieving these results, SOP had to evolve in a very short time not only appropriate design standards and construction techniques, but also the organizational capacity for setting construction priorities, organizing sizeable labor forces simultaneously on a large number of construction sites; providing the requisite technical supervision to achieve acceptable quality of work; and assuring adequate administrative control of the program without unnecessarily curtailing local initiative. The solutions developed for the technical, as well as the organizational problems have significant

1/ This change may be part fact, part statistical artifact. It is not clear from the data sources whether labor inputs are "man/days actually worked" on the various sites, or whether they are derived by dividing total payments to labor by average minimum daily wages prevailing at the time. De facto payments to labor of less than the minimum wage rate would then be reflected as lower labor inputs.

bearing on the efficient implementation of the proposed PIDER II road construction component, and are, therefore, briefly examined below.

Technical Standards and Guidelines

Design Standards

13. All rural roads under the labor-intensive construction program are earth-roads designed to minimum all-weather service standard. Alignments follow existing paths where possible ("brecha mejorada") and new routes as necessary ("camino nuevo"). No money is allocated for purchasing rights-of-way which are contributed by the communities connected by the road.

14. As a rule, feeder roads are 4 meters wide with shoulders of 0.7 m each. Three to six passing places are provided per km, depending on terrain. Design velocity, maximum grade, and maximum curvature also depend on terrain type (see Table 4 for specifications).

15. Local materials are used in construction whenever suitable. Base courses are laid carefully and gravel is used in different stretches. There is no compaction, however, beyond that provided by traffic, which typically is around 10 vehicles/day.

16. Particular attention is paid to provision of adequate drainage. A detailed design manual for drainage works has been prepared by SOP for the use of resident engineers. Again, local materials are used whenever appropriate for small structures.

17. On the roads visited, designs are generally appropriate to terrain, as well as present and potential traffic. Often innovative use is made of local materials, such as cactus stems for drain-holes in retaining walls and local woods and stone in small bridge crossings. Ditches were formed to an adequate depth and lined with concrete in exposed positions. No adverse effects of allowing compaction by normal traffic were observed.

Construction Techniques

18. From its inception, the rural road program was designed for implementation by labor-intensive techniques of construction. Provision of employment to the un- and underemployed in the rural areas has been an important goal of the program, but emphasis on sound construction standards and competitive economic performance with equipment-intensive techniques has been equally strong.

The arguments for using labor-intensive techniques can be summarized as follows:

Costs: Experience with equipment based construction in 1970 showed that the cost of transporting equipment to widely dispersed road

sites increased the total financial costs of the road to such an extent that labor-intensive construction became competitive with the costs of equipment-intensive construction;

Timing of Construction: contractors using equipment-intensive construction methods could not efficiently handle work on many small sites simultaneously and fell behind on schedules;

Income Distribution: labor-intensive works has a positive effect on the distribution of benefits from rural road projects - providing direct employment and income to the rural poor during construction, while at the same time imparting to them new skills that improve their longer term earnings potential; and

Community Organization: labor-intensive works acted as a focus for organizing communities to participate in rural development efforts.

19. As a rule, therefore, the rural road construction program has used casual labor to the greatest possible extent, allowing the use of equipment only under conditions where labor is patently inefficient. The following guidelines presently apply to the choice of construction techniques:

- (i) Labor-intensive techniques are used when an adequate supply of labor is available and the volume of earth-moving is less than 4,000-5,000 m³/km. Basic work implements provided by SOP for this type of construction are picks, shovels, chisels, crow-bars, wheelbarrows, and explosives. Hauling of base and surfacing materials, even on labor-intensive construction sites, is usually done by trucks rented from small local transporters.
- (ii) A mix of labor and equipment is used when the volume of earth-moving, especially of difficult materials, exceeds 5,000 m³/km. In this case, equipment (usually medium capacity scrapers and dozers) is hired for earthmoving, while hand labor is used for finishing base courses and side slopes and for constructing drainage works.
- (iii) Equipment-intensive construction methods may be used occasionally in cases where the volume of earthmoving exceeds 40,000 - 50,000 m³/km, and the supply of labor is not sufficient to carry out the activities described in (ii) above.

20. Special authorization for equipment hire must be obtained from headquarters in Mexico City for every road site where the resident engineers propose to use them. Local availability of equipment for occasional contract-hire was not mentioned as a problem in the micro-regions visited.

21. Quality of construction achieved by labor is good. Due to careful control and supervision, the roads are technically equivalent to similar standard roads produced using equipment. In summary, SOP has been able

over the past six years, to develop appropriate techniques to produce roads of appropriate standards for the functions they serve.

Organizational Arrangements

Organization and Supervision of Construction at the Local Level

22. The way in which labor is motivated and organized has been shown ^{1/} to be a major factor in its productivity in civil construction. In implementing the labor-intensive construction program, SOP engineers have successfully worked to promote involvement of the local community. The engineer is no longer the outside technician who delivers, for example, a road or a basket ball court from SOP. Instead he is a technical expert who assists the community in creating its own infrastructure in a technically sound fashion.

23. The current practice is to involve local communities as much as possible in planning and executing their construction project. Each community participating in road building forms a 'Road Committee' which has elected officers who serve as headman, paymaster, and head of liaison with SOP. The committee negotiates a contract with SOP under which the community agrees to supply labor for construction and maintenance, while SOP agrees to provide "technical assistance", tools and equipment, and payment for labor. The road Committee apportions the work throughout the project cycle to all villagers who wish to participate; it also handles payments to individual laborers.

24. The scheduling of construction activities is worked out jointly by the Road Committee and the Resident Engineer and takes into account climate and terrain the demand for labor in agriculture, and the availability of and need for equipment. It is also based on the needs of other government agencies whose electrification, water, or extension programs may depend on the completion of the roads.

25. During preparation and execution of construction activities, SOP resident engineers are responsible for administrative and technical issues. One engineer oversees up to 50 road sites in a region. He is supported by 10 to 12 experienced construction foremen, who are regular SOP employees and are charged with day-to-day supervision of a cluster of 3-5 roads each.

26. Continuous on-site supervision is provided by a "headman" who is usually a member of the village Road Committee and an experienced construction worker. The "headman" is in charge of recording attendance and checking quantity and quality of work performed for payment purposes; he also

^{1/} World Bank, "Scope for the Substitution of Labor and Equipment in Civil Construction", July 1976, pp. 10-15.

stakes out 'tasks' for each laborer (or group of them) to carry out the next day. Depending on the type of work, a headman oversees up to 40 local workers.

27. On general road works, the foreman and the headman instruct the laborers how to perform their tasks efficiently. Skilled workers are employed for such tasks as bridge building and the construction of culverts. These specialists work with selected local laborers who learn their skills 'on the job'.

28. SOP distributes tools to workers to use for the duration of the project and each foreman has repair facilities to keep tools in good working order. By contrast, all machine equipment is hired, since SOP considers the costs and organizational requirements of owning and maintaining its own haulage and construction equipment excessive.

Organization and Supervision of Maintenance at the Local Level

29. The organization of road maintenance closely parallels the organization of road construction. Within one year of completion, rural roads pass officially from the responsibility of the state construction department to that of the state maintenance department, but the resident engineer at the sub-region level supervises both maintenance and construction. At present, SOP allocates to each state maintenance department Mex\$3,000 to Mex\$4,000 per year per kilometer of feeder road within its jurisdiction. These departments then decide on maintenance priorities. Maintenance funds are adequate for routine maintenance in all but a few areas. They are used for pot-hole filling and brush-clearing, which are carried out after the rainy season, and for correcting other problems when necessary.

30. Maintenance, like construction, is undertaken in cooperation with rural communities. Each community agrees in its contract to maintain the roads and the Road Committee forms a Maintenance Sub-Committee which begins operation when road work is completed.

31. Either a Maintenance Sub-Committee or a SOP inspector can initiate maintenance. If a community requests maintenance, SOP inspectors examine the road to establish the validity of the request. Once SOP authorizes maintenance work, it provides the community with tools and pays community-supplied labor for carrying out specific tasks.

32. As the rural road network has expanded from 25,000 to 100,000 km in the past six years, SOP has succeeded in impressing the importance of timely maintenance on its field engineers. At the same time, it has encouraged community participation in its efficient implementation. The mission visited three PIDER micro-regions during the height of their rainy

seasons. All roads were passable, most of the road surfaces were in good condition, and workers were clearing up bad spots that had made passage in a few places very difficult.

33. In sum, the organizational framework developed for the rural roads program is an innovative one and has been operating smoothly. Definitions of responsibility are clear, supervision is decentralized, skills are being learned, and the roads are being built according to specification. In addition, the focus on community involvement minimizes administrative bureaucracy and offers some encouragement to the local contracting industry.

Payment Systems and Incentives

34. Construction workers received the prevailing minimum daily wage until 1973. According to traditional practice, those who worked on the road six full days were paid for seven days of work. There was little incentive to raise productivity, since the minimum wage was raised regularly to keep pace with inflation (see Table 3). Labor-intensive construction thus became increasingly less competitive with equipment-intensive construction.

35. In 1974, SOP shifted to a task payment system. Under this system the resident engineer, in cooperation with the Road Committee, defines specific construction tasks. An amount to be paid for them is agreed according to the type and quantity of work required. Generally, tasks are performed by groups of four or five, and each worker's share of the pay is established by the Road Committee. Depending on how much time and effort they expend, laborers can earn more or less than the prevailing regional minimum daily wage. Any disputes which arise over the definition of tasks, work share, and payment may be taken for adjudication to the foreman and ultimately to the resident engineer.

36. The task payment system has proved effective in several ways. First, by stressing not time spent on the job but amount of work completed, it has provided incentives for higher productivity. By giving laborers more discretion over hours spent on roadwork on any particular day, it has made it possible for them to divide their time efficiently between construction and agriculture. By effectively lowering wages for road work and aligning them with those prevailing in agriculture it has discouraged the abandoning of agricultural work. Finally, it has encouraged group work.

Organization of Labor-Intensive Construction Activities at the

National Level

37. During the early stages of the rural road program SOP had little knowledge or experience of the organizational and administrative requirements of implementing a large labor-intensive construction program. New institutional

arrangements within SOP have evolved with the program and contributed significantly to its success.

38. Following a period of exclusive reliance on 'advanced' equipment-intensive methods of civil construction, SOP (like other institutions before and since) found that labor-intensive projects undertaken as a "sideline" by engineers used to handling equipment do not work very efficiently. Given the Government's firm policy commitment to a major labor-intensive program for rural areas SOP concluded that it was necessary to create an organizational focus in its central organization for a core of engineers committed to make such a program success. This focus was provided by the creation of a separate directorate (Direccion de Caminos de Mano de Obra = DCMO) in SOP, which has its own budget and exclusive responsibility for both labor-intensive construction of rural roads and their maintenance.

39. DCMO represents a challenging career alternative for civil engineers who take an active interest in the problems of rural development. Its staff is a mixture of engineers with experience in labor-intensive construction from pre-equipment days and young engineers getting their first field experience. The former are found in supervisory positions at the SOP centres in each state capital; the latter more often as resident engineers at the municipal level. Engineers working in the field have considerable scope for independent decision making within the technical standards and guidelines outlined above, and local solutions to suit the widely diverse local conditions are encouraged.

40. Regular three-month staff training courses provide these engineers an opportunity to broaden their experience by exchange and study. A course usually includes 12 engineers already engaged in the labor-intensive construction program. They receive 480 hours of instruction at SOP headquarters and academic institutions, designed both to provide engineering information and broaden the engineer's perspective on the socio-economic aspects of rural life.

41. Other central functions of DCMO are supervision and control. A system for monitoring physical and financial progress and program implementation has been developed. Each state center assembles relevant information on each road project under construction and forwards it monthly to DCMO for precessing and analysis. The data bank built-up thus far is extensive and has provided the basis for a series of studies in which SOP has been engaged both independently and in collaboration with academic institutions. It is accumulating valuable information for a detailed cost analysis of the PIDER road construction program and important data for benefit estimation. There still are some conceptual problems in the data array, particularly regarding the treatment of labor inputs in various construction activities. Therefore, the data array, although suitable for accounting purposes is inadequate for establishing detailed productivity controls. DCMO is aware of these problems and is trying to correct them.

42. The area in which DCMO guidelines are relatively ill defined concerns selection criteria for deciding which proposed road projects should receive priority implementation under the labor-intensive construction program. These include five basic criteria which must be met for a project to be considered for implementation at all, and a second set of criteria to establish priorities. The basis five criteria are:

- (i) The community in whose territory the road is to be located must officially request construction and declare itself "willing to build it with the technical assistance of SOP".
- (ii) Community labor must be available for construction work.
- (iii) A fairweather path currently used by the community should exist where the proposed road is to be built.
- (iv) The communities being connected by the road must have no fewer than 300 and no more than 3000 inhabitants. (see Table 5 for number of such communities and their total population).
- (v) The cost per beneficiary of a road should not exceed Mex\$20,000.

43. Once these conditions are satisfied, priority for construction is said to be decided on the following considerations:

- (a) economic potential of the area of influence of the road;
- (b) minimum daily wage in the region;
- (c) number of inhabitants per kilometer of existing road;
- (d) number of square kilometers of area per kilometer of road;
- (e) number of transport vehicles per inhabitant;
- (f) the transport needs of other government agencies;
- (g) geographic location of the village and existing resources;
- (i) whether or not the new road will complete a circuit; and
- (j) quality of life in the community.

44. Although the mission ascertained that information on these parameters is indeed collected by resident engineers, sometimes with the assistance of rural extension agents, no precise information could be gathered about the relative weights given to the various indicators or how they are actually used in final priority rankings of projects.

Cost Comparison of Labor-Intensive and Equipment-Intensive
Construction Techniques

45. As in PIDER I, no separate benefit-cost analysis of the PIDER II road component in isolation from that of other micro-region investments will be carried out. If the return to all productive and productive support project components including the roads exceeds 10%, road investments in a particular micro-region will be financed.

46. Between regions, construction costs per kilometer of labor-intensive road vary considerably: outlays reported range from Mex\$50-60,000/km (in relatively flat, low rainfall regions like Yucatan or Zacatecas) to Mex\$300,000-340,000/km (in extremely mountainous, high-rainfall areas such as Zacapoaxtla in Puebla). Cost differences are further accentuated by the fact that road construction in regions where the terrain is easy often falls into the category of betterment ("brecha mejorada"), while in topographically difficult locations new construction ("camino nuevo") is often necessary. The average cost of one kilometer of "camino nuevo" is almost 60% higher than that of a "brecha mejorada".

47. Throughout 1973-1976, the average cost per kilometer of PIDER roads (see Table 3) has been roughly double that of SOP Normal Program roads. This reflects: (a) that PIDER roads, usually constructed in isolated regions and difficult terrain, include a high proportion of new roads; and (b) that PIDER roads, with sometimes more stringent completion deadlines than those in the Normal Program, are occasionally finished by bringing in equipment.

48. No separate cost analysis for 'Normal Program' vs 'PIDER' roads has been undertaken to-date by either SOP or the PIDER evaluation agency, CIDER. Mission visits to Bank-financed PIDER micro-regions revealed no systematic intra-regional cost differences between 'Normal Program' and 'PIDER' roads, but confirmed inter-region differences in construction costs due to topography and climate.

Comparison of PIDER I Appraisal Estimates to Actual Experience

49. With the information collected by SOP for a representative sample 1/ of roads constructed by hand-labor in 1972-74, it is possible to check the cost estimates for one 'model-kilometer' of PIDER I 2/ road against actual construction experience. The PIDER I 'model' assumes one average kilometer;

1/ Unless otherwise stated, cost figures (for labor-intensive roads) are those developed by SOP from a stratified random sample of 164 roads with a total length of over 1750 kms. See: Seretaria, de Obras Publicas, Camino y Mano de Obra, Mexico City, pp. 203-209 for sampling technique.

2/ Appraisal of Integrated Rural Development Project - PIDER Mexico - No. 660a-ME, April 16, 1975, Annex 3C Table 1.

SOP reports costs and/or quantities separately for "brecha mejorada" (BM) and "camino nuevo" (CN). As shown in Table 6, observed per km cost of construction (at 1972-74 prices) for BM were Mex\$70,800 and for CN Mex\$115,400, bracketing the PIDER I Model cost estimate of Mex\$85,300. Not surprisingly, there are some differences in the distribution of overall costs both by construction activity and type of input: observed quantities of earthworks are higher (even for the betterment case) than those assumed in the model, resulting in a higher proportion (73-78% vs 60%) for this item in overall cost. Drainage works by contrast proved less costly in actual experience (20% vs 30%) than was estimated.

50. Relative share of payments to labor for the sample roads analyzed by SOP averaged 60% of total direct costs, compared to 70% estimated in the PIDER I model; material costs were 12% and 10% respectively; tools and equipment (hire) accounted for 24% and 10%; supervision cost (estimated separately by SOP for direct supervision and Central Administration) again compared well at close to 10% each.

51. Labor inputs established by SOP are considerably lower than those assumed in the model for "brecha mejorada": 1,328 vs 2,000 days/km; but higher for "new construction" 2,258 vs 2,000 labor-days/km. This reflects the lower productivity of labor working in more difficult terrain which SOP now compensates by limited use of earthmoving equipment (see para 16 above).

SOP Comparison of Labor-Intensive and Equipment-Intensive Construction Costs

52. SOP also used the cost figures derived from these sample roads to compare alternative costs of construction by labor-intensive and by equipment-intensive techniques. By (a) applying SOP's scheduled unit prices to the quantities of work specified for the labor-intensive prototype road; and (b) soliciting quotations from a sample of firms 1/ for constructing the prototype roads, SOP developed construction cost estimates for a range of equipment-intensive construction methods. At 1975 prices, the cost of constructing one kilometer of prototype road with SOP equipment or by large contractors was established at 97-99% that of building it by labor; quotations from smaller contractors - usually the only ones to bid for this type of road project - ranged from 109-127% of the cost of the labor-intensive alternative. The SOP study thus shows labor-intensive construction techniques for low standard rural roads to be financially competitive with equipment-based techniques 2/.

1/ Op.cit. pp. 132-149

2/ Productivities and prices for labor and equipment shown by SOP are commensurate with those found in the World Bank Study of the Substitution of Labor and Equipment in Civil Construction (SOL) for the direct costs of construction. However, SOP assesses indirect costs of site supervision and central administration for the labor-intensive operations, SOP shows indirect costs of 43%, SOL again assumes 50%. If correct, the Mexican experience underlines the importance of efficient decentralized program organization for competitive performance of labor-intensive civil construction projects.

53. The "appropriateness" of labor-intensive methods is further underlined by transforming financial into economic costs. Shadow pricing both labor and equipment, SOP 1/ assumed a shadow rate of labor of 25% of prevailing minimum wages, and a shadow rate of foreign exchange of 130% of prevailing rates. The foreign component of equipment-intensive construction was established at 60% 2/; that of labor-intensive construction (hauling) at 20%. (Table 7 summarizes the results of SOP - calculated "economic" costs of alternative construction techniques using the above shadow prices). With SOP's shadow prices, the cost of equipment-intensive construction is 65% higher than the labor-intensive alternative; using a more conservative shadow wage for labor of 50% still shows equipment-intensive alternatives to be 40% more expensive than the labor-intensive one. -- If a full benefit-cost analysis were carried out, using distributional weights for benefits accruing to different segments of the target population under the two alternative ways of project implementation, results would further favor labor-intensive techniques.

The Socio-Economic Impact of the Labor-Intensive Rural Roads Program

Employment Effects

54. The most important direct impacts of the rural roads program are the provision of employment and income to a significant number of the rural unemployed who would otherwise have to seek work in urban areas. According to 1970 census figures, unemployment in the agricultural sector was nearly 600,000 3/. As shown in Table 3, the labor-intensive rural road construction program has provided an average of 54,500 man/years equivalent of employment annually during the past six years: nationally it has thus absorbed over 9% of rural unemployment. The same amount of construction carried out with equipment would have generated at most one fifth of these employment opportunities or about 10,900 man/years equivalent p.a. 4/

55. For a sample of 79 road projects, short-term impacts at the level of communities and households were studied by SOP in collaboration with the "Colegio de Mexico" 5/. The communities surveyed were located in 9 different

1/ Ibid., p. 149. There are no generally agreed shadow rates used uniformly by all agencies in Mexico, nor in Bank appraisal reports.

2/ Ibid., p. 162-164.

3/ Ibid., p. 1972.

4/ Only 3-5% of this is equipment-related labor; the remainder is hand labor employed in construction of drainage works.

5/ Ibid., pp. 59-76

states. Two-thirds had less than 1,000 inhabitants. Only 29% of the villages could be reached by vehicle in the dry season. Community services of all kinds were poor: of the 79 villages -

- 52% had elementary schools (39% of 3 grades only)
- 38% had electricity
- 30% had drinking water
- 24% had postal services
- 24% had medical services (only half with a visiting doctor).

Forty percent of the communities had no services at all.

46. Members of 1,913 households in the 79 communities participated in road construction. Three-quarters of these households cultivated some land, but 93% of them reported un- or underemployment of some member of the family; the equivalent proportion for landless households was 99%. Average income from all sources amounted to no more than Mex\$7,000 in the households surveyed. This corresponds to an annual per capita income of Mex\$1,107 or less than 10% of the national average (Mex\$11,525) reported for 1973. Not astonishingly, therefore, demand for construction employment was high. Well over 80% of the income from construction employment was reportedly spent on food and clothes, with only 7% going to productive investments in land, cattle or tools.

Income Effects

57. A more detailed study of a sub-sample of 14 communities where road access had been completed 18-30 months earlier, specified further who the road workers were, how much income their participation in the construction program added to their family earnings and what longer term impacts the provision of road access had had on income and expenditure patterns. Details of study findings are presented in Tables 8-10. They show that 51% of road workers came from small-farm households (=20% of the economically active in that group); 40% of roadworkers were day laborers (=45% of the economically active in that group) and 9% only were recruited from among the "unemployed" (=17% of the total in that group). Over three-quarters of those who worked on the roads were employed for less than 26 weeks; only a minority (8%) labored a year or more. Total household income from roadwork was less than Mex\$10,000 or more from road employment.

58. The changes in household production and expenditure patterns detailed in Table 10 confirm the prevalence of increased consumer goods expenditures and also seem to indicate significant changes in marketing and production technologies. However, these do not appear to have resulted in significant production (yield) increases yet - perhaps pointing up the need for complementary (extension) inputs in the road influenced regions surveyed. Such inputs would be normally provided in PIDER micro-regions.

59. In sum, the results of the impact study presented by SOP are indicative of some trends, but do not allow a satisfactory quantification of the longer-term impact of the road program on the local rural economy. Road effects are studied without reference to possible impacts of other rural development schemes in the region. Neither is there as yet a monitoring of control regions to sort out changes that would have occurred irrespective of any intervening road project.

60. As a desirable next step, both SOP and CIDER should develop effective analytical tools to evaluate the longer-run effects of the labor-intensive (PIDER) road program and its specific contribution to improving the quality of life in rural Mexico.

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RURAL DEVELOPMENT PROJECT - PIDER II

The Share of Road Expenditure in Total Project Expenditures

PIDER I and PIDER II (estimate)
(all figures in US\$)

	<u>PIDER I</u> ^{1/} (1975-1978)	<u>PIDER II</u> ^{2/}
1. Total Project Expenditure	\$294.5 million	\$300 million
2. Total Project Expenditure on Roads	\$ 17.9 million	\$ 26 million
3. Bank Share of Total Project Expenditure	\$110.0 million	\$120 million
4. Bank Share of Total Project Expenditure on Roads	\$ 7.2 million	\$ 10.4 million
5. Approximate Total Kilometrage of Roads to be Constructed under the Project	1,630 Kms ^{3/}	
6. Bank Financed Share of Approximate Total Kilometrage to be Constructed under the Project	650 Kms	

^{1/} Figures for PIDER I are based on estimated project costs in Appraisal Report, PIDER I.

^{2/} Figures for PIDER II are based on estimated project costs in Issues Paper, PIDER II.

^{3/} This figure is based on an estimated average cost of \$11,000 per kilometer of PIDER road (see Table 3).

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RURAL DEVELOPMENT PROJECT - PIDER II

Proposed Rural Road Construction Program 1977-82

STATE	NORMAL PROGRAM		PIDER PROGRAM		TOTAL	
	Length (Km)	Expenditure (Mex \$000)	Length (Km)	Expenditure (Mex \$000)	Length (Km)	Expenditure (Mex \$000)
AGUASCALIENTES	645	39 000	231	14 000	876	52 000
BAJA CALIFORNIA	210	43 000	20	4 000	230	47 000
BAJA CALIFORNIA SUR	705	49 000	465	34 000	1 190	83 000
CAMPESHE	415	38 000	198	18 000	613	56 000
COAHUILA	1 960	153 000	359	28 000	2 319	171 000
OAXACA	420	45 000	93	10 000	513	55 000
CHIAPAS	4 000	288 000	3 056	220 000	7 056	508 000
CHIHUAHUA	3 949	312 000	1 139	90 000	5 088	402 000
DURANGO	1 956	183 000	2 308	216 000	4 264	399 000
GUANAJUATO	2 840	203 000	1 634	116 000	4 474	319 000
GUERRERO	3 193	447 000	1 571	220 000	4 764	667 000
HIDALGO	3 371	327 000	1 701	165 000	5 072	487 000
JALISCO	2 524	260 000	3 398	350 000	5 922	610 000
MEXICO	2 590	236 000	294	44 000	3 074	280 000
MICHUACAN	3 475	351 000	970	98 000	4 445	449 000
MORELOS	570	47 000	313	26 000	883	73 000
NAHARIT	1 910	177 000	989	90 000	2 899	267 000
NUEVO LEON	1 930	154 000	999	80 000	2 929	234 000
OAXACA	4 594	464 000	2 277	230 000	6 871	694 000
PUEBLA	2 737	260 000	1 474	140 000	4 211	400 000
QUERETARO	2 450	181 000	1 216	90 000	3 666	271 000
QUINTANA ROO	1 020	87 000	600	48 000	1 620	135 000
SAN LUIS POTOSI	3 090	222 000	1 556	112 000	4 646	334 000
SINALOA	1 363	173 000	787	100 000	2 150	273 000
SONORA	1 290	215 000	251	42 000	1 541	257 000
TABASCO	1 466	170 000	776	90 000	2 242	260 000
TAMAULIPAS	2 460	218 000	1 034	90 000	3 494	308 000
TLAXCALA	225	19 000	176	15 000	401	34 000
VERACRUZ	3 650	303 000	940	78 000	4 590	381 000
YUCATAN	2 290	163 000	704	50 000	2 994	213 000
ZACATECAS	2 471	173 000	1 314	92 000	3 785	265 000
TOTAL	65 769	6 000 000	33 053	3 000 000	98 822	9 000 000

SOURCE: SOP, August 1976

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Integrated Rural Development Project

PIDER II

Table 3

The Rural Road Construction Program ^{1/}
1971-1976

Year	A. Expenditure (millions of Mex \$) ^{2/ 3/}				B. Number of Kilometers Constructed			C. Average Cost per km (Mex \$) ^{2/ 3/}			D. Labor		E. Average Minimum ^{5/} Daily Agricultural Wage (Mex \$)
	Normal Program Budget	PIDER Budget	IDB Loan	Total	Normal Program	PIDER Budget	Total	Normal Program	PIDER Budget	Total ^{4/}	Labor-Force Man-Years/p.a.	Man-Years Per Km.	
1971	124.8	-	53.6	178.4)	2,740	-	2,740)	65,109	-	65,109)	10,800	3.94)	24.91
1972	663.4	-	91.2	754.6)	10,540	-	10,540)	71,594	-	71,594)	44,400	4.21)	29.29
1973	1,723.8	208.8	49.3	1,981.9)	26,610	1,520	28,130)	64,780	137,368	70,455)	176,600	6.28)	34.56
1974	535.0	204.5	-	739.5)	8,230	1,780	10,010)	65,006	114,888	73,876)	34,300	3.43)	39.38
1975	586.0	357.5	-	943.5)	9,520	2,970	12,490)	61,555	120,370	75,540)	37,800	3.03)	48.04
1976	430.0	300.3 ^{6/} (51.5)	-	730.3)	6,920	2,180 ^{7/} (370)	9,100)	62,139	137,752	80,253)	23,400	2.57)	58.68
Total	4,063.0	1,071.1	194.1	5,183.1	64,560	8,450	73,010				327,300		

1. Source: Secretariat of Public Works, 1976; Commission on Minimum Salaries, 1976.
2. Figures for 1976 are estimates.
3. All prices are in current prices in Mexican \$.
4. IDB financing included in costs of Normal Program.
5. The variation around the mean in 1976 (indicative for earlier years), ranged from Mex \$30.40 in Chiapas to Mex \$78.70 in Baja California Norte.
6. Number in parentheses is approximate Mex \$ equivalent of World Bank disbursements on loan to PIDER I Project rural road component, as of November 19, 1976.
7. Number in parentheses equals approximate kilometrage constructed to November 19, 1976 by World Bank financing of PIDER I project loan.

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RURAL DEVELOPMENT PROJECT -
PIDER II

Design Standards for Labor Intensive Rural Roads

	UNIT	T E R R A I N		
		Flat	Hilly	Mountainous
Design Speed	km/hr	40	30	20
Vehicles per day	V/D	50	50	50
Road width	Meter	4	4	4
Shoulder width (each)	Meter	.70	.70	.70
Maximum degree of curvature	o	11	40	65
Maximum grade	%	6	8	10

Source: SOP, 1976

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RURAL DEVELOPMENT PROJECT -

PIDER II

Communities and Population without
All weather Road Access - 1970

STATE	DISTRICT CENTERS		COMMUNITIES W 300-3000 Inh.		POPULATION
	TOTAL	NO ACCESS	TOTAL	NO ACCESS	NO ACCESS
AGS.	9	--	125	71	45 378
B C N.	4	--	142	120	117 496
B C S.	3	1	42	27	15 682
CAMP.	8	--	109	72	63 215
COAH.	38	3	289	166	126 693
COL.	10	--	73	39	31 412
CHIS.	111	33	1 200	962	620 087
CHIH.	67	24	528	369	212 741
DGO.	38	15	576	376	351 862
GTO.	46	3	1 151	950	618 596
GRO.	75	23	1 138	974	709 523
HGO.	84	15	1 013	820	564 091
JAL.	124	26	770	559	479 617
MEX.	121	10	1 409	1 030	181 167
MICH.	112	8	1 230	822	632 320
MOR.	32	--	191	94	111 306
NAY.	19	3	270	153	123 553
N L.	52	2	335	145	104 523
OAX.	570	389	1 736	1 484	1 306 334
PUE.	217	92	1 447	1 158	1 109 982
QRO.	18	1	353	229	146 179
Q R.	7	3	52	37	34 348
S L P.	56	9	834	494	394 020
SIN.	17	--	658	533	289 602
SON.	69	35	319	216	142 141
TAB.	17	--	630	511	363 735
TAMS.	43	7	428	212	109 752
TLAX.	44	5	211	141	133 123
VER.	203	50	2 230	1 747	1 315 540
YUC.	106	32	247	153	164 203
ZAC.	56	11	689	489	336 466
Suma	2 376	780	20 495	15 183	12 059 129

SOURCE: SCP: Caminos de mano de obra, Mexico DF 1976, p 21

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Integrated Rural Development Project

PIDER II

Table 6

Estimated and Actual Construction Costs for One Km of Labor-Intensive
Rural Road
(1972-74 Prices)

ITEM	UNIT	QUANTITIES			COST (Mex \$ 000)		
		PIDER I MODEL	BRECHA MEJ. SQP	CAMINO NUEVO	PIDER I MODEL	BRECHA MEJ. SQP	CAMINO NUEVO
<u>Investment Components</u>							
Clearing	ha/Km	2.3	0.3	1.0	8.2	incl. below	incl. below
Earthworks	m ³ /Km	2,500	2,983	4,219	34.2	32.1	52.4
Excavation		n.a.	1,670	2,803			
Embankment Formation		n.a.	1,313	1,416			
<u>Surfacing</u> (incl. excav/loading/ spreading of materials)							
	m ³ /Km	600	710	860	9.0	19.7	32.0
Drainage					25.2	13.8	22.5
SUB-TOTAL A		n.a.	n.a.	n.a.	77.6	65.6	106.9
Engin. Supervision	% of SUB A	10	8	8	7.7	5.2	8.5
TOTAL					85.3	70.8	115.4
<u>Investment Inputs</u>							
Labor	% total cost	70.4 *	60.0 **	60.0 **	60.0	39.4	64.2
Materials		10.0	12.0	12.0	8.5	7.9	12.8
Tools)			4.5	4.5)	2.9	4.8
Equipment)		10.5	20.0	20.0) 9.1	13.1	21.4
Supervision		9.1 (Site)	3.5	3.5	7.7	2.3	3.7
SUBTOTAL A	% of SUB A	100.0	100.0	100%	85.3	65.6	106.9
			8.0	8.0	-	5.2	8.5
					85.3	70.8	115.4

* assumed min. wage : Mex \$30/day

** assumed min. wage : Mex \$28.5/day

NOTE : No separate distribution of inputs for 'Camino Nuevo' is provided.

Terrain specifications for Brecha Mejorada and Camino Nuevo

Flat	44%	46%
Hilly	50%	45%
Mountainous	6%	14%

SOURCE: Op.cit. pp 131-136

ANNEX
Line
Table 6

MEXICORURAL DEVELOPMENT PROJECT - PIDER IICalculation of the Social Costs of Constructing One Kilometer
of "Prototype Brecha Mejorada" by Labor-Intensive and Capital-
Intensive Technologies.

(1972-1974 Market Prices)

	<u>Labor-Intensive</u> (Mex\$)	<u>Capital-Intensive</u> (Mex\$)
1. <u>Market Price of one kilometer</u>	70,800	70,000
2. Cost of supervision	5,200	0
3. Direct per kilometer cost	65,600	70,000
4. Payment to labor (60%; vs. 12%)	39,360	8,400
5. Adjustment factor for shadow wage of labor	.25	.25
6. Shadow cost of labor	9,840	2,100
7. Payment to equipment (20%; vs. 70%)	13,120	49,000
8. Adjustment factor for shadow price of $\frac{1}{1}$ foreign exchange component of equipment	1.18	1.18
9. Social cost of equipment	15,482	57,820
a) <u>Social cost of one kilometer:</u> ((3) - (4) + (6) - (7) + (9) + (2))	<u>43,642</u>	<u>72,520</u>
b) <u>Social cost of one kilometer</u> (same assumptions as in (a) but a shadow wage adjustment factor of .5) :	<u>53,482</u>	<u>74,620</u>

1/ This assumes a foreign exchange component of equipment cost of 60% and an opportunity cost of foreign exchange of 130%. For derivation see: Caminos y Mano Obra, pp. 229-236
For calculation of Social Costs as above see p.149

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RURAL DEVELOPMENT PROJECT - PIDER II

Employment in Construction and Regular Employment
in 14 Sample Villages

Community	Small Farmers		Day Laborers		Unemployed		Total	
	Total	Employed on Road	Total	Employed on Road	Total	Employed on Road	Total	Employed on Road
1. San Pedro Molinos	200	150	-	-	-	-	200	150
2. Eloxochitlan	150	35	200	-	-	-	350	35
3. Manacal	40	-	40	20	41	20	121	40
4. Francisco Sarabia	91	65	20	20	5	5	116	90
5. Ahuacapan	245	10	150	60	50	-	445	70
6. Chiquilistlan	500	3	130	10	130	-	760	13
7. La Calera	75	72	10	10	10	10	95	92
8. La Barra	60	-	-	-	-	-	60	-
9. El Zapote	120	15	-	-	-	-	120	15
10. Huixcolotla	120	7	-	-	-	-	120	7
11. San Ramon de Martinez	150	150	-	-	260	22	410	172
12. Kini	650	-	400	300	-	-	1,050	300
13. Lopez Rayon	140	15	10	10	35	35	185	60
14. San Jeronimo	188	35	-	-	-	-	188	35
TOTAL	2,729	557	960	430	531	92	4,220	1,079
Total Econ.Active Population					(581)	-	4,664	

SOURCE: Caminos y Mano de Obra, pp 90-91

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RURAL DEVELOPMENT PROJECT - PIDER II

Length of Employment in, and Size of Income from, Road Construction
by Domestic Groups in 14 Villages

Employment Period	%	N Mentioning	Income Earned	%	N Mentioning
<u>No Employment</u>	<u>52</u>	<u>220</u>	<u>No Income</u>	<u>52</u>	<u>220</u>
<u>Some Employment</u>	<u>48</u>	<u>203</u>	<u>Some Income</u>	<u>48</u>	<u>203</u>
<u>Of these :</u>			<u>Of these :</u>		
Employed 2-26 wks	37	154	Mex \$301-2,500	28	119
" 27-52 wks	7	32	" \$2,501-5,000	9	41
" 53 + wks	4	17	" \$5,001-10,000	6	23
			" \$10,001 +	5	20
Total N	100	423		100	423

SOURCE: Caminos y Mano de Obra, p.97

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RURAL DEVELOPMENT PROJECT - PIDER II

Changes in Household Production/Expenditure Patterns

(423 Households; Multiple Mentions Possible)

Item	New Adoption	Use Increased	Use Decreased	Use Abandoned
Consumer Goods	242	18	10	10
Increased Crop Marketing	128	42	31	56
Improved Technology	123	7	3	4
Sale of Goods + Services	67	13	4	17
Wage Labor	37	21	12	6
Increased Ag. Product	19	51	30	28
Non-Family Employees	17	1	-	2

SOURCE: Caminos y Mano de Obra, p. 95

MEXICORural Development Project - PIDER IIPotable Water SupplyIntroduction

1. Unlike other sectors, performance under the potable water component has been slow. At appraisal, some 170,000 persons in the 30 micro-regions were expected to have access to improved drinking water supplies. After two years of the Project, only 131,300 persons have access to better water supplies. After a slow start, progress is picking up.

<u>Category</u>	<u>Appraisal</u>	<u>1975</u>	<u>1976</u>	<u>Total</u>
Beneficiaries	170,000	13,310	118,000	131,300

Under PIDER II, an estimated 200,000 persons are expected from improved water supplies in the 20 micro-regions at an average per capita cost equivalent to US\$55.

Background

2. An adequate safe water supply and proper waste disposal facilities are basic elements in environmental sanitation. In Mexico, water-related infections are listed as the primary cause of death of children between the age of zero to four years, and as the second most important cause of death for the population as a whole (some 70,000 deaths in 1974). In addition, they are by far the most important single cause of debilitating disease in the country. Potable water supply systems have long been recognized as a significant factor in reducing the incidence of such infections. These systems, however, require continuous water quality control and water treatment. Individual house connections are desirable but expensive.

Present Situation of Rural Water Supply

3. According to data published in the principal report of the 1975 National Water Plan, only about one half of the country's population now has access to potable water supplies with 22% (in 1970) of the rural population this category. Only 3% of villagers were connected to sanitary sewers. None of the smaller rural towns and villages with potable water

supplies had water treatment facilities, while in most states there are no water quality laboratories. Of the 85,000 villages in the country with a population of less than 500 people, only a handful have access to potable water supplies. Of the villages and towns with a population between 500 and 2,500 inhabitants, some 6,900 (in 1976) were in the same position. According to officials of the water supply construction division of the Health Secretariat, the present goal is to install about 1,000 new systems yearly in these larger villages or towns. This would be a 20% increase over the 1971-76 average (See Table 2). No attempt is made at present to supply potable water to villages with a population of less than 500 people and the agency selection criteria strongly favor communities with populations of 1,000 or up. The only way the smallest villages can be supplied is either from regional distribution systems or from nearby irrigation water sources, or under a project, such as PIDER which does not have a minimum size criteria for supplying water.

4. Two federal agencies have primary responsibility for the installation of new water supply systems. The Department of Water and Sewage of the Secretariat of Water Resources (Direction General de Agua Potable y Alcantarillados of the Secretaria de Recursos Hidraulicos - SRH) is mainly responsible for the installation of systems in towns and cities with a population of 3,000 inhabitants or above. The Construction Commission for Health Engineering in the Secretariat of Health (Comision de Constructores e Ingenieria Sanitaria de la Secretaria de la Salubridad by Asistencia - SSA) concentrates its efforts in communities ranging from 500 to 3,000 inhabitants. Both agencies construct works under the PIDER program. While SRH itself generally operates and maintains the larger system, SSA turns its completed works over to the villages and towns. A recent SSA survey shows that some 33% of all existing systems in the country are not in operation due to neglect and lack of maintenance. SSA plans to spend some 300 million pesos (US\$60 million) over a five-year period on the rehabilitation of some of these installations.

5. In early 1977, the new administration in Mexico undertook a major reform of government machinery involved in water supply programs. As the Secretariat of Public Works had been efficient and innovative in carrying out the difficult feeder road program, the new administration transferred all responsibilities for design, construction and maintenance of water supply systems to this Secretariat, renaming it the Secretariat of Public Works and Human Settlements. Thus the new Secretariat of Agriculture and Water Resources and the Secretariat of Health (SSA), each have been stripped of all responsibilities for providing water supply systems to micro-region villages. This is a major administrative change. With such a fresh start, the problems that have plagued village water supply systems in the past, especially on the maintenance and operation side, may be given considerably higher priority under the SOP administration. SOP will probably draw heavily on its experiences in getting villager participation in maintenance of feeder roads to encourage the same villagers to take a much stronger interest in water system maintenance. Also, SOP is likely to obtain a significantly higher villager participation in actual construction activities along the piece work or contributed labor systems worked out in feeder road programs.

Table 1

Investment Expenditures of SRH on Water Supply
and Sewage Works, 1970 - 1976
(`000 Dollars)

Year	<u>In Current Dollars; US\$1=Mex\$12.50</u>			<u>Total</u>	<u>Total in 1975 Constant Dollars</u>
	<u>Normal Program</u>	<u>PIDER</u>	<u>Others*</u>		
1970	30,672	-	-	30,672	67,854
1971	35,187	-	-	35,187	78,786
1972	52,095	-	-	52,095	107,905
1973	95,184	6,160	-	101,344	181,168
1974	59,258	5,760	-	65,018	81,864
1975	99,000	8,720	-	107,720	107,720
1976	131,640	6,147	1,957	137,787	n.a.

Source: Direccion General de Agua Potable y Alcanterillados de la Secretaria de Recursos Hidraulicos.

* US\$1,796,000 for the "Plan Canero", a developmental program for sugarcane producing communities, and US\$161,000 for a special program directed at new ejido villages.

6. The Table indicates PIDER's share of the total SRH program reached as high as 10% in 1974, but declined to 5% in 1976. While SRH's total expenditures in current terms rose significantly between 1975 and 1976, in real terms between 1972 to 1976, they remained more or less constant, (except for 1973). PIDER's contribution, in constant 1975 dollars, fell from 10.012 million in 1974 to 8.720 million in 1975.

7. SSA's expenditures on water supply and sewage disposal for the years from 1971 to 1976 are shown in Table 2. They reached a peak of around 50 million (1975) dollars annually in 1972/73, but thereafter fell to between 21 to 25 million dollars in 1974/75 and probably to around 11 million expressed in 1975 dollars in 1976. The number of new systems installed ranged from 310 in 1976 to 870 in 1973, with an average of 611 per year for the 71-76 period. In the same period an average of 200 existing systems were rehabilitated per year. Costs of new installations per beneficiary in 1975 constant dollars ranged from US\$44.50 in 1971 to US\$73.09 in 1973, and fell thereafter to US\$54.30 in 1975. 1976 costs probably amounted to somewhat over US\$60 in 1975 prices. Rehabilitation costs were much lower and ranged from \$4.45 to \$21.09 per capita.

Table 2

INVESTMENT EXPENDITURES OF SSA ON WATER SUPPLY WORKS, 1971-1976

('000 Dollars; US\$1 = Mex\$12.50)*

Year	New Works				Rehabilitations					
	No. of Installa.	Investment		1975 US\$ per Inhabitant	No. of Installa.	Investment		Inhabitan.	1975 US\$ per Inhab.	
US\$	1975** US\$	Inhabitant	US\$		US\$	Inhabitan.				
1971	599	11,153	24,983	561,419	44.50	50	127	284	63,883	4.45
1972	854	24,006	49,692	809,464	61.39	216	2,095	4,337	271,611	15.97
1973	870	29,212	52,289	715,419	73.09	313	3,820	6,838	380,405	17.98
1974	537	20,489	25,816	408,549	63.19	270	4,955	6,243	296,047	21.09
1975	506	21,634	21,634	398,446	54.30	229	4,302	4,302	263,296	16.34
1976	310	13,163	n.a.	172,394	76.35***	123	1,799	n.a.	136,265	13.20***

* Source: Comision Constructora e Ingeniera Sanitaria de la SSA, Secretaria Technica de Informacion y Control de Datos.

** Prices adjusted by the implicit SRH price deflator of Table 1

*** In 1976 prices.

PIDER and the Federal Agencies

8. The PIDER's supported program is small compared to that of SSA and SRH. Both agencies emphasize that they use their own technical specifications for the design of water supply works whether they are financed by PIDER or themselves. Unlike SSA, which has developed a sophisticated 17-step, seven-factor process to select target villages, PIDER appears to select the villages in light of local conditions. In cases in which one of the federal agencies and PIDER select the same community, the agencies will generally let PIDER go ahead with the project and use their own funds on projects elsewhere.

9. PIDER-supported projects are limited to the financing of installations with hydrants only. Users who want to have house connections have to finance the additional costs themselves. Both SRH and SSA emphasize that house-connections are far preferable for the point of view of health. In addition, they claim that hydrants frequently get damaged and often are not turned off, wasting water. Both agencies require metered connections, to curb water consumption.

10. As stated above, about a third of existing water supply systems do not work as a result of poor operation and lack of maintenance. Neither PIDER nor the line departments have trained operators and maintenance personnel or funds to pay technical personnel, to buy spare parts or to accumulate sufficient funds for major overhauls and replacements. Local beneficiaries are unwilling to contribute services in kind for maintenance and repair requirements on a voluntary and sustained basis.

The Project

11. Under PIDER II, some US\$11 million, or about 3% of the total budget would be spent to supply potable water to villages and towns. The project would benefit some 215,000 persons, at an average cost of US\$45 per person. While this average is lower than the US\$76.35 average costs experienced in 1976, it represents an increase from Mex\$954 to Mex\$1,125 at the new exchange rate, or an increase of 18%. Installation of metered house connections and of sanitary privies would be encouraged but not financed under the program. Selection criteria would be coordinated with the selection processes of the federal agencies except in special cases. Technical design specifications would follow federal agency specifications.

12. Beneficiaries would have to agree, in writing, to contribute a total 15% of project costs in cash. In addition they would have to agree to cover fully all future operating, maintenance and repair expenditures through adequate cash payments, adjusted annually to reflect current costs. These charges would have to be high enough to cover equipment replacements. Beneficiaries would be allowed and encouraged to contribute labor and/or material supply and services in lieu of part or all of their cash investment cost contribution.

13. Another approach to improved maintenance might be modeled after a preventive maintenance and repair district organized by SRH in the State of Queretero in 1974. This district is responsible for several hundred installations which include 15 reservoirs, 203 pumping stations, 138 small-scale irrigation units and 30 water supply systems. Regularly scheduled inspections and equipment overhauls are carried out by well-trained crews backed up by a complete system of technical specifications, spare parts, new hoses and accounting and control systems. Lost savings compared to the previous repair-only-after-breakdown system are claimed to amount to over 62% of previous costs. Average costs per installation per month in 1975 amounted to Mex\$387 or US\$30.96 at the old exchange rate.

14. For PIDER, these districts might cover one or more micro-regions or even extend beyond PIDER regions. The decision should be based on distribution of similar water systems installations. The preventive maintenance crew could supervise and train the local operating personnel of each installation.

MEXICORURAL DEVELOPMENT PROJECT - PIDER IIRural Education FacilitiesIntroduction

1. Performance under the rural schools program has been better than expected at appraisal. CAPFCE is somewhat ahead of appraisal schedule.

<u>Category</u>	<u>Appraisal Estimates - Mex\$</u>			<u>1976</u>	<u>Total</u>	<u>Average Unit Cost</u>
	<u>No.</u>	<u>Unit Cost</u>	<u>1975</u>			
Classrooms	1150	5000	456	504	906	4000

2. Under the PIDER II project, an additional 1200 classrooms would be constructed in the 20 micro-regions.

Education in Rural Mexico

3. Mexico's educational system has developed rapidly in the past decade, but problems remain, especially the severe inequality of educational opportunities between urban and rural areas. The limited efforts in the past to educate the rural population are evident from the low literacy rate in rural areas of 59% as against 80% in urban centers. Current enrollment ratios show some early results of the Government's efforts to redress this imbalance. Various non-formal education and training activities are also being developed better to meet the needs of the rural population.

Rural Primary Education

4. In 1970, the total enrollment in primary schools was a high 96% of the number of children aged 7-12. This total enrollment figure, however, included a large number of overaged children, resulting in a net enrollment ratio of only 71%. The overaged children are a particular problem in the rural areas where 46% of rural schools do not offer a six-year program. The lower grades in these classes are swollen by repeaters who do not leave school but who cannot continue on to higher classes. In rural areas, only 15% of the students complete the primary cycle as against 60% in the cities. A key constraint to the provision of primary education in rural Mexico is the high dispersion of its population. Some 20 million people, or 40% of the total population, live in communities with less than 2,500 inhabitants; the minimum under which the establishment of schools is economic.

5. The Government's policy in primary education is directed towards the full participation of all primary school age youth. To this effect, 11,000 primary classrooms are being constructed per year. However this construction program is still heavily urban oriented. In 1973, only 20% of the new school capacity under the regular program was constructed in rural areas, where 40% of the population lives. The PIDER program reduced this imbalance by increasing the construction program for rural classrooms by 40%, or another 880 classrooms. Further, the Secretariat of Education is developing several programs to reach the more scattered population, such as mobile classrooms and part-time boarding facilities.

6. In recent years, several measures have been taken to improve the quality of primary education. A free textbook program has made a significant impact on quality, especially in the rural areas. A massive teacher upgrading program has been instrumental in improving the quality of rural teachers in particular. Much work has still to be done, however, on curriculum development and teacher preparation, issues which go beyond the scope of a rural development project.

Other Rural Education

7. A major effort is underway to expand agricultural secondary education. From 1972 to 1974, the number of lower-secondary agricultural schools (grades 7-9) increased from 158 to 466. Another 90 of these schools will be established under the regular school construction program, many of which will be in PIDER micro-regions. Major non-formal education programs are the Cultural Missions and Rural Development Brigades, Radio and Television are also used to reach the rural population. The role of the agricultural extension service is analyzed in Annex 2-f.

The Project

8. Content. In line with the Government's policy for primary education, the Project aims at the establishment of sufficient school capacity to enroll all primary school-age youth in the communities served by the Project, i.e., all communities in the micro-regions with 300-3,000 inhabitants. To this end the Project would provide for the construction and furnishing of 800 new classrooms in incomplete primary schools, both new and existing, thereby expanding school capacity by 24,000 student places. Further, 400 classrooms would be renovated, thereby improving school facilities for another 14,000. Teaching materials, textbooks and staff for these schools would be provided by the Secretariat of Education and financed from its regular recurrent budget. To ensure that this provision be timely and adequate, the location and timing of school construction would be closely coordinated with this Secretariat. The resulting enrollment expansion in primary education would be 0.3% and the increase in the recurrent budget for education, a marginal 0.1% by 1982. These amounts would be absorbed in the normal increase in the education budget.

9. Execution. The implementation of this project item would continue to be the responsibility of CAPFCE, a semi-autonomous federal agency responsible for the planning and execution of all federal school construction in Mexico. During the 30 years since its foundation, CAPFCE has increased its capacity from 300 to 15,000 classrooms per year. It has 31 regional offices charged with on-site supervision of school construction. CAPFCE has been successful in developing low-cost construction methods. Deliberate policies emphasizing standardization of design, prefabrication of structural elements and computerization of the construction process have led to an average cost of new construction amounting to US\$4,000 per classroom, or US\$100 per m² of construction costs. These costs vary widely among the regions, but specially adapted construction systems keep the cost of construction in remote areas in line with regional averages. For example, local materials are used to the extent possible, the site is normally donated by the local community, and other local contributions are actively promoted.

Table 1: UNIT COSTS PER CLASSROOM BY PIDER REGION (1976)

<u>Region</u>	<u>Mex\$</u>	<u>US\$ (20=1)</u>
Northwest	79,400	3,970
Northcentral	78,900	3,945
Northeast	73,700	3,685
West	72,500	3,625
Central	69,700	3,485
Southwest	68,800	3,440
Southeast	76,900	3,845
Yucatan	76,500	3,825

10. Benefits. The objective of the primary education component is to reinforce the long-term benefits of the Project as a whole. First, by establishing literacy and mathematical skills, primary education helps farmers gain access to modern agriculture and makes it easier for agricultural extension agents to transmit modern knowledge and skills. Second, primary education helps reduce the resistance of the rural population change, thus reinforcing the basis for sustained economic and social development. Third, primary education is an important instrument for improving the quality of rural life, and thus is complementary to the package of productive and social investments provided under the Project.

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER II

Self-Help

1. PIDER has supported a limited self-help program, primarily by providing materials to villages to establish or improve such public places as village plazas, town halls, and town streets. Materials are also made available for improvement of private homes. All unskilled labor is contributed, although professionals are available for the more complicated tasks.

2. This program has been moderately successful. Its popularity is indicated by the high participation rates in program communities and the large number of communities which have applied for their own projects. Its main problem is delays in the authorization of financing which have postponed the initiation of projects.

3. Nevertheless, the economic and/or social justification of the program is tenuous, because:

- (i) the health improvements anticipated when the program was initiated have usually not materialized since the construction of latrines is not stressed when homes are improved;
- (ii) cooperative action in the areas of public spaces and workshops do not appear to generate further cooperative action. In some cases, for example Sinaloa, there is almost no cooperative effort; here most families chose to work on their own homes by themselves. Only in the few areas where there is a tradition of cooperative action does the program appear to have a spill-over into future activities;
- (iii) the uneven nature of income distribution within rural areas may be exacerbated, because the more accessible communities appear to be selected in the first stages;

If the program is to continue, several changes are needed:

- (i) latrines should be required as part of each improved home;
- (ii) homes should only be improved, not completely rebuilt, in order to expand the number of communities covered;

- (iii) selection criteria for communities and beneficiaries should be clearly specified in order to reduce economic and political distortions.

Program History

4. In 1964, the Secretariat of Health began a program to improve rural housing as part of its environmental sanitation work. A special Department for the Improvement of Homes and Public Spaces was established in 1971 within CCISSSA, the engineering and construction commission of the Ministry of Health. After the 1973 earthquakes, five other agencies, in addition to CCISSSA, were assigned home and public spaces improvement responsibilities. With that crisis over, however, the responsibilities were withdrawn from all but two of them.

5. Since 1974, most of the program has been financed by PIDER (Table 1 following).

Table 1

Self-Help Program
----Mex\$'000-----

<u>Government Agencies</u>	<u>1974</u>	<u>1975</u>	<u>(authorized)</u> <u>1976</u>
Secretariat of Health (CCISSSA)	19,763.3	55,593.5	41,367.6
River Balsas Commission	2,578.0	7,110.0	2,238.0
National Indigenous Institute	-	-	169.1
Coordinated Commission for the Integrated Development of the Isthmus of Tehuantepec	-	80.0	-
Secretariat of Public Works	59.0	619.0	
National Institute for the Development of the Rural Community and the Home	<u>18,277.7</u>	<u>8,771.6</u>	
TOTAL	<u>40,678.0</u>	<u>72,174.1</u>	<u>43,774.7</u>

CCISSA

6. The majority of home and public spaces improvement projects are under CCISSA, which is staffed at the federal level by 26 professionals, mostly architects, and at the state level by one resident in each one of the 30 states which at present has CCISSA projects. In addition, there are 42 sub-residents, assisted by 93 technicians who live in project areas. The CCISSA program can be divided into the following six components:

1. Improved or enlarged homes -cement floors, windows, doors, water proofing, addition of kitchen or latrine.
 2. New homes when old homes are not judged structurally sound (up to a ceiling of 500 Mex\$ (US\$25.-) per person).
 3. Improved streets - leveling, drainage, sidewalks.
 4. Public plazas - concert areas, playgrounds, sports fields.
 5. Town halls and clinics.
 6. Community-owned workshops for the production from local raw materials of such construction materials as bricks. The workshops are to become eventually producer cooperatives. Even though these workshops may be considerably under-utilized after the self-help program terminates, the cost of their establishment is so minimal that the initial investment is easily justified.
7. The program mix for 1974-76 was as follows:

PIDER/SSA Self-Help

	1974	1975	Bank 30 Region 1975	Bank 30 Region 1976
Number of communities covered	95	189	-	91
Number of beneficiaries	46,812	92,677	5,718	65,517
Streets (m ²)	8,567	37,820	-	18,172
Plazas (m ²)	6,783	50,373	-	26,880
Townhalls	1	2	-	3
Clinics	5	25	-	3
New homes	1,607	1,224	-	473
Improved homes	4,626	5,119	774	6,136
Latrines	627	2,817		4,002
Workshops	5	84		16
Other units	3	31		17
<u>Total program cost per beneficiary (in Mex\$)</u>	422	600		631

Operational Procedures

8. The state resident is responsible for the preparation of a detailed study of each locality considered a possible candidate for a community improvement package. The members of the locality are also asked to sign a petition which expresses their willingness to participate in such a program. These studies and petitions are sent to PIDER headquarters in Mexico City, where in time funding will be authorized for a small percentage of these communities. It is not clear exactly what criteria are used to determine which communities are selected and what the project mix within communities shall be. CCISSSA guidelines give priority to communities of 500 to 1,500 inhabitants with drinking water, electricity and transport services available.

9. In general, in any one community, the program takes 8-10 months to complete. CCISSSA provides the industrial materials (cement and structural iron) and its own technical assistance free of charge. All local materials and labor must be provided by the beneficiaries. Labor pooling appears to occur only in the construction of public spaces and the operation of workshops.

MEXICO

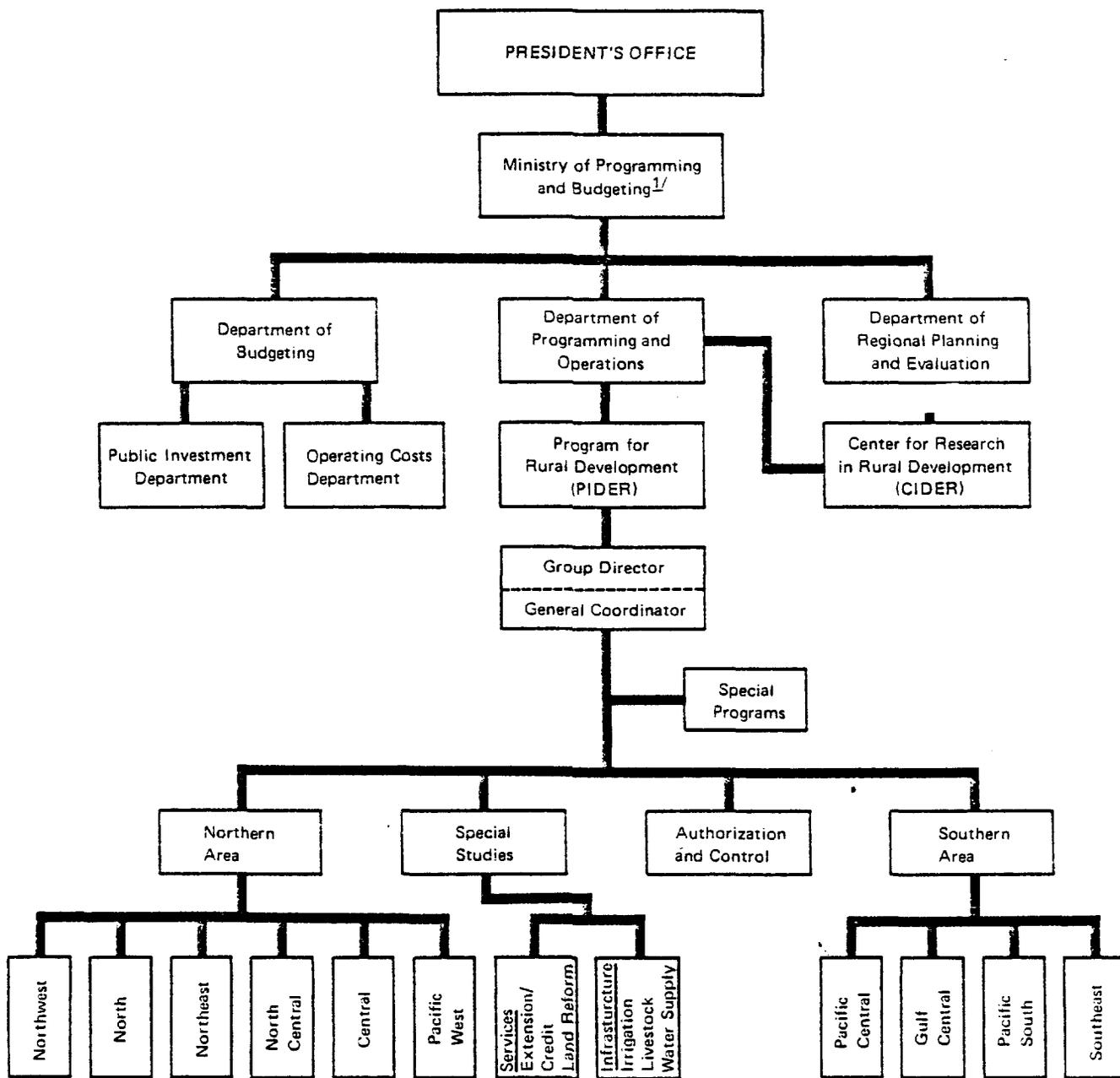
RURAL DEVELOPMENT PROJECT - PIDER II

The Organization and Management System of PIDER

1. Since 1974, Mexico has undertaken a progressive decentralization of the PIDER program, a move which has worked well. In early 1977, the new Government decentralized execution of most federal programs to the state level, adapting much of the PIDER organizational structure in the process.
2. In PIDER, the states now have full responsibility for programming execution, supervision and financing. Programming, both long and short-term, is carried out by the state coordinating committee. Execution of authorized investments is the responsibility of the state offices of participating agencies. Supervision of the program execution and disbursement of PIDER funds are carried out by the PIDER technical group at the state level.
3. At the federal level, the PIDER program is under the Secretariat of Programming and Budgeting established in 1977 to replace the Secretariat of Presidency. SPP is in charge of coordinating activities of all Government agencies working in the rural sector and has final authority over their investment and operating budgets. ^{1/} By 1977, some 2,700 agency professionals were carrying out the PIDER program under the supervision of SPP.
4. In 1977, SPP assigned one of its senior officers to each state (Chart 2) with the job of coordinating all federal spending within the state. This move represents a new dimension in decentralization of Government operations in Mexico, as this officer has considerable power to plan all federal spending within his state, to re-allocated money without reference to Mexico City, and to arrange payment at the state rather than at the federal level. The officers are the highest ranking federal civil servant at the state level and report directly to the SPP Minister in Mexico City. The new job is an outgrowth of the success of the position of PIDER state coordinator

^{1/} Federal institutions participating at the federal and state levels include: the Secretariats of Agriculture and Water Resources (SARH), Finance, Public Works (SOP), Health and Assistance (SSA), and Agrarian Reform (SRA); Federal Electric Commission (CFE), National Corporation for Basic Marketing (CONASUPO), Committee for Administration of the Federal School Construction Program, National Arid Zones Commission, National Indigenous Institute, National Institute for Rural Community Development and Low Cost Housing, the National Rural Bank and the Guarantee Loan Fund.

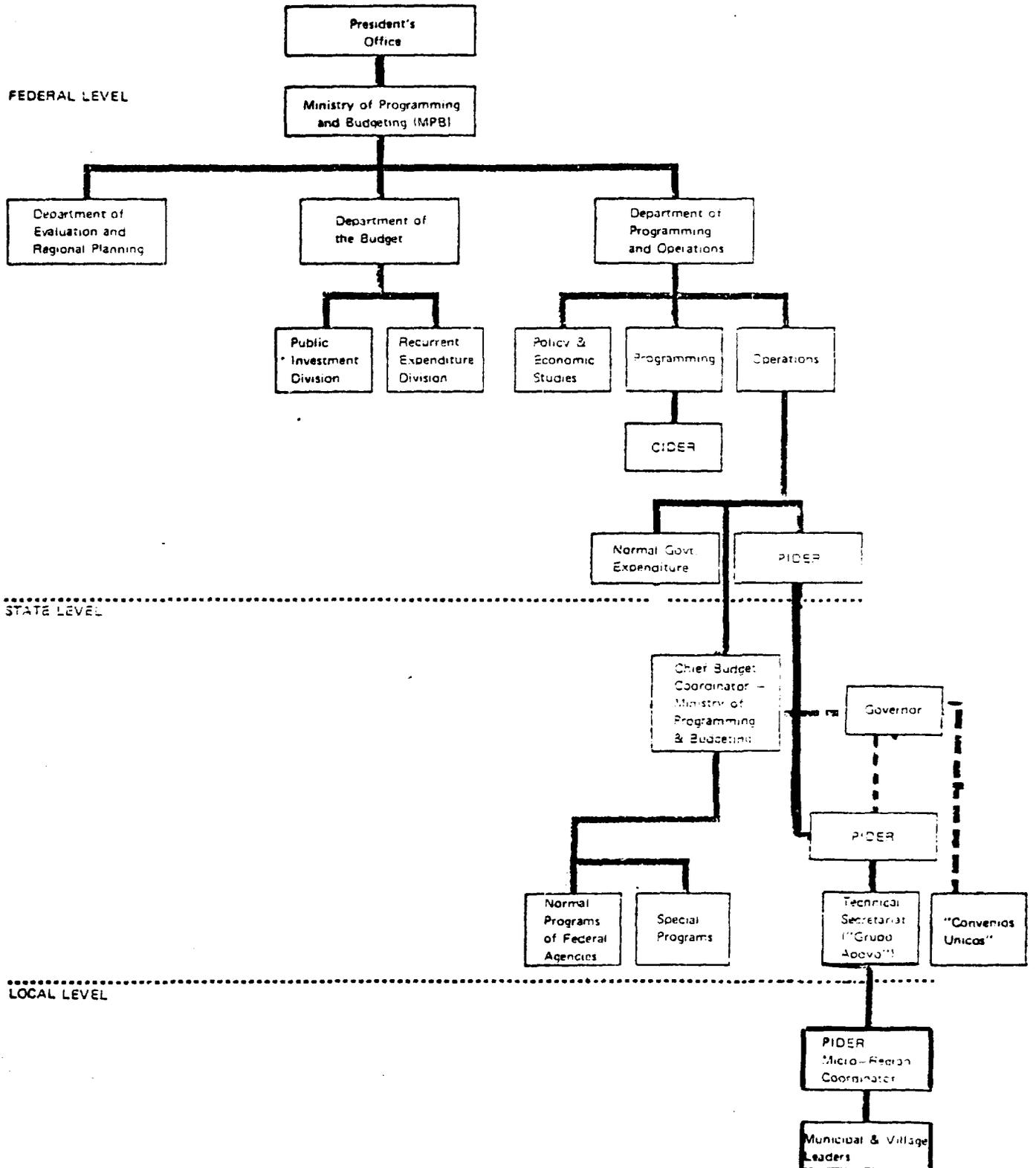
MEXICO
 RURAL DEVELOPMENT PROJECT – PIDER II
 PIDER ORGANIZATION CHART



^{1/} Formerly Ministry of the Presidency

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ANNEX 6-a
 Page 2a
 CHART 2



(described below), as it will vest in one man the job of overseeing execution for all federal programs in the state as the PIDER state coordinator oversees all PIDER programs. The development should greatly assist the coordination between PIDER and all other investment programs. In a number of cases, PIDER coordinators have been promoted to the job of senior SPP officer.

5. An experiment is underway to give the senior SPP officer the authority to contract a variety of federally-funded works to private, federal, or state contractors. This further step towards decentralization represents an attempt to avoid delays which commonly occur when the federal agencies are given the job of constructing roads, irrigation works, schools and health facilities. The experiment is in the form of special agreements "convenios unicos" between SPP and the states, which bestow on the SPP senior officer and the Governor the authority to let the contracts. The contract would include only the actual construction work; planning, detailed design and operation would remain in the purview of the relevant agency.

6. The PIDER program itself is organized at three levels.

A. Federal Level. PIDER policy is developed and coordinated through the Directorate of Promotion and Regional Operations of the SPP. This Directorate is supported by a Sub-Directorate of Rural Development (i.e., PIDER) with a staff of some 95 technicians responsible for: reviewing investment plans, management operations, and investment monitoring.

B. State Level. Coordination of the program is handled by a Coordinating Committee consisting of the state level directors of the participating agencies under the chairmanship of the state governor. Actual management is the responsibility of the new state level SPP representative who is the technical secretary of the State Committee. The SPP representative is assisted by a technical secretariat of professionals including a state level PIDER coordinator and resident Coordinators for each of the states' micro-regions who work closely with local elected officials and community leaders.

C. Village/Ejido Level. Local participation in the planning and execution of PIDER has progressed. It has been achieved through a variety of schemes, depending on the political, social and administrative characteristics of the micro-regions. As a rule, SRA field personnel take the lead in organizing communities. The involvement of local authorities e.g., municipal chiefs, ejido presidents and teachers, is encouraged. In some

cases, such individual programs as feeder roads and small irrigation works have galvanized community action which can later be funneled into other PIDER projects.

7. This three-tier organization provides the overall structure to carry out the various functions under the program. Experience to date indicates that the system works satisfactorily and without undue inter-agency friction. Responsibilities are adequately delineated between agencies. The appointment by PIDER of resident State and --in some cases-- micro-region staff provides a direct coordinating link to the PIDER central tier. In particular, these micro-region staff provide PIDER and state-level staff with a much more realistic assessment of ejido and village development preferences. While the authority for selection of micro-regions and the approval of the respective investment plans will remain at the central level, the responsibility for plan preparation and coordination of the different agencies is being taken over increasingly at the state level. The individual project works are executed by the appropriate public agency, as determined by the central coordinating committee and concurred in by the state committee. Operation and maintenance, other than for larger works, will be the responsibility of the benefiting communities. Project implementation will be supervised at all three levels.

8. Micro-Region Planning Procedures. While initially, micro-region development plans were drawn up by Federal level PIDER staff with the help of state level technicians, now state level officials have taken over the planning function, leaving only review revision and final approval of plans to federal authorities. This shift represents an important gain in PIDER's attempts to encourage local participation. The procedures show how communities determine their priority needs and present them to state and federal level agencies and PIDER representatives. It should be noted that, as the process evolves, most communities become increasingly aware of the role they can play.

9. Rural Development Departments in Federal Agencies. Most of the influential federal ministries and agencies (SAHOP, SARH, CONASUPO, CFE and the Bank of Mexico) have substantially increased their capability to deal with the rural poor. The Secretariat of Finance supplements the agencies' traditional program budgets for new rural programs. Countrywide programs have obtained IBRD or IDB funding for rural roads, irrigation and credit. A better awareness of the needs of new clientele is also being fostered.

10. Coordination at the Field Level. Coordination at the municipal and village levels is necessarily flexible. CONASUPO organizes its local committees to handle store management, handicrafts and small industries. Very often SRA sets out to concentrate on ejidos and later broadens its activities to embrace private smallholders. In another instance, the labor-intensive feeder road program of the Secretariat of Public Works may act as a catalyst -- with formal local village committees simultaneously functioning as contractors for construction labor and as counterparts for road maintenance. The encouragement these broadening activities have given to other

areas of village organization have been impressive. SARH operates programs for small irrigation works on a similar organization basis. Prior to project installation a local consumers' association is formed. SARH and SRA then draw up an agreement with the association, specifying: (a) works and services the SARH will provide; (b) operation and maintenance conditions; (c) amount of water to be used; and (d) charges covering operation and maintenance costs and capital payment.

11. Budgeting and Auditing Procedures. In addition to the regular annual budgetary allocation, each agency participating in the PIDER program receives a separate allocation at the beginning of the fiscal year out of PIDER's budget to carry out the agreed program of rural development in pre-selected regions throughout the country. Separate accounts for the PIDER program are kept by the Presidency, PIDER staff, the Secretariat of Finance and each participating agency to ensure there is no overlap with the normal budgetary program. In addition, the Secretariat of Finance keeps separate accounts to cover the external financing of the program by the Bank and IDB. Each participating agency has its own auditing section where all vouchers and documents are checked and approved before payments are made. The accounts of each agency are subject to independent auditing by the Secretariat of Finance, the President's office and the Secretariat for National Patrimony.

12. Budget Authorization. Although Mexico's fiscal year coincides with the calendar year, budgets are normally late and most agencies do not start new investments before April of each year, while using the (dry) period from January to March to complete last year's investments. The latter period shows, therefore, normally only little investment activity. PIDER's management had intended to change this situation, but up to now with little success. Budget allocations in 1976 were still delayed until March. These delays resulted in construction, land clearing, and pasture seeding activities starting in the cropping season rather than in the dry period when labor is seasonally unemployed. With labor short in the cropping season, machines have been used, thus reducing local employment benefits. Moreover, pasture planting conditions are inappropriate and production benefits are likewise reduced. Needed therefore is a change of authorization procedures to allow full-scale investment activities in the January-March slack period.

13. Monitoring. To ensure that expenditures are actually carried out as programmed and approved, separate supervision and authorization/control divisions are established within PIDER. The supervision division is divided into seven zones, the authorization/control group into an authorization and control and statistics section. The supervision division staff spend considerable time in the field, especially in checking expenditures against estimates.

14. Early in 1976, several improvements were made in PIDER's organization and management. At PIDER headquarters, a reorganization was implemented in March 1976, which has led to an improved integration of the planning/programming and supervisory functions. The new organizational structure has two regional Departments, North and South, which combine the former Departments

of Studies and Supervision. In addition, a small Planning Department is responsible for overall planning of PIDER and an Authorization and Control Department is in charge of budgeting, budget control and monitoring. Under the Deputy Manager (Coordinator), special units were established for the IDB and IBRD projects and for the new extension program.

15. The system described has worked satisfactorily and without undue inter-agency friction. There are, however, areas that require improvement.

16. Functional Staffing. The total number of staff in PIDER headquarters has now reached 100, with 45 supervisors in the Regional Departments and 55 Administrative/managerial staff. An attempt has been made to form inter-disciplinary teams for each of the sub-regions, but the teams comprise mainly civil engineers and economists. PIDER has been short of functional expertise in agriculture and rural industries. This would not be serious if PIDER's role could be limited to overall micro-region programming, supervision, and monitoring. However, experience during PIDER's existence indicates that such a role is too limited.

17. PIDER involvement in the review of rural development policies and investment criteria of the line agencies, particularly the weaker ones, is unavoidable. PIDER's management has recognized this and taken action in early 1977. A Special Studies division (Chart 2) was organized to provide PIDER with capability to review functionally agency programs. This new division is organized in two sections: services (extension credit, land reform) and infrastructure (irrigation, roads, etc.). It has taken the lead in developing "agreements" with extension credit and the land reform agency.

18. Need for Resident PIDER Managers in Micro-Regions. There are resident PIDER coordinators in only 15% of PIDER micro-regions while in the other 85% the coordinator lives in the State Capital and periodically visits the regions. Those micro-regions with resident coordinators have better records both in coordination of investments and of operations since the coordinators take the initiative in advising on re-programming, in generating local understanding of the PIDER approach, and in insisting on proper operation and maintenance of completed investments. The resident PIDER manager in effect has become a fairly effective locally based change agent whereas those not resident and only visiting the micro-regions normally only perform investment monitoring functions.

19. Manuals and Training. Much progress has been made in the development of manuals for PIDER staff at the federal and state level, describing procedures, and explaining how the PIDER system works. A first draft has now been completed and will be circulated among all staff after revision. The operations manual in particular contains a wealth of information which makes it an important training tool. Other activities related to staff training have been limited to two recent seminars for vocales, the state-level PIDER managers. The seminars clearly showed the need for more frequent contacts among these functionaries. A necessary next step is more systematic training of state-level supervisors, who have a key role in PIDER but are too often

unaware of all that is expected from them and how to carry out their tasks. Both vocales and supervisors did participate in regional meetings organized by CIDER in late 1976. CIDER and PIDER had a number of meetings in early 1977 to develop a joint training program. An agreed program is expected in March/April 1977.

20. Operation. One of the areas that requires increased PIDER involvement is the operation and maintenance of investments once completed. Several of the agencies participating in PIDER have poor records in the functioning of capital investments after they have been turned over to beneficiaries as a result of these agencies' inadequate technical assistance and supervision. Several cases have surfaced already of PIDER-financed investments which are not effectively used by beneficiaries. It will be necessary for PIDER to take an active role in changing this situation through pressures on the agencies and continued supervision after investment completion. This task will require additional expertise at both headquarters and State level, particularly in agriculture. Some State-level PIDER groups, such as in Morelos, have already taken the initiative to restructure their staffing. The appointment of considerably more resident managers should also greatly assist in improving operations.

MEXICORURAL DEVELOPMENT PROJECT - PIDER IIThe Evaluation System of CIDEREvaluation

1. The Center for Rural Development Research (CIDER) is charged with evaluating the impact of current rural development programs. Its principal focus is on PIDER, though it has undertaken studies of related programs. In addition to evaluation, CIDER is involved in devising an improved investment programming methodology, in undertaking various research efforts, and in training - principally of PIDER field staff. CIDER has made significant progress in micro-region evaluations and in improving micro-region programming methodology. Research has recently been expanded, while training will start only in 1977. CIDER's professional staff now numbers 26; their distribution by discipline and area of activity is in Table 1. PIDER's rapid expansion and CIDER's involvement in reprogramming has left CIDER short of staff and a further expansion will be required.
2. CIDER's interest is to determine the real benefit to rural communities from rural development efforts and to derive strategies and programs such that these communities can be involved in their own development. Most evaluations in the rural development field focus on measurements of yield and income changes, CIDER however gives particular attention to analyzing administrative and sociological aspects. CIDER is particularly concerned with determining what structural changes are required for programs to result in self-sustaining growth. Two issues central to CIDER evaluations generally neglected in other evaluation exercises are: (i) the effectiveness of institution building under the PIDER investment and service strategy; and (ii) the degree and quality of villager participation in the programming and execution of the investment program.
3. Evaluations. Evaluation studies are of two kinds, operational evaluations concentrate mainly on programming methodology and consistency and on general performance by the Agencies. Long-term evaluations include, in addition, case studies of selected communities aimed at assessing program benefits. Evaluations of seven micro-regions have been completed thus far: three operational (Rio Sonora; Baja California Norte and Sur) and four long-term evaluations (Dolores Hidalgo, Guanajuato; Sur de Yucatan; Chiapas, Chiapas; and Zacapoaxtla, Puebla).
4. Main findings of the short-term evaluations were that more attention should be given under the PIDER program to:

- a. coordination of investment proposals at both planning and implementation stage in terms of type of investments, beneficiaries, and timing;
- b. continuity over time of investments in individual communities; and
- c. grassroot participation in investment decision.

CIDER noted also that federal agencies are now for the first time participating in a countrywide, integrated development program, which has brought up issues which were not previously considered by any individual agency. Examples of PIDER-induced changes in participating agencies are: improved interagency coordination; improved coordination within agencies, with SAG as a clear example; and more effective programming, budgeting, monitoring, and control systems which have affected internal procedures of several participating agencies.

5. Programming. Above findings have led CIDER to increase its efforts in improving PIDER's programming methodology. A more systematic methodology has now been developed which:

- a. makes better use of PIDER and agency field staff;
- b. provides a more comprehensive approach; and
- c. facilitates annual reprogramming as part of budget preparation.

The principal changes recommended in the programming process are: (i) increased time - from the normal one month to a recommended five months for the initial re-programming; (ii) increased participation of PIDER and agency lined staff - and a major reduction in the use of visiting PIDER and agency teams from Mexico City; (iii) increased participation of and consultation with the peasants - not only in the initial diagnosis and programming, but in the execution of the programs as well; (iv) increased analysis of specific investments - in terms of viability, particularly markets; and (v) greater attention to program balance - investment phasing has been uneven, investments have been concentrated among relatively few beneficiaries, and complementary activities are often not taken into account. This improved methodology is now being tested in Baja California Sur, Oriente de Morelos and in the State of Chiapas.

6. Research. CIDER's ongoing research activities include:

- a. State-level institutional organization for rural development;
- b. agricultural policy related to rural development;

- c. agricultural education; and
- d. agro industry.

In addition, several agencies besides PIDER have requested CIDER to develop operational models for their activities, including SRA and the Rural Credit Bank.

7. Training. CIDER's training work program which included was not undertaken because of staff constraints. CIDER now hopes to implement that program in 1977. Training activities were begun, however, through meetings organized jointly with PIDER of PIDER field staff. A first meeting was held in mid-1976 in Mexico City for State Directors (Vocales Ejecutivos) which provided the first real opportunity for field staff to discuss among each other their common problems, recommendations for solutions, and to present their collective views to PIDER and Presidencia managements. A series of regional-level meetings were then organized for field directors and staff to discuss in detail the various issues raised at the prior meeting, and to determine a pragmatic re-programming strategy for 1977. This "pragmatic" re-programming was to combine CIDER findings with particular regional political and administrative realities. Subsequently, a second national level meeting was held. Bank supervision missions have continually recommended the holding of both the national and regional level meetings as a major form of in-service training for PIDER staff.

Impact

8. The relatively short period during which PIDER is functioning does not allow a firm judgement on impact, particularly with regard to output and income levels of PIDER beneficiaries. However, CIDER evaluations and mission observations both indicate a clearly noticeable development impact. More general indications include:

- a. In beneficiary-communities, a fundamental basis is - often for the first time - created for peasant organization, conscious self-management and local initiative in exploring available resources. Many farmers, interviewed in the field, are aware of their opportunities and seem ready to explore them.
- b. The creation of temporary employment through public infrastructure investments has reduced rural under-employment had has, in several regions, like Yucatan, increased actual rural wages to official minimum-wage levels.
- c. The combination of temporary employment and higher expectations has reduced seasonal outmigration in several micro-regions.

- d. Various examples were noted of direct impact on incomes from feeder road investments, particularly when combined with organized marketing. In Zacapoaxtla, unit prices received by one group of farmers were 220% higher than the middleman's offer in the first year and the quantity marketed increased by 400% during the second year. In Cosala-Elota, the construction of a penetration road increased the producer's price for corn by 65% and for cattle by 80%.
- e. Significant, though still tentative, yield increases have taken place in those regions where the PRONDAAT extension scheme is operating. In those regions, actual increases in small-farmer yields and incomes appear in line with or in excess of appraisal estimates.
- f. Lastly, CIDER has noted that often it is the more prosperous farmers who tend to first benefit from PIDER investments. This reflects the lack of real grassroots participation in investment programming and implementation; it also reflects executing agency bias.

9. Most information regarding PIDER's impact is still impressionistic or referring to single cases. This is mainly caused by the short existence of PIDER. In addition, it is caused by CIDER's insufficient quantification in its evaluation reports and its inadequate attention to financial and economic analysis. CIDER should also expand its activities to include: (i) micro-region marketing structures and their implications for the target communities; (ii) a more systematic treatment of variables such as prices, imputed labor costs, and specific investment benefits. In addition there should be a greater interchange of field experiences with PRONDAAT.

C I D E R
PROFESSIONAL STAFF
1976

Discipline	Repro-gramming	Evaluation		Research	Training	Total
		Short Evaluation	Evaluation /Research			
Agronomists	2	1	3	3* ¹		9
Economists	1	1	2	2*		6
Anthropologists	1		1	1		3
Sociologists		2*	1*	1*		4
Lawyers				1*		1
Teachers				1**	1*	2
Agric. Eng.				1*		1
TOTAL	4	4	7	10	1	26

* PhD

** MSc

*¹ 2PhD

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER II

Cost Estimates and Investment Phasing

1. Project cost estimates (Table 1) are based on detailed plans for the proposed 20 micro-regions. These plans were reprogrammed during the first half of calendar year 1976 and cover estimated expenditures over a four-year period. As the PIDER II project was appraised before the period of major monetary adjustment in Mexico (September-November 1976), base line project costs were increased by 30% for the estimated inflation between mid-1976 and April 1977.

2. To these adjusted base line costs were applied 10% physical contingencies for all items except credit. Further, expected international price contingencies were added at the rate of 10%, 9% and 8% for the project investment period. In using these price contingency estimates, the assumption for internationally traded goods is that over the project disbursement period the peso/dollar exchange rate would broadly adjust itself to the difference between domestic and international inflation. To the extent the exchange rate would not be allowed to adjust to possible differential inflation rates, these price contingency estimates would not be correct. Indications are that the peso would be allowed to float freely in response to market forces. For non-traded goods, the assumption is that local price increases will be in line with internationally traded goods.

3. Unit Cost Estimates. PIDER supports a wide variety of projects in different sectors and in fairly isolated areas. There has been unit cost variation for similar projects in different parts of the country. Some part of this variation is due to differing wages; other differences are related to problems of access and non-availability of suitable local supplies of wood and crushed rock; yet others to difficulty in terrain (road building in mountainous areas). PIDER's monitoring work has derived both national and regional unit cost estimates for the principal works and services supported under the project. (Table 2 provides data on national averages; each sector annex provides unit cost data.)

MEXICO
RURAL DEVELOPMENT PROJECT - PIDER II

COST ESTIMATES AND INVESTMENT FINANCING (Mex\$ millions)

	Base-Line Cost (%)	Labor/ Material Cost (%)	Project Years			Total
			1	2	3	
I. Directly Productive	70		858.2	909.4	800.2	2,567.8
A. Infrastructure, total	34		429.8	454.6	345.7	1,230.1
Irrigation:	16		177.2	239.1	170.2	586.5
Labor		30	53.2	71.7	51.1	176.0
Materials, equip. & other		70	124.0	167.4	119.1	410.5
Soil & Water Conservation:	5		75.3	59.5	45.2	180.0
Labor		75	56.5	44.6	33.9	135.0
Materials, equip. & other		25	18.8	14.9	11.3	45.0
Livestock:	8		114.0	101.7	88.7	304.4
Labor		20	22.8	20.3	17.7	60.9
Materials, equip. & other		80	91.2	81.4	71.0	243.5
Fruit, Forestry & Fisheries:	4		63.3	54.3	41.6	159.2
Labor		30	19.0	16.3	12.5	47.8
Materials, equip. & other		70	44.3	38.0	29.1	111.4
B. Development Credit:	24		275.0	295.0	295.0	865.0
Labor		15	41.3	44.3	44.3	129.9
Materials, equip. & other		85	233.7	250.7	250.7	735.1
C. Rural Industry:	7		80.8	80.8	80.8	242.4
Labor		20	16.2	16.2	16.2	48.6
Materials, equip. & other		80	64.6	64.6	64.6	193.8
D. Incremental Production Credit:	6		72.6	78.7	78.7	230.0
Labor		20	14.5	15.7	15.7	45.9
Other		80	58.1	63.0	63.0	184.1
II. Productive Support	20		292.7	249.4	202.2	744.3
Feeder Roads:	7		128.4	91.9	54.1	274.4
Labor		70	89.9	64.3	37.7	191.9
Materials, equip. & other		30	38.5	27.6	16.4	82.5
Rural Electrification:	3		47.8	45.8	32.1	125.7
Labor		20	9.6	9.2	6.4	25.2
Materials, equip. & other		80	38.2	36.6	25.7	100.5
Farmers' Organization:	3		31.8	31.7	31.7	95.2
Staff		80	25.5	25.4	25.4	76.3
Materials, equip. & other		20	6.3	6.3	6.3	18.9
Extension & Field Demonstration:	5		61.6	55.9	55.8	173.3
Staff		80	49.3	44.7	44.6	138.6
Equip. & vehicles		20	12.3	11.2	11.2	34.7
Rural Marketing:	0		7.1	4.1	2.5	13.7
Labor		10	0.7	0.4	0.3	1.4
Materials, equip. & other		90	6.4	3.7	2.2	12.3
Feasibility Studies:	2		16.0	20.0	26.0	62.0
Labor		80	12.8	16.0	20.8	49.6
Materials, equip. & other		20	3.2	4.0	5.2	12.4
III. Social Infrastructure	9		155.3	103.3	79.0	337.6
Education:	2		39.6	29.9	21.9	91.4
Labor		30	11.9	9.0	6.6	27.4
Materials, equip. & other		70	27.7	20.9	15.3	64.0
Rural Water Supply:	5		87.4	55.5	35.9	178.8
Labor		40	35.0	22.2	14.4	71.6
Materials, equip. & other		60	52.4	33.3	21.5	107.2
Self-Help Materials	2		28.3	17.9	21.2	67.4
IV. Evaluation						
Evaluation, Monitoring & Training	0		5.8	5.8	5.8	17.4
Staff		80	4.6	4.6	4.6	13.8
Materials, equip. & other		20	1.2	1.2	1.2	3.6
V. Total Base-Line Cost (June '76 prices)	100		1,312.0	1,267.6	1,087.2	3,666.8
Labor		36.5	478.9	462.7	396.8	1,338.4
Materials, equip. & other		63.5	833.1	804.9	690.4	2,328.4
VI. Revised Base-Line Costs (Adjusted for price increases from July '76-April '77) (307)			1,705.6	1,647.9	1,413.4	4,766.9
(Exchange Rate Conversion Mex\$22.5/US\$1) in US\$ millions			75.8	73.2	62.8	211.9
VII. Contingencies						
A. Physical (10%)			5.0	4.6	3.5	13.1
B. Price (10%, 9%, 8%)			4.1	10.7	15.1	29.9
VIII. Total in US\$			84.9	88.6	81.5	255.0

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER II

Unit Cost Estimates

Mex\$12.5 = US\$1 (1974)

Mex\$20 = US\$1 (1976)

<u>Category</u>	<u>Unit</u>	<u>National Averages</u>			
		<u>PIDER I (1974)</u>		<u>PIDER II (June 1976)</u>	
		<u>Mex\$</u>	<u>US\$</u>	<u>Mex\$</u>	<u>US\$</u>
1. Rural Roads Range	Km	85,000	6,800	135,000 70,000-270,000	6,750
2. Electrification Range	Person	1,062	85	1,134 500-1,500	57
3. Water Supply Range	Person	937	75	890 600-1,500	45
4. Schools Range	Classroom	62,500	5,000	80,000 45,000-116,000	4,000
5. Irrigation Range	Ha	15,000	1,200	18,700 7,500 - 55,000	940
6. Soil Conservation Range	Ha	13,000	104	2,000 900 - 4,500	100
7. Fruit Tree Estab. Range	Ha	8,125	650	15,900 7,000 - 27,000	795
8. Beef Cattle Unit Range	Animal Unit Infrastruct. Unit	325,000	26,000	4,400 2,800 - 6,600	220
9. Extension Service	Extension Person/annum	156,000	12,500		
10. Land Reform Serv.	Land Reform Person/annum	100,000	8,000		

PROJECT COST ESTIMATES

1. The costs estimates and investment phasing shown in Annex 7-a, Table 1 are the summation of the twenty individual micro-region programs. Table 1 of this appendix shows the phasing of investments by micro-region 1/. Tables 2, 3, and 4 show individual micro-region programs for three of the twenty micro-regions-- Soto La Marina, Tam., Centro, Yuc., and Huasteca, Hdgo.-- to be supported under this project.

2. The cost estimates shown in this appendix are for mid-1976. In estimating total project cost it was assumed that there was an average inflation of 30% on all project costs between mid-1976 and April 1977. Thus to obtain the April, 1977 estimated costs, each figure would have to be increased by 30%. To then obtain the dollar equivalent amount, the exchange rate of Mex\$ 22.5/US\$1 was used.

1/ Excluding credit, rural industries, feasibility studies, and evaluation. Credit and rural industries requirements were made on the basis of PIDER I experience, FIRA experience, and mission estimates. Evaluation estimates are from CIDER, the evaluation agency. Feasibility study estimates were estimated globally at Mex\$4 million per micro-region.

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER II

INVESTMENTS PROGRAMMED - BY MICRO-REGION
(Mex\$ millions)

<u>MICRO-REGION</u>	<u>YEARS</u>			<u>TOTAL</u>
	<u>1</u>	<u>2</u>	<u>3</u>	
1. Litoral Oeste, Yuc.	44.8	34.2	18.9	97.9
2. Centro de Yucatan	31.2	27.9	20.0	79.1
3. Norte de Quintana Roo	47.9	47.8	43.9	139.6
4. Sierra de Tabasco	44.3	35.4	25.2	104.9
5. Parras, Coah.	27.1	25.8	24.7	77.6
6. Ramos Arizpe, Coah.	66.6	43.2	-	109.8
7. General Trias-Satevo, Chih.	28.4	23.4	19.8	71.6
8. Francisco Sarabia, Dgo.	31.7	35.2	17.6	84.5
9. Soto la Marina, Tam.	29.4	43.9	39.5	112.8
10. Calvillo-Jesus Maria, Ags.	57.5	54.1	34.5	146.1
11. Sombrerete, Zac.	42.9	34.2	36.2	113.3
12. Cihuatlan, Jal.	78.1	32.8	39.5	150.4
13. Vallarta, Jal.	74.6	104.1	51.4	230.1
14. Tlaxcala Norte, Tlx.	34.8	35.1	40.6	110.5
15. Tlaxcala Sur, Tlx.	17.9	13.8	17.7	49.4
16. Huasteca, Hdgo.	34.1	22.9	2.4	59.4
17. Izucar de Matamoras, Puc.	79.3	51.5	41.1	171.9
18. Amuzgos, Gro.	23.1	25.6	25.2	73.9
19. Amealco, Qro.	40.1	55.9	53.3	149.3
20. Mazahua, Mex.	30.6	40.8	47.9	118.3
TOTAL PROGRAMMED ^{1/}	864.4	787.6	599.4	2,251.4
	=====	=====	=====	=====
US\$ Equivalent (Millions) (Mex\$22.5/US\$1)	38.4	35.0	26.6	100.0

1/ Excluding Credit, Rural Industries, Feasibility Studies, Evaluation.

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER 11

INVESTMENT PROGRAM ('000 PESOS)

HUASTECA, HDGO.

Category	Unit	Total Units	Total Cost	Unit Cost	Year 1		Year 2		Year 3	
					No. Units	Cost	No. Units	Cost	No. Units	Cost
<u>Productive</u>										
Irrigation	ha	1,098	8,945	8.1	418	4,675	680	4,270	-	-
Fruit Development Orchards	ha	185	1,247	6.7	185	1,247	-	-	-	-
Technical Assistance			1,189			481		354		354
<u>Sub-total</u>			<u>11,381</u>			<u>6,403</u>		<u>4,624</u>		<u>354</u>
<u>Supportive</u>										
Agricultural Extension ^{1/}			2,689			1,053		818		818
Land Reform ^{2/}			4,122			1,680		1,221		1,221
Marketing			132			132		-		-
Feeder Roads	Km	120.8	23,220	192.2	32.8	10,110	88	13,110	-	-
Electrification	beneficiaries	5,652	3,090	0.5	5,652	3,090	-	-	-	-
<u>Sub-total</u>			<u>33,253</u>			<u>16,065</u>		<u>15,149</u>		<u>2,039</u>
<u>Social</u>										
Drinking Water	beneficiaries	12,741	5,480	0.4	12,741	5,480	-	-	-	-
Education	classrooms	87	5,625	64.7	41	2,515	46	3,110	-	-
Self-Help	beneficiaries	6,638	3,608	0.5	6,638	3,608	-	-	-	-
<u>Sub-total</u>			<u>14,713</u>			<u>11,603</u>		<u>3,110</u>		<u>-</u>
<u>TOTAL INVESTMENT</u>			<u>59,347</u>			<u>34,071</u>		<u>22,883</u>		<u>2,393</u>

1/ 2 professionals; 6 para-professionals; plus support.

2/ 5 professionals; 6 para-professionals; plus support.

MEXICO
RURAL DEVELOPMENT PROJECT - PIDER II

INVESTMENT PROGRAM ('000 PESOS)

SOTO, TAM.

Category	Unit	Total Units	Total Cost	Unit Cost	Year 1		Year 2		Year 3	
					No. Units	Cost	No. Units	Cost	No. Units	Cost
Productive										
Irrigation	ha	1,275	21,300	16.7	-	700	930	9,950	345	10,650
Soil Conservation	ha	2,900	9,472	3.3	1,100	3,543	1,200	4,199	600	1,730
Livestock										
Beef Units	500 ha 160 head	12	25,877	2,156.4	4	8,620	4	8,625	4	8,626
Forage Improvement	silos	318	988	3.1	106	462	106	263	106	263
A. I. Program			585			-		-		585
Wells	No. wells	12	2,276	189.7	4	681	4	880	4	715
Fruit Development										
Orchards	ha	115	1,416	12.3	45	583	40	510	30	323
Technical Assistance			537			233		152		152
Beekeeping										
Units	60 hives	26	1,274	47.1	12	565	14	659	-	50
Technical Assistance			390			157		117		116
Rural Industries	factories	1	1,539	1,539		-		1,539		-
Sub-total			65,654			15,550		26,894		23,210
Supportive										
Agricultural Extension ^{1/}			4,429			1,712		1,392		1,325
Land Reform ^{2/}			4,088			1,716		1,186		1,186
Marketing										
Tiendas	No.	14	420	30	6	180	8	240	-	-
Bodegas	No.	2	1,668	834	-	260	1	704	1	704
Feeder Roads	Km	145.7	11,876	81.5	28.1	2,524	62	5,109	55.6	4,243
Electrification	beneficiaries	8,307	16,100	1.9	3,243	3,845	2,146	5,760	2,918	6,495
Sub-total			38,581			10,237		14,391		13,953
Social										
Drinking Water	beneficiaries	4,304	3,332	0.8	1,081	1,332	2,103	600	1,120	1,400
Education	classrooms	20	1,825	91.3	10	900	7	640	3	285
Self-Help	beneficiaries	5,343	3,424	0.6	2,293	1,370	2,153	1,371	897	683
Sub-total			8,581			3,602		2,611		2,368
TOTAL INVESTMENT			112,816			29,389		43,896		39,531

1/ 6 professionals; 9 para-professionals; plus support.

2/ 7 professionals; 3 para-professionals; plus support.

MEXICO
RURAL DEVELOPMENT PROJECT - PIDER II
INVESTMENT PROGRAM ('000 PESOS)
CENTRO DE YUCATAN, YUCATAN

Category	Unit	Total Units	Total Cost	Unit Cost	Year 1		Year 2		Year 3	
					No. Units	Cost	No. Units	Cost	No. Units	Cost
Productive										
Irrigation	ha	50	1,466	29.3	-	55	30	861	20	550
Livestock										
Beef Units	250 ha 227 A. U.	10	7,852	785.2	4	3,141	4	3,141	2	1,570
Health Services			1,370			404		312		654
Fruit Development	ha	744	20,601	27.7	408	10,044	188	6,168	148	4,389
Beekeeping	100 hives	15	1,014	67.6	6	406	5	338	4	270
Sub-total			32,303			14,050		10,820		7,433
Supportive										
Agricultural Extension ^{1/}			10,025			3,637		3,122		3,266
Land Reform ^{2/}			5,276			2,046		1,615		1,615
Feeder Roads	Km	62	5,455	88	16	1,400	29	2,525	17	1,530
Electrification	beneficiaries	5,326	5,407	1	1,792	1,913	2,356	2,086	1,178	1,408
Sub-total			26,163			8,996		9,348		7,819
Social										
Drinking Water	beneficiaries	16,536	10,366	0.6	6,749	4,124	5,208	4,559	4,579	1,683
Education	classrooms	71	4,700	66.2	37	2,330	20	1,080	14	1,290
Self-Help	beneficiaries	15,159	5,572	0.4	4,959	1,674	5,040	2,139	5,160	1,759
Sub-total			20,638			8,128		7,778		4,732
TOTAL INVESTMENT			79,104			31,174		27,946		19,984
=====			=====			=====		=====		=====

1/ 6 professionals; 22 para-professionals; plus support.

2/ 9 professionals; 6 para-professionals; plus support.

MEXICORURAL DEVELOPMENT PROJECT - PIDER IIEstimated Schedule of Disbursements

<u>Fiscal Year and Quarter</u>	<u>Cumulative Disbursements at End of Quarter</u> US\$'000
<u>1977/78</u>	
September 30, 1977	
December 31, 1977	
March 31, 1978	
June 30, 1978	7,000
<u>1978/79</u>	
September 30, 1978	14,000
December 31, 1978	21,000
March 31, 1979	27,000
June 30, 1979	34,000
<u>1979/80</u>	
September 30, 1979	46,000
December 31, 1979	58,000
March 31, 1980	70,000
June 30, 1980	82,000
<u>1980/81</u>	
September 30, 1980	94,000
December 31, 1980	106,000
March 31, 1981	118,000
June 30, 1981	120,000

Source: mission estimates

February 1977

MEXICORURAL DEVELOPMENT PROJECT - PIDER IICOST RECOVERY AND FISCAL BURDENGeneral

1. Government's policy on cost recovery is based on budgetary criteria and also takes into account the extent to which private benefits are identifiable and beneficiaries have the capacity to repay. Thus, while Government would aim at substantial recovery of most directly productive investments, repayment rates would depend on the income levels of beneficiaries. Since the benefits of this project would go to the rural poor, who will need part of the project-related incremental income to meet subsistence needs, it is estimated that 61% of directly productive activities would be recovered, with all costs of maintaining these investments borne by the beneficiaries. Further, 6% of productive support services and 11% of the cost of social infrastructure would be recovered (Tables 1 and 2). Government would recover a total amount of US\$99 million of original investments, or 39% of project costs, leaving an initial fiscal impact of US\$156 million, excluding interest. The cost of maintaining and operating directly productive infrastructure would be borne fully by beneficiaries. They would also be charged with the full operating costs for marketing, electricity, drinking water and self-help projects, and would contribute to education. At full development, the additional fiscal burden for Government would be US\$8 million per annum, a small part of which (10%) would be offset through additional tax revenues as a result of incremental production and income from the project.

2. In PIDER II, the expansion of the development credit component and the inclusion of rural industries will increase the proportion of the Project investment recovered from the beneficiaries. It was anticipated under PIDER I that repayment requirements would be based on "detailed socio-economic studies" of the beneficiaries "post-project net income situation," but due to administrative complexities, a more straightforward approach to cost recovery is being applied.

3. Cost recovery would thus be limited to: (i) productive, direct income-producing investments (credit, livestock, irrigation, fisheries, etc.); and (ii) investments with identifiable private benefits such as electricity. For public-goods-type investments (such as roads, soil conservation, schools, etc.), cost recovery would be limited to the supply of sites and local construction materials.

4. For productive investments: (i) cost recovery and/or cost contribution rules would be agreed upon with beneficiaries prior to construction; and (ii) beneficiaries would be able to defray their repayment obligations, through labor and material contributions. The procedures for cost recovery are set forth below.

Investment Costs (see Table 1)

5. Irrigation. The Government requires an initial cash, labor or kind contribution of about 10% of the project investment cost, with an additional amount to be recovered as shall be reasonable taking into account the ability of the beneficiaries to pay.

6. Fruit Production. CONAFRUIT enters into agreements with groups of beneficiaries committing them to contribute to the original investment. This contribution is mainly labor for land preparation and fruit tree planting.

7. Livestock Infrastructure. Groups of beneficiaries would be committed in principle in their contract with SARH to repay original investments in the on-farm commercial-scale demonstration units. However, some 30% of the expected beneficiaries have before-project family incomes under US\$375 per annum; another 40% have incomes between US\$375 and US\$475. In these cases investment repayment would be tied to the relative success of the specific investments. On average, it is estimated that about 50% would be recovered.

8. Soil and Water Conservation. The Mexican Government considers conservation of soil and water of national interest and its policy is not to charge beneficiaries for the initial investment.

9. Beekeeping. INI enters into contracts with groups of beneficiaries obliging them to repay the costs of the initial investment. This is normally done by beneficiaries repaying with incremental hives generated from the initial pilot units. Since beekeeping provides additional cash income and has a high rate of return, a 100% recovery is feasible. This INI procedure of repayment in kind has worked well.

10. Credit. Current terms and conditions are 3 to 5 years at 9.5% to 11.0% for development credit and up to one year at 14.0% for seasonal production credit. Credit would be provided through public and private banks under technical and financial supervision by FONDO. Repayment of interest and principal from small farmers has been running at 95%.

11. Productive Support. Investments in feeder roads, extension and field demonstration, and farmer organization are not recovered from beneficiaries. For marketing, however, CONASUPO is expected to enter amortization over 15 years. The community provides the site and a building for remodelling into a rural store.

12. Other Infrastructure. Government does not recover its capital investments in water supply, primary education and self-help projects. However, the benefitting communities participate in these investments by providing sites and -to the extent possible- labor and local materials. In primary education, this contribution amounts on the average to 15% of the financial cost. For self-help projects, all local labor and materials are provided by the community; the project would only provide supervisory power and materials that are not available locally. For electrification and drinking water, cost recovery is arranged as follows:

- (i) Electrification. Upon installation, beneficiaries provide a cash contribution to the investment cost of the system. Further, individual families pay all costs of internal household wiring. The remainder of system costs are recovered through electricity charges.
- (ii) Drinking Water. SAHOP requires beneficiaries to contribute at least 15% of the construction cost of the system, either in labor and local materials or in cash. Beneficiaries' cash payments, which have been included in the project cost, are estimated at one-fifth of their contribution, or about 5% of the amount included in the project for water supply. Contributions in kind and the costs of house connections, which are installed at the expense of the individual families, are not included in the project.
- (iii) Project Administration. The costs of technical services would be borne by Government without recovery.

Operation and Maintenance Costs^{1/} (see Table 2)

13. Livestock Infrastructure. Under their contracts with SARH, beneficiaries are obligated to maintain the infrastructure according to SARH's guidelines and under supervision of the regional SARH conservation staff.

14. Irrigation. SARH would ensure a 100% contribution to operation and maintenance by beneficiaries. In the past, SRH took full responsibility for both operation and maintenance of its systems, and recovered all costs from the users associations through water charges. SAG left this to the local water committees, which maintained their system at their own expense, under SAG supervision. SARH policy is not yet defined.

^{1/} For directly productive investments, only maintenance costs have been estimated, since beneficiaries are fully responsible for their use.

15. Soil and Water Conservation. Maintenance of the conservation works constructed under the project is carried out by the ejido/village conservation association under SARH supervision. The obligation of beneficiaries to maintain those works would be spelled out in their agreement with SARH.
16. Beekceping, Forestry, Fishery. For all three components, the groups of beneficiaries would be obligated under their agreement with SARH to maintain these investments. Maintenance would be carried out by beneficiaries under SARH supervision.
17. Feeder Roads. Road maintenance is the responsibility of SAHOP which finances this from its regular budget without recovery from beneficiaries.
18. Extension and Field Demonstration. After the initial intensive effort to introduce improved technical practices and to ensure proper use of the productive investments, SARH extension and field demonstration staff would be reduced. Their salaries and other operating expenses would be financed from SARH's regular budget without recovery from beneficiaries.
19. Farmer Organization. Once the basic village/ejido organizations are set up and operating, SRA's community development brigades would be reduced to an average size of two agents per micro-region. Their salaries and other operating expenses would be financed from SRA's regular budget without recovery.
20. Marketing. Maintenance and operating expenses, amounting to US\$3,000 per rural store and US\$20,000 per rural warehouse, would be carried out by CONASUPC. These costs would be recuperated through the prices that CONASUPC charges beneficiaries.
21. Primary Education. The primary schools would be operated by the Secretariat of Education and maintained by CAPFCE. Their costs, amounting to US\$2,000 per 50-student classroom, would be financed from the regular budget. However, costs of materials, such as paper and pencils, and extra-curricular activities are paid by the parents.
22. Electrification. Operation and maintenance of the electricity network would be carried out by CFE, with full cost recovery from beneficiaries.
23. Drinking Water. The local water committees would operate and maintain the water systems under SAHOP supervision. Their costs would be fully covered by user charges, set in consultation between these committees and SAHOP.
24. Self-Help Project. The benefitting communities would operate and maintain the facilities constructed with self-help at their own expense and with advisory assistance by SAHOP.

25. Project Administration. The on-going evaluation effort would be financed by Government through the regular CIDER budget.

26. Conclusion. The above estimates indicate that beneficiaries would contribute US\$9.8 million to operation and maintenance costs. They would bear 100% of the cost of maintaining the directly productive investments and contribute 29% to the operation and maintenance costs of productive support and social infrastructure investments. The fiscal burden for Government would be US\$8.1 million per annum, or 0.7% of estimated total public recurrent expenditures in 1980. These expenditures would provide the beneficiaries with a level of government services which is about average nationwide, but still far below urban standards. For direct beneficiaries annual expenditures per capita would be US\$10, which compares with total public recurrent expenditures estimated at US\$85 per capita in 1980.

Beneficiary Repayment Capacity

27. With the possible exception of electrification, which requires a beneficiary cash contribution to the investment cost of the system, repayment - where required (in addition to initial cash, labor or kind contribution) - is conditioned to repayment capacity, itself a function of the success of the project (for productive investments). In some areas, where the opportunity cost of contributions of labor are wages earned elsewhere (and where such wages are necessary for minimal consumption), at the discretion of the local PIDER and agency staff, contributions are tailored to the particular circumstances (e.g. half-rate wages, with half contributed). With respect to electrification, PIDER and CFE are currently studying mechanisms to lessen the financial impact of the initial contributions. Thus far, however, no new policy exists, though special arrangements have been set in specific areas.

28. On the development of the micro-region plans, the impact of beneficiary contributions is studied and in the "ejido models" the investment program is coordinated with ejido repayment capacity. This both for investment recovery and operation and maintenance costs. Cash flow projections for the ejido program are calculated to ensure ejido capacity to sustain the proposed investments in the short-term. The high financial rates of return (even with the inclusion of water and electrification) indicate the longer-term viability of the ejido to sustain the investment program.

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER II

Estimated Recovery of Investment Costs

	<u>Total Investment (US\$mill.)</u>	<u>Recovery Period (years)</u>	<u>Interest Rate (%)</u>	<u>Amount Recovered (US\$mill.)</u>	<u>Proportion Contributed or Recovered (%)</u>
I. <u>Directly Productive</u>					
A. <u>Infrastructure</u>					
1. Livestock	17.6	2-25	-	3.6	20
2. Irrigation	33.9	2-25	-	8.5	25
3. Fruit, Forestry, Fisheries & Beekeeping	9.2	3-12	-	2.9	32
4. Soil & Water Conservation	10.4	-	-	-	-
5. Rural Industries Pilot	5.0	3-12	-	2.5	50
Sub-Total	76.1			17.5	(23)
B. <u>Development Credit</u>					
1. Agriculture	50.0	3-12	9.5-11.0	50.0	100
2. Rural Industries	9.0	3-12	9.5-11.0	9.0	100
Sub-Total	59.0			59.0	(100)
C. <u>Incremental Production Credit</u>					
Sub-Total	13.3	1	14.0	13.3	100
ii. <u>Productive Support</u>					
1. Feeder Roads	15.9	-	-		
2. Extension	5.5	-	-		
3. Farmer Organization	10.0	-	-		
4. Marketing	0.8	15	-	0.8	100
5. Electrification	7.3	2-25	-	1.8	25
6. Feasibility Studies	3.6	-	-	-	-
Sub-Total	43.1			2.6	(6)
III. <u>Other Infrastructure</u>					
1. Education	5.3	-	-	0.8	15
2. Drinking Water	10.3	-	-	1.5	15
3. Self-Help Projects	3.9	-	-	-	0
Sub-Total	20.5			2.3	(11)
IV. <u>Evaluation</u>					
Sub-Total	1.0	-	-	-	0
Total Base-Line Cost	212.0			92.4	
Contingencies	43.0			6.9	
Total Project Cost	255.0			99.3	(39)

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RURAL DEVELOPMENT PROJECT - PIDER II

Estimated Recovery of Operation and Maintenance Costs^{a/}

<u>Project Component</u>	<u>Unit</u>	<u>Number of Units</u>	<u>Annual O & M Cost per Unit (US\$)</u>	<u>Total Annual O & M Cost (US\$'000)</u>	<u>Contribution by Beneficiaries (US\$'000)</u>	<u>(%)</u>
<u>I. Directly Productive^{b/}</u>						
1. Livestock Infrastructure	300 ha.	100	1,500	1,500	1,500	100
2. Irrigation	ha.	34,000	65	2,210	2,210	100
3. Fruit Production	ha.	70,000	50	3,500	3,500	100
4. Soil & Water Conservation	ha.	75,000	5	375	375	100
5. Beekeeping	30 hives	200	70	14	14	100
6. Forestry	ha.	900				
						<u>100</u>
<u>II. Productive Support</u>						
1. Feeder Roads	km.	2,000	240	480	--	0
2. Extension	staff	500	5,000	2,500	--	0
3. Farmer Organization	staff	200	4,500	900	--	0
4. Marketing	warehouses/ stores	40	7,250	290	290	100
5. Electrification	'000 pers.	131	10.	<u>1,300</u>	<u>1,300</u>	<u>100</u>
III.				5,570	1,590	(29)
<u>III. Other Infrastructure</u>						
1. Education	Additional Class.	1,200	3,200	3,840	150	4
2. Drinking Water	'000 pers.	214	8	440	440	100
3. Self-Help Projects	villages	n.a.				
				<u>4,280</u>	<u>590</u>	<u>(14)</u>
<u>IV. Project Administration</u>						
1. Evaluation	Staff	25	16,000	<u>400</u>	--	0
				400	--	(0)
<u>Total Costs</u>				17,850	9,780	(55%)

Note: n.a. Not applicable

a/ For directly productive investments, maintenance only

b/ In October 1974 prices

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RURAL DEVELOPMENT PROJECT - PIDER II

AGRICULTURAL YIELDS AND TECHNICAL SPECIFICATIONS

Rainfed Crops

1. Better data is now being collected on yield levels, possible yield increases, and farmer acceptance rates. PIDER programming teams now have large quantities of pre-project yield level data for rainfed crops in the PIDER micro-regions. Through PRONDAAT extension officers, yields responses to extension, fertilizer, and improved seeds are now being obtained as is information of farmer acceptance rates. Table 1 provides a breakdown of yield data on rainfed crops in different rainfall areas, both without and with the project. 1/

Irrigated Crops and Livestock

2. Yield increase estimates for irrigated crops and for livestock investments are subject to less variation than are estimates of rainfed production, especially for the PIDER micro-region areas. With irrigation, basic crop yields are often triple the yields on previously rainfed areas, especially for corn and beans. For livestock, simple fencing, better pastures and animal management provide reasonable surety of lower mortality rates, better weight gains and increases in calving. Tables 2 and 3 provide estimates of these levels for irrigated lands and for livestock units.

1/ For the purposes of the economic and financial analysis it was assumed that a maximum of 30% of the hectares said to be affected through the project would result affected. It was further assumed that phasing to full development would take between one and three years longer than estimated in the PIDER preparation reports. Yields were assumed as per Table 1 (generally much lower than assumed by PIDER).

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER II

MICRO-REGIONS - RAINFALL, MAIZE AND BEAN YIELDS

<u>Average Rainfall</u>	<u>Rainfall</u>		<u>Maize Yields (kg/ha)</u>		<u>Bean Yields (kg/ha)</u>	
	<u>Minimum</u>	<u>Maximum</u>	<u>Without PIDER</u>	<u>With PIDER</u>	<u>Without PIDER</u>	<u>With PIDER</u>
<u>1,200 mm and over</u>						
Sierra, Tab.	2,340	3,750	800	2,100	500	1,000
Amuzgos, Gro.	2,000	2,500	600	1,500	300	700
Huasteca, Hdgo.	1,600	2,100	1,000	2,000	500	1,200
Litoral Oeste, Yuc.	1,400	2,000	600	1,400	-	-
Cihuatlan, Jal.	1,250	1,450	1,200	2,000	600	800
Vallarta, Jal.	865	1,700	900	1,500	500	1,000
Average	1,575	2,250	850	1,750	480	940
<u>700 mm-1,200 mm</u>						
Centro, Yuc.	1,000	1,200	700	1,300	400	1,000
Soto La Marina, Tam.	800	1,200	1,000	1,500	500	1,000
Norte, Q.R.	800	1,600	1,000	1,800	-	-
Mazahua, Mex.	800	1,000	800	2,000	-	-
Amealco, Qro.	700	1,060	500	1,200	300	800
Izucar, Pueb.	800	950	1,000	1,800	600	900
Tlaxcala Sur, Tlax.	725	950	800	1,600	300	800
Tlaxcala Norte, Tlax.	650	780	800	1,600	-	-
Average	785	1,085	825	1,600	420	900
<u>700 mm or less</u>						
Parras, Coahuila	250	400	400	900	400	600
Trias Satevo, Chih.	350	400	700	900	400	800
Calvillo-Jesus Maria, Ags.	420	541	400	900	400	700
Sombrerete, Zacatecas	400	800	300	800	200	500
Ramos Arizpe, Coahuila	300	500	400	700	200	600
Francisco Sarabia, Durango	300	400	500	900	400	700
Average	330	525	460	850	330	630

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER II

YIELDS AT FULL DEVELOPMENT ON IRRIGATED LANDS

<u>Crop</u>	<u>Yields at Full Development (6 years) - M. Tons</u>
Maize	3.5
Beans	2.0
Sorghum	5.0
Wheat	4.0
Alfalfa	70.0 (year 1) 55.0 (year 2)

MEXICO

RURAL DEVELOPMENT PROJECT - PIDER II

TECHNICAL COEFFICIENTS FOR LIVESTOCK

At Full Development

Beef Cattle - 1,200 mm and up rainfall (Breeding and Fattening)

Weaning - 70%
Mortality (adult) - 2%
Culling Rate - 10%
Daily Steer Weight Gain - 0.5 kg (180-200 kg per year)

Beef Cattle - Below 800 mm rainfall (Breeding)

Weaning - 60-65%
Mortality (adult) - 3-4%
Culling Rate - 14-16%

Dairying

Calving - 90%
Cow Mortality - 2%
Annual Cow Milk Production - 4,500-5,000 liters
Productive Life - 5 years (8 years old)

Pigs

Annual Farrowing Average - 16
Marketing Weight - 95-110 kg
Mortality: Young Pigs - 4-6%
Adult Pigs - 1%

Goats

Weaning Rate - 95%
Adult Mortality - 2%
Male-Female Ratio - 1/32
Culling - 20%

Rabbits

Average Litter Size - 6
Litters per year - 5
Average Weight of Marketed Rabbit - 3 kg
Mortality: Young Rabbits - 10%
Adult Rabbits - 4-6%

Chickens (Broilers)

Mortality - 6% (10% if bought 3 days old)
Weight at Sale - 1.3 kg
Efficiency kg food/kg of live weight - 2.6

Beekeeping

Kg of Honey per Hive - 30 (750 mm rainfall or less)
50 (750-1,500 mm)
70 (1,500 mm or more)

MEXICORURAL DEVELOPMENT PROJECT - PIDER IIMARKETING OF PROJECT OUTPUTIntroduction

1. In comparison to levels of PIDER support to improving small-farmer production capabilities, PIDER efforts to address micro-region marketing bottlenecks received less attention. An important part of the PIDER II project will be the efforts made to improve the marketing, storage and processing of output resulting from the PIDER investment. This effort involves three basic strategies.

- (a) For production consumed for self-consumption, the PIDER II project would continue to support the efforts of SARH and INI home economists in improving food preparation and preservation and storage at the householder level (see Annex 4-a).
- (b) For production of basic grains, maize, beans and sorghums, PIDER II will also continue support for the important buying and storage programs run by CONASUPO (Annex 4-c). Where CONASUPO is active in its buying, their programs tend to provide an important and higher priced alternative than middlemen for marketing these traditional crops.
- (c) CONASUPO, however, does not have a program for market support to many non-traditional crops supported by the PIDER program; especially in fruits, vegetables and livestock. Under PIDER II efforts would be made to fill this gap by: (i) including support for farmer owned agro-processing units (Annex 3-b); and (ii) by supporting the expansion of the PRONDAAT extension system which includes a major emphasis on technical assistance for improved marketing. In the Zacapoaxtla, Puebla micro-region, for example, PRONDAAT technicians developed a very successful farmer run grading, boxing and transportation network for traditional fruits which substantially increased the value added to local farmers of this marketed output.

Project Output

2. From the 20 micro-regions included in PIDER II, the investments supported are likely to result in output increases of a variety of crops. These are listed below and compared to existing national production.

PIDER II

<u>Category</u>	<u>National Production 1975</u>	<u>Incremental at Full Development (m/tons)</u>	<u>Consumed at Home (%)</u>
<u>Maize</u>			
Rainfed		76,500	
Irrigated		<u>39,900</u>	—
Total	8,575,000	115,400	30
<u>Beans</u>			
Rainfed		14,200	
Irrigated		<u>17,000</u>	—
Total		31,200	40
<u>Beef</u> (Carcass)		6,300	
<u>Milk</u> ('000 l)		11,072	20
<u>Pork</u> (Carcass)		1,000	30
<u>Honey</u>		324	
<u>Fruit</u>			
Apples		12,000	
Mangoes		26,000	
Grapefruit		12,600	
Avocado		12,000	
Peaches		8,300	
Other		<u>30,100</u>	
Total		101,000	

Present Marketing System

3. Incremental agricultural output generated under the PIDER project has basically three markets, one with guaranteed prices (CONASUPO warehouses), private traders with considerable price fluctuation, and home consumption. Prior to PIDER, most small-scale farmers in the targeted micro-regions have only a small amount of marketable surpluses left after satisfying the needs of their own families. A study by CONASUPO determined that fully 60% of the small farmer's crop is retained for on-farm consumption.

4. The marketing of output not purchased by CONASUPO suffers from various deficiencies. Government also has been slow in addressing itself to the efficiency of the non-CONASUPO marketing system. At present few small farmers have access to transportation, storage or processing facilities. They cannot time their sales so as to get the best prices from the local outlets. Perpetually cash poor, these farmers are sometimes forced to sell before harvest, at low prices. When they can wait until after the harvest, their shaky financial situation requires that they sell their produce in peak season, when prices are at their lowest levels. Their loss of potential income is substantial since the average seasonal price variations for most perishable products are somewhere around 30%.

5. In the past, much of the small-farmers income generated by the production and marketing of agricultural products goes into the hands of middlemen. In 1974, for example, the spread in tomato prices between producer and consumer amounted to 198% in Monterrey, 239% in Guadalajara and almost 400% in the Federal District. In basic grains, local storekeepers often extend small farmers corn and beans on credit during the year and take payment at harvest in bags of the same items. Not infrequently, the equivalent of two bags is lent, but four bags are required in harvest in repayment.

6. CONASUPO was organized to provide an alternative marketing outlet to these producers. CONASUPO's primary function is to deal with the marketing problems inherent among small-scale agricultural producers of basic grain crops. The agency's objectives are to support the basic grain market, raise the incomes of small farmers, and increase the consumption of basic goods by poor families. The Government considers these goals sufficiently important that it has expanded CONASUPO's investment in marketing tenfold, from Mex\$100 million in 1970 to Mex\$1 billion in 1975.

7. In order to stimulate production and provide better returns to farmers, CONASUPO sets support prices for a number of major crops. Despite inflation, during the late 1960s and early 1970s, CONASUPO kept these supports at the same level. As a result, the volume of CONASUPO's internal purchases of maize dropped sharply from 2.1 million tons in 1966/67 to only 770,000 by 1973/74; domestic wheat purchases dropped from 1.1 million tons in 1967/68 to 718,000 tons in 1974/75; and bean purchases dropped from 166,000 tons in 1966/67 to 111,000 tons in 1973/74. Meanwhile, demand was rising and CONASUPO was forced to expand its imports of these products. To reverse this trend, support prices were increased sharply after 1972. Between 1970 and 1976 corn prices rose 102%, wheat prices 118% and bean prices 243% (Table 1).

A. The Guaranteed Price System

8. CONASUPO's procurement system has undergone an amplification of services that by 1976 included guaranteed prices, grain storage, and ancillary services. The first tool in the procurement kit is a guaranteed price. These prices are set before the planting period so as to affect the farmers' planting

decisions. The price is set in function of the projected demand, current inventory levels, expected supply price elasticities, farmer costs and risk exposure, and the desired subsidy level.

9. As can be seen from Table 1 the guaranteed prices have increased dramatically during the 1970-76 period with the bulk of these increases occurring during the 1973-75 period when world commodity prices also skyrocketed.

Table 1

GUARANTEED PRICE INCREASES
(Mex\$ per ton)

	1970	1976	1977 (Feb.)
Maize	940	1,900	2,150
Frijol	1,750	5,000	4,500-5,000
Rice (milled)	1,900	6,700	6,700
Sorghum	625	1,600	1,700
Wheat	913	1,750	1,950
Barley	950	1,450	1,950
Sesame	2,500	6,000	6,000
Cottonseed	900	2,200	2,200
Soy	1,300	3,500	4,500
Safflower	1,500	3,500	9,500
Sunflower	1,800	2,700	2,800

Source: CONASUPO

10. CONASUPO has periodically over and under procured. It currently is suffering from an excessive stock of frijoles (beans). The company appeared to have overreacted to an expected production drop by simultaneously importing and drastically raising the support price. CONASUPO imported 42,265 tons in 1974 and 77,731 tons in 1975; total world trade in frijoles is reportedly only about 150,000 tons. A major jump in production resulted in growing inventories. As of January 1976 CONASUPO had 484,627 tons of frijol stored in its warehouses. Monthly consumption was running at about 10,000 tons, thus leaving a carry-over balance of approximately 360,000 tons. Although some exports had been made, this stock was tying up both storage capacity and working capital and was a matter of considerable concern to many of the BORUCONSA and DICONSA managers interviewed. The support price for frijoles was lowered in 1976 which was a politically sensitive decision but economically necessary.

11. In order for the procurement program to work the Government had to offer more than a guaranteed price; it had to provide a series of additional services which enabled it to compete effectively against alternative buyers. Principal among the adjunct services is warehousing. The warehouse program administered by BORUCONSA has strengthened and expanded during the 1970-76 period to include a network of 1,257 rural warehouse centers with a storage capacity of 2.2 million metric tons. The effective warehousing capacity of CONASUPO also includes another 3.8 million metric tons because CONASUPO now operates the 796 warehouses of the government agency Almacenes Nacionales de Depositio (ANDSA) which was absorbed into the BORUCONSA system in 1975. An additional 300 warehouses, each with a 300 ton capacity are projected for the 1978-80 period. The BORUCONSA rural warehouses are of two types. The first are the conspicuous cone shaped "graneros del pueblo". These warehouses had high visibility and were widely promoted originally. However, their use encountered many difficulties due to technical deficiencies, poor location, and administrative weaknesses. At one point only 50,000 tons (13%) of installed capacity was being used. CONASUPO recognized these weaknesses and shifted to the use of more conventional rectangular warehouses. Some centers were relocated and some of the "graneros" were put to alternative uses such as fertilizer and merchandise storage. Many centers now have both "graneros" and rectangular warehouses, but the latter dominate constituting 74% of all the BORUCONSA storage units. Capacity utilization has improved markedly to about 60%.

12. The quality of the management of a warehouse and buying system is another key determinant of its success. Many such networks with modern storage facilities have failed due to poor administration. CONASUPO's system experienced some serious administrative problems initially but these have been addressed and it appears that the current supervisory and control system can handle the operation in a relatively efficient and effective manner. A Zone Chief supervises the warehouse Grain Analysts; his direct visits (at least once every two weeks) plus the reporting system on the grain and cash movements, stocks and balances provide a series of "early warning flags" capable of detecting problems before they become serious. A team of traveling "auditor/trouble shooters" is used to investigate difficult situations.

13. Perhaps the most critical person in the system is the Grain Analyst who is in charge of receiving and analyzing (humidity level, foreign matter, etc.) the grain, storing it, paying the farmer, and in some cases selling inputs (e.g. fertilizer) and staples (via warehouse stores). The analysts are nominated by the community (the candidates must have at least a 6th grade education) and are trained in a three-month course by BORUCONSA and CECONCA in one of the 20 training centers. The analysts seem to be working fairly well, although some difficulties have arisen. About 15% of the communities have decided to change analysts due to their dissatisfaction with their original choice. Ten of the 1,700 Analysts were fired because of attempted embezzling or fraud. This is remarkably low considering that they are

handling at times cash amounts up to Mex\$25,000.^{1/} The campesinos have proven themselves capable of being trained and of handling the administrative demands of the system in a relatively efficient and effective manner.

B. The Non-Guaranteed Price System

14. While PIDER is investing in infrastructure, inputs and services to increase basic crops (maize, beans) which have assured prices, PIDER's strategy is also to assist farmers in diversifying their farming systems, especially in livestock and horticulture. For this output, prices are not guaranteed nor does Government have a national procurement grid. Current (February 1977) prices paid to producers for such production by the private sector and cooperative purchases are illustrated below (see also Table 2):

	<u>Mex\$</u>	<u>US\$</u>
<u>Cattle</u> (Beef)		
Fat Steers (k)	6.5	0.30
Weaners (k)	5.2	0.26
<u>Milk</u> (l)	5.0	0.25
<u>Pigs</u> (Fat) (k)	7.5	0.36

For fruits and vegetables, prices fluctuate enormously between seasons and between regions in Mexico (Table 3). The higher prices normally reflect peak season winter sales to export markets. Lower prices are more reflective of domestic price level.

Beef Marketing

15. Rising incomes, high income elasticity for beef, and rapid population growth will contribute to strong domestic market opportunities for beef. The Federal District, with the municipal slaughterhouse, consumes about one-third national production. Beef production represents about 35% of the value of agricultural sector production. North of Mexico City, the U.S. demand for beef and feeder cattle exports continues to dominate both the structure and prices of cattle. For example, in 1970 feeder cattle exports from Mexico to the U.S. more than doubled, reaching nearly a million

^{1/} The analysts are exposed potentially to considerable pressure to make false grain analyses to minimize the penalties to the farmers; controls against this type of fraud are also critical.

head per year. They remained at a high level until 1973, when market conditions deteriorated; only 522,849 head were reported in 1973 and 363,481 in 1974. As prices greatly softened in the US, exports to the US amounted to 89,757 head, compared to 300,979 for a comparable six-month period in 1971. The following table summarizes the export of cattle (head) to the United States between 1965 and 1975.

Exports of Feeder Cattle to the US (head)

<u>Year</u>	<u>Head</u>	<u>% Change</u>
1965	557,439	
1970	933,598	67
1971	756,610	(19)
1972	965,811	28
1973	552,849	(43)
1974	363,482	(34)
1975 (6 mos)	89,757	-

Source: FAO

16. Demand for feeders is expected to expand again in the late 1970's, as US feedlots increase their demand for feeder cattle. Nevertheless, continued cyclical instability is expected which inevitably influences output from PIDER schemes.

Dairy Marketing

17. Prices of milk to the farmer, to pasteurizing plants, and to the consumer are theoretically fixed by the Secretariat of Industry and Commerce. The Government has recently reversed a policy favoring low-income urban consumers and is now offering incentives to farmers and pasteurizing plants to increase production. Current regional prices to the producer vary throughout Mexico, from a high of US\$0.26 per liter in Morelos and Guerrero to a low of US\$0.18 in Tabasco, Chiapas and Campeche.

18. In the past, Mexican dairy production was restricted both by these price controls especially for first class milk and by a 20-year Government regulation that first class milk should be pasteurized at the farm level. These factors both resulted in uneconomically-sized pasteurization plants. Within the last few years, however as a result of intensive producer lobbying, price controls have been dropped for first class milk, and centralized dairy processing plants are being permitted.

19. Although the milk and dairy product marketing system is presently geared toward the larger commercial producers, smallholder participation in the system is expanding as cooperative production and marketing systems develop. PIDER and other development agencies have stimulated this trend by offering financing as well as technical and marketing assistance programs.

Pig Marketing

20. The slaughter of swine over the period 1960-1973 has grown about 8% per year. About one-half of the swine population of Mexico is located in the central plateau, where commercial swine production has been concentrated because of its temperate climate and proximity to the main consumption centers. In recent years, production has spread to the northern states as a result of increased availability of lower cost sorghum. Pork production is also increasing in the Yucatan in response to rising consumer demand there. Most hogs are raised by large commercial producers, who usually combine breeding and fattening operations under confined management conditions.

21. There is a shortage of slaughter plants for hogs in Mexico. One result is incomplete utilization and recovery of by-products at slaughter. A second is the high death rate and loss of weight of hogs which must be transported live over considerable distance to slaughterhouses. Hog producers are authorized to slaughter hogs at the municipal facilities and to sell direct to butcher shops and supermarkets. Although hog prices have risen steadily since 1970, traditional cyclical and oversupply patterns and high cost of feedgrains will probably limit significant expansion in the near future.

22. As indicated earlier in this Annex, adequate marketing for basic crops supported by CONASUPO is not likely to be a major problem. The Government has kept farmer prices of these crops at or slightly above international levels to reduce Mexico's imports, especially of maize. For non-traditional crops, PIDER is attempting to improve their value-added by supporting agro-industry and by expanding the PRONDAAT system (which includes marketing technical assistance) to more micro-regions. However, it is not clear in all micro-regions how successful this approach will be and as a result, in calculating the economic rates of return, the mission reduced prices for these non-traditional crops, especially those grown on newly irrigated lands, to account for the problem of marketing them.

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RURAL DEVELOPMENT PROJECT - PIDER II

Prices of Principal Products Produced in PIDER Micro-Regions
-tons-

<u>Category</u>	<u>Mex\$</u>	<u>US\$</u>
Corn	2,150	96
Beans	5,000	222
Barley	1,950	87
Sorghum	1,700	76
Wheat	1,950	87
Tomatoes	3,100	138
Chile	4,000	178
Oats	200	9
Potatoes	1,850	82
Rice	6,700	298
Pumpkins	600	27
Alfalfa	450	20
Lemon	1,700	76
Mango	2,000	89
Tamarind	5,000	222
Peaches	3,500	156
Apples	4,000	178
Oranges	700	31

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RURAL DEVELOPMENT PROJECT - PIDER II

MARKETING OF PROJECT OUTPUT-PRICES

MAIZE PRODUCTION AND IMPORTS

	<u>Production</u> <u>(tons 000)</u>	<u>Imports</u>	
		<u>(Tons 000)</u>	<u>(Mex\$000)</u>
1970-71	8,804	-	-
1971-72	9,483	135	163,807
1972-73	9,200	1,646	2,063,975
1973-74	8,720	1,112	2,128,939
1974-75	7,847	2,717	5,156,837
1975-76	8,575	624 ^{1/}	981,422

^{1/} As of January 20, 1976.

CONASUPO PURCHASES AS A PERCENT OF NATIONAL PRODUCTION

	<u>1970-71</u>	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>	<u>1974-75</u>	<u>1975-76^{1/}</u>	<u>Average</u>
Maize	19.1	16.9	9.9	10.0	3.3	4.1	10.8
Frijol	2.3	20.7	3.2	11.1	35.2	19.8	15.9
Rice (milled)	.1	4.4	5.3	.1	3.1	15.0	5.7
Sorghum	.1	.3	.9	1.1	3.9	6.9	2.5
Wheat	36.8	35.5	44.0	26.2	39.0	-	35.8
Barley	-	19.6	3.7	.9	-	.1	4.6
Sesame	-	-	.1	-	-	40.2	4.2
Copra	-	1.4	-	-	-	18.7	3.0
Soy	-	-	-	-	17.4	28.6	10.0
Safflower	-	10.3	37.1	-	-	73.5	27.4
Sunflower	-	8.3	15.8	1.4	-	-	7.4

^{1/} Through January 20, 1976

Source: CONASUPO, Generencia de Compras.

MEXICORURAL DEVELOPMENT PROJECT - PIDER IIEconomic and Financial AnalysisIntroduction

1. Economic and financial analysis was based on detailed micro-region investment programs submitted to the Bank. Each report contains detailed cost estimates of both investment and operating costs required by the program. Each micro-region report contains financial analyses for "representative" villages (ejidos) of the micro-region. Each report also contains an analysis of micro-region production (itemized by crop) both with and without PIDER investments. Rates of return, both economic and financial, are calculated and are included in each investment program report. In undertaking the appraisal, Bank staff recalculated rates of return, both economic and financial - based on the submitted reports, but modifying various parameters (e.g., yields, prices, area reached by project activities, phasing, uptake rates, shadow pricing of labor, etc.) to meet more stringent tests of reasonableness set by the appraisal team. Financial rates of return were calculated only on the directly productive activities: livestock, irrigation, fruit production, etc., plus the associated development credit. Economic rates of return were calculated on the directly productive activities plus the supporting productive investment and services including the feeder roads, electrification, extension, agrarian reform, marketing, facilities needed to achieve the incremental benefits. Investment in social infrastructure such as domestic water supply and education facilities were not charged as costs in the economic analysis.

2. Cash flow models were also analyzed for "representative" ejidos in each micro-region to ensure that incremental income expected from project investments is sufficient to repay the principal and interest of development loans, and operation and maintenance expenditures of directly productive and support investments. As the beneficiaries of the PIDER project are mainly subsistence farmers with very small, if any, marketable surpluses available to repay long-term productive investments in the short run, it is essential that the loan repayment include a grace period until production reaches a minimum marketable surplus. In addition, the repayment period must be long enough to permit small payments so that the ejido will be left with sufficient cash to provide the participating farmers with a minimum income for family expenditures. The PIDER project does not envisage interest charges on long-term loans made for basic infrastructure investment from PIDER funds. However, interest rates are charged in all "development loans", which comprise

mainly cattle, hogs, beekeeping and tree-fruit production. These types of investments are financed by the banks. Operating expenses for development activities as well as annual crops are to be financed either by official or private banks.

Economic and Financial Analysis

3. The economic and financial analyses take as the direct benefits of the project only the incremental output, net of farming expenses. This incremental output is due to higher yields of the ongoing agriculture and new agricultural activities implemented through the directly productive investments. Bank appraisal estimates of incremental output are less both in volume and value than the estimates submitted in the Mexican reports. In the appraisal, various modifications were made. It was assumed that a maximum of 25% of the of the cultivable land in the target portions of the micro-regions would be reached by extension services and thus would benefit from improved techniques and inputs. It was also assumed that the take-up rate would be considerably slower than assumed in the Mexican reports (i.e., 8 years to full development as opposed to 6 years). Yields were adjusted to coincide with recent field data gathered by the appraisal mission, as were prices for specific crops. Furthermore, it was assumed in the analysis that no high value fruit and vegetable crops would be grown in the newly irrigated areas. The combined impact of these assumptions reduces the rates of return from those calculated by the Mexicans. These assumptions, while conservative are realistic, and give rates of return in accordance with acceptable Bank levels.

4. There are also direct benefits implicit in the incremental output, aside from higher levels of employment and income, particularly improvements in farmer human capital. These come from on-farm training provided through the PIDER project. Higher skill levels lead to better farm management and more efficient use of available resources. These in turn result in better soil and water conservation practices needed in these backward micro-regions. Direct benefits from training and soil and water conservation can be assessed only by comparing output levels with and without the PIDER project. Output levels have not been constant, rather they have been declining over the past decade due to a deterioration of natural resources and the low levels of physical and technological inputs. Hence, without the PIDER project, both output and standard of living could very well deteriorate in the near future; in any case, they should in no way be assumed as constants.

5. The rest of the components - education, potable water and electrification (non-"productive") and self-help (12% of the baseline project costs) - were excluded from the analysis since no meaningful rates of return could be estimated due to the predominance of non-quantifiable effects. These components would not contribute directly to the productive purposes of the project, but their inclusion is consistent with the policy of the Government to increase the access of the low income stratum of the rural population to public services such as education, potable water and electricity. The project would

improve these services at low cost and, to reduce wasteful expenditure, would provide potable water and electrification only with the active participation of the local communities. The charges for these services would be based on conventional rates set at levels reasonably consistent with a coherent set of objectives - covering costs, reducing waste and encouraging the participation of the rural communities.

Economic Rates of Return

6. In undertaking the economic analyses, the net cash flow to beneficiaries was adjusted under the following assumptions:

- (a) The costs of productive support (feeder roads, farmer organizations, extension, electrification and markets) needed to achieve the estimated increment in production were added to the cash flow. These costs are borne by the Government and not by the beneficiary.
- (b) The cost of unskilled labor used in the construction of indirectly productive and productive support assets was reduced from the rate actually paid by Government to the opportunity wage. This opportunity wage was estimated in each of the "representative" micro-regions as the casual labor daily wage rate in the non-crop season, e.g. what a landless laborer could earn doing odd jobs on a daily basis in that area. This rate varied from 80% of the government minimum wage in Guerrero to 40% of this wage in the densely-populated, very poor micro-region of Mazahua in the state of Mexico. The prevailing local labor wage or opportunity wage in each micro-region in the non-crop season was taken as an approximation to shadow wages and used to calculate both the value of community contributions in terms of labor (as said above) and to adjust the minimum legal wage used in financial calculations for the purpose of the economic rate of return analysis. The relationship between the legal minimum wage and the opportunity cost of unskilled labor on a daily basis are shown in Table 1. The opportunity wage levels of off-farm employment in rural areas in these micro-regions were assumed relatively constant through the entire development period. The real wage levels are not expected to increase since unemployment and disguised unemployment are high in these micro-regions, and income is expected to increase for on-farm employment.

- (c) Physical input prices. The prices of all variable inputs were assumed equal to the local market prices or those domestic prices controlled by government agencies. The local market prices in each micro-region were taken, with special attention to draft animals, seeds and transportation. Domestic prices were taken for fungicides, pesticides and fertilizers. Cattle production costs were taken on the basis of information provided by SARH.
- (d) Output prices. The incremental output was assumed not to affect the overall price relationships.
- (e) Foreign Exchange. The foreign exchange costs and earnings of the project were not adjusted.

The results of these adjustments are reflected in the economic rates of return listed in Table 2. Sensitivity tests showed that:

- (a) if overall costs increased by 20% , the economic rate of return would fall to 21%;
- (b) if the rate of adoption of improved practices on rainfed maize and beans was 20% less than currently projected, the economic rate of return would drop to about 20%.

Financial Rates of Return

7. Financial rates of return were measured for all of the investment, including credit in directly productive activities being carried out at the ejido or village levels. These returns were measured from "representative" ejido or village-level development budgets and aggregated into packages (e.g., irrigation, livestock, rainfed grain production, etc.) for purposes of rate of return calculations. "Partial" budget analyses for specific development activities such as livestock production or rainfed corn production were more rigorously undertaken under Loan 910-ME for beef cattle, irrigated dairying, fruit production and some small-scale agro-industries.

8. Physical contingencies of 10% of investment costs were included in the cost streams as these would represent, if required, a utilization of real resources by participating beneficiaries. The resulting financial rates of return for the "representative" micro-region models are given in Table 3.

Employment Effects

9. Employment effects would be substantial through the increased opportunities for work provided by the project. The project's contribution to employment would stem mainly from the regular work generated at the farm

level at full development, resulting from the higher labor requirements of improved farming systems or from the new activities implemented through the directly productive investments, but also from the jobs generated during the investment period. At the farm level, the project would require, annually, an additional 8.5 million man-days of labor at full development, equivalent to 34,000 full-time jobs. Some 6 million man-days, or 75% of this labor, would be provided by members farm families while the rest would come from hired labor on a permanent or part-time basis. In addition, a total requirement of 16 million man-days (65,000 full-time jobs) would be created during the three-year investment period by the other components of the project.

MEXICORURAL DEVELOPMENT PROJECT - PIDER II

<u>Micro-Region</u>	A	<u>Actual Wages Paid in Dry Season</u>	<u>B/A</u> %
	<u>Legal Minimum Salary (September 1976)</u> Mex \$		
Tlaxcala Norte, Tlx.	52.9	52.9	100
Tlaxcala Sur, Tlx.	52.9	52.9	100
Izucar, Puebla	72.5	67	92
Norte, Q.R.	66.8	60	90
Cihuatlan, Jal.	71.9	60	83
Vallarta, Jal.	71.9	60	83
Parras, Coah.	76.1	63.4	83
Ramos Arizpe, Chih	76.1	63.4	83
Mazahua, Mex	39.6	33	83
Sombrerete, Zac.	50.9	40	79
Soto La Marina, Tam	64.7	50	77
Amealco, Qto.	49	35	71
Sierra, Tab.	63.5	45	71
Trias, Chih	68.4	45	66
Calvillo Jesus Maria, Ags.	62.8	40	64
Amuzgos, Gro.	50.1	30	60
Francisco Sarabia, Dgo.	51.3	30	58
Huasteca, Hdgo.	73.4	40	54
Centro, Yuc.	57.4	30	52
<hr/>			
Average (20 micro-regions)	61.5	46.3	75%
(US\$1 = Mex\$22.5)	US\$2.73	US\$2.06	

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RURAL DEVELOPMENT PROJECT - PIDER II

ECONOMIC RATES OF RETURN

	Sensitivity Analysis					
	PIDER	IBRD	Investment Costs		Yields	
			10% +	10% -	10% +	10% -
Sierra, Tabasco	13.7	15.5	13.9	17.4	17.2	13.8
Soto La Marina, Tam.	10.1	12.9	9.9	16.4	16.1	9.6
Amuzgos, Gro.	11.0	16.9	15.5	18.5	18.4	15.4
Cihuatlan, Jal.	24.9	25.4	23.9	27.1	27.0	23.7
Centro, Yuc.	24.5	17.2	15.6	19.0	18.8	15.4
Litoral Oeste, Yuc.	12.4	16.7	15.5	18.0	17.9	15.3
Amealco, Qto.	16.7	23.4	21.1	26.1	25.8	21.0
Vallarta, Jal.	27.1	31.9	29.8	23.3	34.1	29.6
Tlaxcala Sur, Tlx.	15.0	36.5	31.2	43.5	42.8	30.7
Tlaxcala Norte, Tlx.	25.8	36.0	32.8	39.9	39.5	32.5
Norte, Q.R.	19.0	32.8	29.8	36.5	36.1	29.6
Izucar, Pue.	12.3	15.1	14.0	16.4	16.3	13.8
Mazahua, Mex.	19.8	25.5	24.3	26.9	26.7	24.2
Parras, Coah.	17.8	30.9	28.3	34.0	33.7	28.0
Trias, Chih.	20.8	24.0	22.2	26.1	25.9	22.0
Huasteca, Hdgo.	14.8	24.0	21.3	27.2	26.9	21.1
Calvillo, Ags.	26.4	23.3	21.2	25.9	25.6	21.0
Sombererete, Zac.	16.3	21.3	18.4	24.7	24.4	18.2
Francisco Sarabia, Dgo.	26.1	13.2	10.1	16.6	16.3	9.8
Ramos Arizpe, Coah.	18.9	15.8	14.5	17.4	17.2	14.3
Average (simple):	19.2	23.0 ^{1/}				

^{1/} Weighted average is 24.5%

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RURAL DEVELOPMENT PROJECT - PIDER II

FINANCIAL RATES OF RETURN^{1/} (FROR)

<u>Micro-Region</u>	<u>Financial Rate of Return (%)</u>
Soto La Marina, Tam.	20.1
Norte, Quintana Roo	16.9
Calvillo-Jesus, AGS	28.6
Tlaxcala Norte, Tlx.	19.9
Tlaxcala Sur, Tlx.	29.8
Huasteca, Hdgo.	29.9
Trias-Satevo, Chih.	22.5
Centro, Yuc.	11.3
Ramos Arizpe, Chih.	11.8
Sierra, Tabasco	16.5
Francisco Sarabia, Dgo.	18.0
Vallarta, Jal.	26.3
Amealco, Qto.	20.0
Sombrerete, Zac.	33.4
Amuzgos, Gro.	18.2
Mazahua, Mex.	24.5
Cihuatlan, Jal.	16.2
Izucar de Matamoros, Pue.	17.5
Parras, Coah.	14.5
Litoral Oeste, Yuc.	18.3

	Simple Average: 20.7
	=====

^{1/} Based on representative ejido or village budgets submitted by PIDER.

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RURAL DEVELOPMENT PROJECT - PIDER II

Estimated Beneficiaries

<u>Category</u>	<u>Units</u>	<u>Families</u>	<u>Individuals</u>
Rural Roads	2,010 km	15,000	97,000
Electrification	131,000 persons	20,000	131,000
Water Supply	214,000 persons	33,000	214,000
Schools	1,200 classrooms	n.a.	60,000 (students)
Irrigation	34,000 ha	14,000	88,000
Soil Conservation	80,000 ha	8,000	56,000
Fruit Tree Establishment	7,500 ha	2,500	16,000
Afforestation	900 ha	50	350
Extension Service	125,000 ha (arable rainfed)	25,000	163,000
Land Reform Service	1,000 ejidos/villages	80,000	500,000
<u>Livestock Units</u>			
1. Beef Cattle	28 units	1,400	9,000
2. Dairy	69 "	3,450	22,425
3. Dual Purpose	45 "	2,250	14,625
4. Pigs	27 "	1,350	8,775
5. Goats	12 "	600	3,900
6. Bees	189 "	1,890	12,300
7. Poultry	36 "	180	1,200
<u>Development Credit</u>			
1. Agriculture and Livestock	1,000 loans	20,000	130,000
2. Rural Industries	200 industries	8,000	50,000
<u>Markets/Stores</u>	65 units	3,250	21,000
<u>Self-Help</u>	persons	14,200	92,000

MEXICORURAL DEVELOPMENT PROJECT - PIDER IIEstimated Employment Impact

Category		Man-Years during Construction	Jobs Created
Rural Roads	2,010 km	16,200	300
Electrification	131,000 persons	2,000	50
Water Supply	214,000 persons	6,000	200
Schools	1,200 classrooms	2,000	1,200
Irrigation	34,000 ha	14,800	26,000
Soil Conservation	80,000 ha	12,000	300
Fruit Tree Establish.	7,500 ha	3,500	2,000
Afforestation	900 ha	50	25
Extension Service	125,000 ha (arable rain- fed)	n.a.	n.a.
Land Reform Service	1,000 ejidos/village	n.a.	n.a.
<u>Livestock Units</u>			
1. Beef Cattle	28 units	-	-
2. Dairy	69 units	-	-
3. Dual Purpose	45 units	-	-
4. Pigs	27 units	-	-
5. Goats	12 units	-	-
6. Bees	189 units	-	-
7. Poultry	36 units	-	-
Sub-total		4,800	2,200
<u>Development Credit</u>			
1. Agriculture and Livestock	1,000 loans	4,000	1,000
2. Rural Industries	200 industries	2,000	4,000
<u>Markets/Stores</u>	65 units	100	65
<u>Self-Help</u>	persons	-	-
<u>TOTAL</u>		65,000 =====	37,300 =====

1/ Unskilled labor required during construction.

2/ Required either for maintenance of infrastructure or for permanent labor on new productive units.

Financial Rate of Return

1. The financial rates of return were calculated based on sample ejido budgets submitted by the PIDER preparation team. These ejido budgets were corrected for various factors including: excessive yield expectations; excessive take-up rates; excessive coverage resulting from extension activities; in addition to errors in methodology and in calculation. Social investments were also deleted from the cost flow. The rates of return are then calculated based on the resulting net impact of the project investments (net of prior net benefits from pre-project activities). In addition, income resulting from new irrigation of vegetables and fruits was calculated on the basis of net corn benefits on those hectarages. This gives a conservative estimate on the rate of return; this conservatism was deemed appropriate for the purposes of the appraisal.

2. For the ejido Huejutla shown in the following tables, a rate of return of about 32% was calculated with the inclusion of the production of vegetables under part of the new irrigation. A rate of return of 29% was calculated where corn was assumed to be planted to those new hectares under irrigation.

3. In the following tables are included: (i) the investment program for the ejido; (ii) the estimated technical and production coefficients; (iii) the estimated sales and expenses; and a financial cash flow model.

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RURAL DEVELOPMENT PROJECT - PIDER II

Quasteca, Hidalgo
Investment Program

	Units	No.	Mex\$ ^{1/} (000's)	US\$ ^{1/} (000's)	Man-days	%
I. <u>Productive Investments</u>			1,851,600	106,981	9,760	44.0
A. Irrigation	Ha	200	1,776,000	102,613		42.0
1. Unskilled labor	Ha		444,000		8,073	
2. Skilled labor	Ha		168,720		1,687	
3. Materials	Ha		1,030,080			
4. Services ^{2/}	Ha		133,200			
B. Soil, Water Conservation		50	75,600	4,368		2.0
1. Materials	Ha		71,971			
2. Services ^{2/}	Ha		3,629			
II. <u>Support Investments</u>			2,248,000	129,884	21,666	53.0
A. Extension ^{3/}	Ha	428	48,000	2,773		1.0
B. Feeder Roads	km	12	2,200,000	127,111	21,666	52.0
1. Unskilled labor			970,020		17,640	
2. Skilled labor			402,600		4,026	
3. Materials			662,200			
4. Services ^{2/}			165,000			
III. <u>Social Infrastructure</u>			130,000	7,511		3.0
A. Schoolrooms	Rooms	2	130,000	7,511	392	3.0
1. Unskilled labor			13,000		236	
2. Skilled labor			15,600		156	
3. Materials			91,650			
4. Services ^{2/}			9,750			
IV. <u>TOTAL</u>			4,229,600	244,377		
					Unskilled Man-Years of Labor	96.1 ^{4/}

^{1/} Mex\$ costs are as of 6/76; in calculating dollar equivalent, costs have been increased by 30% (inflation to April 1977) and converted at the Mex\$22.5/US\$1 exchange.

^{2/} Includes study, drawings, work supervision.

^{3/} Pro-rated cost of extension program for micro-region.

^{4/} 270 days per work year.

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Technical and Production Coefficients

	Units	Pre-Program	Y E A R S					
			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6-25</u>
<u>I. Technical Coefficients</u>								
Ton/Ha								
A. Rainfed Agriculture								
Corn	Ton/Ha	1.3	1.3	1.4	1.6	1.8	2.0	2.0
Beans	Ton/Ha	0.6	0.6	0.7	0.8	0.9	1.0	1.0
B. Irrigated Agriculture								
Corn	Ton/Ha	-	-	2.5	2.8	3.2	3.5	3.5
Beans	Ton/Ha	-	-	1.4	2.2	2.6	2.8	3.2
Vegetables	Ton/Ha	-	-	15.0	17.0	20.0	25.0	25.0
<u>II. Production Data (Phasing)</u>								
Ha								
A. Rainfed Agriculture								
Corn	Ha	220	220	35	30	25	20	15
Beans	Ha	30	30	15	20	25	30	35
B. Irrigated Agriculture								
Corn	Ha	-	-	152	135	100	80	60
Beans	Ha	-	-	45	60	93	110	130
Vegetables	Ha	-	-	3	5	7	10	10
<u>III. Production (Volume)</u>								
Ton								
A. Rainfed Agriculture								
Corn	Ton	286	286	49	48	45	40	30
Beans	Ton	18	18	10.5	16	22.5	30	35
B. Irrigated Agriculture								
Corn	Ton	-	-	380	378	320	280	210
Beans	Ton	-	-	63	132	242	308	416
Vegetables	Ton	-	-	45	85	140	250	250

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RURAL DEVELOPMENT PROJECT - PIDER II

Huasteca, Hidalgo -
Sales and Operation Expenses
(Mex\$'000)

	Units	Unit Cost	Pre-Program	YEARS					
				1	2	3	4	5	6-25
I. <u>Sales</u>	Ton		648.0	648.0	1,257.6	1,672.7	2,201.3	2,614.0	3,023.0
A. Rainfed Agriculture									
Corn	Ton	1.95	558.0	558.0	96.6	93.6	87.8	78.0	58.5
Beans	Ton	5.00	90.0	90.0	52.5	80.0	112.5	150.0	175.0
B. Irrigated Agriculture									
Corn	Ton	1.95		-	741.0	737.1	624.0	546.0	409.5
Beans	Ton	5.00		-	315.0	660.0	1,209.0	1,540.0	2,080.0
Vegetables	Ton	1.20		-	54.0	102.0	168.0	300.0	300.0
II. <u>Costs</u>	Mex\$		441.5	441.5	931.4	945.0	962.2	981.0	1,016.0
A. Rainfed Agriculture									
Corn	Ha	2.90	380.6 ^{1/}	380.6	101.5	87.0	72.5	58.0	43.5
Beans	Ha	3.10	60.9 ^{1/}	60.9	46.5	62.0	77.5	93.0	108.5
B. Irrigated Agriculture									
Corn	Ha	3.80		-	577.6	513.0	380.0	304.0	228.0
Beans	Ha	4.00		-	180.0	240.0	372.0	440.0	520.0
Vegetables	Ha	8.60		-	25.8	43.0	60.2	86.0	86.0
III. <u>Net Income</u>			206.5		326.2	727.7	1,239.1	1,633.0	2,007.0
IV. <u>Income Increment</u>					113.7	515.2	1,026.6	1,420.5	1,794.5

^{1/} Pre-PIDER per Ha costs are Mex\$1,730 and Mex\$2,030 for corn and beans respectively.

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RURAL DEVELOPMENT PROJECT - PIDER II

Huasteca, Hidalgo -
Financial Model
(Mex\$'000)

	Current	YEARS							
		1	2	3	4	5	6	7-25	
I. <u>IN</u>	648.0	4,877.6	1,909.6	1,967.2	2,496.3	2,614.0	3,023.0	3,023.0	
A. Sales	648.0	648.0	1,257.6	1,672.7	2,201.3	2,614.0	3,023.0	3,023.0	
B. Productive Investments									
(a) Long-term soft loans		1,481.3							
(b) Ejido contribution (20%)		370.3							
C. Working Capital									
(a) Short-term loans			652.0	295.0	295.0				
D. Support/Social Investments									
(a) Federal Resources		1,902.4							
(b) Ejido contribution (20%)		475.6							
II. <u>OUT</u>	648.0	4877.6	1216.1	1908.8	1569.0	1552.4	1,461.6	1,461.6	
A. Productive Investments		1,851.6							
B. Support/Social Investments		2,378.0							
C. Direct Operating Costs	441.5	441.5	931.4	945.0	962.2	981.0	1,016.0	1,016.0	
D. Services									
(a) Roads				66.0	66.0	66.0	66.0	66.0	
(b) Schoolrooms				3.9	3.9	3.9	3.9	3.9	
E. Loan Amortization									
(a) Infrastructure							169.2	169.2	
(b) Operating				652.0	295.0	295.0			
F. Interest Payments									
(a) Operating (12%)			78.2	35.4	35.4				
G. Family Consumption	206.5	206.5	206.5	206.5	206.5	206.5	206.5	206.5	
III. <u>NET</u>	0.0	0.0	693.5	58.4	927.3	1061.6	1,561.4	1,561.4	
Net (per capita)	0.0	0.0	1.3	0.1	1.7	2.0	2.9	2.9	

