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STRATEGIES FOR SMALL FARMER DEVELOPMENT: AN EMPIRICAL STUDY OF RURAL DEVELOPMENT PROJECTS

V O L U M E II

CASE STUDIES

A Report Prepared for the
Agency for International Development
under Contract No. AID/CM/ta-C-73
May 1975

DEVELOPMENT ALTERNATIVES, INC.
1823 Jefferson Place, N.W.
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STRATEGIES FOR SMALL FARMER DEVELOPMENT: AN EMPIRICAL STUDY OF RURAL DEVELOPMENT PROJECTS

VOLUME II

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May 1975

STRATEGIES FOR SMALL FARMER DEVELOPMENT: AN EMPIRICAL STUDY OF RURAL DEVELOPMENT PROJECTS

This study contains three separately bound documents as listed below.

VOLUME I

Contained in this volume are the following chapters:

I. Research and Focus
II. Project Success
III. Local Action
IV. Project Components for Small Farmer Development
V. Summary of Findings and Their Implications for AID and Other Major Donors

Appendix One: Methodology
Appendix Two: Information Systems to Support Rural Development Projects
Appendix Three: Implication of the Findings for Future Research

VOLUME II

This volume is comprised of 36 write-ups of the projects studied, a complement to the analysis in Volume I.

EXECUTIVE SUMMARY

Sections in this volume include the following:

Highlights of the Report
Summary of Findings and Their Implications for AID
Annex A: Projects Included in the Study

ANNEX A

Guide to Project Write-ups
(Table of Contents)

Volume II Annex and Page No.	Project	Type	Sponsor
AFRICA			
GAMBIA			
B-2	Chinese Irrigated Rice Production Project, Upper River Division	Crop-specific	Taiwan
B-12	IBRD Agricultural Development Project, MacCarthy Island Division	Irrigated Rice Production, with component for designing an integrated agricultural development project	IBRD; government of The Gambia
B-22	Mixed Farming Centers (nationwide)	Farmer training and extension follow-up with the use of paraprofessional workers	Government of The Gambia
B-31	Mixed Vegetable Scheme, Western Division	Introduction of onion production and the creation of women's farmer associations	Government of The Gambia; Gambia Cooperative Union; Freedom from Hunger
B-40	Confectionary Groundnut Package Deal, Western Division	Crop-specific innovations through the cooperative movement	Gambia Cooperative Union; government of The Gambia
GHANA			
C-2	Christian Service Committee's Agricultural Program, Northern and Upper Regions	Introduction of simple technological innovations through agricultural stations	Christian Council of Gambia; World Council of Churches
C-15	Ghanaian-German Agricultural Project, Northern and Upper Regions	Fertilizer distribution evolving into an effort to help small farmers	West German government; government of Ghana
C-24	Ghanaian Government/FAO Fertilizer Use Project, Volta Region	Cooperative development, and the introduction of improved maize seed and fertilizer use	UNDP/FAO; government of Ghana

Volume II Annex and Page No.	Project	Type	Sponsor
GHANA (Cont'd)			
C-31	Biriwa Development Project, Cape Coast Area	Development of fishing village through commercial and community development activities	West German government; government of Ghana
C-38	Denu Shallots Project, Denu District, Volta Region	Short-term and medium-term credit for expanding shallot production	Local Cooperative; Agricultural Development Bank of Ghana
KENYA			
D-2	Vihiga Special Rural Development Program, Western Province	Integrated rural development program	USAID; government of Kenya
D-11	Tetu Special Rural Development Program, Central Province	Experimental agricultural extension project to reach less-progressive smallholders	University of Nairobi; government of Kenya
D-20	Lirhembe Multi-Service Cooperative, Western Province	Agricultural and social development project in a small geographic area initiated by local Member of Parliament	NOVIB, Dutch charity organization; government of Kenya
D-31	Kenya Tea Development Authority, Highland areas	Government-controlled commercial effort to expand production by small farmers	Government of Kenya; British Commonwealth Development Corporation; IBRD/IDA
D-43	Maasai Rural Training Centre Kajiado District	Improve cattle production practices, training of Maasai, and establishment of commercial activities	National Christian Council of Kenya

Volume II Annex and Page No.	Project	Type	Sponsor
LESOTHO			
E-2	Thabu Bosiu Rural Development Project, Thaba Bosiu District	Intensive effort to improve agricultural production, rural infrastructure and conservation practice	IBRD/IDA; USAID; government of Lesotho
E-12	Leribe Pilot Agricultural Scheme, Leribe District	Experimental project to develop technological packages and approaches to improve agricultural production, for replication in other parts of Lesotho	UNDP/FAO; government of Lesotho
NIGERIA			
F-2	Abeokuta Rice and Maize Development Project, Western State	Introduction of improved inputs, including mechanization, through farmer groups	Western State and Federal Ministry of Agriculture; FAO and USAID in earlier stages
F-13	Nigerian Tobacco Company, Western State	Introduction of flue-curing through Farm Family Units	Nigerian Tobacco Company, British American Tobacco Company
F-23	Zaria Tomato Production Project, North Central State	Irrigated tomato production, introduced through farmer associations for commercial processing	North Central State Government; FAO; Cadbury, Ltd.
F-32	Tiv "Bams" and Farmers' Association, Benue Plateau State	Indigenous small farmer savings/credit program	None
F-42	Uboma, East Central State	Integrated rural development project	Shell-BP Nigeria; East Central State Government

Volume II Page and Annex No.	Project	Type	Sponsor
LATIN AMERICA			
BOLIVIA			
G-2	DESEC, Center for Social and Economic Development (nationwide)	Promotion of rural base institutions and rural assistance agencies which sponsor income-generating projects by small farmers	MISERIOR (German Catholic Bishops); OXFAM; other private European donors; Inter-American Foundation
G-15	ASAR/ARADO Potato Production and Seed Improvement Project, Cochabamba	Promotion of yield-increasing potato technology on a risk-sharing basis with organized small farmers	Association of Artisan and Rural Services (ASAR), agency of DESEC; MISERIOR
G-24	National Community Development Service (NCDS) (nationwide)	Community development in the rural sector	National Community Development Service; government of Bolivia; USAID
COLOMBIA			
H-2	Cáqueza Project, ICA Rural Development, Eastern Cundinamarca	Pilot project to adapt high-yield crop technology to small farm requirements	Institute of Colombian Agriculture (ICA), USAID
H-17	ICA Rural Development Project for Northern Cauca, Valle de Cauca	Pilot project to adapt high-yield crop technology to small farm requirements	Institute of Colombian Agriculture (ICA); USAID
H-28	Futuro Para La Ninez (Futures for Children), Antioquia	Community development program promoting self-help projects which benefit children	Futuro Para La Ninez; government of Colombia (Ministry of Health)

Volume II Annex and Page No.	Project	Type	Sponsor
ECUADOR			
I-2	Agricultural Enterprise Promotion Program (PPEA), Guayas Basin	Production and infrastructure development credit for agricultural cooperatives	Financial Funds Department, Central Bank; USAID; National Development Bank (BNF)
I-14	FECOAC Directed Agricultural Production Credit (nationwide)	Directed agricultural production credit to small farmers	FECOAC; Cooperative Bank; USAID
MEXICO			
J-2	Plan Puebla, State of Puebla	Pilot project to adapt modern corn technology to small farm requirements in dryland regions	International Maize and Wheat Improvement Center (CIMMYT); Rockefeller Foundation
J-17	Plan Maize, State of Mexico	High-yield corn production credit program	State of Mexico, Department of Agriculture and Livestock Development (DAGEM)
PARAGUAY			
K-2	CAH Associations of Agricultural Credit Users	Technical assistance, credit, and group marketing project with organized small farmers	Caja Agraria de Habilitacion (CAH); government of Paraguay
K-12	CREDICOOP Directed Agricultural Production Credit	Directed agricultural production credit to small farmers	CREDICOOP; CUNA; USAID
PERU			
L-2	The Community of Vicos, Department of Ancash	Community development and rural modernization via democractic institution-building in an indigenous society	Cornell University; Peruvian Indigenous Institute
L-14	ORDEZA/RDD, Rural Enterprise Development, Huaraz, Department of Ancash	Planning, construction and financing of income-generating projects in rural communities	Rural Development Division of the Peruvian Earthquake Relief Agency; government of Peru, USAID

ANNEX B

The Gambia

THE GAMBIA

Area: 4467 square miles
Population: 494,279
Population growth rate: 1.9%
Density per square mile: 110.7
GNP per capita: $140
GNP per capita growth rate: 2.1%
Capital: Banjul (39,476)
Major language: Native tongues, English
Religion: Muslim, Christian, Animist
Literacy rate: 5-15%

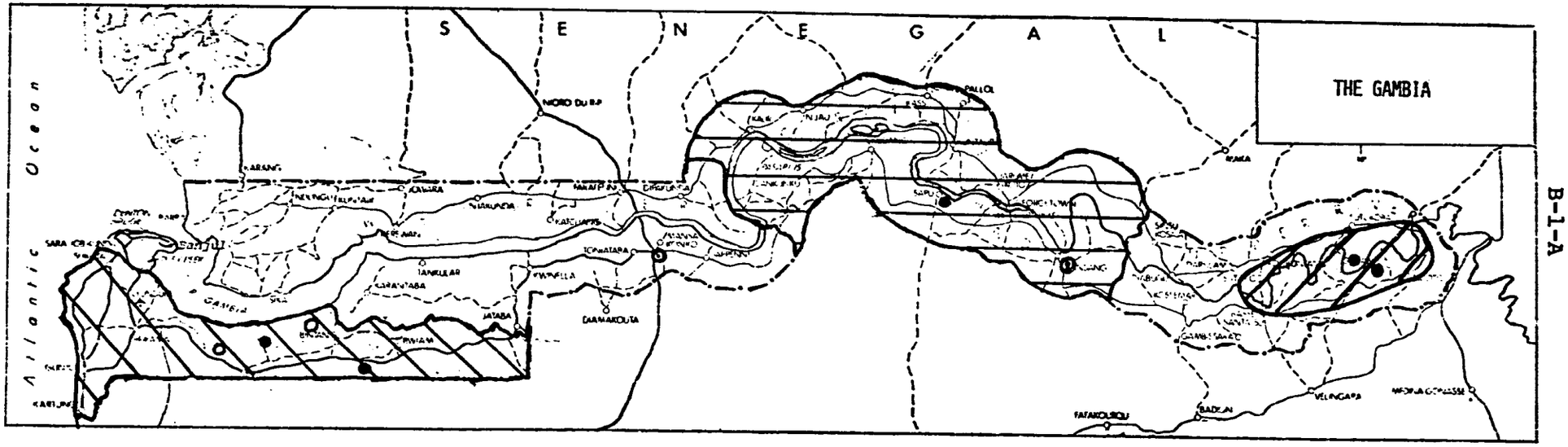
Chinese Irrigated Rice Production Project - This project covers the shaded area in the Upper River Division, with subprojects at Alohungari and Kuoba Kunda (●).

IBRD Agricultural Development Project - This project covers the shaded area in the MacCarthy Island Division, with a subproject at Kerewan (●).

Mixed Farming Centers - This project covers the entire country, with subprojects at Jenoi and Sare N'gai (⊙).

Mixed Vegetable Scheme - This project covers the shaded area in the Western Division with subprojects at Busumbala and Kembujie (●).

Confectionary Groundnut Package Deal - This project covers the shaded area in the Western Division with subprojects at Faraba Banta and N'Demban (○).


THE GAMBIA
S E N E G A L
Atlantic Ocean
MORO DU BAP
PALLOL
KARANG
KAUR
NJAU
SAPU
KUNG
KAUR
KARIUPA
KARIUPA
SARA
TANKULAR
KARANTABA
JATABA
KWINELLA
KOMATABA
DAMAKOUTA
BADJAN
FATAKOUROU
VELINGARA
MEDINA GONASSE
GAMBISMAKO
BAKA

B-1-A

CHINESE IRRIGATED RICE PRODUCTION PROJECT (BASSE SUBSTATION, UPPER RIVER DIVISION)

I. PROJECT BACKGROUND

The Chinese Agricultural Technical Mission (CATM) from Taiwan initiated its irrigated rice production scheme in The Gambia in 1966, and set up its substation in Basse in 1967. The substation serves the Upper River Division (region) which consists of an estimated 22,000 small farms. The objective of the project is to reduce The Gambia's dependence on imported rice by introducing new varieties, irrigation and other improved production techniques. Since the project was initiated, about 1500 acres have been irrigated, with a planned expansion of about 500 acres per year. Approximately 2000 farmers now grow irrigated rice, and their number has the potential to grow by 750 to 1000 each year.

CATM has a project unit located in Basse which is under the nominal control of the Ministry of Agriculture and Natural Resources. The project is funded by the Taiwanese government, and is manned by four Chinese agricultural extension and technical support personnel. At the local level, CATM assists villages to form cooperatives which serve basically as vehicles for the distribution of inputs. Operationally, the CATM members identify one literate member in each cooperative through whom they coordinate their technical assistance effort.

II. LOCAL ENVIRONMENT

The flat soils on the banks of the Gambia River, where the project operates, are fertile and suitable for intensive agriculture and irrigation. Even though the area is frequently plagued with droughts, the river flow is sufficient to meet year-round irrigation requirements.

Farms in the area average about four acres in size, with only slight variations. The major cash crop is groundnuts, and the subsistence crops include sorghum, millet, rice and cassava.

Rice has become a more important food crop over the past 20 years. Traditionally, a farmer would cultivate an acre of dry field rice, dependent on rainfall. Under the project a farm family can only handle, according to CATM, one-half acre of irrigated rice. Because of the use of irrigation, two crops per year can be produced and the timing of the crop cycles is such that they do not interfere with the planting or harvesting of groundnuts.

Rural services and infrastructure are almost nonexistent in the Upper River Division. Although the number of schools is increasing, the literacy rate is only between ten and 15 percent.

There are several tribal groups in the area. While there are few tensions among these tribes, differences in tribal characteristics explain in part the varying rates at which innovations are accepted and the level of output achieved. One important variable is the tribal people's definition of the number of hours in a work day (which ranges from three to eight hours). Even though technical advice may be readily available, the extra man-hours required to follow it may not be forthcoming, resulting in lower production (though the new wet rice still gives seven times the yield of traditional rice.) For all tribal groups, the traditional village chief is responsible for land allocation decisions so his participation in the project is necessary to divide up the river basin areas to be irrigated.

About 40 percent of the rice produced in the project is marketed, while the other 60 percent is consumed. The sale is assisted by the Gambia Produce Marketing Board, which provides transportation and insures a market for the rice. The price is fixed by the government to prevent hoarding and to guarantee that farmers get a fair return.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

Irrigated rice production was first introduced in The Gambia by the Commonwealth Development Corporation, which launched a mechanized rice production project in the 1950's. This large-scale commercial venture folded when Gambian technical and maintenance capabilities proved insufficient to handle the operation. Desiring to reduce rice imports and to protect its limited foreign exchange holdings, the Gambian government obtained technical assistance from the Taiwanese government. The Chinese established their headquarters at Yori-Beri-Kunda (MacCarthy Island Division) in 1966 and

applied a project design which had been successfully applied in other countries. During the first year, CATM conducted field experiments at its research station; then it moved directly to the problems of implementation. Because of the suitability of Upper River Division for intensive agricultural cultivation, the Basse substation was set up the following year.

IV. DYNAMICS: PROJECT IMPLEMENTATION

The Technological Package

Compared to traditional methods, irrigated rice production requires a considerable amount of labor, both individual and communal. Moreover it requires the farmers to become familiar with the use of machines (pump engines and small cultivators), improved seeds, fertilizers, and water control methods for irrigation.[1] After CATM identifies possible sites, the farmers in the area form a cooperative (discussed below). They are then provided with small tools for land clearing which is normally done in October and November when stumping is easy; the felled material is burned during the next dry season. After burning, the area is surveyed by CATM and laid out for irrigation. The farmers do most of the levelling and construction by hand. Before the first crop is planted, the land is deep-plowed by tractors and a pump and engine are installed to lift water from the river.

The initial inputs are provided to the farmers by CATM free of charge and the project is supervised daily throughout the first crop cycle by a CATM technician. The seed is first planted in nurseries of about one-tenth of an acre. Seedlings are transplanted, and then fertilized three times. The rice is weeded immediately before each fertilizer dressing. Harvesting is done by hand, and the paddy is threshed with small pedal-operated machines. Two rice crops are grown annually; the dry season crop is sown in mid-January and harvested in May, while the rainy season crop is sown by mid-July and harvested in November.

Process of Introduction

CATM initially sent a seven-man technical assistance team to Basse. The team established a demonstration plot of two and one-half acres near the town and, for two years, local village chiefs, headmen, merchants and government officials were brought by CATM to see the results. Even though the

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[1] In his comments on this write-up, Douglas Broome, USAID/Banjul, correctly emphasized the importance of women in the rice-growing schemes.

yield from the demonstration plot averaged 12,000 pounds per acre annually (double cropping), as compared to the average of 1000 pounds per acre from traditional rice, there appeared to be little interest. In retrospect, CATM believes that it was a mistake to have started so close to Basse where farmers and businessmen were occupied with other commercial ventures. However, once the profitability of irrigated rice was recognized, tribal groups near Basse became interested in the technological package.

As a consequence of the initial poor response, the CATM team was reduced to two members who spent a considerable amount of time talking with village chiefs and headmen in outlying villages. In 1969, experiments were launched in two of the less wealthy villages where farmers were totally dependent on income from the land. When successful results were achieved in these villages, the demand for assistance increased and village chiefs began to contact the Chinese. One reason for the difference in response between the demonstration and the two experiments appeared to be that, in the latter case, the farmers themselves carried out the project activities on their own land. The farmers in these two villages were willing to experiment because CATM promised daily supervision and free inputs for the initial crop cycle; moreover, only a small portion of village land (about 15 acres) would be used for irrigated rice, not jeopardizing their subsistence. Further, the village chiefs had seen the demonstration plot near Basse.

Approach and Support

Local Organizational Arrangements

CATM may become involved locally either in response to a village chief's request or at its own initiative. Mission members first meet with the village elders; then they explain the project to all the village farmers at a meeting called by the chief. Almost always the village chief assumes leadership in setting up the cooperative because of his control over land allocations. The basic purpose of the cooperative is threefold: 1) to organize the communal labor, 2) to receive inputs from CATM, and 3) to provide a means of bringing the farmers together to discuss production problems. Both the cooperative president and a local person who will be responsible for pump operation receive one week of training from CATM, which is barely sufficient to teach them to handle the daily operations of the irrigation system. Rather than working through the cooperative, CATM identifies one literate member through whom they maintain liaison. This is done

mainly because of language difficulties.

The First Crop Cycle

The CATM provides all inputs for the first crop cycle, which include seed and fertilizer, oil and gasoline, as well as the pump and the use of a small power tiller. Further, a CATM member works directly with the farmers on a daily basis during the first cycle, training and supervising their work. This intensive supervision is required to teach the farmers the new production techniques and to insure that they are carried out correctly and on a timely basis.

Continuing Support

After the first crop cycle, the farmers are required to pay the costs of inputs. This did not pose a problem because CATM had made clear to the cooperative that members would be expected to purchase these inputs, and because most Gambian government programs will not provide inputs after the first crop cycle. Technical assistance continues, normally on a weekly basis, though the requirements for supervision vary from group to group. The problem is not one of reteaching the farmers what to do; instead, it is to insure that they do it on a timely basis.

One major problem is the maintenance of the pumps and power tillers, which is carried out entirely by the CATM mechanic. Little effort has been made to train Gambian mechanics or agricultural workers so a dependency on CATM remains; this appears to have been a conscious decision by the Taiwanese government, growing out of a fear that CATM will be asked to leave because of political reasons.

Subproject Dynamics

An important consideration in selecting locations is the availability of family labor; CATM has found that it is necessary to have two adults and three children over 14 available in order to cultivate one-half an acre of land. Even though labor may be available, tribal culture appears to influence the level of production as well as the amount of technical assistance required. This was evident in the two subprojects examined. One was the Kuoba Kunda Scheme which involved 20 Mandingo farmers cultivating ten acres of rice. The Mandingoes are Muslims and the major tribal group in The

Gambia. The second was the Alohungari Scheme which involves 110 Sarahulley farmers cultivating 85 acres at the present time, with an expansion of 77 more acres under way. The Sarahulleys are known as the diamond miners, for young men are sent to Sierra Leone to work in the mines. Yields average 3500 pounds per acre per crop cycle in the Kuoba Kunda Scheme and 5500 pounds in the Alohungari Scheme. Since the quality of the soil and irrigation systems are about the same, several other factors may explain the difference in production levels:

- the Sarahulleys consider a work day to include at least eight hours, while the Mandingoes are inclined to work three to four hours per day;
- the Sarahulleys are more inclined towards communal efforts, both to prepare the land and to maintain the irrigation system;
- while the Sarahulleys reject formal education (unlike the Mandingoes), they are more responsive to technical advice (the CATM estimates that they spend twice as much time with the Kuoba Kunda Scheme); and
- the Sarahulleys have found rice farming a better alternative to diamond mining as a way to earn money, while the Mandingoes in Kuoba Kunda see rice farming as one of several sources of income.

Another difference is that the Alohungari farmers took the initiative in getting Chinese support while the Kuoba Kunda farmers were approached and had to be convinced by CATM. These differences in tribal responses were not anticipated; the only change in design was the amount of time allotted for working with different tribal groups after the initial crop cycle.

Changes in Project Design

Since the beginning of the World Bank rice production project in 1972[1], the Gambian government has been attempting to standardize approaches. The government has decided that farmers now recognized the profitability of rice production,

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[1] See IBRD Agricultural Development Project Write-Up, page B-12.

and so should be charged for the costs of the initial inputs. CATM has been asked to provide future initial inputs on credit.

Overall Development Approach

CATM assumes that farmers will adopt a technological package if it is well-tested on their land and profitable. High success is then achieved by supervision. Moreover, organizational arrangements are only necessary to facilitate the distribution of land and inputs and the provision of technical assistance.

V. PROJECT SUCCESS

Project Benefits

The shift from traditional methods of cultivation to irrigated rice production has increased yields per acre on average by 800 percent (1000 pounds from traditional methods versus 9000 pounds from double-cropped paddy rice.) An average farmer in the project grows one-half acre of irrigated rice, which is about 13 percent of his total holding. From this portion of his land, he will net $245 (excluding the costs of the pump and power tiller which are provided by CATM). This represents an increase in income from the land of 83 percent. Except for the Sarahulley and a few farmers from other tribal groups with significant off-farm incomes, loss of alternative income is minimal, for the timing of the crop cycles takes advantage of labor when it is normally underemployed.

Aside from the major increases in food supply and income as a result of the project, there are few noticeable benefits. Farmers now do respond faster to other innovations than they did to irrigated rice, as was seen when the Gambian government introduced irrigated vegetable production. Since CATM does not give the cooperatives responsibilities beyond coordination, there has not been an increase in local institutional capabilities.

Potential Spread

The Chinese have created a demand for irrigated rice

production among the farmers; a British survey in Upper River indicated that this was the first preference of farmers over the other innovations being offered (tobacco, cotton, and irrigated vegetable production). At this point, the major limitation is the ability of the CATM to respond to requests for both technical and maintenance assistance. Since Gambian government capabilities have not been developed by the project, the requirements fall on CATM which currently has four team members in Basse. The projected expansion is 500 acres per year, though this will require an increase in Chinese technicians.

Self-Sufficiency

The yearly net income return from the 1500 acres now under cultivation is about $735,000 or approximately three times the estimated costs of the CATM substation in Basse since 1967 (though not its share of overall project costs). This indicates that the project has the potential to pay all operating expenses, in addition to the initial costs. However, because CATM has not developed a Gambian technical assistance and maintenance capability, it is probable that the project would collapse without continued Chinese support. This problem may be overcome because the World Bank project is developing Gambian expertise, and some Gambians are being trained in Taiwan.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The design or approach used by CATM has been applied successfully in Nigeria and other West African countries. It can work almost anywhere there is suitable land for intensive agricultural production and the technical expertise for introducing the new technology. Nonetheless, there are lessons which can be drawn from the Chinese experience for other types of agricultural development projects. First, the project showed that demonstrations carried out by the project were not sufficient to build farmer interest; instead, the project only got off the ground when two villages experimented successfully with the technological package on the farmers' own land. Moreover, these villages only accepted the package because it did not threaten their basic subsistence, and initial inputs were provided free of charge by CATM. Further, it appears that they were more willing to experiment because the farmers did not have alternative sources of income as did those near Basse who did not adopt the package.

Second, the demonstrator approach (having a technician work directly with the farmers during the first crop cycle) appeared to be effective in helping farmers adopt a complicated technological package. The use of crop-specific demonstrators has proven to be successful in other projects in The Gambia.

Third, the project illustrates the necessity of taking account of tribal or cultural differences when planning the level of technical assistance required. Normally, a foreigner will miss these subtleties, which points up another lesson from the project. CATM did not recruit and train Gambian staff members; the failure to do so frequently results in the mission's not having specific information about local circumstances which will facilitate or impede project implementation. Moreover, not developing local technical and maintenance capabilities endangers the self-sufficiency of the project.[1]

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[1] In his letter of March 3, 1975, James H. McFarland, Jr., Chargé d'Affaires notes that the Taiwanese Embassy and CATM have been withdrawn from The Gambia. In light of trends in other African countries, this is not surprising. It remains to be seen who, if anyone will pick up on the work of the CATM.

Information Sources

A. Field

Field collection took place during early March and early May 1974. Two visits were made to Basse, during which the following people were interviewed: CATM chief of the Basse substation; the members of the CATM team, the Upper Region Division Officer, officials of the Ministry of Agriculture and Natural Resources, an American agricultural economist, and the leaders of the Kuoba Kunda and Alohungari Schemes. In Banjul, two discussions were held with officials from the Embassy of the government of Taiwan.

B. Reports

Little written material was found on the project aside from the brief examination included in the IBRD draft appraisal report for the Gambian Agricultural Development Project, dated 1 June 1972. Census statistics were used to verify the population and education figures.

Data Adequacy

The data on yields and costs were collected by CATM. For the calculation of overall farm family income, the figures for both the divisional and local levels were based on estimates from the Ministry of Agriculture and Natural Resources, at both the divisional and local levels. It should be noted that there has not been an agricultural census, so that the size of land holdings is based on several estimates by those interviewed. Comments were recieved from James H. McFarland, Jr., the American Chargé d'Affaires and Douglas Broome, USAID/Banjul.

IBRD AGRICULTURAL DEVELOPMENT PROJECT

I. PROJECT BACKGROUND

The IBRD Agricultural Development Project began in early 1973. It is located in MacCarthy Island Division (MID) which covers 704,000 acres, or one quarter of the land area of The Gambia. Building on the concepts that were developed in the Chinese Irrigated Rice Production Project, the project's primary objective is to bring 3000 acres of land under irrigation for rice production over a three-year period. Secondly, the project is to prepare an integrated agricultural development plan for the MID, based on field research and experimentation. Since the project was initiated, 35 village schemes with the participation of 800 farmers have been developed. It is planned that eventually 3000 farmers between 15 and 20 percent of those in the MID, will be introduced to irrigated rice production, each cultivating about one acre of his own land. The estimated costs of the project are U.S. $1.63 million, of which U.S. $1.2 million is being financed by IDA credit and the remainder is being met by Gambian government revenues, with the farmers providing the labor (not calculated).

The project is managed by a Project Management Unit situated in the Ministry of Agriculture and Natural Resources and headed by an expatriate. Project operations are carried out by 11 Gambian government agricultural officers and two cooperative officers, supported by 35 locally-recruited demonstrators (secondary school graduates) who work directly with the farmers in each village scheme. Local organizational arrangements consist of village cooperatives, through which seasonal and medium-term credit (for the purchase of the irrigation pump), as well as agricultural inputs and technology, are channelled.

II. LOCAL ENVIRONMENT

MacCarthy Island Division extends 100 miles along both banks of The Gambia River. It is estimated that the river basin holds sufficient water to irrigate 40,000 acres, so supply is not a problem even during the dry season. As in the Upper River Division, the soils are fertile and suitable for intensive cultivation. The climate is such that year-round cropping under irrigation is feasible.

The MID produces 30 percent of the country's groundnuts; the groundnuts are grown under shifting cultivation in rotation with food crops, mainly sorghum and millet. The MID also produces 25 percent of the country's rice, mostly on the river flats and swamps. With the introduction of the Chinese technical assistance team, however, land has increasingly come under pump irrigation.

Average farm size in the MID is about four acres, with a range of three to eight acres. Land allocation is the responsibility of the village chiefs and compound (extended family) heads; individual rights to land exist only as long as the land is cultivated. In the project, the cooperation of the village chief is required to handle the necessary redistribution decisions regarding the river flats and swamps which will be irrigated.

Rural infrastructure is poorly developed. Rural incomes are low, averaging about $299 for a family of six. The literacy rate is only 10 percent, though the number of school age children who receive a primary education is increasing. There is a little migration out of the MID, mainly by the better educated young.

Tribal differences influence the rate at which innovations are accepted. In the MID, there are villages which are composed of two different tribal groupings (such as the Mandingoes and Fullas); this normally requires the project to set up a cooperative for each group.

The Project Management Unit is located at Sapu, a Gambian government agricultural experimentation station, previously the site of the Commonwealth Development Corporation's Mechanized Rice Production Project. At Sapu, the Gambian Produce Marketing Board (GPMB) has taken over 600 tons of silo storage and a 2500 ton mill to handle the increased production resulting from the project. Since 1971, the GPMB has been organizing the marketing of rice, including the provision of transport.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The project was identified by the World Bank's Permanent Mission in West Africa in February 1969, and the FAO/IBRD Cooperative Program completed the preparation of the project in July 1971. During its visit in February 1972, the IDA appraisal mission made several modifications at the suggestion of the Gambian government; its report was submitted in June 1972 for approval by IBRD. Two major efforts set the stage for the Bank's project. The first was the Commonwealth Development Corporation's Mechanized Rice Production Project in the 1950's, which demonstrated the potential for growing irrigated rice and also the problems of designing an effort which was beyond the technical and maintenance capabilities of the Gambians. The second was the Chinese Irrigated Rice Production Project,[1] which offered a well-tested technological package and which had laid the groundwork for farmer acceptance of that package. Seeing some basic shortcomings in the Chinese approach, the Gambian government incorporated ideas in the IBRD's design to increase the possibility of the project becoming financially viable and self-sustaining. The most important of these ideas were the training and use of Gambians in the project and the provision of credit at unsubsidized rates for all inputs.

Another important feature of the project's design is that it provides for the experimentation necessary for longer-term planning. Starting with one "proven" idea, the project has the mandate and resources to experiment and develop a more comprehensive development program.

IV. DYNAMICS: PROJECT IMPLEMENTATION

The Technological Package

The basic technological package for growing irrigated rice is patterned after the Chinese approach, though there are distinct differences. Aerial photography was used to identify possible sites. Beginning near Sapu, the project staff selected suitable sites for development in units of not less than 20 acres. To facilitate land distribution arrange-

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[1] See Chinese Irrigated Rice Production Project write-up, page B-2.

ments, the sites were located within village boundaries. In each village, a rice growing cooperative was formed (see below) which was responsible for developing the site, receiving inputs, and repaying the medium-term loan for the irrigation equipment. Each cooperative member develops and cultivates one acre, which is twice the size recommended by the Chinese. Under project supervision, the co-op members clear the site with hand tools provided by the project. Prior to planting the first crop, the land is deep-plowed and levelled using government tractors from the Sapu machinery pool.

The basic agricultural techniques developed by the Chinese are used. The seed is first planted in nurseries of about one-tenth of an acre. Seedlings are transplanted and fertilized three times. The rice is weeded immediately before each fertilizer dressing. Harvesting is done by hand, and the paddy is threshed in small pedal-operated machines. Two crops are grown annually.

For this project, in contrast to the Chinese project, the Gambian government decided that power tillers were too expensive, so all cultivation is done by hand; the labor supply in the area is adequate for this. Another difference is that the initial inputs as well as the pumps, are provided on credit through medium-term loans. The project unit provides improved rice seed in exchange for an equal weight of paddy rice at harvest and the Gambia Produce Marketing Board is responsible for the delivery of fertilizers and gasoline from its depot at Sapu.

Project Initiation

The project could not have been launched as quickly as it was if the Chinese had not spent several years testing and improving the technological package and convincing small farmers of its benefits. However, the major problem in initiation emerged because the farmers knew that the Chinese provided the initial inputs and irrigation pump free of charge. Convincing the farmers to go ahead with the scheme without these subsidies required considerable persuasion by the project staff during the early days of the effort. Two or three meetings between the Gambian project staff members and the village chief and farmers were required to explain that the farmers would be able to repay the credit easily because of the profitability of rice. Also the staff mentioned that the Chinese would not be providing assistance in their area.

The Project Unit

Decision-making

Although there is an expatriate directing the project, he is supported by a well-trained Gambian staff which appears to be capable of managing the project by 1976. The Gambian staff handles almost all interaction with the local villages, helping to overcome organizational and land allocation problems. Their insights about what is happening at the local level are channelled through the Deputy Project Manager (a Gambian) who has considerable influence on modifying project design as special circumstances arise in individual villages. This interaction between Gambian officials and village groups frequently uncovers obstacles which sensitive foreigners would be hard put to identify before project difficulties are encountered. For example, the Gambian staff determined the need to set up cooperatives for individual tribal groups within a village rather than for the village as a whole.

Use of Demonstrators

As in the Chinese project, daily supervision is provided to the farmers in each scheme to help them learn the new agricultural techniques and maintain the irrigation system. To provide this assistance, the project unit has recruited young Gambians, most of whom have completed secondary school. They receive intensive training from the project for about a month and then each is assigned to work directly with the farmers in one of the cooperative schemes. The demonstrator is paid by the project during the first crop cycle, after which the cooperative assumes responsibility for salary costs ($38 per month); so far this responsibility has been assumed willingly. One government agricultural officer supervises the work of three demonstrators; monthly seminars are held for the demonstrators during which additional training is provided and operational problems encountered are discussed. Since Gambian women carry out much of the labor in the rice fields, the project is experimenting with the use of female demonstrators. In addition to providing the intensive technical assistance required on a low cost basis, the "demonstrator" approach offers badly-needed job opportunities to young Gambians.

Cooperative and Credit Arrangements

Organization

When the project was started, there were immediate requests from village chiefs to participate because they had seen or heard about the results of the Chinese project. The Gambian project staff met initially with the chief and the compound heads. They decided which farmers would participate, and organized the election of the cooperative leadership; normally the village chief was elected president. Usually three to five meetings between the project staff and the village were required to explain the program and form the cooperative. The cooperative became the focal point for the provision and distribution of inputs. In addition, it was responsible for repayment of the medium-term loan for the irrigation pump and for paying the salary of the demonstrator after the first crop cycle.

Loan Repayment: Shift from Communal Approach

To pay off the medium-term (five year) loan, the cooperative is required to set aside four to five acres which are worked communally by the cooperative members. It has been found that the yields from the communally-worked plots were substantially lower than those cultivated privately. Normally after one or two crop cycles, the cooperative decides (with project approval) to pay off the loan from the profits of its individual members' own land, and divides up the communal plot. Repayment rates on the medium-term loans are running ahead of schedule, with both approaches (from communal plot or from private plots) being applied.

So far, there has been a 100 percent repayment rate of short-term loans. Both the medium-term and seasonal loans carry a ten percent annual interest rate, which is expected to cover all costs, even though it is less than the 15 percent annual rate charged small farmers by the Gambia Cooperative Union for subsistence credit.

Subproject Dynamics

Since the project is in its early stages, only one scheme was examined, though several were visited. As in the case of the Chinese project, the degree to which different tribal groups were willing to accept technical advice and to perform communal labor varied significantly; these differences were

apparent in the yield data by group. On the whole, however, the average yields from the IBRD project (7000 pounds per acre) were lower than the Chinese project (9000 pounds per acre). One reason appears to be the amount of land under cultivation and the intensity with which it is cultivated. On average, a farmer cultivated 1.2 acres in the IBRD project, while a farmer in the Chinese project cultivated just over one-half acre.

The subproject examined illustrates the need to vary project design and approach to accommodate local circumstances. The Fullas scheme was one of two initiated in the same village to take account of tribal differences. The scheme involves 19 farmers cultivating 26 acres of land. Land clearing and preparation required 1800 man-days. In contrast to the participants in several of the other schemes, the Fullas were inclined towards communal endeavors and able to work together to maintain the irrigation system. Nonetheless, because of lower yields, the cooperative communal plot for paying off the medium-term loan was divided into private plots after the first crop cycle. Yields from the 26 acres were averaging 7000 pounds per acre, and loan repayment rates were 100 percent.

Future Project Design

Beyond the implementation of the technological package, the project is conducting field experimentation and studies to prepare a more comprehensive development program, to include additional work with swamp rice, identifying alternative crops for cultivation under irrigation, and preparing the designs and cost estimates for feeder roads. In the experimental crop work, initial testing is done at the Sapu station and then by farmers on their own land. Progressive farmers are asked by the project to try new varieties of rice or irrigated vegetables on a small portion of their land; the only incentive is the provision of seed and sometimes fertilizer, which is sufficient to gain farmers' interest.

V. PROJECT SUCCESS

Project Benefits

The introduction of irrigated rice production has increased substantially both the labor commitment by farm families and the production costs, compared to traditional

rice growing. However, yields per acre have increased by 600 percent (1000 pounds per acre from traditional and 7000 from double cropped improved). Taking account of all costs to the farmer, including his share of the costs for the irrigation equipment and demonstrator, he earns an additional U.S. $397 from the portion of his land in the project (assuming this portion to be 1.2 acres or 30 percent of the average-sized holding in the area). In achieving this, the project more fully utilizes the underemployed labor in the area.

Moreover, the project is developing stronger local institutional capabilities by placing responsibility for loan repayment and continued technical assistance in the hands of the cooperatives. As yet, there has not been an increase in the capabilities of these organizations to bargain for more resources from the government.

Potential Spread

There is an increasing demand from farmers in the MID to grow irrigated rice, and there are no obvious barriers to expanding production. The water supply is sufficient for a significant increase in the number of acres under cultivation, and Gambian technical and management capabilities are developing. In its first year of operation, the project was able to achieve its objective of extending irrigation to about 1000 acres; it should be able to sustain this rate of growth.

Self-Sufficiency

The project is so designed as to increase the probability of its overall operation becoming financially viable. Among the most important design features are: the provision of loans on an unsubsidized basis, the creation of the rice growing cooperatives which assume the costs of low-level technical assistance (demonstrators), and the development of Gambian technical and management capabilities. Overall, the increase in net income can cover all the costs of the rice growing component of the project and, over time, the costs of the design preparation work. Total project costs divided by 3000 project participants works out to be US$543 per farmer over three years; the average farmer earns an additional U.S. $397 per year as a result of the project.

Replicability

The technical aspects of the project can be replicated if there is suitable land for intensive agricultural production. Other design features, particularly those directed towards making the project self-sustaining, are difficult to replicate unless the host country government is willing both to make the necessary policy decisions and to commit its most qualified personnel to the project.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The project offers several lessons. *First,* the project demonstrates the importance of having host country nationals integrated into central project decision-making, with the ability to modify project design as necessary to accommodate local circumstances. *Second,* it illustrates a low-cost system of providing technical assistance (demonstrators) with the potential for local organizations to assume the attendant costs. *Third,* it shows that farmers are willing to pay unsubsidized interest rates for credit if the technological package is sound and profitable. *Fourth,* the project demonstrates a procedure for future project design which starts with a "proven" idea (irrigated rice) and then gradually develops a more comprehensive approach through field research and experimentation.

Information Sources

A. Field

Field collection took place during two visits to Sapu in May 1974. Discussions were held with the IBRD project manager, the chief agronomist, the Gambian agricultural extension staff, the accounting office, three field demonstrators, and members of the Fulla cooperative.

B. Reports

Information on the project area was taken from the IBRD draft appraisal mission report, dated 1 June 1972. Census statistics were used to verify population and education figures.

Data Adequacy

The data on yields were provided by the IBRD agronomist. Project cost information, including data on seasonal and medium-term loans, came from the accounting office. As with the description of projects in The Gambia, land holdings are based on several estimates of those interviewed. For the calculation of family income, the figures were based on estimates by officials of the Ministry of Agriculture and Natural Resources at the Sapu Station. Comments were received from James H. McFarland, Jr., Chargé d'Affaires, and Douglas Broome, USAID/Banjul.

MIXED FARMING CENTERS

I. PROJECT BACKGROUND

Mixed Farming Centers were established in The Gambia by the British Colonial Administration in the late 1950's. When independence was granted to the country in the mid-1960's, the Gambian government took control and, in 1968, began to upgrade the service and personnel at these centers. The basic purpose of the centers is to improve the agricultural practices of the 100,000 Gambian farmers, most of whom only cultivate two to four acres of land. Situated in remote areas at 15-mile intervals, the 24 centers facilitate farmer access to extension assistance and training by providing headquarters for district agricultural officers and areas for agricultural demonstrations. Since only about one-fourth of the land area in The Gambia is under cultivation, the centers are also being used to introduce the use of bullocks for opening up new lands.

While many of the extension techniques employed at the centers are commonly used in other African countries, the project offers several insights on how to help small farmers, which is a major objective of the Gambian government. These insights range from developing yearly themes or priorities for the extension service to the training of young farmers as paraprofessional extension agents. Currently, the Gambian Ministry of Agriculture and Natural Resources has only 64 trained agriculturalists and a limited budget, so it has taken the initiative through the centers to build farmer self-reliance

II. LOCAL ENVIRONMENT

The Gambia is a former British colony which has a population of 498,000, with an estimated 100,000 small farmers. While there are a few large commercial farms owned by expatriates or businessmen, the average holding under cultivation is three acres; ten years ago, it was about one and one-half acres. There has been a gradual increase in farm family income

over the past ten years due to the rising world price of groundnuts (the major cash crop) and, to a lesser extent, the expansion of land under cultivation. This increase in cultivated land was brought about through the introduction of bullock plowing, for which the Mixed Farming Centers have been a major catalyst. The level of education is improving, although among adults the functional literacy rate is estimated to be between ten and 15 percent.

The Gambia consists of a 20 to 30 mile wide strip of land, 240 miles long, straddling the Gambia River. The major cash crop is groundnuts, and groundnut oil and cake account for about 95 percent of the country's exports. Subsistence crops include sorghum, millet, rice and cassava. Livestock are kept for status, and since the animal health campaign in the early 1950's the national herd of cattle, sheep and goats has grown rapidly.

The agricultural sector receives high priority from the Gambian government because it furnishes the major portion of government revenues. The urgency to develop agriculture has increased because the British have phased out their support of the government's recurrent budget, though there is still an assistance program. In spite of the priority given, the Ministry of Agriculture and Natural Resources suffers from a lack of financial support and is understaffed. To make up for these deficiencies, the government emphasizes farmer involvement in decision-making and program development. The major vehicle for accomplishing this is the Gambia Cooperative Union, which has an estimated membership of 86,000 farmers.[1] Also, the Gambia Produce Marketing Board, a statutory organization with responsibility for marketing groundnuts and other crops, assists the farmers. Through a system of competitive, licensed buyers, the GPMB insures marketing outlets and maximum producer prices.

Although in short supply, Gambian civil servants are young and well-educated. The five Divisional (regional) Commissioners are about 35 years old, having received graduate training in France, Spain, Hungary and England. The agricultural officers are also young, and received their college-level training in Sierra Leone and Nigeria. In addition, there appears to be frequent and substantive interaction among the various levels of government. Another element in the political system which promotes communication and monitors government interaction with the farmers is the elected Parliament. The MPs are in frequent contact with their home areas and provide a communications channel to government agencies at the Division and national levels. The pressures exerted by the MPs have increased government efficiency and effectiveness.

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[1] See Confectionary Groundnut Package Deal write-up, page B-40.

While there appears to be a consensus at the national level regarding priorities in the agricultural sector, the implementation of these policies is hampered somewhat by tribal differences in the rural areas. There are 12 major tribal groupings with different languages. While there are few tensions among these tribes, unlike the situation in some African countries, tribal characteristics have to be considered in the design of programs -- for there are distinct differences which affect the rate and manner in which innovations are accepted. Some tribal groups (Wollofs and Fullas) are inclined towards communal endeavors; others (Jolas and Mandingoes) are not. Other differences such as willingness to accept innovations and definitions of the number of hours in a workday are apparent. These differences are uncovered in the two-way communication between the extension officers and farmers, and appropriate modifications by these officers are made in project design at the local level.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The Mixed Farming Centers are one means for implementing the Gambian government's agricultural development strategy; because of their locations, the centers are a major point of contact between the government and farmers. The idea for the centers grew out of a 1933 experiment with bullock plowing carried out by the British Colonial Administration. When bullock plowing proved feasible in MacCarthy Island Division, the British decided in the late 1950's to set up a series of centers to introduce bullock plowing.

Each center has an 11-week training program for young men. To attend, a young man has to be sponsored by his father, uncle, or village chief, who provides the oxen. The center provides food, lodging and a small allowance to the participants which is considered by young men to be a substantial incentive for participation. The training takes place during the dry season when the workload is light. Each day, the trainee spends the morning and part of the afternoon working in the field with his bullock. Some instruction is given on the making of farm implements and on basic farming practices. The capacity of each center is about 25 trainees.

After The Gambia received its independence in the mid-1960's, the Ministry of Agriculture and Natural Resources continued the program and, in 1968, decided to upgrade the centers, making them the headquarters of the district agricultural officers.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Organization

The Mixed Farming Centers have a basic staff which normally consists of the district agricultural officer, a senior ox-plowing instructor (who assists sometimes with the extension work), and two assistant ox-plowing instructors. The center has a training area for plowing, demonstration areas, offices and a small store where a farmer can buy hand implements, seed and insecticides. The major inputs such as fertilizer are delivered by the Gambia Cooperative Union. Technical experts (horticulturalist, veterinarian, etc.) are available at the Division headquarters if their advice is needed; the Ministry of Agriculture and Natural Resources provides the funding for operating costs, which average US$3800 yearly for each center.

The centers function like district agricultural offices in other parts of West Africa, except that they are located in rural areas rather than major towns. Further, there are certain program elements designed to help small farmers with a minimum amount of resources.

Focus of the Extension Effort

Each year the Ministry of Agriculture and Natural Resources decides on a major theme which will be emphasized in the activities of the Mixed Farming Centers. One year it was introducing improved methods for growing groundnuts, and the next it was introducing basic farm management practices. There are several reasons for identifying specific areas of concentration. First, the Ministry has found that extension personnel are more effective if they concentrate on one or two crops rather than attempting to provide general extension assistance on a number of subjects. If an extension officer can deal expertly with one crop, his credibility with the farmers is higher and his advice more readily accepted than if he attempts to answer all the farmers' questions. Secondly, the Ministry organizes training programs for the extension officers around these themes. Each year the Ministry systematically expands the expertise of its extension personnel in another area. The building of this expertise assumes particular importance because of the limited number of trained technicians within the Ministry. Thirdly, the demonstrations and field days at the center are planned around the theme, thus providing a focus for the extension activities and specific goals for the extension officers and farmers.

Linked closely with the question of program emphasis is the overall orientation of the agricultural officers. Ministry training programs for extension personnel emphasize the costs and potential benefits to farmers of each innovation. In other words, an attempt is being made to get the extension officers to view specific innovations as the farmer would perceive them. Most district agricultural officers can spell out the level and sources of farm family income plus farm and home expenses in their areas, and how and why they differ from national norms. This information comes from informed interaction with the farmers themselves.

The Approach

An agricultural officer at a Mixed Farming Center may have to cover 100 villages. In part, this is facilitated by the location of the centers, for farmers do not have to travel far to find one (five to seven miles at the most) and are inclined to go there to purchase hand tools or other small inputs. While at the center, they normally will take the time to look at the demonstration plots and ask questions of the agricultural officer or ox-plowing instructor. In addition, there are six demonstration days each year. Invitations are extended through the village chiefs; normally the progressive farmers and former trainees of the ox-plowing course will attend, in part to learn how to improve production methods but mainly because it offers an opportunity for a social gathering. Attendance is much higher at the field days, held twice a year, for these are family social affairs. The Division-level extension officers will set up a series of demonstrations in stalls, creating a carnival-like atmosphere. While the demonstration and field days arouse interest, the extension follow-through is what the agricultural officers believe is critical in encouraging acceptance of innovations.

Extension coverage is extended through the use of the network of the former trainees from the Mixed Farming Center. The center keeps a list of the former trainees, and extension visits are made to these individuals in their villages about once a year. When an innovation is introduced, such as the increased use of fertilizer on groundnuts, the former trainees are asked to test it. If the innovation results in higher yields, it is likely that other villagers will ask the trainee about what he did differently. The willingness to test different innovations developed as a result of his 11-week training course at the center. In addition, several of the young men trained at the center contract to plow other farmers' land with their bullocks, and in the process, make suggestions of improved practices learned at the center. About 20 percent of those trained become unpaid paraprofessional extension workers, which increases their status in their villages.

Subproject Dynamics

Two Mixed Farming Centers, the Sare N'gai center in MacCarthy Island Division and the Jenoi Center in Lower River Division were examined. The effectiveness of the centers differed considerably. As an illustration, bullock plowing was accepted by 70 percent of the farmers serviced by the Sare N'gai Mixed Farming Center, while less than 30 percent had accepted bullock plowing in the Jenoi area. There appeared to be two major reasons for the differences in acceptance rate. First, in Sare N'gai, there was a strict schedule of extension follow-up visits to the former trainees carried out by the district agricultural officer and the senior ox-plowing instructor; this was not the case in Jenoi, which functioned more loosely. Second, the Fulla tribal group dominated the area of Sare N'gai, while the Mandingoes were the prevalent tribal group in the Jenoi area. The Fullas are more inclined to communal endeavors and exchange of ideas than are the more individualistic Mandingoes.

V. PROJECT SUCCESS

Project Benefits

It is difficult to calculate specific benefits from the extension program of the Mixed Farming Centers. One measure would be the increase in income due to the expansion of acreage under cultivation through the introduction of bullock plowing. Over the past 16 years, the average farm size has increased from one and one-half acres to about three acres. Another possible measure is the increase in net income from an acre of groundnuts using traditional methods of cultivation (US$52) and improved practices (US$74). However, there were several other factors which may have helped bring about farmer betterment, such as the improved delivery system for inputs developed by the Gambia Cooperative Union.

Other benefits accrued to the trainees who contracted out to plow other farmers' fields, but the data are not available to calculate the increased income to them because of their training. This is also true of those who perform duties as paraprofessionals, for they are not paid by the government, and increased status may be their only benefit.

Despite the difficulty in determining benefits attributable to the project, it is clear that the project has increased farmer access to extension services which are attuned to their needs and constraints.

Potential Spread

Since the creation of the Mixed Farming Centers, about 6,000 young farmers, or six percent of all farmers, have been trained at the 24 centers. This provides a fairly broad network of farmers through which the extension service can operate. However, the major limitation is the number of trained agriculturalists (64) who can work with them, giving timely advice. The centers also have the capacity to train 600 more each year, but as was seen in the subprojects, the impact comes from strict extension follow-up. It is questionable whether the extension service can expand rapidly enough to provide the needed supervision. Moreover, the center is underfinanced.

Self-Sufficiency

The Mixed Farming Centers are part of the government's overall extension effort, and as such, are not designed to recover costs. If operating expenses were to be covered, each of the 100,000 farmers would have to pay about US$.90 per year.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The Mixed Farming Centers suggest several techniques for structuring a rural extension effort. *First,* the location of the centers in remote areas, easily accessible to farmers, brings extension assistance where it is needed. *Second,* when there is a limited number of trained extension workers, the use of a crop-specific approach (based on the yearly themes) focuses the extension effort, increasing the expertise of the extension staff while building credibility with the farmers. *Third,* a more subtle lesson can be drawn, which is the importance of training development workers to think in the same terms as the farmer; in other words, to assess what effect an innovation will have on his overall income and family resource commitment and what perceived risks this innovation entails for him. *Fourth,* the project shows how a training program can be used for creating a network of contacts, some of whom

become paraprofessional extension workers in their own villages; it also shows the need for regular extension follow-up.

Information Sources

A. Field

Field visits were made in March and September 1974, during which discussions were held with; officials of the Ministry of Agriculture and Natural Resources at the national, division, and district levels, the Director for Youth, Sports and Social Welfare, the Minister of Education, Youth and Social Welfare, Members of Parliament, and the staffs of the Sare N'gai and Jenoi Mixed Farming Centers.

B. Reports

No written reports on the Mixed Farming Centers were available; some of the statistics were drawn from the Education and Population Census reports.

Data Adequacy

Most of the statistics and calculations in this write-up are based on interviews with knowledgeable sources and, as such, should be considered rough estimates. Comments were received from James H. McFarland, Jr., Chargé d'Affaires, and Douglas Broome, USAID/Banjul.

MIXED VEGETABLE SCHEME

I. PROJECT BACKGROUND

The Mixed Vegetable Scheme in The Gambia was launched with a pilot project in Western Division in 1971. The purpose was to introduce improved varieties of onions and expand production, thereby reducing reliance on imports (30,000 pounds of onions were being imported each year). Moreover, the project was designed to create an income-generating role for women and to open up an opportunity for women to form cooperatives and become part of the Gambia Cooperative Union.[1] The project was designed and supported by the Ministry of Agriculture and Natural Resources, the Gambia Cooperative Union, and Freedom from Hunger (which provided a small revolving fund).

The idea for the project came from British expatriate at the Yandum national agricultural research station. After the initial trials, the Ministry of Agriculture and Natural Resources decided to test the technological package in one village, and an organizational approach was developed with the Gambia Cooperative Union. It involved having the village chief call the women together to explain the program and to identify 30 participants who would form a local women's society (pre-cooperative). Trained by a demonstrator (who then worked with the women on an almost daily basis), each woman cultivated about ten beds (24 feet by three feet). The Ministry of Agriculture and Gambia Cooperative Union delivered the fertilizer and improved seed and purchased the onion crop, deducting the costs of the inputs. From 1971 to 1973, the number of participants grew from 30 to about 960, or to about five percent of the women farmers in Western Division.[2] In addition, the men assist with the fencing and well-digging, making it a community endeavor.

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[1] See Confectionary Groundnut Package Deal for description of Gambia Cooperative Union, page B-40.

[2] As of November 1974, there were 83 schemes involving 4295 members throughout the country; this write-up concentrates on the work in Western Division only.

II. LOCAL ENVIRONMENT

Women in The Gambia tend to be innovators in most spheres of agricultural production, and one aim of the project was to begin to institutionalize this role. Their husbands handle the established cash crop (groundnuts) and major food crops such as millet and sorghum. When rice was introduced, the women took the initiative in growing it, in particular the swamp rice; later, as the profitability of rice production (especially with irrigation) was demonstrated, the men assumed responsibility for rice growing, although the women still worked in the fields.

Some vegetables have been traditionally grown in Western Division (tomatoes, leaf vegetables, traditional onions, etc.), though primarily for home consumption. The Mandingo (tribal group) women in the region are known as the "traditional" vegetable growers, though they sell only a small portion of their produce to the market in Banjul because of the high costs of transport. Vegetables are normally grown on village (communal) land, and the village chief designates the plot each women should work. Even in the Mandingo villages, a one-half acre plot would be large. Prior to the project, traditional methods of cultivation were used: seeds were scattered; the plants were usually not thinned; and no fertilizer or sprays against insects or diseases were used. There are frequent droughts, and water has to be carried from nearby streams; this was usually done too late to save most of the vegetables.

Groundnuts, the major crop in the Division, receive priority in terms of family labor and resource commitment. As in the rest of The Gambia, farm size is small, averaging three acres for groundnuts and food crops. Since most of the project participants were the wives of chiefs, heads of extended families, and progressive farmers, the average farm size for the participating families is slightly larger.

Western Division is near Banjul, so the rural infrastructure in the area is better developed than most of the country. More schools are being built, though the level of literacy is low. For the women in the project, it is only about five percent, while for men, it is about ten percent. Priority in educating the young has traditionally been given to the male offspring.

Several factors assisted the introduction of the scheme in Western Division. First the Yundum station is situated in the area so that the soil and climate differences were not a problem; moreover, the research staff at the station could follow the pilot project closely. Second, the Ministry of Agriculture and Natural Resources, though understaffed and poorly financed, has developed a low-cost method of providing

extension assistance (the use of demonstrators) which has been applied successfully in other schemes, such as irrigated rice production. Third, the Gambia Cooperative Union has a reasonably efficient system for delivering inputs and purchasing the produce; this guaranteed a market for the improved varieties of onions and insured the delivery of fertilizer and seeds. Fourth, across tribal groups, the village chief's status and control over village land facilitated arrangements for setting up the groups and insuring the availability of land. In several cases, the village chief was also a progressive farmer, and so could assist with the introduction of the simple technology.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The idea for the scheme was originated in 1970 by the British horticulturalist assigned to the Yundum experimental station, sponsored by the British Overseas Development Agency. At the station, he initiated trials for 21 different varieties of onions, five of which proved to be promising. As with most innovations in The Gambia, the Ministry of Agriculture and Natural Resources and the Yundum station personnel decided to test these varieties on the farmers' own land. Responding to frequent requests from women to participate, the Gambia Cooperative Union suggested that the scheme be launched through precooperatives consisting of women participants. In addition, the union agreed to put up the initial funding for the scheme. Later, Freedom from Hunger established a small revolving fund for the purchase of fertilizer and seed.

After it was decided to test the package in a village, the British expatriate, in cooperation with the Ministry of Agriculture and Natural Resources, chose a spot which had suitable soil types for the pilot project. Ministry officials contacted the village chief to explain the scheme. The chief called the women of the village together to decide who should participate and how they should be organized. The primary decision-making was assumed by the village chief. Because of uncertainty about how well the onions would do, the Ministry suggested that 15 beds (24 feet by three feet), which is a small portion of the village (communal) land used for vegetable production, be used. During the test, the women were supervised daily by experimental station personnel while the land was prepared and planted; afterwards, one or two extension visits were made each week.

The results of the test proved successful, and word about the new scheme spread among the women in the division. To assist, program expansion demonstrators were trained at the Yundum station, and the scheme was extended to nine other villages the following year.

IV. DYNAMICS: PROJECT IMPLEMENTATION

The Technological Package and Its Introduction

The Approach

After the technological package had proven successful in the pilot project, the initiative for seeking the package came from women in the different villages. They would request the village chief (a traditional leader, though confirmed by a vote of the elders) to contact the Ministry of Agriculture and Natural Resources. An extension officer (college-educated) would come to the village to explain the scheme, first to the village chief and then to the village women. The chief, in cooperation with the extension officer, would identify a piece of village land which was suitable. In most cases, the village chief also selected the participants; however, in some cases the demand to participate was so great that the chief had the extension officer select the participants to protect himself from being accused of favoritism. Almost always, the wives of the village chief and elders were involved.

With the assistance of the village chief the women participants formed a precooperative. This was done informally, and the president and vice president were chosen by consensus. Usually the wife of the village chief became the president. The touchy problem of dividing up the communal land into private plots was also handled by the village chief, with preference in size and quality going to the wives of the senior elders.

The technological package was relatively simple, and involved clearing the land, constructing the beds (24 by three feet), fertilizing and planting the onions in rows, thinning, and harvesting. The total of about 12 man-days was required to cultivate ten beds, which represented a small portion of the time women normally spent on farm labor.

During the first crop cycle, strict extension supervision was exercised through the trained demonstrators. On an almost daily basis, they would work with and train the women. Each demonstrator was responsible for three village schemes, or in

total 90 women farmers. One trend was significant. The women who had traditionally grown vegetables were more reluctant to adopt the new techniques such as thinning, planting in rows, watering on time, and applying an adequate amount of fertilizer; in contrast, the inexperienced women adhered to the advice of the demonstrator and achieved slightly higher yields than the traditional growers. In part, this may have been due to the strong leisure tendency of the Mandingoes (the traditional growers).

Marketing and Credit

An agent of the Gambia Cooperative Union visited each scheme at harvest time, and purchased and transported the crop to Banjul. The Union paid the women U.S. $4.84 per bag, and sold the bag at U.S. $6.45 in the Banjul market. At times, during the off season, the Banjul market price was as high as U.S. $9.68 per bag, but the Union's agreement with the Ministry of Agriculture and Natural Resources did not allow storage of the onions and the acceptance of this higher price. The women knew the major market price and objected to the price that they were getting per bag; they also could not understand how the costs of the inputs were being paid, having thought that the inputs were being provided free. In spite of explanations by the village chief and extension officers, these misunderstandings continued. However, the profitability of the onions, even at the U.S. $4.84 price, has resulted in continued participation. Also, the lack of alternative transportation facilities has insured continued marketing through the Gambia Cooperative Union.

Another marketing problem arose due to poor planning. The Ministry of Agriculture and Natural Resources did not ask the government to stop importing onions, and the market was flooded at harvest time. The Union decided to export the scheme onions to England, and most of the shipment rotted on the boat; some of the varieties were not suited for long voyages. This error cost the Union about U.S. $12,900. Because of the fixed purchase price, the women farmers were not hurt. For the next crop cycle, only long-lasting varieties were grown, but problems have still been encountered.[1]

Subproject Dynamics

The Kembuje and Busumbala Schemes were the two subprojects examined. Both schemes were initiated at the request of the

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[1] USAID inquiries in The Banjul uncovered other problems with the marketing storage and pricing of the onions which places more of the blame on the Gambia Cooperative Union. This reflects some of the problems of data collection where, even if several sources are interviewed, non-mentioned facts can change a picture; it reemphasizes the need for ongoing communication and information collection.

women in the two villages. However, the yields of the Kembuje Scheme were slightly higher. This was due in large part to the active role the village chief played. The village chief was a powerful man and progressive farmer who worked for the Gambia Produce Marketing Board. The chief arranged for the extension officer to come to the village, selected the participants, made a portion of his land available, arranged to have the Ministry of Agriculture and Natural Resources plow the land by tractor, and provided technical assistance to complement the work of the demonstrator. Moreover, the chief had a vegetable garden nearby, supervised by his son, so the women could see what to do and could make comparisons with their own crop; this was important because they had attempted growing vegetables before.

In contrast to the Kembuje participants, the Mandingo women of Busumbala had grown vegetables for several years. They entered the scheme because they had heard about the free inputs; this misunderstanding has not been dispelled and they cannot understand why the Ministry and Gambia Cooperative Union did not provide fertilizer and seed for the remainder of their vegetable garden. Even though the demonstrator and agricultural extension officers spent more time there providing assistance than Kembuje, the women did not respond rapidly to technical advice, particularly that advice which required them to do more labor such as thinning and watering. This may have been due in part to the leisure preference of the tribal group, and in part to satisfaction with the way that they had been doing things in the past. Even though these women were slower to respond, the spread effect of the use of fertilizer was high. About 90 (or 60 percent) of the women from the village not in the scheme started to follow the example of the participants in the use of fertilizer and planting in rows. The yields in Busumbala were about three and one-half bags per ten beds, as compared to four bags in Kembuje.

V. PROJECT SUCCESS

Project Benefits

Growing ten beds of improved onions meant an increase in family income of about U.S. $19, or an average increase in on-farm income of seven percent. The requirements of the project were minimal in terms of labor, land, (provided by the village chief) and other family resource commitment. However, in an area where the average farm income is about U.S. $299, the additional funds are helpful, and are used for clothing and school fees.

In addition to having direct income benefits, the project has begun to institutionalize the role of women as innovators. Gradually, the precooperatives are building management and leadership skills and have the potential for conducting other income-producing schemes. Moreover, the improved techniques, particularly in the case of Busumbala, have been applied to growing other vegetables.

Potential Spread

The project has expanded rapidly because there is little risk and the profitability of onion growing has been demonstrated. The limitations to the spread of the scheme are the ability of the Banjul market to absorb more onions, the level of funds in the Freedom from Hunger revolving fund, and the availability of trained demonstrators. There are now 32 schemes in Western Division, with about 960 participants. Also, the scheme is catching on in the other divisions.

Self-Sufficiency

Since the costs of the agricultural inputs and transportation are being deducted from the profits of the Gambia Cooperative Union, the only direct operating costs are those of the Ministry of Agriculture and Natural Resources and of the British Overseas Development Agency for the horticulturalist. An estimated combined cost was about U.S. $13,000 for 1973. Total return to the women farmers in Western Division was about U.S. $18,000. There are no plans to attempt to recover the costs of providing extension assistance.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The project illustrates the effective introduction of a simple technology, and some basic points which can be applied in other schemes. First, the project is directed at women, a human resource that was underutilized in the area; moreover, it recognized and began to institutionalize the traditional role of women as innovators in The Gambia. Second, the technological package was tested on a small portion of village land by the women farmers themselves; they and other women from nearby villages saw the results and were willing to adopt the package. Third, the value of a crop-specific, low-cost demon-

strator has been shown; his almost daily presence helped insure that the new practices were being learned and applied and further, his work freed the regular agricultural extension workers for other tasks. Also, the Kembuje subproject shows that valuable assistance can come from a progressive farmer in a village. However, it is unlikely that many villages will have an individual like the Kembuje Chief who will take the time to help get a scheme launched and provide continuing assistance. Fourth, even though poor planning resulted in the loss of the first major crop through spoilage, the farmer was protected by the guaranteed purchase price.

Information Sources

A. Field

Field collection took place in March and May, 1974, during which time discussions were held with: the British horticulturalist at the Yundum experimental station, officials of the Ministry of Agriculture and Natural Resources in Western Division, the leaders of the Gambia Cooperative Union in Banjul, and the leaders and participants of the Busumbala and Kembuje schemes.

B. Reports

There were no written reports on the scheme available. Census data was used for population and education statistics.

Data Adequacy

Data on yields were collected by the Yundum station and the Ministry of Agriculture and Natural Resources. Income figures were estimated from several of the sources mentioned above. As in the other Gambian projects, acreage figures had to be estimated. Detailed comments were received from Douglas P. Broome, USAID/Banjul.

CONFECTIONARY GROUNDNUT PACKAGE DEAL (GAMBIA COOPERATIVE UNION)

I. PROJECT BACKGROUND

The Gambian government's Ministry of Agricluture and Natural Resources and the Gambia Cooperative Union jointly initiated the Confentionary Groundnut Package Deal in Western Division in 1971. This was done at the urging of the Gambia Produce Marketing Board which saw the potential for higher export prices because of the greater oil content of confectionary groundnuts. The project requires the farmers to use a new type of seed and adjust their timing, planting and harvesting procedures.

Fifty of the most progressive farmers in two primary societies were selected by the Ministry of Agriculture and Natural Resources and the Gambia Cooperative Union to test the package on about 150 acres in 1971. The package deal was then extended to 200 farmers from four societies in 1972 (about 500 acres), and 400 farmers from seven societies in 1973 (about 950 acres). Gradually, as the package has been improved and the prices for confectionary groundnuts have been fixed by the Gambia Produce Marketing Board, non-package deal farmers are adopting the new variety. The intent is to extend confectionary groundnut growing to the 20,000 farmers in the division. The costs to the Gambian government for the first three years have been about US$25,000.

II. LOCAL ENVIRONMENT

Cash crop production in The Gambia is dominated by groundnuts, which constitute over 90 percent of the country's exports. This is true in Western Division where the confectionary groundnuts package deal has been introduced. Groundnuts are frequently grown in rotation with subsistence crops such as sorghum and millet.

Western Division is near Banjul where the rural infrastructure is better developed than elsewhere in the country. More schools are being built, though the level of literacy is only about ten percent. The average holding in Western Division is about three acres, with farm size ranging from one to 50 acres. Farmers participating in the project have larger holdings which average about five acres in size.

The area is affected by frequent droughts. During the first year of project implementation, a serious drought caused low yields and slowed acceptance of the package deal; farmers were unsure whether the new seeds had contributed to these low yields.

Project initiation was facilitated by farmer experience with the three main institutions involved. Experimental work on confectionary groundnuts was done by the Ministry of Agriculture and Natural Resources at the Yundum Station, and the field staff of Western Division was supplied technical assistance. Although the Ministry is understaffed and poorly trained, it has younger extension workers who are trained to determine the costs and benefits of innovations to farmers.

Second, there is the Gambia Produce Marketing Board, a statutory organization, with responsibility for marketing groundnuts. Through seven licensed buyers, it purchases the groundnuts; the GPMB and government sets minimum producer prices each year. Third, there is the Gambia Cooperative Union (GCU). Some reasons why the GCU was used as the mechanism for introducing the package deal become apparent when considering its organization and functions.

The Gambia Cooperative Union (GCU)

Organization

The GCU was formed in 1956 and grew rapidly during the early 1960's. While the movement operated efficiently in early years providing marketing assistance, credit, and agricultural inputs to its members, it declined in status as a result of poor management. Funds were misused, and loans and payments to the farmers were delayed. Both the farmers and government lost confidence in the movement, and the parliament set up a commission of inquiry which set new guidelines and controls on the GCU's operation.[1] The movement was revitalized and has grown to include 61 primary societies with a combined membership of 86,000 farmers. Its activities have been expanded to include handling new crops in addition to groundnuts, but the major changes have been organizational.

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[1] Field comments indicate that a similar problem has occurred since the field collection work.

The basic thrust of the new guidelines was to give responsibility to the farmers. From the village branch through the national level, the GCU is controlled by elected representatives of the farmers. Twenty-five or more farmers can organize a village branch; the village branch elects one representative for every 25 members to the district or primary society. In the primary society, the village representatives elect both a ten-man management committee and an executive committee. One member of the executive committee is an educated secretary trained by the GCU. The salaries of the secretary and other executive committee members are paid from the society's marketing fees. The same organizational arrangement is used at the national level, with each primary society electing two representatives.

At the district and national levels, registrars (who are government employees) oversee the finances of the primary societies and arbitrate the cases of GCU members in default. The role of the registrars is mainly auditing, and they are responsible to the elected parliament. The field reports of the registrars and of GCU national staff members are sent to members of parliament. Surveillance functions are therefore carried out by elected representatives of the farmers, the registrars and members of parliament.

GCU Farmer Services

The GCU is a licensed buyer, and unlike several countries, it competes against other international and domestic buyers. This forces the union to be competitive in providing inputs to the farmers and in sharing the profits from marketing activities with them. While the major cash crop is groundnuts, the GCU handles all other crops as well. It delivers the agricultural inputs; it also transports and markets the crops to the Gambia Produce Marketing Board. GCU leaves agricultural research and extension work to the Ministry of Agriculture and Natural Resources. Marketing fees cover the costs of running the GCU. Each society receives a portion of the profits, and part is given to the farmers as bonus payments. The remainder is used to help finance experiments and programs of the Ministry of Agriculture and Natural Resources.

The GCU is the only source of credit for the farmers. Their primary need is for consumption credit, though the GCU also provides fertilizer and seeds on credit. The Commercial and Development Bank of The Gambia provides funds to the GCU at an interest rate of 7.5 percent which is slightly below the commercial rate. The national office loans the funds to the primary societies at a nine percent rate, and the farmers are charged a 15 percent rate. This rate is sufficient to cover GCU credit costs and any defaults.

Loan repayment is strictly enforced. If a village branch does not have a 95 percent repayment rate, it cannot receive future credit; the village as a whole assumes responsibility for dealing with individual members who are in default to protect its credit rating. The village first holds a meeting with the defaulter to determine his capability to repay. The village recommendation on how to handle the defaulter is passed on to the primary society, which passes its recommendation to the district registrar. The registrar conducts the final review and orders the person to repay a certain amount within a specified period of time. If he or she does not, the case goes to the courts. There is considerable flexibility in the system; if, for example, a farmer is wiped out by drought, the village may ask that the loan be held over until the next year. Almost always, however, the 30 percent penalty rate is enforced. The application of these sanctions has resulted in high repayment rates.

In Western Division where the project is operating, the GCU in July 1973 made 5030 loans with a combined value of US$195,270, or US$38.83 per farmer on average. To receive a loan, a farmer has to have been a member of the village branch for one year. In his second year, he is eligible for a loan of one-third the value of the crops he marketed through the cooperative, though no farmer can receive more than US$129. In March 1974, loan repayment in the division was 95.8 percent.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

Growing farmer confidence and participation in the GCU made it an obvious vehicle for introducing the confectionary groundnut package deal. The original idea for the project came from the Gambia Produce Marketing Board based on its knowledge of the export market for different types of groundnuts.

Initial experimentation with different varieties of confectionary groundnuts was begun at Yundum in 1967. In 1969, a few selected farmers were asked to test a Chinese variety on a small portion of their land. The test resulted in low yields. However, at the same time, experimentation was going on at the research station with Philippine Pink and Georgia Hybrid varieties and they showed promise. Through a series of meetings between the GCU and agricultural extension officers, it was decided to introduce the package deal for the two varieties and the design was worked out.

From the experience of introducing the Chinese variety, two important considerations in design emerged: first, the

need to have the farmers grow the new varieties on only a portion of their land because of the uncertainty of the yields; and second, the need to protect them further by providing a grower's fee, particularly since the Gambia Produce Marketing Board would not immediately guarantee prices for the new nuts.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Requirements of the Technological Package

There were major differences as regards the growing of confectionary groundnuts compared to production of traditional oil nuts: first, confectionary nuts are planted two weeks after the regular groundnuts; second, a longer growing period is required before harvest;and third, yields are normally lower than those of regular nuts, though prices are higher. The farmers initially blamed the GCU and agricultural officers for not getting the inputs to them on time, a delay which farmers believed caused the lower yields. During the first year, the problem was compounded because a drought damaged the first crop. Even with close extension supervision, it has taken two or three crop cycles for farmers to understand the different requirements and results.

Incentives for Adoption

Because the package deal has not yet been proven more profitable than regular groundnuts, the Ministry of Agriculture and Natural Resources and GCU have developed two major incentives: for the first crop cycle, the ministry provides the major inputs, the new seeds and fertilizer,free of charge. Because of the uncertainty of the new varieties, a farmer is only allowed to plant a portion of his land with confectionary groundnuts while traditional groundnuts are grown on the remaining land. Moreover, a grower's fee of about US$48 is given for each acre of land under cultivation with the new varieties (as compared to the US$74 a farmer would earn from one acre of traditional groundnuts). This fee will be continued until the prices for the new varieties are set by the Gambia Produce Marketing Board. During this period, the grower's fee acts as an insurance against lower yields, and provides an income to the farmer that is at least comparable to what he would receive from an acre of traditional groundnuts.

Agricultural Extension Support

The Approach

The government extension workers in cooperation with the GCU first selected the most progressive farmers to receive the package deal, operating under the assumptions that: (1) they can afford to experiment; and (2) that the spread effect would be greater than if less experienced farmers were used.

Demonstrations on how to plant the new varieties were conducted on the farmer's land and follow-up visits by the extension officers were made weekly. At harvest, the yields were measured by the extension officers. The problems and potential benefits of the package deal were discussed at the meetings of the village branch and primary society. Throughout the process, there was continual interaction among the farmers, extension workers and non-participating cooperative members.

Use of Small Farmers as Extension Workers

Another reason for selecting the most progressive farmers is to train them to help with the extension supervision of new adopters. Normally, a farmer has to go through two crop cycles with successful results before he is ready to assist. The extension officers select four or five of the farmers who have been most successful with the package, to work with other farmers. Beyond family and village relationships, no incentives are provided for these paraprofessional extension workers. Nonetheless, in the tribal areas where there was an inclination towards communal efforts and where the package has proven reasonably effective, this approach has extended the numbers of adopters.

Subproject Dynamics

The first of the two subprojects examined was Faraba Banta, one of the first areas where the package was introduced. Because of the drought, mixed results were achieved. Of the initial 25 farmers who adopted the package, five decided not to grow confectionary groundnuts after the first season, ten maintained the number of acres under cultivation and ten expanded their acreage. On the whole, expansion in the area has been slow (34 adopters) which can be attributed both to the mixed results from the package and to a lack of cohesiveness in the villages and village branches of GCU. There was

little discussion about the innovation in cooperative meetings, and the more progressive farmers were unwilling to assist with extension work.

In N'Demban, where the package was introduced a year later, consistently better yields were achieved and the adoption rate was higher. Currently, 131 farmers are growing confectionary groundnuts. Moreover, there has been regular discussion of the new varieties in meetings of the cooperative society and branches, and 12 farmers have been assisting with the extension work.

From the two subprojects, several factors can be seen as crucial, for speeding the adoption rate of a new crop. One obvious factor was the initial results achieved with the new variety. Less apparent was the amount of communication among farmers assessing the innovation. In the N'Demban cooperative, this interaction did occur, which facilitated expansion; in the Faraba Banta cooperative (which was more loosely organized), there was little discussion or evaluation of the results. A third element, directly related to the relative strengths of each cooperative, was the inclination for the tribal group in N'Demban to work together and to share experiences.

V. PROJECT SUCCESS

Project Benefits

As yet, the profitability of confectionary groundnuts has not been proven. Yields average about 1298 pounds per acre, which is about 65 percent of those from traditional groundnuts. With the grower's fee, a farmer nets US$83 per acre as compared to US$74 per acre for traditional groundnuts. The average farmer who has accepted the package has 2.48 acres under cultivation in confectionary groundnuts.

More broadly, the development and implementation of the confectionary groundnut package deal provided the basis for a collaborative approach between GCU and Ministry of Agriculture and Natural Resources. A similar approach has been employed in the Mixed Vegetable Scheme.[1]

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[1] See Mixed Vegetable Scheme write-up, page B-31.

Potential Spread

The number of acres under cultivation has increased from 150 to 950. However, expansion depends on the continued availability of the grower's fee or a significant price increase for confectionary groundnuts by the Gambia Produce Marketing Board. The spread continues because of this built-in protection for the farmers. Also, international buyers such as the Mars Candy Company appear interested in purchasing large quantities of the confectionary groundnut.

Self-Sufficiency

The costs of introducing confectionary groundnuts have been minor; however, the eventual self-sufficiency of the project will only come when it moves to an unsubsidized basis. This is in the planning stages, though the major drawback appears to be finding varieties which produce sufficiently high yields.

Replicability

Some approaches for introducing an "unproven" technological package can be used in other projects. First, the use of various methods to protect the farmer -- such as having him grow the new crop on a portion of his land available for that crops, and providing "insurance" so that he does not suffer a loss in income. Second, the use of farmers to help extend the adoption of technological packages, though replication of this approach will depend on local circumstances.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

In addition to the lessons which can be drawn from introducing a new technological package, the project offers insights on cooperative organization and development. *First*, the GCU demonstrates the importance of giving farmers responsibility in decision-making at each level and of having a multi-dimensional surveillance system. *Second* it demonstrates what a cooperative movement can do, in operating in competition with private firms. *Third*, it illustrates that small farmers are willing to pay an interest rate higher than commercial rates if they perceive a definite credit need.

Information Sources

A. Field

Field collection took place in March and May, during which time discussions were held with: officials from the Ministry of Agriculture and Natural Resources at the national and divisional levels, an officer of the Gambia Produce Marketing Board, the Secretary General of the Gambia Cooperative Union, the Managing Director of the Commercial and Development Bank of the Gambia, the Western Division Assistant Registrar, the Executive Committee and elders of Faraba Banta, and the Executive Committee of N'Demban.

B. Reports

Background material and yield data came from "Confectionary Groundnut Package Deal: Programme in Western Division -- 1973-74," Ministry of Agriculture and Natural Resources planning document. Census reports were used for population and educational statistics.

Data Adequacy

Data on yields were collected systematically by the Ministry of Agriculture and Natural Resources. Pricing information came from the Gambia Produce Marketing Board. The Assistant Registrar in Western Division provided data on loan repayments. As in the other Gambian projects, acreage figures (except those for confectionary groundnuts) and family income figures were estimated from several sources. Comments were received from James H. McFarland, Jr., Chargé d'Affaires, and Douglas Broome, USAID/Banjul.

ANNEX C

GHANA

GHANA

Area: 92,100 square miles
Population: 9,325,000
Population growth rate: 2.9%
Density per square mile: 101.2
GNP per capita: $250
GNP per capita growth rate: -2.1%
Capital: Accra (633,880)
Largest cities: Kumasi (342,982), Sekondi-Takoradi (161,071)
Major language: Twi, Fanti, Ga. Ewe, Dagbani, and English
Religion: Pagan, Christian, Muslim
Literacy rate: 20-30%

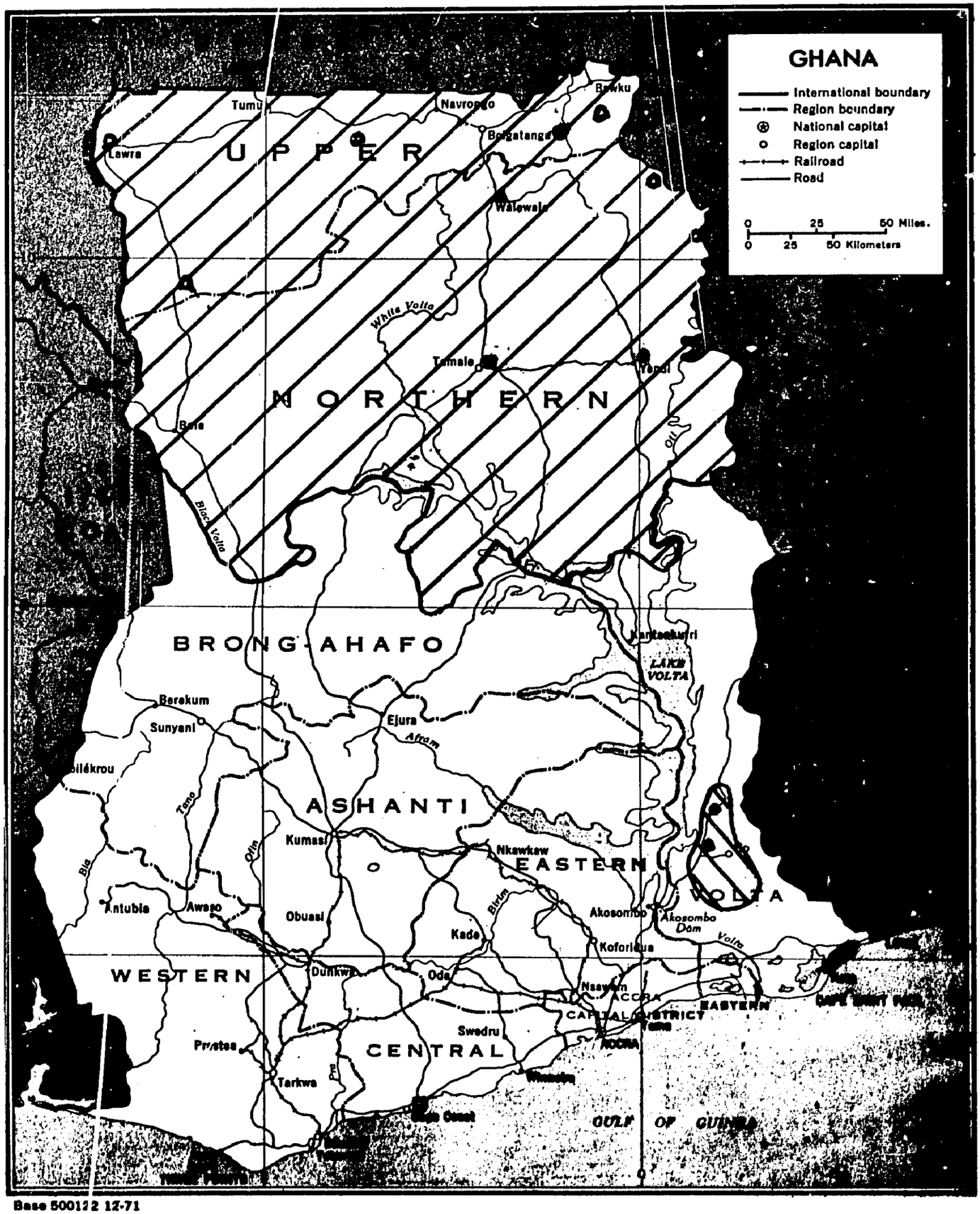
Christian Service Committee's Agricultural Program - This project covers the shaded area, with many subprojects (○) throughout the Northern and Upper Regions.

Ghanaian-German Agricultural Project - This project area is contiguous with the CSC area in the Northern and Upper Regions. Project headquarters are at Tamale.

Ghanaian Government/FAO Fertilizer Use Project - This project covers the shaded area in the Volta Region, with subprojects at Vovoli and Tsiba (●).

Biriwa Project - This project and subproject are located in the Cape Coast Area (□).

Denu Shallots Project - This project covers the shaded area east of Keta on the coast in the Denu District of the Volta Region.



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CHRISTIAN SERVICE COMMITTEE'S AGRICULTURAL PROGRAM (NORTHERN AND UPPER REGIONS)

I. PROJECT BACKGROUND

The Christian Service Committee's Agricultural Program in the Northern and Upper Regions of Ghana evolved out of the work of missionaries in these areas. The missionaries saw a need to help people improve their physical well-being. In the mid-1950's, they set up farm schools which for one year taught young men reading skills, improved agricultural practices and religion. However, after this experience, the young men were unwilling to return to their family farms and sought employment in urban areas. In 1963, ministers in the two regions decided to import three trained agriculturalists, and gradually the approach shifted to the development of agricultural stations for testing and for assisting farmers to adopt new techniques and inputs.

Today, the Christian Service Committee (CSC) has ten agricultural stations located in remote areas of the Northern and Upper Regions. They are staffed by 21 agriculturalists, primarily from foreign voluntary services, assisted by Ghanaians who have been recruited and trained locally. The main purpose of the project is to assist the poorest of the small farmers in the area. Approximately 7000 farmers are helped by the project through the provision of extension assistance, the introduction of improved (and simple) agricultural production techniques and the delivery of inputs for the farmers to purchase. CSC is directly assisting only a small portion of the 180,000 farmers living on the 774,000 acres of land in the two regions.

Part of the operating expenses of the ten stations is covered by the sale of fertilizer, seeds and implements to farmers. The remaining part, plus the support for the foreign agriculturalists, comes from different church groups in Ghana, Europe and the United States. A rough estimate of the current yearly external support is about US$300,000.

II. LOCAL ENVIRONMENT

The 1970 Census of Agriculture for Ghana shows that over 95 percent of farmers in Northern and Upper Regions produce entirely or mainly (over 50 percent for home consumption) for subsistence. The average farm size in the area is about seven acres, though the median is 4.2 acres. An average family (about seven members) earns about US$247 from its land, using traditional methods of cultivation; earnings increase to about US$310 when a family adopts the use of fertilizer and improved seeds for a few crops.

Major crops in northern Ghana include maize, guinea corn, millet and yams. Groundnuts are grown in both regions, while various beans are grown primarily in Upper Region. As part of the large mechanization program in the area, rice cultivation has increased significantly. Also, larger farmers are growing cotton and tobacco as cash crops. The area is normally dry, and overall crop production has been hindered by frequent droughts.

Infrastructure in the area is poorly developed. Roads and transportation are major problems, though the government has made an effort to construct feeder roads. Much of the produce is sold in the traditional market places; the markets operate on different cycles ranging from three to six days. Some women, head-loaded with farm produce, have to walk 12 miles to the nearest market and back the same day. One of the most pressing needs in both regions is for drinking water, with less than 25 percent of the families having access to a good supply. There are few schools, and the 1970 census showed that more than 95 percent of those over 25 years old had never attended school.

There are several tribal groups throughout the area, with Islam the dominant religion. Tribal differences, particularly in social organization and characteristics, require various approaches to encourage acceptance of improved agricultural practices. For example, it is necessary to work formally through the traditional leadership of the Dagomba (a Muslim tribal group) while the rate of adoption in Komkomba (a mobile, less traditional group) village will be speeded if a development worker starts with younger, married men.

Foreign missionary groups have been active in both regions for many years. Some missionaries have been there 15 to 20 years and have become knowledgeable about different tribal customs. Moreover, individual churches have developed networks of local evangelists who also assist in laying the groundwork for introducing improved agricultural practices by informing church groups and village leaders of innovations. According

to CSC leaders, those individuals or tribal groups who have accepted the idea of Christianity are more inclined to adopt other ideas. In part they attribute this to Christians perceiving the earth as "good" and the Muslims seeing it as "alien."

A primary aim of the government of Ghana has been to become self-sufficient in food production. Under the umbrella of Operation Feed Yourself (OFY), several activities are underway which range from primary school vegetable gardens to the wide-scale mechanization of rice production in northern Ghana. Mechanization has been a major objective of the Ministry of Agriculture for the past three years, with little attention paid to small farmers. Because of this emphasis, little extension assistance and few inputs reach these farmers. Another reason is the limited resources of the Ministry of Agriculture which has one of the highest ratios (5000:1) of farm units to extension workers in Africa. The orientation of the government towards increasing output through mechanization has reinforced the determination of some private groups to concentrate their programs on helping small farmers.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The CSC agriculture program, begun by several small (separate) initiatives of missionaries in northern Ghana, has grown into a larger coordinated project. Recognizing the need to help improve living conditions of people in their parishes, local foreign missionaries started a few food distribution projects but decided that change would only come over the long run if the people improved their own production practices. A farm school was established at Yendi in 1959, where young men were brought to a church farm for a year to learn about improved farm practices and the Bible. However, several of these men decided to seek employment in the urban areas because they had acquired the ability to read and write, rather than return to their family farms.

In the early 1960's three missionaries began to informally exchange ideas on common problems connected with material (food, medicine) aid to northern Ghana. A particular concern was how to channel gifts from overseas and from local sources into relief work and rural development. By 1963, Accra-based religious leaders (Ghanaian and foreign) had created a structured Christian Service Committee as part of the Christian Council of Ghana. Because most of the relief and development activities were underway in the north, a special northern committee was set up. Difficulties in coordination arose between the "northern" and "southern" committees which led to the establishment of a formal organizational structure in Tamale to handle the northern operations in 1969. Problems of planning and the channeling

of material support still continue to plague working relations between the committee in Accra and its northern arm.

Underlying the formalization of church efforts were several assumptions. First, it was felt that experienced and devoted church-related workers could effect change in people's living conditions by taking their cues from local needs rather than from directions of an administrative structure. Moreover, because church personnel had means of transport, they could assist in the distribution of supplies and services; in the north, church vehicles were the only means for reaching people in remote areas. Finally, it was believed that the churches could secure foreign (as well as domestic) support for relief and development efforts.

As the overall structure of the Christian Service Committee emerged, the agricultural program began to take shape. Missionaries in the north decided that trained agriculturalists were needed to provide adequate technical assistance. Three were recruited through foreign church organizations and began work in the mid-1960's. Having concluded that the farm schools were inadequate as a means for improving production, the agriculturalists started to explore new approaches. They worked in areas where there were established missions and developed the concept of an agricultural station with a model farm which conducted demonstrations and provided extension follow-up.

Three stations at Yendi, Garu and Wa were set up. Initially, these stations worked with farmers who were active in church activities. However, as the number of stations expanded to ten, various approaches were developed to help non-Christian tribal groups.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Organization

The primary activities of the Christian Service Committee in northern Ghana include preventive medicine and nutrition, community development and agricultural production. The activities of the ten stations are coordinated by the Tamale office which provides technical and program assistance, logistical and financial management support, and liaison with the main office of the Christian Service Committee in Accra. The Tamale office for the past five years has been headed by an American minister; recently, as part of the CSC effort to shift control of its activities to Ghanaians, his counterpart became director of operations in the north.

Each agricultural station structures its own activity program from frequent discussions with farmers over an extended period of time. Most stations have a model farm which has been built to replicate conditions on the farmers' own farms. In addition, a station has an area for testing new inputs and conducting demonstrations and a distribution center (sometimes several in key locations) for selling fertilizer, improved seeds and small implements to the farmers.

Either a foreign or Ghanaian agriculturalist heads a station, with a staff of foreign and Ghanaian extension workers. Frequently, volunteers from the Mennonite Service Committee or Canadian University Service Overseas (CUSO) serve at these stations. These young American and Canadian farmers (sometimes without college educations) appear to comprehend quickly why farmers adopt some innovations and not others and have an aptitude for working with local farmers. However, the presence of a trained agriculturalist to provide guidance also seems necessary. The Ghanaian agricultural assistants are trained by the stations. Normally they have some education (frequently primary school) and start as interpreters for the American and Canadian volunteers. Over a two- or three-year period, they learn how to provide extension assistance on their own.

Project Approach

Activities vary from one CSC station to the next. In part, this is due to differing local circumstances and constraints. Ideas for activities come out of extensive dialogue with small farmers. Sometimes, an evangelist will identify a specific problem such as poor groundnuts yields, in his travel through villages. The missionary in his discussions with villagers will note their concern about increasing maize production.

Perhaps even more important, the missionaries and staffs at the various stations learn over time about a family's sources of income and expenditures -- what a farmer has available and is willing to spend on innovations. Along this line, they also know a farmer's priorities, and the trade-offs between purchase of a bag of fertilizer and drinking palm wine in the local market. They have a knowledge of village customs and history as well as the details of village decision-making. This knowledge base allows them to determine the best approach for intervening in a specific tribal groups's village.

While the approach to individual villages varies, the general CSC operating procedure is to identify the more progressive small farmers and encourage them to test different innovations. This is referred to by the CSC as the "preferred farmer" approach. Before a farmer is asked to try an innovation, it is tested at the agricultural station for two or three years. The farmer is shown the results at the station and then

asked if he would like to try the seed or insecticide on a small portion of his land. The improved inputs are usually given to the farmer for the first crop cycle. However, an operating assumption of CSC is that if an innovation is well-received by a farmer, he has the cash and is willing to pay for the improved inputs. Over the years CSC has found that several of the "poor" farmers can purchase bullock plows at US$522 from money saved for funerals or marriages.

CSC maintains contact with the two or three "preferred" farmers in each of the villages, and through them encourages the spread of an innovation. Another important element in the approach is strict extension follow-up; CSC staff visits priority villages weekly to check on progress and to discuss with the farmers other problems or concerns.

The technology introduced by the CSC stations is quite simple and is within the financial capabilities of small farmers. Some of the innovations include the use of fertilizer, improved seeds, insecticides and herbicides, rabbit and poultry production and the development of low-cost, grain storage silos. The church network throughout West Africa facilitates communication about experiments that have worked in other countries. These ideas are also tested at the agricultural stations.

CSC has found that the delivery of fertilizer has helped to gain the confidence of small farmers. Recognizing the cash constraint of farmers and their unwillingness to take risks, CSC repackaged the 110-pound bags that it received from the Ministry of Agriculture into seven to nine-pound packets. These were sold to farmers at a price slightly higher than the Ministry's to cover the costs of transport and repackaging. Fertilizer use expanded, and Ghanaian farmers were willing to purchase larger quantities; this was possible because the Ghanaian-German Agricultural Project[1] had increased the available supply. Also to further fertilizer sales, CSC used a grant from the Germans to build 24 small fertilizer stores (16 by 25 feet with a capacity of 20 to 30 tons) in remote areas. Local farmers were hired as "storekeepers" and paid out of the profits of their sales of fertilizer and other inputs.

Several points in CSC's introduction of fertilizer illustrate its general approach. First the CSC agriculturalists identified with the farmers the need to improve crop yields. They then convinced a few "preferred" farmers to use fertilizer on a small portion of their maize crop. When other farmers in the village saw the increased yields, they wanted to try it. Recognizing the unwillingness of the farmers to make a major initial investment, CSC repackaged the fertilizer in

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[1] See the Ghanaian-German Agricultural Project write-up, page C-15.

quantities which reduced the first commitment of resources by farmers. Then as the demand for fertilizer grew because of results achieved on their own land, larger packages were sold and a distribution system was set up to match the spread of the innovation.

Further, CSC desired to recover the costs of the transport and repackaging operation and increased its price. The evangelists and Ghanaian staff members and "preferred" farmers were called on to explain the price difference. Since there was no other source of supply, farmers were willing to pay the higher price. It should also be noted that CSC cooperated with other agencies in the process of introduction; CSC workers are willing to share their insights and take advantage of available resources in the area to help farmers.

When fertilizer use was introduced into the area, almost no small farmers were using it; five years later (in 1974), over 7000 farmers were using fertilizer on a portion of their land, primarily land for growing groundnuts and maize.

The introduction of fertilizer facilitated experimentation with other innovations. As will be seen by the work at the Yendi and Garu stations, these innovations varied, as well as the manner in which they were introduced.

Yendi CSC Agricultural Station

The Yendi Agricultural Station began as a farm school in 1959, and changed its program to extension in 1963. Extension work by a CUSO volunteeer and a Ghanaian agricultural assistant now covers 16 villages within a seven-mile radius of the station. Trials and demonstrations are conducted at the station, and then on land of cooperating farmers (see below). Fertilizer and seeds are supplied on sale. The station also keeps poultry and sells chicks to interested farmers. In addition, the station has introduced the low-cost (US$15) grain silos for storing small amounts of grain (one ton), the use of which has resulted in higher producer prices. Another innovation has been the use of bullocks for plowing, and the Yendi station has trained over 200 farmers from different parts of Northern and Upper Regions.

There are about 320 farmers in the 16 villages who are directly assisted in the extension effort and 600 out of the 10,000 in the district who have some contact with the station; several farmers come to the station to see the activities on the model farm or to purchase inputs. Seven of the villages are Dagomba and nine are Komkomba. Because of tribal differences, two approaches have been used by the CSC.

The Dagomba are Muslim and have a strong traditional hierarchy in their villages. CSC had to make initial contact with the village chief. After a short meeting with him to outline the purpose of the visit, the chief called together the compound (extended family) heads for a discussion of the problems and possibilities of increasing agricultural production. Even though there were few, if any, Christian converts in the area, the credibility of the CSC workers with the village chief and compound leader was high because of the station's long service in the area.

Once an idea was agreed upon by these village elders, it was tested on the land of the compound leaders. A compound leader controls about 12 acres of land which he farms with two other males (normally sons); the leader has about eight acres and each of the younger men has about two acres. The compound head also controls all the money for the family and makes the decision to purchase additional inputs.

Because of his control over family resources, the compound leader is the natural target of the extension effort. To help facilitate communication with the compound leaders, a key individual is identified by CSC -- in most cases, the village linguist who is the spokesman for the chief. Each time a CSC worker visits the village (usually once a week) he contacts the linguist who accompanies him on visits to the compound heads. The pattern of CSC interaction rarely changes in the series of extension visits to the village because of tribal adherence to traditional procedures.

Nine of the villages are Komkomba which is a mobile, less traditional tribal group. Each village has a leader, but his powers and authority are limited. The Komkomba will settle in an area for three or four years and then move. There is less of a tendency for Komkomba families to operate as an extended family unit. Young, married men go off on their own, and because of their receptivity to education, have become the focus of the station's extension effort. CSC contacts with these young men are always informal and involve lengthy discussions on a variety of ideas, although they are lax in following the technical advice of the extension workers. Strict and regular (weekly) extension visits are required to supervise their use of improved practices.

Garu CSC Agricultural Station

The Garu Agricultural Station was launched in 1967. A Dutch pastor had been in the area several years, and decided that professional agricultural assistance was needed. At his request, a Dutch agriculturalist was brought to Tamale in 1966; he started to make visits to Garu but found that it would be necessary to establish a station there if regular extension

assistance was to be provided. The entry of the agriculturalist into the area was facilitated by the network of evangelists developed by the Dutch pastor. The evangelists made introductions to village chiefs, and assisted in the dissemination of information about possible innovations as well as transmitting farmer reactions back to the station. Unlike the Yendi Station, there were many Christian converts in the area.

The activities of the Garu station are similar to those at Yendi. In addition, the station has experimented with the construction of poultry houses out of local materials, the development of village silos (rather than the family variety), the use of a boar to service the farmers' hogs and training programs in farm management. The station's extension effort covers 25 primary target villages and ten secondary ones. The station applies the "preferred farmer" approach in testing innovations.

One innovation was the development of a small farmer credit union for the Garu area. The station began by storing the crops of farmers and selling them when the price was highest; the costs of the inputs (improved seeds, fertilizer) for the next season were deducted from the sale of the crops before returning the proceeds to the farmer. Some problems were encountered, for farmers did not know where they stood (how much they had received from the sale of their crop and how much had been deducted for the purchase of the improved inputs). Nonetheless, these were minor, and about 250 farmers learned about the need to save.

The next step was to encourage the farmers to form a credit union. Working through the "preferred farmers" and evangelists, CSC called a meeting at the station in 1972, and the farmers decided to form a credit union called *Sungemeng* (Self-Help). Shares were sold at US$.43. Money for the shares was collected at the station and by the CSC workers as they travelled throughout the area. To remain eligible for loans, a member had to contribute each year.

The credit union elected a committee to review and approve loan requests by the members. Each request for a loan has to be supported by a guarantee from another member who agrees to repay the loan if the recipient defaults. Loans average about US$15-20 and carry an interest rate of two percent per month during a crop cycle. About 600 farmers participate in the union, and approximately 240 of them receive loans which yearly amount to US$4300. After the loans have been made, the remaining funds are placed in a bank account which pays a 7.5 percent annual interest rate. This is the only source of credit for small farmers in the area. Moreover, the steps by which the Garu Station helped the farmers form the credit union illustrate one way of encouraging farmers to develop their own savings/loan program.

V. PROJECT SUCCESS

Project Benefits

One serious shortcoming of CSC's work in Northern and Upper Regions is the lack of data on whom the project is reaching and with what effect. It has been found that fertilizer doubles the yields of maize and groundnuts. However, the data do not allow CSC to determine what difference this makes in overall family income. This is true for other innovations as well. Moreover, it is unclear how many farmers the ten stations are actually helping. The estimate of 7000 farmers comes from the number of bags of fertilizer sold by CSC; this assumes that each farmer has bought one bag. According to CSC leaders, this would be a conservative estimate of the number helped. In terms of direct extension assistance in the villages, however, a rough average per station would be about 300 farmers.

Potential Spread

The simple technological innovations developed by CSC appear to be well-received by the farmers. Again, because of data inadequacies, it is not possible to measure the spread of these innovations in individual villages. This problem is particularly important when assessing CSC's "preferred farmer" approach. To what extent do other farmers follow the lead of "preferred farmers"? CSC would say that the spread has been qualitatively significant, and this impression has been backed up by the increases in CSC sales over the past five years.

There are limitations to the number of farmers the project can reach. As is evident in the case studies, strict extension follow-up is required. To provide increased coverage will require the training of more Ghanaian agricultural extension workers. This is being done by CSC, though the number trained so far is only about 12. Another limiting factor is the supply of agricultural inputs available in the area. While the German government has improved the distribution system, there have been times when stations have not been able to get the needed amounts of fertilizer.

Originally, CSC believed that the Ministry of Agriculture would be the primary means of spreading the innovations developed and tested by the agricultural stations. Because of the emphasis on mechanization and support to the larger farmers in increasing aggregate output, the Ministry does not appear to be ready now to perform this role.

Self-Sufficiency

An attempt has been made to cover the local currency costs of the CSC project through the sale of inputs to farmers. The chart below shows the amount of sales and the yearly program expenses (in dollars):

	1969	1970	1971	1972	1973
Expenses	32,174	52,174	81,739	177,773	432,172
Sales	-	-	49,435	110,885	321,739

In the most recent year (1973), sales covered about 65 percent of the expenses. The remaining amount was covered by donations from foreign and domestic church groups. In addition to these costs, there was the support for foreign staff members. A rough estimate of those costs not covered by sales would be US$326,000, or about US$47 per farmer (assuming 7000 farmers assisted). If a farmer uses fertilizer on an acre of maize and one of groundnuts, he stands to net an additional US$63 per acre.

In addition to the sale of inputs to help cover operational expenses, CSC is attempting to gradually turn the project over to the Ghanaians. The training of the agricultural extension workers is continuing. However, one need will be to replace the college-educated, foreign agriculturalists; this will require additional local funding to attract experts of comparable quality. Foreign churches (as well as as some foreign donors) are reluctant to pay high salary costs for qualified host country nationals, and it is questionable whether the sales of agricultural inputs or other income-generating activities can cover the replacement costs for the foreign experts.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

There are several lessons which can be drawn from the work of CSC in northern Ghana. *First,* the missionaries, with their many years of experience in the area, have gained an understanding of farmer needs and the tribal differences which affect the manner in which innovations can be introduced most effectively. In most cases, it would be difficult to replicate this experience; rather, their experience represents a knowledge base to be tapped in project identification and design, and signals the type of information an external agency should have before intervening in a village. *Second,* the innovations developed by CSC are simple and can be easily understood by farmers. Moreover,

they are within the financial capabilities of the farmers if they perceive innovations as profitable. *Third*, the CSC experience illustrates a process by which innovations may be effectively introduced. An improved input is first tested at the station, and then farmers are asked to test it on a small portion of their land. The major indicator of an innovation's success is farmers' willingness to pay for it in cash. *Fourth*, CSC has been making attempts to insure the self-sufficiency of the project by covering a portion of costs by sales to farmers and developing the capabilities of Ghanaians to take over the administration and operations of the project.

Information Sources

A. Field

Field visits were made to Northern and Upper Regions during February and May 1974, during which time discussions were held with the Tamale staff of CSC, the Ministry of Agriculture personnel in Tamale and the staff of the Ghanaian-German Agricultural Project which provides some support for CSC. In addition, visits were made to the Garu, Yendi and Walewale agricultural stations, and discussions were held with CSC personnel from other stations. In Accra, talks took place with the central CSC staff.

B. Reports

Statistics on Northern and Upper Regions were taken from the 1970 Agricultural and Population Census. Reports used in preparing this write-up included the Annual Reports of CSC and the 1971 Evaluation of the Christian Service Committee Program by the Advisory Committee on Technical Services of the World Council of Churches.

Data Adequacy

Data on education, agricultural production and landholdings come from the census reports. Cost estimates have been compiled by CSC. The major data deficiencies are on the number of farmers assisted by the project and on the increased income from various innovations; those in the write-up should be considered rough estimates.

GHANAIAN-GERMAN AGRICULTURAL PROJECT

I. PROJECT BACKGROUND

The Ghanaian-German Agricultural Project was launched in March 1970 in the Northern and Upper Regions of Ghana. The initial purpose of the project was to increase the availability of fertilizer in the two regions. As an adjunct to this function, the project identified other needs, primarily at the regional level, and began assisting the Ministry of Agriculture in experimenting with improved seeds, land clearing, mechanization and information services. During the first four years of the project's history, its concentration has been on improving these central delivery functions of the Ministry. The project currently serves an estimated 15,000 out of the 180,000 farmers living on the 774,000 acres in the Northern and Upper Regions.

The German project leadership recognized that few of the Ministry inputs were getting to small farmers. Using a revolving fund (created from the sales of German-imported fertilizer), the project began experimenting with different components for a smallholder package. The package which was developed included the introduction of fertilizer, improved seeds, crop rotation, bullock plowing and grain storage. The Germans have worked with the Christian Service Committee and other private groups to identify, test and introduce these different techniques.[1] More recently, the German leadership has turned its attention towards improving the capabilities of the Ministry of Agriculture's extension service.

The planned life of the project is ten years. With the first phase completed -- that of improving the central delivery system of the Ministry -- the focus for the next four years will be the improvement of the Ministry's management and logistical system as well as the introduction of the smallholder package. During the final two years, control of project operations will be shifted to the Ghanaians. Costs of the project through the end of 1973 have been US$6.3 million.

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[1] See Christian Service Committee Agriculture Project write-up, page C-2.

II. LOCAL ENVIRONMENT

The German project directly supports the Ministry of Agriculture in the Northern and Upper Regions. According to the Assistant Director of Agriculture in Northern Region, the primary emphasis of the Ministry is on mechanization because the government believes that this is the most cost-effective way to increase aggregate output. Self-sufficiency in food production is the objective of the government's program, Operation Feed Yourself (OFY). Not so much a program with an operational plan for implementation, OFY is more of a statement of intent by the Ghanaian government leadership. However, under OFY, specific production goals are set for each region. Over the past three years, the goals have been significantly higher than what has actually been produced in the Northern and Upper Regions. The attempt to meet these goals has led the Ministry to concentrate its limited resources and manpower (5000 farm units to one extension worker) on helping the few large-scale commercial farmers in the area.

Within northern Ghana, the major attempts to help small farmers have been carried out by the Christian Service Committee, the Roman Catholic Church and other private groups.[1] CSC has carried out several experiments with local savings/credit programs and has instigated the use of small silos for grain storage, improved seeds and other inputs, and the use of bullocks for plowing. Its system of ten agricultural stations has had a visible impact on the production practices of the approximately 7000 farmers CSC assists.

The 1970 Census of Agriculture shows that the vast majority of farmers in Northern and Upper Regions are small, subsistence farmers; over 95 percent produce entirely or mainly for subsistence. The average farm size is about seven acres, though the median is 4.2 acres (which indicates the small number of commercial farmers). An average farm family (about seven members) earns about US$247 from its land, using traditional methods of cultivation; it increases to a net of US$310 when fertilizer and improved seeds are adopted for a few crops.

Major crops in northern Ghana include maize, guinea corn, millet and yams. Groundnuts are grown for cash in both regions, and various beans are grown primarily in Upper Region. As part of the large mechanization program in the area, rice cultivation has increased significantly. Also, the Ministry of Agriculture has been encouraging larger farmers to grow

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[1] The CSC write-up noted above describes in more detail the local environment in Northern and Upper Regions, and specifically some tribal differences.

cotton and tobacco as cash crops. The land in both regions is arid, and overall crop production suffers from frequent droughts.

Infrastructure in the area is poorly developed, with roads, transportation and access to drinking water the major problems. There are few schools, and the 1970 Census shows that more than 95 percent of those over the age of 25 have never attended school.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The German project was an outgrowth of the FAO fertilizer trials and demonstrations carried out in Northern and Upper Regions from 1962-69. FAO and the Ministry of Agriculture also determined that only 600 tons of fertilizer were being used in the two regions in 1969. This low level of use was attributed in part to the absence of a centralized delivery system. During discussions with the Ministry of Agriculture in Accra, the German government was asked to provide assistance in developing this system. As the project expanded (see below), modifications were discussed and approved by the regional and central offices of the Ministry.

The project was a follow-up to other German programs in Ghana. In Biriwa, a fishing village near Cape Coast, the German government helped the village in 1965 develop a repair facility for gasoline motors used by the fishermen to propel their boats.[1] After the repair shop was launched, a program of commercial and community development activities emerged to develop the whole village area.

Another German government-sponsored effort is the Peki Project which was initiated in 1969. This began as a land clearing and resettlement project which has expanded into a commercial farm enterprise carried out by 100 farm families for a cost of US$4.1 million. Both of these efforts illustrate the pragmatic approach (albeit expensive) of the Germans, which is to start with a specific problem and build from there; this is one main characteristic of their project in Northern and Upper Regions. In contrast to the evolution of the Biriwa and Peki projects, however, the design was developed with little involvement of farmers. A preliminary plan was drawn up by the German Embassy with the Ministry of Agriculture and submitted to secure German foreign assistance funds.

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[1] See Biriwa Project write-up, page C-31.

Both parties realized that the plan would be modified as field operations commenced.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Project Organization

The central project unit is located in Tamale, along with headquarters for Northern Region. The project team consists of 13 German experts, supported by a Ghanaian staff seconded from the Ministry. Primary decision-making within the project is controlled by the Germans, with only minor inputs from the Ministry of Agriculture; the Germans operate semi-autonomously from the Ministry, though from the same compound. To assist with the logistics of fertilizer distribution, some of the experts are located at Wa and Bolgatanga in Upper Region.

The composition and size of the staff varies as specific needs are identified, but generally includes agronomists, information and extension specialists, mechanical engineers and logistics specialists. Experts in farm credit and agricultural economics are brought in as the project manager deems them necessary. The original project manager still directs the project which has lent continuity to the development of the activity program.

Project Activities

The project has evolved in a pragmatic fashion, responding to needs identified by German staff members in the field and to requests of the Ministry of Agriculture. It started with the limited objective of increasing fertilizer use through increasing the supply and creating the distribution system. Initially, some meetings called by village chiefs were held so that the use of fertilizer could be explained by Ghanaian staff members. However, during the first stages of the project, not much attention was focused on small farmers but on general increases in fertilizer use. From 1969 through 1973, fertilizer sales expanded from 600 to 9500 tons in the two regions. The proceeds of these fertilizer sales were put into a revolving fund out of which new projects were to be initiated.

A major portion of the fertilizer went to large farmers near Tamale. Several of these farmers were involved in the government's large scale mechanization of rice production. After the first year, the Germans saw the need for improved

seed (primarily rice seed). The project set up a unit that buys seeds from the farmers, cleans them and sells them back to the farmers. In addition, the project established a seed multiplication unit, which has now been transferred over to a Ghanaian Ministry official trained by the project.

The Germans realized they needed their own maintenance shop for their 60 vehicles, and brought in their own mechanic. At the request of the Ministry, the project imported equipment for land clearing. The equipment was sold to larger farmers on credit from the local banks. Also, at the Ministry's request, the Germans assisted in putting into operation six rice mills which had been built in the early 1960's and which were not in use because of technological problems and the lack of spare parts. In cooperation with the government's agricultural experimentation station near Tamale, the project has carried out field research on rice, maize, groundnuts, and guinea corn.

The project was not satisfied with its information dissemination capabilities and brought in an information specialist and a mobile film truck. The intent was to spread information about various innovations such as fertilizer use. Although the film shows were enjoyed by the villagers, there were few films which portrayed improved agricultural practices in such a way that villagers could see the implications for their own work; the farmers could not perceive the relevancy of films on rice production in Taiwan to what they were doing on their own farms. The project has since shifted to showing slides of farmers using improved practices in the area. Other information materials developed by the project include posters, a booklet for extension workers, and a calendar indicating the market days in each village.

Shift in Project Direction

The German project manager and staff were aware that their initial activities were only benefiting the large commercial farmers in the area. From observing the work of the Christian Service Committee and other private groups, the project became interested in helping small farmers. In addition, the priorities of the German government (like other foreign donors) shifted towards more emphasis on helping small farmers, which reinforced the project's shift in direction.

In the development of its small farmer package, the project continued along its pragmatic path. CSC and the project leadership desired to expand fertilizer distribution to farmers in remote areas. Using the revolving fund generated from the sale of German imported fertilizer, the project gave CSC funds to construct 24 fertilizer stores in remote areas. Seeing

CSC's success with the introduction of bullock plowing, the project provided for the sale of 1500 bullock plows to farmers; most of the farmers had sufficient funds to purchase the plows but credit was provided for some plows through the Agricultural Development Bank.

Also drawing on CSC's experience, the Germans have promoted the use of the small silos by providing technical assistance and transport for the cement; a small silo has a capacity of about one ton of grain and can be built at a cost of US$11. In addition, the project has hired people to look at small farmer credit needs and the approach for developing a strategy to help farmers.

It should be noted that there is little direct interaction between the project and small farmers as yet. For this work, the Germans have relied on the ten CSC agricultural stations, and the existing capabilities of other private groups.[1] In addition, the project has brought three German volunteers to northern Ghana to set up stations similar to those of CSC.

In mid-1974, the project formulated its plans for the coming four years. The plans include a concentration on helping small farmers through a technological package which combines several of the CSC innovations and German research. The basic components are:

- fertilizer use;
- use of improved seeds;
- introduction of improved crop rotation techniques;
- bullock plowing; and
- grain storage (through the introduction of the low-cost silos).

These components, primarily through the efforts of CSC, have been tested on the farmers' own land, and past success with the innovations indicate that they will be readily accepted by the farmers and are within the farmers' financial capabilities.

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[1] Concerning the local involvement question, the ten agricultural stations of the Christian Service Committee can be regarded as subprojects of the German project. See this write-up, page C-2.

Another goal of the plan is to improve the capabilities of the Ministry's agricultural extension staff. The concentration will be on improving the management and logistical (communication and transport) capabilities of the Ministry. In addition, some instruction will be provided on introducing the various components of the technological package for small farmers.

V. PROJECT SUCCESS

Project Benefits

Except for the project's statistics on fertilizer distribution, there is little data from which project benefits can be calculated. Therefore, it has been necessary to use a rough proxy to determine the number of farmers reached and with what effect. In 1973, about 9500 tons of fertilizer were distributed which reached about 15,000 farmers in the two regions. Through a combination of improved maize seed and fertilizer, a farmer should earn an additional US$83 from an acre of land. If the fertilizer and improved seed distributed were used only for maize production, this would cover about 75,000 acres and increase income from an acre in the two regions at a rate of 228 percent. The increase in income goes mainly to the larger farmers in the area, for as yet the smallholder package has not been widely implemented.

Potential Spread

The demand for fertilizer has increased significantly among larger and small farmers. Fertilizer use has increased from 600 to 9500 tons for the two regions in five years, though this amount is adequate for less than ten percent of the land in this area. The major limitation is still the amount of fertilizer imported and the capacity of the delivery system. Moreover, extension assistance is needed to introduce fertilizer use and other innovations to other areas. The Ministry is understaffed, and the capabilities of the private organizations in the area such as CSC are fully extended.

As regards the small farmer package developed by the project, the chances for innovations to spread also depend on the capabilities of the Ministry's extension service. Unless government priorities shift from mechanization and personnel are made available, it is doubtful that the project will be able to reach more than a small proportion of the 180,000

farmers in the area. The various components of the package have been well-tested on the farmer's own land, so these should be acceptable to the farmers.

Self-Sufficiency

The cost of the project in 1973 was US$3.9 million, and with the above proxy, the income generated by the project was US$2.6 million. While a very rough estimate, this illustrates the high level of subsidy provided by the Germans in support of agricultural production in the two regions. There is an added cost because the Germans are selling their fertilizer at the same heavily subsidized price as has been set by the Ghanaian government. Since the tendency of the Germans has been to "do the job" themselves, it is questionable whether their Ghanaian counterparts would be able to take over management of the project at this point in time.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The project offers an approach to the development of a small farmer package. The Germans started with one function (the development of a fertilizer distribution system) and gradually developed a package for small farmers. In developing this package, they drew upon the experimentation and field work of the Christian Service Committee to identify the various components for the package. The effort was to identify simple innovations which had proven to be successful on the farmers' own land. The unknown is whether by working through the Ministry of Agriculture's extension staff, the project can introduce the package on a wide-scale basis. This will be a real test for German pragmatism.

Information Sources

A. Field

Field visits took place in February and May 1974, during which discussions took place with the German project manager and staff members, officials of the Ministry of Agriculture, central and field staff members of the Christian Service Committee, and Fred Winch, an American agricultural economist working with the Ministry of Agriculture and as a consultant to the German project.

B. Reports

The area statistics came from the 1970 Agricultural and Population Censuses, and the Ministry of Agriculture. Project cost and fertilizer distribution figures came from the German project. Also, the project plan for introducing the small farmer package was reviewed in draft.

Data Adequacy

The major data deficiency was the lack of information on the number of beneficiaries and the income generated by the project. The estimates in the write-up must be considered quite rough. The basic socioeconomic data came from government census reports.

GHANAIAN GOVERNMENT/FAO FERTILIZER USE PROJECT

I. PROJECT BACKGROUND

The Ghanaian Government/FAO Fertilizer Use Project grew out of the fertilizer trials conducted by the Ministry of Agriculture in Volta Region from 1962-69. After the trials, two unsuccessful attempts were made to introduce fertilizer use. The first was an effort to "focus and concentrate" on the most progressive farmers, using them for fertilizer demonstrations. The next approach was to provide credit through cooperatives which resulted in 28 huge, poorly-organized cooperatives, with low repayment rates and little additional use of fertilizer. In 1972, the Ministries of Agriculture and of Cooperatives, in cooperation with two FAO advisors, decided to make another attempt to introduce fertilizer use through the reorganized cooperative movement.

Working with 14 cooperatives having a combined membership of 227 farmers, the project is trying to establish financially viable cooperatives to promote the use of improved maize seeds and fertilizer. The first step was reorganization. For membership, each farmer was required to pay a US$2.61 membership fee and purchase at least one share for US$8.70. For each share, the member receives the fertilizer and maize seeds to plant one acre. The cooperative uses the difference between share and input costs (US$1.30) to cover administration and transportation expenses.

In addition, each cooperative has a communally-worked plot which provides funds to the cooperative from sales of the maize grown on it and serves as a demonstration plot for weekly meetings between the agricultural officer and the farmers. Courses are also given to the co-op management and members by the Cooperative Officer and his seven assistants. To make the co-op more attractive to potential members, a consumer purchasing program has been initiated so that members can buy needed goods at co-op headquarters rather than trekking to the nearest town.

The project reaches a marginal percentage of the 100,000 farmers in the region, at an estimated cost of about $50,000 provided by UNDP/FAO (50 percent) and the government of Ghana (50 percent).

II. LOCAL ENVIRONMENT

The history of cooperatives in Ghana has been troubled, mainly because under Nkrumah, the United Farmers Cooperative expropriated the assets of existing cooperatives. An attempt was made to return the assets to the farmers after Nkrumah's ouster, but this for the most part was unsuccessful. Consequently, farmers feel that they should not have to pay back new loans they receive as members of cooperatives. Moreover, there are severe problems in building the management capabilities of cooperative leaders; this is an area which has been neglected by the Ministry of Cooperatives over the years. These two problems are the major ones faced by the Cooperative Officers in Volta Region.

The project activities are concentrated in Ho and Kpandu districts. Food crops are predominant and include maize, cassava, yams, vegetables, groundnuts and plantains. Maize and cassava are grown on most farms. Farm size in the region averages 2.2 acres; however, for project participants, the average size is five acres. Functional literacy in the area is 25 percent, though for the project participants it runs as high as 60 percent.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

From 1962-69, fertilizer trials were conducted in the Volta Region by the Ministry of Agriculture, funded by Freedom from Hunger. In 1969-70, FAO and the Ministry of Agriculture conducted several fertilizer demonstrations throughout the area. Plots were planted and cared for by the Ministry of Agriculture staff; because of location, few farmers took the time to visit and observe the demonstration plots.

In 1969, the Ministry of Agriculture, on the advice of a USAID consultant, launched a "focus and concentrate" approach to agricultural extension. The most progressive farmers -- called cooperators -- were selected for intensive extension assistance to help expand the use of fertilizer and improved maize seeds. It was then planned that these cooperators would become local farm leaders or extension workers.

The "focus and concentrate" approach failed to increase yields and expand fertilizer use. There were several problems, among which were farmer delays in planting the improved varieties and applying the fertilizer. To a large extent, these problems were cultural because there were local "taboos" about planting

times. Studies showed that the yields of cooperators were slightly lower than non-cooperators in the area.

The next attempt was to form cooperatives through which credit was provided for the purchase of improved maize seeds and fertilizer. When the farmers heard that credit might be available, 28 cooperatives were organized with memberships up to 200 farmers. However, these cooperatives were poorly managed and the repayment rate on loans was low.

Nonetheless, the Ministries of Agriculture and of Cooperatives decided in 1972 in cooperation with FAO advisors, that the co-op approach might still be the best way to increase fertilizer use as well as build the institutional structure at the local level. Primarily at the suggestion of an FAO advisor, it was decided that the best approach was to reorganize the cooperatives with the goal of making them financially viable. To do this required improving management capabilities and having the farmers finance their own inputs by the purchase of shares. The major question mark recognized by Ghanaian staff members at that time was the acceptability of the maize technological package to the farmers. In addition to the implications of changing planting times, there was the problem of suitability of the improved varieties (as compared to local varieties) for local consumption. Moreover, because of the mixed farming system employed by the farmers, there was a question as to whether the required changes in practices, such as pure strand growing, might reduce overall farm income.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Project headquarters are located in Ho; it is a semi-autonomous unit operating under the regional government. Both cooperative and agricultural officers are seconded to the project staff from their respective ministries. The Cooperative Officer works out of Ho, and his staff lives in the field. There are two FAO advisors who assist the project on a part-time basis, for they cover other regions where similar efforts are underway.

The leaders were then asked if they wanted to take part, and if so, to call together their members and ascertain their willingness to participate. Fourteen cooperatives indicated interest, though only a small portion of their memberships desired to participate because of the lack of the credit incentive which had initially brought them together.

After a cooperative decided to reorganize, the Assistant Cooperative Officer helped register the members and record

payment of their membership fees and purchase of their shares. The minimum requirement was the purchase of one-half share which was sufficient to cover input costs for one-half acre. The membership fees were used to purchase accounting books for the co-op. The co-op then bought the inputs and arranged delivery to their headquarters. From this initial start, two types of training started up on a regular basis: cooperative management and agricultural production.

The agricultural extension officer conducted weekly classes on the use of fertilizer, improved seed and planting and husbandry techniques. Classes were held on the co-op's communal plot on the day designated by co-op members for work. Initially, the officer demonstrated how to prepare the land and how to plant on the communal plot and frequently followed up the demonstration by visiting the farmers' own land. However, most of the agricultural training was done on the communal plot. Produce from the plot was sold by the co-op which provided operational funds. Some cooperatives have begun other production ventures, such as the raising of hogs and poultry.

The second type of training was co-op management. There were two training courses, one for the co-op secretary (who must be literate) and the second for the full membership. The secretary received instruction in accounting methods while the one for the members started with the philosophy of cooperatives and then moved to operating procedures. The Assistant Cooperative Officer gave weekly classes to the secretary, and at the same time checked the books of the co-op.

A portion of each monthly or bimonthly meeting of the cooperative was devoted to discussion of income-generating projects for the co-op. Out of these discussions came the idea of setting up consumer purchasing programs: the cooperatives buy sardines, corned beef, sugar, rice and soap for re-sale to co-op members. Members appreciate this service because of the distance to the major towns which sell these highly-desired foreign goods.

Marketing is another service provided by the reorganized cooperatives. Co-op members pool their harvest for sale, a practice which helps attract buying agents -- such as the government's Food Distribution Corporation or the Grains Development Board -- to the area to purchase the crop. Basically, it saves the farmers the cost of transportation.

The approach described above was applied in two of the societies examined as subprojects. One was the Tsibu Gudui Food Cooperative, where co-op member lands are contiguous. The co-op was started by retired teachers in 1970 and was reorganized in 1972; about 80 percent of the 30 members are

literate. Maize crop yields doubled as a result of following closely the technical advice of the agricultural officers closely. Also, the co-op arranges and finances the plowing of contiguous farm plots and runs a consumer purchasing program.

Membership in the co-op is still dominated by the larger farmers in the area, though gradually smaller farmers (who use the same production practices) are joining. Their interest in joining appears to have been spurred by co-op services: plowing, marketing and provision of consumer items. Adoption of the technological package has been limited to small portions of members' total land for maize. The main reason appears to be the farmers' preference for traditional maize for home consumption.

A similar situation prevailed in the Vovoli Food Marketing Cooperative Society. This co-op was formed by three progressive farmers in 1970; at that time, farmers thought credit would be available and 170 joined the co-op. With reorganization, membership dropped to 11 in 1973 and then expanded to 18 in 1974. These 18 members live in seven villages scattered within a five-mile radius; they have holdings which average about five acres and are considered to be progressive farmers by the Ministry of Agriculture. The co-op has a three-acre communal plot and a communally-owned hog production project. Once again, the technological package has only been adopted on a portion of their land for maize. Even though their yields have also doubled, the spread effect has been low on their own land and in the areas around their fields.

V. PROJECT SUCCESS

Although it is too early to judge, the project appears to be developing cooperatives which are financially self-sufficient. The cooperatives are developing services in response to farmer needs and are gradually expanding. On the other hand, it appears that the technological package is not gaining wide-spread acceptance. Even though yields have doubled -- which has meant on average a 91 percent increase in income per acre for the 227 participating farmers -- there has been little spread of the package beyond that land required for participation in the co-ops.

Project cost is high because of the participation of foreign advisors and the intensity of both the agricultural extension and cooperative assistance efforts. The combined, increased yearly income generated from the project for all

farmer participants has been US$9000, which is less than 20 percent of the annual project cost.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The project demonstrates some of the difficulties in attempting to spread a technological package not fully acceptable to farmers. After four years of experimentation, the project has failed to generate much farmer interest in the package; the reasons for their apathy remain only suppositions. Some extension workers blame it on the unacceptability of the improved maize for home consumption; others suggest that farmers are unwilling to change their planting times and farming system to adopt the package innovations. The lack of an explanation points up the need for a better two-way communication system which picks up farmer reactions and allows for modifications in the package.

In spite of the drawbacks in the technological package, it appears that the 14 cooperatives *are* being strengthened through a process of building on existing capabilities and resources (except for the technical assistance requirements). The co-ops are evolving because they serve specific needs identified by farmers, such as the need for marketing assistance, consumer goods and mechanisms to secure technical assistance.

Information Sources

A. Field

Field visits were made during February and May 1974, during which time discussions were held with: officers of the Ministries of Agriculture and of Cooperatives, the FAO advisor, the leaders and members of the Tsibu Gudui Food Cooperative and the Vovoli Food Marketing Society.

B. Reports

The reports of the Senior Cooperative Officer to UNDP/FAO were reviewed. The study, *An Evaluation of the Focus and Concentrate Programme in the Ho and Kpandu Agricultural Districts* by S. Y. Atsu and C. K. Brown (University of Ghana, 1973) was used for background information on the area. Statistics were taken from the 1970 Agricultural and Population Census.

Data Adequacy

The data on yields and income come mainly from Ghanaian government officials, and should be considered as estimates (though the estimates were checked against the figures from the Atsu/Brown survey). The remaining data came from government documents. Information on the two subprojects was provided by co-op leaders and should be considered estimates.

BIRIWA PROJECT

I. PROJECT BACKGROUND

Biriwa is a small fishing village with a population of about 2600, located near Cape Coast, Ghana. The project began in 1966, when a German doctor started talking with young men who had been working as surf boat crewmen at the Accra wharf and were returning home to Biriwa to seek employment opportunities. These discussions turned up the need for a boat motor repair facility, becuase 1400 out of the 2000 outboard motors in the area were inoperable. The doctor convinced the German government to provide about US$26,000 for equipping the repair facility and modernizing the fishing industry. To construct the repair facility, to start other commercial ventures and to train the Ghanaians, ten German volunteers worked two years in the village (1966-68). Several commercial enterprises were started, including a carpentry shop which exports furniture.

In 1968 when the roof of the primary school collapsed, a delegation consisting of elders of the village asked the project to assist with the repair because the school had been refused help from the Ministry of Education. This marked the beginning of community development activities which led to the construction of sanitation facilities, new schools, a health station and other improvements. To a large extent, these activities were financed by the profits of the commercial ventures, and the skilled labor was provided by those trained by the project. With the initiation of the community development activities, the major problem was building an active local institution; this was difficult because of competing power elements within the village.

Since 1972, the project has been run and financed by Ghanaians. A German project manager remains in the area and is now responsible for the construction and development of a regional vocational training center at Biriwa.

II. LOCAL ENVIRONMENT

Fishing is the major source of livelihood in the village. The men are normally organized in 13-men crews, and at the end

of the day the catch is sold and the return divided by shares: the boat owner gets three shares, the outboard motor owner gets four shares, the net owner gets three shares and each crew member gets one share. A crew member will earn at most US$32 per month or US$384 per year. Many fishermen's wives market the fish; they purchase the fish from their husband's boat, traveling sometimes 50 to 100 miles to get a good price for the fish.

Only 15 percent of the villagers do any serious farming. The average-sized holding in the village is about 1.5 acres, with a range of .5 to 20 acres. Land control to a certain extent reflects the power structure of the village. About half the land belongs to the Village Chief and half to the Queen Mother. Both give land to village families and in return receive voluntary contributions of produce. There is competition between both for villager loyalty. The situation was further complicated when the Village Chief was suspended as a result of destoolment (loss of power) charges preferred against him by a portion of the village people. A third major local leader is the Chief Fisherman of the village who has substantial support from the 70 boat crews. Divisions at the local level had prevented the creation of an effective Village Development Council.

Although the village is on a main highway, infrastructure within the village was not well developed: the school was run-down and there were no health facilities. Education level was low, with 22 percent of the adult population functionally literate. Average family income prior to the initiation of the project was roughly US$274.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The idea for the project grew out of discussions between young fishermen who had been working on the Accra Wharf and a German doctor who was a regional medical officer. The young men were concerned about employment opportunities upon return to their home village of Biriwa. The fishing industry was doing poorly because 1400 out of the 2000 outboard motors provided by FAO for sale through department store outlets were not functioning; as a result, fishermen were underemployed. Moreover, there was a need to modernize the fishing industry through the use of improved nets, underwater lights for searching for schools of fish during the off-season, and an improved smoking process.

Shortly after the motors were sold to the fishermen in 1965, many motors were strewn along the beach, out of commission because of a lack of maintenance capabilities. Following his frequent discussions with the young fishermen, the

doctor asked the German ambassador to provide equipment for a repair facility and for modernizing the fishing industry. The ambassador agreed to supply about US$26,000 in equipment for sale to the fishermen; sales proceeds were to be used for community development activities. In addition, the German government decided to send volunteers into the area to build the repair facility and train the local men.

VI: DYNAMICS: PROJECT IMPLEMENTATION

The Biriwa Project grew in a pragmatic fashion, with new ideas identified as the ten German volunteers progressed in their work. Also, the German project manager who oversaw the work of the volunteers assisted in the planning of the project's commercial and community development activities.

The project began by concentrating on those inputs already known to the Biriwa fishermen. Nets, rope and hooks were sold to the fishermen on a subsidized basis. The volunteers built the outboard motor repair facility and trained Ghanaian mechanics. The training was directed towards middle school-leavers who had few opportunities for employment beyond fishing. Outboard motors were also sold by the project to the fishermen on a rent-purchase arrangement. Several innovations were developed: one volunteer invented a new way of mounting motors in canoes; lobster traps and underwater lights were introduced to increase the catch in the off-season.

Not all the findings from the experimentation proved usable. New types of ovens were introduced for smoking the fish; however, this required putting rods through fishes' eyes and eyeless fish were not acceptable on the local market. The project purchased an eight-ton Mercedes Benz truck to cart the fish to the markets, but the cost of maintenance was too high for the operation to sustain itself.

Another commercial activity started by the Germans was the construction of a carpentry shop and a furniture sales store. Prior to project initiation, there was only one carpenter in the village; he made coffins and door frames and did small repair jobs. The shop makes quality furniture which is sold at a profit both domestically and overseas, with sales up to US$40,000 in a recent year. A block-making machine was purchased, and a roof repair program for homes was launched.

Training is an important component of the Biriwa project. Three men from the area were sent for one year to a technical training school in Accra. About 26 carpenters have been trained, with 20 currently working at the furniture shop. In

addition, over 30 masons and construction workers have been trained, some of whom have sought employment outside the area. The carpentry shop assists the woodworking courses at the local middle school. This training effort has developed a pool of skilled workers available for work locally; several of the workers have been recently employed by the project on the construction of a Vocational Training and Rehabilitation Center at Biriwa which will be used to train middle school leavers as well as the handicapped.

The project's initial intent was to use the profits from the outboard motor repair shop and furniture sales to finance community development projects. The primary problem was the lack of an effective organizational system because of conflicts between the Queen Mother and Village Chief; also the suspension of the Village Chief had left him without the power to organize community development activities.

To solve this problem, the project asked the regional head of the Ministry of Social Welfare to intervene. He decided that the Chief Fisherman should head the Village Development Council. Procedures for establishing a Village Development Council were prescribed by the Ghanaian government. Biriwa is divided into 12 zones, each of which elects a representative to the Council. Representatives are responsible for planning and organizing the contributions of the people in their area to carry out community development activities.

Thanks to a tradition of communal labor in the area, the planning of village activities came naturally. Under the leadership of the Chief Fisherman, members of the Council meet weekly with the project manager and decide what projects will be undertaken. Representatives determine local labor input requirements; everyone in the village is available to work on Sunday and Tuesday when the men are not out fishing. If labor is required throughout a project, a member of the fishing crew will be assigned to help, but he gets his share of the catch nonetheless; other workers may also receive a share of the catch for their effort, even though they are not members of crews going out to sea.

The collapse of the primary school's roof stimulated the community development part of the project in mid-1968, when the village elders contacted the project because the Ministry of Education would not provide needed repairs. The project and village elders decided to build a new school. The attempt to get the school construction project off the ground led to the revitalization of the Village Development Council as described above. Besides constructing the school, the project and local community have built community toilet facilities, a dressing station and two houses for the government-provided nurses, and have renovated the old middle school. Most recently, the Village Development Council decided to install street lights. Facilities constructed by the project and community are main-

tained through the collection of a head tax -- US$1.74 per year for each male and US$.84 for each female.

V. PROJECT SUCCESS

In 1972, the Biriwa Project was taken over by a Ghanaian who was formerly a business man in Tema; since then, the Germans have phased out their direct assistance (though a German is still in charge of efforts to develop the regional vocational training and rehabilitation center). What remains are the two major commercial ventures which are generating sufficient profits to help finance the new street lights and other community development activities. Reorganized with the Chief Fisherman at its head, the Village Development Council continues to help plan and finance the maintenance of the community improvements. Moreover, the project has developed a cadre of skilled workers (about 50) in the area who work on the community development projects and do construction and carpentry work in the outlying areas beyond Biriwa.

Because of the village initiatives, with German assistance, the Ghanaian government has improved services to the area, providing nurses and more school teachers. Other communities in the area have seen the results of the community development activities and have asked for assistance in replicating the efforts.

Rough estimates indicate that the project has generated on average an increase of US$154 in cash income per family (500 or so families in the area) over the past six years. The income generated to date is slightly less than the estimated total cost to the German government of US$500,000 over the life of the project.[1]

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The Biriwa Project was launched to solve specific problems -- the problem of unemployment among young fishermen who had worked on the Accra wharf, and that of the lack of a maintenance facility to repair the non-functioning outboard motors.

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[1] W. E. Vickery, University of North Carolina, is currently doing a detailed cost-benefit analysis of each activity conducted by the Biriwa project.

After establishing a presence to meet these needs, the project evolved in a pragmatic fashion to build commercial enterprises and promote community development. The process of starting with a specifically defined need and growing as other needs (and the capabilities of the local population) are identified offers one approach to area development. More specifically, the project suggests the importance of:

- starting with technological packages which build upon people's accustomed activities and making improvements that will have a high impact;

- experimenting at the local level with new innovations, with ample opportunity for feedback from the local population;

- making a determination on whether innovations can become financially viable and self-sustaining (and discarding them if they are not) after the external agent pulls out;

- identifying skilled labor requirements and developing them through non-formal educational techniques (apprenticeships at the carpentry and outboard motor repair shops); and

- developing a community organization which can mobilize local manpower and resources to not only carry out a self-help activity but provide the funding for maintenance.

Even though the project was carried out in a fishing village, these operational guidelines are instructive for other development efforts. In Biriwa, they have been sufficiently successful to stop the outmigration of youth from the area.

Information Sources

A. Field

Only one field trip was made to the Biriwa Project in May 1974, during which time discussions were held with the German project manager who had worked with the Biriwa project, the Ghanaian project manager, members of the project staff, school teachers at the middle school, and government health workers.

B. Reports

The 1970 Education and Population census was used, as well as a preliminary paper by W. E. Vickery explaining his research program.

Data Adequacy

The data in this write-up, except for the census statistics, are based on rough estimates from the above-mentioned sources. Books and accounts of the project were not examined. This case study was reviewed and commented upon by Frank Neequaye, the Ghanaian Director of the Biriwa Project.

DENU SHALLOTS PROJECT

I. PROJECT BACKGROUND

The Denu Shallots Project was formally launched in 1971 when the Agricultural Development Bank (ADB) of Ghana provided credit to 417 farmers through the Anloga Cooperative V. G. Marketing Society. The purpose of the loan was to expand shallot production in the Denu area, a sandy strip which extends into the Gulf of Guinea in the Southeast corner of Ghana. There are over 2000 farmers there who have been growing shallots for the past 75 years. Of the 6400 acres in the area, shallots are grown on 2000. The vegetable is marketed throughout Ghana, with particularly heavy consumption in the shallot-growing areas.

Growing shallots is a complicated, labor-intensive task. Seed beds must be built with a combination of natural (dried fish, swallow and cow dung) and chemical fertilizers. Most of the beds are 50 feet by seven feet, with about 120 beds per acre. Three crops of shallots can be grown in a bed each year. About two months between each crop are needed for soil recovery, so tomatoes and maize are rotated with the shallots. The shallots are marketed to distributors at a price which ranges between US$14 and $26 for a bundle of 40 pounds. On average, a farmer will get about two bundles per year for marketing, from each bed.

The loan to the shallot farmers was politically-motivated; the Parliament passed a resolution stating that the area should receive ADB credit, without a determination by the technical ministries and ADB that a credit need existed. Indeed, the Denu farmers had a traditional credit system which was functioning. The total value of the loans was US$247,000, of which 91 percent went to individual farmers through the cooperative for the purchase of seed and seed bed preparation, and nine percent went for the purchase of four tractors and carts.

II. LOCAL ENVIRONMENT

Most of the shallot farmers came from Togo and have been growing shallots for the past 75 years. In fact, the seed for the shallot still comes from Togo, though the Ghana Ministry of Agriculture is considering the development of a nursery because Togo seed costs have risen. Over the years, farmers have experimented and have developed a scientific method for growing the shallots which entails the use of a combination of natural and chemical fertilizers.

Farm size in the project area is small, with the average size holding being about 1.8 acres. The larger farmers in the area may own as many as four acres; these were the recipients of ADB loans. In addition to growing shallots, families in the area earn part of their livelihood from fishing. The functional literacy rate in the area is about ten percent.

In the project area, there is one Ministry of Agriculture officer for every 2000 farm units. The Ministry's activities have been limited, except for the delivery of fertilizer to a few locations for sale to farmers. In the late 1950's, the Ministry of Cooperatives was active. At that time the Anloga Cooperative V. G. Marketing Society was formed and registered #1044. It immediately encountered problems because few farmers were willing to pay the cooperative marketing charges. The cooperative did accumulate some funds which were confiscated by the Nkrumah regime. When this occurred, the cooperative became dormant. This unsuccessful experience made several of the farmers reluctant to join the cooperative again, but they did because it was the only way to procure the ADB loan money. Moreover, several of the farmers saw the new loan as a grant from the government, a form of repayment for the previously confiscated funds.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The ADB began its small farmer credit program in 1969, and several of the larger, more progressive farmers in the Denu area applied for loans on an individual basis. The ADB told farmers that it was necessary to organize in groups in order to get loans. In six Denu locations progressive farmers called together their friends and associates, explained the possibility of receiving loans from the ADB and the need to form a group and asked those interested to join their group in submitting a request for loans. In most cases, only two meetings were required for organization of these informal

groups. The progressive farmers, who were frequently literate small businessmen, put together the loan applications and discussed the details with ADB officials.

As the groups were being formed, the progressive farmers contacted members of the Parliament and asked for their support in getting the ADB loan. In 1970, the Parliament voted to have ADB provide US$261,000 in loans to the Denu region, the major argument being that the government had neglected this area of the country.

ADB and the progressive farmers worked out the details of the loan together. The farmers estimated that they would need US$8.79 for the expansion or improvement of each seed bed. This estimate included the cost of labor which in the past had been supplied by family members without direct payment. The 417 farmers had acreage for 25,520 beds which formed the basis for the short-term loans. In addition, the farmers identified the need for tractors and carts to assist with land preparation and to carry the bundles to market. The farmers argued that the tractors could plow across contiguous fields, making land preparation (and expansion) faster than if each field were prepared individually by hand; this contention formed the basis for the medium-term (proposed seven-year) loan.

During these discussions, it appears that neither the ADB nor the Ministry of Agriculture analyzed whether the farmers needed credit. In fact, the farmers had a traditional system whereby in return for a loan, another farmer was allowed to work part of the loan recipient's land (growing shallots) for repayment. This yearly system had generated sufficient funds to cover the increasing cost of seed from Togo and gradual expansion of shallot-growing acreage within the area.

As the details of the loans were being worked out, the Ministry of Cooperatives intervened and said that loan funds could only be given to members of a registered cooperative. The leaders of the six groups met and decided to reactivate the Anloga Cooperative, V. G. Marketing Society, with each leader participating in the co-op executive structure. Almost immediately there were divisions among these six leaders over how the cooperative should operate.

Finally, an "Accra Round Table" (formal meeting) was held between the ADB and the six leaders, during which the final terms of the loans were negotiated. According to the farmers, ADB abruptly changed the repayment period for the medium-term loan from the previously discussed seven years to four years.[1]

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[1] In his review of this write-up, the Managing Director of the Agricultural Development Bank says that the terms of the loan were fixed (four years for the medium-term loan and 18 months for the production loan, with a nine month grace period) and submitted to its Board of Directors before the loan was

The annual interest rate on the loan was set at eight percent, though shortly afterward, the military leadership reduced the interest rate on all agricultural loans to a six percent annual rate.

IV. DYNAMICS: PROJECT IMPLEMENTATION

ADB promised the loan money by November 1970 when the farmers said they were prepared to expand and improve their acreage. About 20 percent of the funds came in May 1971, and the remaining portion in September 1971. The loans for seed bed preparation and expansion were given to the individual farmers rather than to the cooperative, and the four tractors and carts were delivered to the cooperative.

Immediately, there were conflicts among the six leaders as to use of the tractors. After much debate, it was decided that the original groups would be responsible for the operations, maintenance and repayment on the tractors; each of the two largest groups having one tractor apiece and the other four sharing the remaining two tractors. In actual fact, the leaders of the initial six groups took control of the tractors and set the prices for their use. The prices were too high for the other cooperative members, so the tractors were contracted to work land outside the project area. There was a shortage of spare parts and maintenance capabilities in the area, so the tractors were frequently out of commission. Partly because the tractors were not used fully, repayment on the loans was slow; only 17 percent of the loan was repaid by June 1974 (over a year after the note was due), and at least one of the tractors had become totally inoperable.

About 20 percent of the loan funds given to individual farmers was actually used for improving seed beds and expanding land under cultivation; most went for the purchase of personal belongings and also for paying family members to work. The men and boys did the bed preparation work and the women helped to weed, harvest and bundle the shallots. This money was spent by the family members who earned it. As a consequence, the repayment rate on the individual farmer's loans has been about 33 percent.

When the repayment problems became apparent, ADB assigned a loan officer to Denu; however, through cajoling, he has had little effect on increasing repayments. The cooperative leaders have been warned by the ADB that the police will seize the tractors, and the farmers have been warned that the military will be asked to enforce loan repayment. These threats have caused a mild (perhaps just feigned) panic among the leaders and members of the cooperative (the situation as of June 1974).

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approved. He adds that the ADB has never made a tractor loan for which repayment is spread over seven years, and that the nine month grace period on the production loan was given to the farmers at their request.

Another problem recently arose. New cooperatives are being formed in the area, and since the Anloga Co-op and its members are blacklisted because of credit default, several members have attempted under false names to join a new co-op to get more credit. ADB has made it clear to shallot growers in the area that unless the old shallot loans are paid in full, no new loans will be considered for shallot-growing in the area.

V. PROJECT SUCCESS

The benefits actually derived from the project have been low because only 20 percent of the ADB funds were used to expand production. The farmers did increase the acreage under cultivation by 35 acres. If the return from this new acreage were divided among the 417 farmers, each would receive an additional US$152 in on-farm income. However, there were sig-cent increase in annual net income. However, there were significant differences in the amounts individual farmers used for production, so there was not an equal distribution of income benefits. Actually, it appeared from the ADB records that the smallest farmers (those with less than 1.8 acres) used a greater proportion of their loans for production, have received the greatest production return, and have had the highest repayment rates.

The high income levels in the district suggest that the farmers could pay off the loans. Their refusal is due to their perceptions that the government owes them something because Nkrumah expropriated their assets and because at least up to now, they have not believed the government would follow through on its threats.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The project dramatizes several points about project design. *First*, the project illustrates the importance of identifying whether there is an actual need for credit in an area. Also, it suggests that past experience with government agencies is a determinant of how farmers view credit and its repayment. *Second*, the primary motivation for forming the groups and reestablishing the cooperative was only to procure the loans; and this proved to be a poor basis for organizing. Moreover, the forcing of the six natural groupings into an artificial (though legal) organization impeded project success.

Information Sources

A. Field

Field visits took place in February and May 1974, during which time discussions were held with Ministry of Agriculture officials in Denu and Ho (regional headquarters), the Agricultural Development Bank officer in Denu, officials in Accra and the leaders and several members of the Anloga Cooperative V.G. Marketing Society.

B. Reports

Data were taken from the 1970 Agricultural and Population Censuses, the Agricultural Development Bank reports, and a thesis by a sociologist from the University of Ghana.

Data Adequacy

The data on loans and their repayment were taken from ADB reports. The statistics on production came from both the Ministry of Agriculture and the farmers, and should be considered estimates. All figures on income were checked against those found in the sociologist's thesis which appeared to be reasonably rigorous in methodology. This write-up was reviewed and commented on by E. N. Afful, Managing Director of the ADB. In addition to his specific comments, he said:

> "It is true that loan repayment is a big problem in this country, particularly in this part of the country where the shallot loans were made, but the impression should not be created that this particular loan was meant to be a gift to the farmers for the reasons you have given in other parts of the report. I will suggest rephrasing of that particular portion of the report to give the correct picture of the situation. The loan repayment position has, of course, improved considerably over the past four months.
>
> I should mention finally that even though there might have been some political pressures on the making of this loan, the Bank was convinced beyond doubt that the project was financially and economically viable and that repayment was not going to be a problem if the cooperative set-up had worked properly as was envisaged "

ANNEX D

KENYA

KENYA

Area: 224,960 square miles
Population: 12,895,000
Population growth rate: 3.0%
Density per square miles: 57.3
GNP per capita: $160
GNP per capita growth rate: 4.3%
Capital: Nairobi (629,000)
Largest cities: Mombasa (255,400)
Major language: Swahili, Bantu, Kikuyu, English
Religion: Animist, Christian, Muslim
Literacy rate: 20-30%

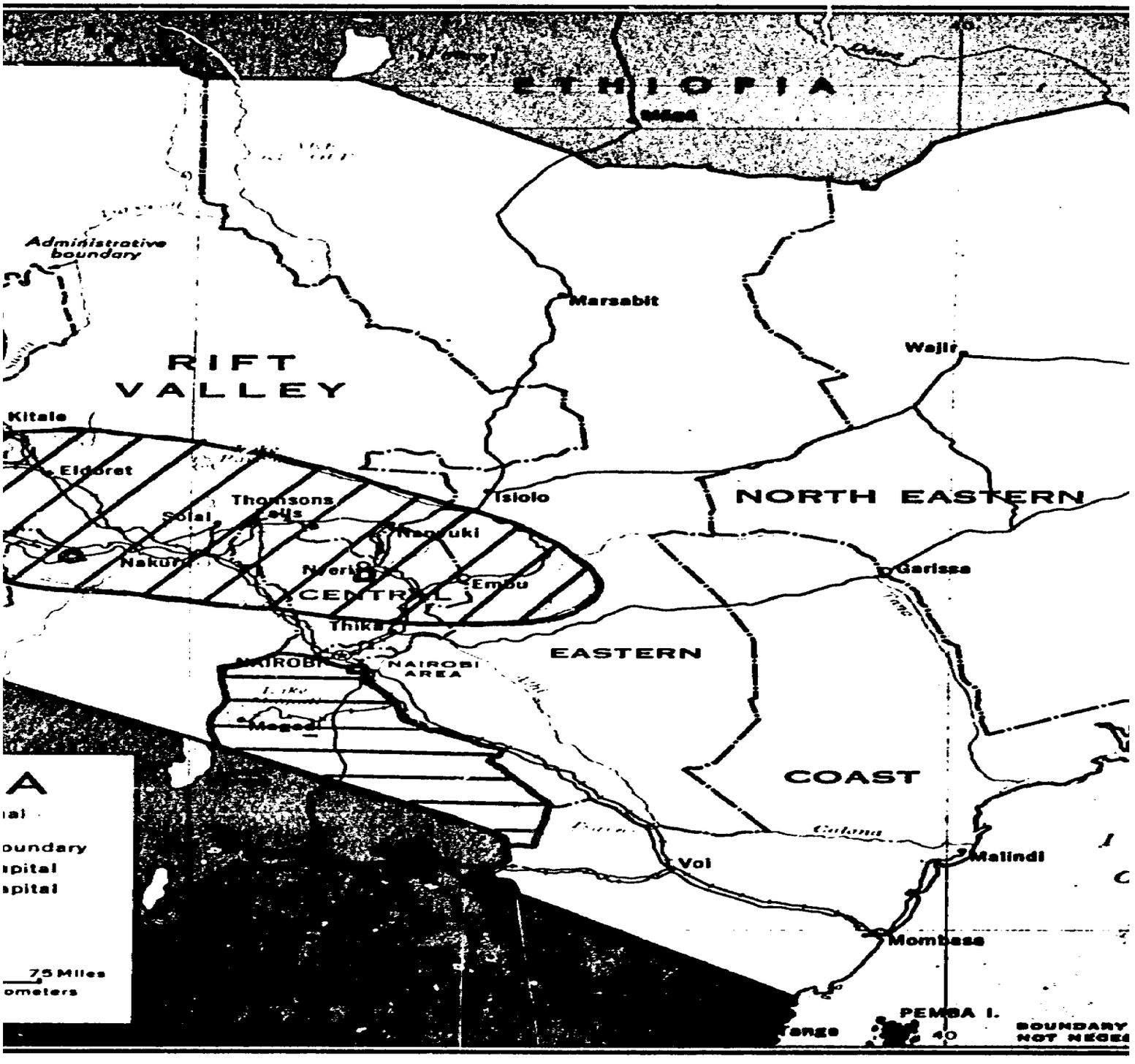
Vihiga Special Rural Development Program - This project and its subprojects Madzuu and Lyaduywa are located near Lake Victoria (■) in the Western Province.

Tetu Special Rural Development Program - This project is located south of Nyeri (□) in the Central Province.

Lihrembe Multi-Service Cooperative - This project is located near Lake Victoria (⊙) in the Western Province.

Kenya Tea Development Authority - This project covers the shaded area in the highlands, with subprojects at Kericho and Maragoli (○).

Maasai Rural Training Centre - This project covers the shaded area in Kajiado District.


ETHIOPIA
Administrative boundary
Marsabit
Wajir
RIFT VALLEY
Kitale
Eldoret
Thomsons Falls
Solai
Nanyuki
Nakuru
Nyeri
Embu
CENTRAL
Thika
Isiolo
NORTH EASTERN
Garissa
EASTERN
NAIROBI
NAIROBI AREA
Magadi
COAST
Vol
Malindi
Mombasa
PEMBA I.
75 Miles
40

VIHIGA SPECIAL RURAL DEVELOPMENT PROGRAM

I. PROJECT BACKGROUND

The Vihiga Special Rural Development Program (SRDP) is one of six experimental efforts initiated by the government of Kenya (GOK) with the assistance of foreign donors to test various ideas and approaches to the rural development of regions. The Vihiga SRDP was initiated in 1970 under the joint sponsorship of the GOK and USAID. The project area includes two divisions (Vihiga and Hamisi) in Kakamega District, Western Province. There are 50,000 families in the area, living on 128,000 acres with 70 percent cultivated.

In Vihiga, 26 rural development activities -- ranging from family planning to maize and tea credit -- are being carried out (or are in the process of being planned). The purposes of these activities are threefold:

- testing of experimental prototype activities which may be replicable elsewhere;
- providing an operational milieu in which rural development systems can be developed; and
- helping to build a cadre of Kenyan rural development officers.

While experimental in nature, the orientation of these activities has been towards the practical problems of increasing production, employment and income in Vihiga. Each activity is evaluated according to criteria developed by the project's analysis unit which include measurement of the effects of each activity and an assessment of the desirability and feasibility for replication. Throughout the project's history, there has been a vagueness surrounding the project's basic goal: whether the intent of the project was to experiment with and evaluate these specific activities or more broadly, to produce tangible results in terms of increasing production and income in the area. Program documents stress the experimental focus, while the Kenyan field staff appear to be under pressure to obtain material results.

The project works through the existing GOK structure at the division level, though the activities of the technical ministries are coordinated by a Kenyan SRDP Coordinator. There is a five-man USAID contract team (Florida Agricultural and Mechanical University) which provides advisory assistance. In total, USAID has funded about 20 man-years of long-term advisory assistance and about 14 man-months of short-term consultant assistance. In addition, there have been about 20 man-years of other expatriate planning and advisory assistance from FAO, Partnership for Productivity and other donors or private agencies. Project cost has been about US$1.8 million.

II. LOCAL ENVIRONMENT

Vihiga straddles the equator at an altitude of 4500 to 6500 feet. Rainfall averages about 65 to 70 inches, though there is a short dry period from mid-December to mid-February. The soil in the area is quite fertile and the hilly land is broken by huge granite boulders. Farm size in the area is small, with the average holding about 2.5 acres; 83 percent of farms are five acres or less. The major crop grown in the area is maize; there is a large herd of local cattle in the area, though tsetse disease is prevalent. Basic subsistence income from an average-sized plot is US$130, and average income from the land is only slightly higher. Outmigration of men seeking employment in urban centers is heavy. The functional literacy rate in the area is 56 percent.

Most of the 300,000 people in the area are Luhya, with small numbers of Kalenjin, Nandi and Luo. Political factionalism is readily apparent at election time.

Prior to the project, there had been few development efforts in Vihiga beyond provision of health and social services. The government presence at the division level is larger than in most African countries, with an average of one extension worker for every 450 farm families. Most of the activities carried out by the technical ministries are formulated and financed by central offices in Nairobi, so there has been little local input into the development of past programs.

Throughout the country and in Vihiga, the major means for involving people in self-help activities has been the Harambee movement. Under this system, people contribute funds or labor to village development projects. Through local level meetings (barazas), a project and the expected contribution of each family are determined, normally through a vote. Local

leaders and officials record each family's contribution, and frequently through coersion ensure that the expected contribution is forthcoming. Barazas are also used by government officials to explain new activities; however, the communication is normally one-way.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The idea for the project came out of the Kericho Conference in September 1966, organized by the University of Nairobi and attended by 80 government officials, social scientists and administrators. The conference urged that greater priority be given to rural development by the government and stressed the need to test various approaches. After a series of meetings between the academics and government officials, the government decided on January 27, 1967 to set up a working group chaired by the Ministry of Planning and Development to devise alternative pilot projects for consideration and eventual implementation. During 1967, general ideas from the Conference were translated into specific program recommendations, including criteria for identifying the pilot projects -- e.g., the areas selected should represent varying ecological and socioeconomic conditions which would lend themselves to country-wide application.

Still more groundwork was laid in 1968 for launching the pilot programs. Guy Hunter, a British development specialist, prepared a working paper. The British Overseas Development Ministry provided an advisor who was charged with central coordination responsibilties; the pilot areas were selected and a National Rural Development Commission was formed. The University of Nairobi agreed to do the baseline studies for the project areas. In 1969, the preparation of the area plans took place, with primary responsibility being assumed by the Provincial Planning Officers; these initial plans were modified and cleared in Nairobi. Financial estimates were put together and negotiations conducted with various foreign donors.

Initially, the GOK asked the foreign donors to pool their resources in a central fund to support the SRDPs; the donors rejected this suggestion. Instead, the donors wanted to be responsible for specific areas -- basically to exercise better control over their funding and to have activities which could be identified as their own.

The Vihiga plan was prepared in January 1970 and USAID was selected as the donor in May 1970. Also in May 1970, a

researcher from the University of Nairobi's Institute for Development Studies (IDS) was sent to Vihiga to do the socio-economic baseline study. In July 1970, the project was formally launched with much publicity and many promises to the farmers. The project design was modified by USAID advisors as the programming process continued; however, the approach and major activities were basically determined by the initial GOK planning. The IDS researcher completed and tabulated the results of the baseline survey over a year after the project's initiation; on occasion this information has been tapped but has had little effect on project design.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Project Approach and Shortcomings

The project has been operating for four years with little increase in local area production or income. From an experimental viewpoint, only a few activities have shown signs of success and potential replicability (discussed below). On the other hand, there have been major deficiencies in project design which have not been corrected:

- The maize credit program was launched without ascertaining whether the farmers actually needed the credit. Research by the project's analysis unit indicates that credit is not a constraint but maize credit continues to be a high priority activity.

- The construction of cattle dips has been set back because local contributions (labor and funds) have not been forthcoming. Several of the cattle dips were initiated at the urging of local government officials but without the local population's full comprehension of their purpose and their agreement that a dip was needed.

- Without an adequate number of cow dips or local acceptance of their use, a grade cattle credit program was introduced for farmers with over ten acres of land. The mortality rate of the grade cattle has been as high as 60 percent, plunging the farmers into serious financial trouble.

- The tea credit program was launched in 1972, without the terms of the loan or repayment mechanism being defined (i.e., this was the case in August 1974).

There are several factors which appear to explain this lack of success in individual activities and the project as a whole:

1. The project activities were designed by GOK officials. Almost no consultation took place with local leaders and farmers in identifying needs and approaches.

2. An underlying assumption of the project was that developmental change could take place through an improved (and slightly expanded) administrative structure. Unfortunately, because of Nairobi control of planning and funding approval, local level officials have few opportunities to initiate new activities to meet specific local needs. In other words, there was little freedom within the system for local officials to change program activities.

3. The project relied on traditional mechanisms for communication with local people. When it was apparent to the project leadership that the baraza was not an effective communications mechanism, this was discussed but alternative approaches were not tried. Moreover, the communication that did take place was one-way, with government officials exhorting the population to follow rigidly set activity guidelines.

4. The strong government/foreign donor participation appeared to result in people perceiving the project as someone else's effort and not their own.

5. Considerable information was gathered on project activities and the local environment. However, there appeared to be little capability, either on the part of the government staff or foreign advisors, to identify operational alternatives from their analysis of this information.

The Vihiga project is noteworthy for its general lack of local involvement, despite a stress on local involvement in the national SRDP guidelines.

Project Highlights

Certain activities appear to be having some success:

- Maize credit barazas were conducted in 1974 with farmers who received loans. Initially, government officials used the baraza as a forum for expressing their ideas, and farmer participation was low. When the barazas were then changed to allow the farmer to talk about his problems, farmer interest and participation grew. From these discussions, specific ideas for modifying the maize credit have emerged which government officials may implement.

- The Partnership for Productivity has helped local merchants form market committees which currently administer small business loans for expanding rural industries. PFP also provides technical and management advice.

- The provision of tea credit has allowed 895 small farmers to grow tea, and the Kenya Tea Development Authority has initiated a smallholder tea credit program based in part on this experiment (though with clearly-defined loan terms). Because of the small farm size in the area, farmers could not cover the upfront costs for producing tea.[1]

- The project has developed a system for building roads using labor-intensive methods. Local workers are recruited by an Assistant Chief on the basis of need for income; the poorest men in the area are seeking employment for work on the roads rather than going to the urban centers.

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[1] See Kenya Tea Development Authority write-up, page D-31.

Another project contribution has been the work of the project analysis unit which uses local secondary school graduates and university students as research assistants. The unit has examined various activities, providing the analysis necessary for future design. Their studies have made local officials and foreign donor personnel aware of information requirements at the local level for evaluating development activities. The problem has been translating the research results into alternative proposals for project design or redesign.[1]

V. PROJECT SUCCESS

Estimates of the income generated by the major production activities such as tea, grade cattle, and improved maize, show that the increase in income on the land from project activities has totaled about US$462,000. These activities reach less than ten percent of the 50,000 families in the area. There is no chance of a project of this type, with its heavy foreign donor participation, becoming self-sufficient. Moreover, the cost and the low return, in terms of increasing income, make replicability unsound.

The project has improved government services in the area and developed the capabilities of government officials to a limited extent. Some experimental ideas have emerged which can be considered for further expansion or replication in other areas, but for the reasons mentioned above, the experimental value of the project has been limited.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The project was started with a list of activities which were not well researched or thought through. While there was a baseline survey of socioeconomic conditions (from which an overall strategy and specific activities could perhaps have been defined), the findings came too late to be useful for project design. The list of activities was developed by GOK officials without consultation with local leaders and farmers. This provides a poor foundation on which to build a project.

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[1] See *Data Collection to Support Rural Development Programs - The Case of Vihiga, Kenya*, by Peter F. Weisel, November 1974.

Priority in the project was given to development of the capabilities of local government officials -- primarily management and planning. Little attention was paid to the difficult questions of how to develop a two-way dialogue with the local population so that activity design deficiencies could be corrected. Further, little effort was made to consider alternative approaches to involving the local population in the implementation of the various activities -- a primary principle of the SRDP program. Those activities which appear to be working are ones where there was some farmer involvement in identifying a need and in discussing or working on a problem.

Information Sources

A. Field

Field visits took place during February and September 1974, during which discussions were held with: USAID officials, the FAMU contract team members and other foreign field staff members, Ministry of Agriculture officials in Nairobi and Vihiga Division, other Kenyan government officials in the Division, local leaders in three villages.

B. Reports

Primary reference sources were: series of nine discussion papers prepared by Peter F. Weisel; Eric Crawford's comparative analysis of Vihiga and the Lirhembe Multi-Service Cooperative Society; and USAID planning and programming documents.

Data Adequacy

The baseline study and research of the project unit provided most of the data; these studies were done by trained social scientists. The only estimates are on income generated by the project and they are extremely rough. The write-up was discussed with USAID officials in Kenya.

TETU AGRICULTURAL EXTENSION EXPERIMENT

I. PROJECT BACKGROUND

The Tetu Agricultural Extension Experiment was one component of the Tetu Special Rural Development Program (SRDP), the effort by the Government of Kenya (GOK) to test new ideas and approaches to rural development. Unlike the five other SRDPs, no foreign donor was asked to sponsor the Tetu Project; instead, the SRDP activities have been carried out by Kenyan government officials, with assistance from the Institute for Development Studies (IDS), University of Nairobi.

IDS, working in cooperation with local government officials, designed the agricultural extension experiment to determine how extension efforts could be more effectively directed towards helping the less progressive farmer. The experiment began in 1970 with a baseline survey which graded farmers on four levels of progressiveness, according to innovations that they had adopted on their land (and time of adoption); the survey also generated socioeconomic data on the area. Based on their analysis of these data, IDS proposed a strategy which consisted of farmer training and extension follow-up. This strategy was modified by local officials to fit the capabilities and operating procedures of government agencies in the area. For three years, IDS assisted the Farmer Training Center and Ministry of Agriculture officials to develop and evaluate different techniques for helping small farmers, which included the use of improved teaching methods at the center, the procedures for identifying and recruiting the less progressive farmers, methods of extension follow-up, and the structuring of a credit program.

The experiment concentrated on the introduction of hybrid maize, though Ministry of Agriculture officials are using some of the techniques developed for introducing other crops. During the three implementation phases of the experiment, 798 farmers were trained. The results in the field showed a high adoption rate for the hybrid maize among the trainees and a significant spread effect (over two additional farmers adopted hybrid maize per farmer trained). The cost per participant was less than US$10. There are about 12,000 families in the area, about 45 percent of whom would fall into the IDS less-progressive categories.

II. LOCAL ENVIRONMENT

Tetu Division is situated in the Kikuyu Highlands of Central Province. The average altitude in the area is between 6000 and 7000 feet; the land slopes from the wet, high tea growing areas in the western part of the Division to the drier and lower coffee-growing areas in the eastern portion. Because of rainfall and the quality of the soil, the area is considered to be excellent for farming. The Division covers about 60,000 acres. Average farm size in the area is about six acres.

The population of the Division is homogeneously Kikuyu, politically the most powerful tribal group in Kenya. Several influential leaders and professionals are from this area. Moreover, a high priority is placed on education; functional literacy in the area is over 60 percent. Further, the infrastructure in the area is well developed, with a good network of roads which allows travel to all sections of the Division by four-wheel drive vehicles throughout the year. The growth rate in income of 3.8 percent in the area is higher than the national average of 3.6 percent.

Farming is the major occupation in the Division, with several cash crops grown. Several innovations have been adopted by the progressive farmers in the Division, such as grade cattle, coffee, pigs, macademia nuts, pyrethrum and potatoes. The Ministry of Agriculture has been active in the Division; the IDS baseline survey showed that 85 percent of the farmers had been visited by an extension worker at least once per year.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The idea for the experimental Special Rural Development Program grew out of the Kericho Conference in September 1966, where 80 government officials and academics proposed that greater priority be placed on rural development, and that various approaches be tested in a series of experimental projects. After an extended period of government discussion and decision-making, basic plans were developed for six areas by government officials at the province, district, and division levels.[1] The basic plan for Tetu, which was selected because

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[1] See Vihiga Special Rural Development Program write-up for a more detailed history, page D-2.

it represented the more advanced areas of the country (better educational attainment, infrastructure, and agricultural potential), was drawn up. The plan emphasized the need for experimenting with extension assistance and for expanding the capacity and use of the Wambugu Farmers Training Center.

IDS was asked to conduct the baseline study and provide expert advice on designing the overall strategy. The baseline study was conducted in 1970, using four Agricultural Assistants (AAs). One important component of the study was to determine if and when farmers adopted eight innovations. From this information, IDS developed a system for rating farmers on the degree of their progressiveness. The four breakouts were: 1) Most Progressive; 2) Upper Middle (early adopters); 3) Lower Middle (late adopters); 4) Laggards. In addition, IDS gathered information which attempted to explain the difference in adoption rates. Some of the indicators used and the rankings were as follows:[1]

	Most Progressive	Upper Middle	Lower Middle	Laggards
Illiterate	28%	42%	39%	57%
Farm visit by agricultural extension officer last year	100	96	85	41
Farmer initiated contact with agricultural extension officer	81	65	56	17
Attended agricultural demonstration	92	76	76	37
Membership in co-op	99	96	57	8

Also, the study revealed that the more progressive farmers have larger farms and better access to water and labor, and normally have title to their land. Moreover, the progressive farmers were increasing their farm size and disparity in income distribution was growing. Further, the "trickle down" approach did not appear to be working, and the progressive farmers were demanding and receiving a disproportionately large amount of extension worker attention.

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[1] See *Extension and the Forgotten Farmer*, Joseph Ascroft, et. al., published by Afdelingen Voor Sociale Wetenschappen Aan De Landbouwhogeschool, Wgeningen, 1973.

The findings of the survey were discussed with local level officials and a strategy worked out to reach the less progressive farmers. Initially, IDS wished to develop a multi-purpose training program of one week duration for the less progressive farmers (with extension follow-up), but administrative complexities at the national and local level (such as funding availability) led to concentration on introducing hybrid maize.

IV. DYNAMICS: PROJECT IMPLEMENTATION

The Strategy

Over three years, the strategy was developed and refined through experimentation and discussion with officers from the Ministry of Agriculuture. The basic elements in the strategy, as summarized by IDS, were:

1) The Subchief and JAA (Junior Agricultural Assistant) in a sublocation select and invite 25 to 30 farmers who are homogeneous in that a) they lack the innovation which is to be promoted on their farm, b) they lack other common innovations (which make them less progressive), and c) they are from one small, ecologically homogeneous area. For each group, the Subchief and JAA also select and invite two to four more progressive farmers, who have already adopted the innovation concerned, to act as "motivators."

2) The farmers thus selected in two adjacent sublocations (i.e., a total of 50 to 60) are collected in their locality by the FTC (Farmer Training Center) bus and taken to the FTC.

3) The farmers are trained (together with their JAA) at the FTC during a short course of up to three days, according to a curriculum which stresses a) economic motivation to adopt the innovation, b) all aspects of husbandry related to the innovation, and c) details on the provision of credit, inputs, etc., which make adoption by a small-scale farmer feasible.

4) During the course, AFC (Agricultural Finance Corporation) provides the farmers with a credit voucher for a package of inputs necessary to implement the innovation on a given scale (say one acre).

5) In exchange for the vouchers, the Cooperative Union or supplier provides the farmers with the inputs from stores or factories close to the localities of the farmers.

6) Farmers adopt the innovation (use the inputs) and are assisted during this time by the JAA, who also follows up on other husbandry practices and disease control.

7) After a given time (the harvest), AFC, with help of administrative staff, collects loan repayments. Those who have repaid the loan receive a second loan so that the innovation continues to be used on borrowed capital.[1]

Implementation

The strategy outlined above resulted from a series of test runs carried out over three consecutive years. During that period, 798 farmers were trained in hybrid maize at the Farmer Training Center. Almost all these farmers (97 percent) accepted the maize package, and 78 percent voluntarily repaid the loans. Most of the farmers were below-average in terms of progressiveness, though were not classified as laggards.

The test runs provided insights into farmer behavior and the willingness and capability of agricultural officers to make the extra effort required to help less progressive farmers. Among the most important were:

1. The baseline study convinced Ministry officials that there was a need to focus specifically on less progressive farmers. In the first year (1971), the agricultural officers and chiefs were asked to identify and recruit the less progressive farmers for the training program. However, the result was that too many farmers in the

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[1] See IDS Working Paper No. 100, *Rapid Development for Kenya's Small Farms (1973)*, by Niels Roling, Fred Chege, and Joseph Ascroft, pp. 3-4.

progressive category attended the training program; the officers and chiefs did not appear to know the less progressive farmers. The second year farm record cards were made out on potential trainees and the center made the final selection, which resulted in a larger proportion of less progressive farmers. With the withdrawal of IDS from the project, the Ministry was unwilling to continue the systematic collection of data on the farmers to insure that the program continued to reach the less progressive farmers. However, because the criteria for selection were well defined, the agricultural officers proved capable of identifying and recruiting less progressive farmers for the third phase of the experiment.

2. The farmers were responsive to the training program because it was set up in a way that insured they had opportunities to actively participate, asking questions and discussing their problems. In addition, the program was crop-specific, so there was time during the three-day session to cover all aspects of the growing of hybrid maize.

3. Although the training program was free the first year, farmers were willing to pay the FTC charge of US$1 for the training, which was made a part of the credit package for the second and third years. Transportation was provided; the project reached the conclusion that this was necessary to insure attendance, but it was not confirmed by the research.

4. Farmer attendance dropped during the first sessions of the second year. The problem turned out to be confusion over dates rather than farmer disinterest. This emphasized the need for letting the farmers know clearly where they were expected to be and at what time.

5. Training farmers from one small area introduced pressure for change and may account for the significant spread of hybrid maize adoption by non-trainee farmers. During the first year, farmers

were formed into groups and a date was set (at the time of training) for an agricultural officer to visit the group for a follow-up demonstration on their land; this was discontinued the second year because the Ministry felt it was not needed. The adoption rate and spread effect were still comparable between the first and second years. In follow-up surveys, farmers reported that their neighbors watched closely what they were doing and the results. The increased yields (140 percent) convinced their neighbors to follow their lead.

6. IDS proposed that the fertilizer and improved maize seed be provided free of charge. Ministry offcials objected, arguing that this would be setting a precedent that could not be met in the future. No determination was made through research of whether the farmers needed credit, though this was made a part of the project. As part of the training program, the conditions of the loan were made clear; the major incentive for repayment was the provision of a new loan after repayment. In about 78 percent of the cases this has worked. The annual interest rate on the loan was 12 percent.

In addition to the above points, IDS evaluations stress the importance of having a well-developed technological package, a reliable delivery system, and marketing outlets as necessary elements for successfully implementing the strategy. The major constraint, IDS researchers have concluded, is not farmer disinterest in changing methods of production but elements beyond farmer control, such as the capacity of the delivery system.

V. PROJECT SUCCESS

Hybrid maize yields are 140 percent higher than those of traditional varieties; the increase in net income is 92 percent of that from traditional maize. For a farmer who grows one-half acre of the improved variety, this means an increase in income of US$26, or about an eight percent jump in the on-farm income of the average family in Tetu Division. Setting the increases of income against the cost of the project, the

return to the Kenyan government is high, even without taking account of the return to the 2000 farmers who adopted hybrid maize without attending the training program.

Beyond the direct income increases to the adopters, the project has provided guidance on what is required to change small farmer production practices. The Ministry of Agriculture officers in Central Province have applied the approach (identification of the less progressive farmers and use of the Farmer Training Center) to other crops in other divisions and districts. When considering the potential for replicability, however, it should be noted that the project was carried out in one of the most advanced sections of the country, where there is a relatively cohesive and energetic tribal grouping. This may be one factor which contributed to the success of the experiment.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The research and the resulting experimental work show that a special effort is required to reach the smaller and less progressive farmers in an area. Further, it shows that if there is a technological package which is acceptable to the farmers, a delivery system which provides inputs and technological advice, and a market for the crop, farmers are willing to change their production practices. This change can be speeded by a training program in which the farmers participate, and a concentration of the trainees in a small geographic area. Moreover, the project shows that this type of project is within the capabilities of the Ministry of Agriculture, though the Ministry's leadership has to give such an effort a high priority and specify clearly to its extension staff what is required of them in identifying and working with less progressive farmers.

Information Sources

A. Field

Field visits took place in February and September 1974, during which discussions took place with the Provincial Agricultural Officer, the Provincial Training Officer, members of the Tetu Division Ministry of Agriculture staff and other government officials at the division level.

B. Reports

The Institute for Development Studies has prepared several reports on the experiment in Tetu. The major ones used for this write-up were: *Extension and the Forgotten Farmer*, by Joseph Ascroft, et. al., *Rapid Development for Kenya's Small Farms*, by Neils Roling, et. al., and *Innovation for Kenya's Small Farms: A Strategy for Equitable Rural Development*, by Neils Roling, et. al. In addition, Ministry of Agriculture papers about the project were used.

Data Adequacy

The data used in this study came from academic research of the Institute for Development Studies. Most of these studies were carefully done, and the conclusions that were drawn from them appear reasonable. This write-up was reviewed by S. Muna, the former Provincial Agricultural Officer of Central Province.

LIRHEMBE MULTI-SERVICE COOPERATIVE

I. PROJECT BACKGROUND

The Lirhembe Multi-Service Cooperative was launched in early 1972, primarily through the efforts of the local Member of Parliament (MP) who wanted to improve the welfare of his poorest constituents. The MP conceived the idea of the cooperative and refined it in discussions with his brother (a Planning Officer in the Ministry of Agriculture) and a Dutch professor at the University of Nairobi. The MP held two meetings to discuss the idea with local leaders and farmers and with their approval successfully sought the cooperation of Kenyan government officials. Working with the MP and his brother, the Dutch professor helped secure a grant of US$140,000 to finance the project from NOVIB, a private Dutch charity organization.

The objective of the project was twofold: first, to increase agricultural production through the introduction of grade cattle, hybrid maize, passion fruit, and vegetable growing; and second, to improve social services through the construction and use of a social center which contains offices, a workshop, classrooms, canteen, and film or social hall. The social center was to be the focal point for the activities of the cooperative and community.

Lirhembe is a very small geographic area (part of a sublocation) situated in Central Division, Kakamega District, Western Province, Kenya. The project area covers about 1000 acres, of which 900 are suitable for agriculture. There are 400 households in the area which formed the cooperative. Formally, Lirhembe is organized as a registered multi-service cooperative society and is run by an elected board of seven local leaders, primarily school teachers, with the MP as chairman.

II. LOCAL ENVIRONMENT

Lirhembe was considered to be one of the less progressive sublocations in Central Division. In spite of several attempts

of agricultural extension officers to introduce improved techniques, most of the farmers in the area continued to grow traditional maize, local cattle, and a few vegetables for household consumption. Farmers in the area hold on average about 2.5 acres, with a range of one to six acres. Prior to project initiation, an average farmer would earn about US$138 annually from his land; this income was supplemented by significant off-farm employment. Many of the men work in the cities, leaving a major portion of the farm labor to the women. Overall functional literacy in the area is about 50 percent.

Despite the fact that the area is agriculturally one of the less progressive in Kenya, several of the local people have gone on for higher education and achieved important positions. The area is actually the home village of the MP, and this almost insured local support when he initiated the project. The Vice Chairman of the cooperative is a lecturer at Kaimosi Teachers' College. Also, there were several other teachers in the area who provided the leadership for the project.

Lirhembe is inhabited entirely by the Baluhya tribal group, so there was a certain cohesiveness in the project area. In the past, there has been an active local council, elected by the people, which collected a yearly head tax of US$1.39 and used the money for feeder road improvement, bridge construction, and market upkeep. Beyond this local effort, there has been no history of development efforts in the area, and health and social welfare facilities were almost nonexistent. Kenyan government interaction was limited to the efforts of a veterinary officer who served the entire sublocation (1400 farms) and division level agricultural crops officers who visited the area occasionally. A few market outlets had been established for crops, and the potential existed for selling in Kakamega and Kisuma. In sum, Lirhembe was a very small geographic area of subsistence farmers, somewhat isolated from markets and government services.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The idea for the project was conceived in January 1970 by the newly elected MP, the Honorable Seth Lugonzo, for his Ikolomani constituency. He developed the idea through discussions with his brother, who at that time was a Planning Officer for the Ministry of Agriculture, and Professor Jan Koopman, a Dutch professor who was working at the University of Nairobi on a grant from the Ford Foundation. The MP's brother had had Professor Koopman as one of his professors in the Basic Philosophy course and invited him to visit Lirhembe and offer his advice. Out of these discussions it was agreed that the

focus of the project would be agriculture combined with a social center; Professor Koopman offered to seek NOVIB support.

The MP called a meeting of the local leaders (primarily school teachers) and farmers to discuss the idea. The initial reaction of the local population was mixed. Some feared that the project was a trick to steal their land; others were not convinced of the value of agricultural innovations such as hybrid maize and improved dairy husbandry. After several weeks during which the local leaders discussed in detail the proposed project, a second meeting was held; the MP received approval to go ahead, and a committee (consisting of four men and three women) was elected by the adults (over 18) present. Throughout the design and implementation phases, the MP and committee met regularly with the local people. They viewed these meetings as a means to consult the local population, as well as to disseminate information about what was happening. The MP felt that the only way to involve the people was to insure that each had opportunities to participate actively from the outset and to voice his or her views freely.

After gaining the initial approval of the local people, the MP met with the Provincial Director of Agriculture (PDA) to explain the project's objectives and to get his approval and technical assistance. The PDA approved the project and asked his Provincial Land and Farm Management Officer to draw up the agricultural plans. This he did with the assistance of the Divisional Agricultural Officer and his staff. It was decided that about 300 acres would be used for growing hybrid maize, another 300 for grade cattle, a third 300 for tea and the remaining 100 acres for households and gardens. The local agricultural extension staff discussed these ideas with the farmers to get their preliminary agreement. One problem arose, however, when the Kenya Tea Development Authority would not extend tea production to the area because of soil unsuitability; so passion fruit was eventually substituted for the tea.

The overall proposal was prepared by the MP's brother, with the assistance of Professor Koopman, who advised on the type of format and information NOVIB would want. NOVIB agreed in 1971 to provide a grant of US$140,000 plus some materials which included a tractor, 22 sewing machines, knitting machines and 20 tons each of milk powder and cheese for children in the nursery school. These in-kind payments were provided on a regular schedule. However, instead of giving all the money at once, NOVIB decided to make four payments. Prior to the release of each payment, NOVIB would inspect the progress being made; these inspections involved looking at the accounts of the cooperative, loan repayments, and the steps which were being taken towards achieving the objectives of the overall plan. Though tied to the overall plan, the control of the funds was basically in the hands of the local leaders and cooperative members.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Organization

The committee elected at the second meeting called by the MP started enrolling farm families in the cooperative. Fairly rapidly, 300 out of the 400 families in the area agreed to join because of groundwork laid by the MP. Enrolled families paid the US$.28 membership fee and purchased a share for US$1.39. One stipulation of NOVIB was that all the families in the area join the cooperative to insure that everyone would benefit from the project. Since future payments were contingent on enrolling the other 100 families, the committee made a considerable effort to do this. However, most of the remaining families did not join until they saw the tangible result of the social center being constructed. All but three or four families eventually joined; and in addition, several farmers in nearby areas joined when they heard about the availability of credit.

Lirhembe is registered as a multi-service cooperative society and continues to be run by the seven-man cooperative which serves without pay. Formal meetings are held every two months, though there are informal sessions almost weekly at the social hall.

Social Center and Services

The first step in project initiation was the construction of the social center. Originally, the plan called for NOVIB funds to be used to purchase materials and the labor to be provided by the cooperative members. Because of continuing skepticism about how they would actually benefit from the project (and the underlying fear of losing their land), the members were reluctant to work on the center; consequently, some of the NOVIB funds had to be used to hire labor. Lirhembe leaders hired labor because they felt that it was important to produce rapid results on the social service side in order to create receptivity to agricultural innovations. The center was built between March and July 1972. It consisted of a main hall that could be used for social events or film showings, a health center, a day nursery, classrooms for functional literacy training and home economics courses, a canteen, and offices for the cooperative leaders.

The social center rapidly became the focal point for discussions of community problems, provision of social services, and the initiation of agricultural innovations. Attendance

at the center was high every Saturady night because movies were shown; at this time some informal discussions took place and information about services (social and agricultural) was disseminated. Moreover, several classes were initiated. The functional literacy classes have been well attended by male and female participants. Sewing and home economics classes are held three times a week with an attendance of 30 to 50 women. Three women have been trained in machine knitting and produce cloth there for the area; three other women have been trained as community health workers by the "Flying Doctors," though the health center is not functioning regularly because a government health worker has not been assigned to the center as yet. The staff for the day nursery is funded by the local county council (described above). In addition, the Ford Foundation sent four men to Arusha for training as artisans. Even though the shop has not been opened, these men have helped with the design of simple farm implements.

Shortly after the completion of the center, several agricultural extension activities were initiated at the center. Nurseries and demonstration plots were established on land adjacent to it, and field days were held every month or two. A maize storage facility was constructed, and a milk cooler is under construction. Near the center, a cow dip was built using a combination of local labor and NOVIB funds. Six government agricultural assistants were assigned to the area during this initial phase to promote the adoption of new practices, following up the demonstrations at the center with visits to about 70 percent of the farms monthly. As the innovations have caught on, this number has been reduced to two junior agricultural assistants and one veterinary officer (which is still more outside assistance than before project initiation). To encourage more government officials to visit the area, the cooperative has instituted a US$.70 lunch allowance for officials working there each day.

Agricultural Development Program

Introduction of Grade Cattle and Improved Husbandry Practices

One aim of the overall plan was to introduce grade cattle into Lirhembe. This has become the greatest income producer in the area. About 150 grade cattle (in calf) have been supplied by the cooperative as of August 1974; also, the construction and use of the cow dip has lengthened the lives and increased the milk supply of the 800 local cattle in the area.

Since grade cattle are quite susceptible to tsetse fly disease, the first step of the cooperative was to build a cow dip. Farmers agreed to this because of the high death rate

rate of local cattle from the disease. The dip (near the social center) was completed in six months and is owned and managed by the cooperative. Farmers are under heavy pressure to dip their cattle twice a week at a cost of US$.04 per head. Getting farmers to dip their cattle has been a problem throughout this part of Kenya. To overcome this problem, the cooperative decided to register each head of cattle in the area. The cow dip attendant (employed by the cooperative) records the dipping of each head; if a farmer misses a day, he is first contacted by cooperative leaders and sometimes by the Divisional Agricultural Officer. If he misses again, he loses his privileges as a member in the cooperative; if he still does not dip his cattle, the Divisional government will intervene (which has not occurred as yet). The proceeds from the dipping cover the cost of chemicals and operations. Out of the 103 grade cattle first introduced into the area, only six percent have died (and not all from tsetse desease), as compared to the neighboring Vihiga Division, where 60 percent of the grade cattle have died.

After the establishment of a controlled dipping operation, the cooperative supplied 45 grade cattle (mothers in calf) on credit. Because of the interest-free loan, the farmers were willing to accept the improved breed, although at first they were skeptical about whether it would be profitable. The farmer was required to repay the loan in kind, either giving the cooperative the mother or a heifer; the cooperative in turn would distribute the cow to another family under the same condition. In addition, the cooperative provides a three-year loan of US$62.50 for pasture preparation; this was to be repaid by the farmer giving the cooperative one bottle of milk (about one pint) per day for three years. This works out to about US$25 per year (or a six percent annual interest rate).

The number of grade cattle supplied by the cooperative increased to 103 and then to 150. As a result of the grade cattle scheme, one major behavioral change took place. In the past all major credit decisions were made by the men, even though they lived in major cities. When the profitability of grade cattle became apparent, women started making the decision to accept the package without the approval of their husbands.

Introduction of Hybrid Maize

Hybrid maize was introduced through demonstrations on the grounds of the social center and on very small portions of farmers' plots in the area. These farmers were given seed and fertilizer free of charge. The yields were 200 percent higher than for the traditional variety, and the cooperative decided

to offer an interest-free package of improved seeds, fertilizer, and insecticides on the condition that the farmers sell their produce to the cooperative. In 1973, this worked well and the repayment rate was 95 percent. The cooperative had 700 bags of maize left over (after selling enough in the local market to cover input costs); and when needs arose, these were sold back to the farmers for a profit (though lower than the current market price).

The next year, there was a poor crop due to weather and the cooperative was short of cash. Few bags of maize were sold through the cooperative, and the repayment rate was only 30 percent. Through the efforts of the Divisional Agricultural Officer and the cooperative leaders, some progress has been made toward collecting the outstanding arrears. However, the failure to repay has forced the cooperative to use part of the NOVIB funds to cover administrative expenses. One explanation offered for the low repayment rate was that the leaders of the cooperative and the farmers were reluctant to discuss the repayment requirements because credit is a touchy issue; this was in spite of the frequent meetings which were held. To correct this and inform the local farmers of the cooperative's financial problems caused by low repayment, several *barazas* (local meetings) have been held by the MP and government officials.

Introduction of Passion Fruit and Vegetable Growing

When it was found that the tea growing area would not be extended to Lirhembe, the Divisional Agricultural Officer and the Provincial Director of Agriculture decided to grow passion fruit. The process of introduction was similar to that of maize. Demonstrations and a nursery were set up at the social center and on a few farms in the area (for which seedlings were provided). Because it requires 18 months for the seedlings to grow and bear fruit, there has been no farmer reaction as yet. However, the success of grade cattle and hybrid maize have made them receptive to trying passion fruit.

The vegetable growing scheme was initiated by the Home Economics Assistant who supervised the establishment of a large vegetable nursery and demonstration plot at the center. The nursery is a source of seedlings for members to take on credit, and the demonstration plot is to show how members should establish their own gardens. There is a US$.69 charge for the seedlings to start a small home garden, repayable by selling the vegetables to the cooperative. While vegetable production for home consumption has spread rapidly, few vegetables are grown for sale. As yet, the cooperative has not arranged for marketing outlets, which may be one reason commercial production has not developed.

V. PROJECT SUCCESS

Project Benefits

While many of the farmers are deficient in one or more aspects of husbandry, the project has brought about a high rate of adoption for new practices (hybrid maize and fertilizer use, grade cattle and pasture preparation, dipping, and vegetable production). This has been done successfully in an area where previous government attempts have basically failed. In part the adoption was due to the personal efforts of the MP and members of the cooperative committee to persuade the farmers; also, it was due to farmer involvement in the project from the outset, first through discussion at social gatherings and later through the testing of the various technological packages.

Using rough calculations, the average family earned about US$142 a year from its land prior to the project; currently a family earns about US$172 (or approximately a 21 percent increase in net annual income). These calculations, however, do not include the increased milk from local cattle because of dipping, nor the potential gain when the passion fruit becomes ripe.

Beyond the direct income benefits, the level and quality of services in the area has improved through the activities of the social center. There has been an increase in government extension services (probably at a cost to other areas), encouraged further by the cooperative's provision of a lunch allowance for government officials who visit their area. Perhaps more importantly, the cooperative serves as a forum where community problems are discussed and acted upon. One indicator of the value that members place on the cooperative is that yearly dues and subscribed capital are fully paid (though there are credit arrears).

Potential Spread

Within the project area, it is estimated that at a minimum 70 percent of the families have adopted one or more of the new practices. This number is expanding as the number of grade cattle increases and the administrative capabilities of the cooperative grow. About 600 farmers from outside the project area have joined to take advantage of the hybrid maize package. However, the expansion of the project beyond its defined geographic area may reduce its effectiveness for the target population. Recognizing this, the MP is setting up similar schemes in three other areas.

Self-Sufficiency

The cooperative will probably not be able to pay off the initial capital provided by NOVIB, nor is this expected. However, the question at this point is whether the cooperative operations can be run at a profit. It is too early to tell whether the society's income will cover its expenses, though the arrears in maize loan repayment and the increasing administrative costs suggest that problems will be encountered. However, the society's budgetary projections indicate that running expenses can be covered. The cost of the project for NOVIB per farm family has been about US$180, and the yearly increase in income for an average family has been about US$30.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

Lirhembe was conceived, planned, and carried out by local individuals, private and government, without much direct donor involvement (though it should be noted that funds would not have been available without Professor Koopman's quiet intervention). The plan which evolved was straightforward and had limited objectives. However, there were some unique local circumstances which contributed to the project's initial success. First, Lirhembe is a very small geographic area with a cohesive population; it is doubtful that the project could be replicated in areas which have different ethnic groupings and political factions. Second, the leadership of the MP (and of the teachers) was instrumental in getting people to participate and adopt new practices; it is questionable whether such leadership without monetary remuneration would emerge in other areas. Third, Kenyan government officials provided intensive extension assistance, probably at the cost of aid to other areas. The combination of these elements contributed to the successful launching of Lirhembe and now to the three similar projects being initiated by the MP in other localities. However, it should be noted that replication of this type of effort is difficult unless the local leadership, initiative, and economic base for the cooperative are already in existence.

While these local circumstances contributed to project success, there are some basic lessons for future design and implementation. The project shows the importance of local involvement from the outset; one strength of the project was the communication channels, formal and informal, between the people and leaders (and government officials). Of particular importance was that the process included both consultation with the farmers and information dissemination at each phase

of project development. The project also shows how a social center can assist in bringing about community endeavors, especially in areas where individuals are inclined to pursue their private interests in isolation. It is unlikely that the agricultural program would have gotten off the ground without the initiation of the social center program. Another element in encouraging the agricultural program was that new practices were demonstrated in the local area, and in most cases, on the farmers' own land.

The NOVIB grant made the project possible. Control of the funding was in the hands of the local people, which appears to have made them more conscientious about its use. The inspections helped to insure that it was being used properly. This type of funding approach requires flexibility on the part of donors, but in the implementation of programs with limited objectives it may be a way to build local management, leadership, and organizational capabilities.

Information Sources

A. Field

Visits to Lirhembe were made in February and September 1974, during which several discussions were held with the Division Officer, the Senior Agricultural Officer and his staff, the leaders of the cooperative, and individual participating farmers. Also, discussions were held with Eric Crawford, Ministry of Agriculture in Nairobi.

B. Reports

The major sources used for this write-up were two papers prepared by Eric Crawford for the Ministry of Agriculture: one was a comparative analysis of the Vihiga Special Rural Development Program and the Lirhembe Multi-Service Cooperative (July 1974) and the other was prepared on his June 1973 visit to the Lirhembe Cooperative Project.

Data Adequacy

Information on yields, income, loans and loan repayments came from the offices of the Senior Agricultural Officer and those of the Lirhembe Cooperative Society. The data and estimates of income were checked against the information collected by the Vihiga SRDP in its survey to insure reasonableness; however, all figures should be considered rough calculations.

KENYA TEA DEVELOPMENT AUTHORITY

I. PROJECT BACKGROUND

The Kenya Tea Development Authority (KTDA) was established in 1964, with responsibility for smallholder tea development. Tea was first grown in Kenya in the early 1900's, and over the years, a number of major European-owned plantations developed, ranging in size from 400 to 2000 acres. Since tea production is highly labor intensive, these commercial plantations employed substantial numbers of farmers and their family members. From their work on the plantations, there was a strong demand from small farmers to grow their own tea. After the Mau Mau Emergency in 1959, the Kenyan government decided to expand tea production through the use of smallholders, even though at that time it was questionable whether smallholders could handle the complexities of tea production. Experiments with peasant tea schemes had had disappointing results in Ceylon and Java, with poor husbandry and low quality leaf.

With a combination of improved production techniques and strict extension supervision, smallholder tea production has been extended to 79,314 farmers, cultivating 76,341 acres of tea in 1973. Commercial plantation acreage in 1971 was 56,400 acres. The current KTDA plan is to expand smallholder production to 110,000 acres, with each farmer cultivating on average an acre of tea which KTDA has determined to be the most economical unit. The expansion of tea production is limited by soil and climate conditions as well as by tea infrastructure requirements (factories, roads, nurseries and technical assistance personnel). However, in the highlands where conditions are suitable for tea production, there are 1.5 million acres of potential land for cultivation.

Since the export of primary crops (tea, coffee and pyrethrum) formed a majority of Kenya's foreign exchange earnings, the government has placed high priority on tea development. In addition to establishing KTDA, the government has contributed to all aspects of tea development, with its primary and continuing support located in the building and maintenance of tea roads. Foreign donors have been willing to invest in KTDA's smallholder tea project. Over the years (1960-73) the Commonwealth Development Corporation, the International Development Association and the West German government have made substantial loans

for field operations (US$6.1 million) and road construction (US$3 million).

II. LOCAL ENVIRONMENT

Climate and soil determine in large part where tea can be grown. The tea plant flourishes in areas where there is little variation in daily temperature, rainfall of at least 50 to 80 inches and no strong dry winds nor freezing temperatures. In Kenya these conditions are prevalent in those areas between 5500 and 7500 feet. East of the Rift Valley, the potential areas include parts of Kiambu, Murang'a, Nyeri, Kirinyaga, Nandi and Kagamega districts; west of the Rift, they include parts of Kericho, Kisii, Nandi, and Kakamega districts. Yields vary according to growing area, in part due to climatic conditions (e.g., Nandi and Kakamega are subject to severe hail storms which have reduced the yields and farmer demand to produce tea) but also to other environmental factors.

Beyond the natural conditions which affect yields, several other reasons have been offered for yield differentials:

- tribal differences: the Kikuyu tribe east of the Rift are known for their energy and discipline and have achieved a high level of subistence (an average family net income from the land of about US$306 in Tetu Division), whereas the Luhyas are traditionally thought of as being shiftless and never well to do (an average income of US$139 in Vihiga Division);

- farm size: in Kakamega and Nandi districts where average farm size is small (two to three acres), less land is available for tea cultivation (average plot size in Kakamega is .54 acres as compared to national average of .96 acres) and the farmers are less willing to spend the time taking care of their plots because of the low returns;

- off-farm employment: in certain areas such as Kakamega there is a high outmigration of males for employment in the urban areas -- which reduces the needed labor supply for tea production;

- absentee ownership; in Nandi and Kericho districts, there is a high degree

of absentee ownership, and hired workers do not take as great an interest in tea plots as owners do; and

- demonstration effect: nearness to major tea plantations (and working on them) appears to be related to higher yields on a farmer's own land.

KTDA assessments indicate that these environmental factors affect production more than natural constraints, producing the lowest average yields from the highest potential areas (Kakamega and Nandi).

Average farm sizes in the ten growing areas vary from 2.2 acres in parts of Kakamega to about five acres in Kericho and Nyeri Districts. Since tea requires from three to four years before a farmer begins to get any return for his investment, most farmers in the project have holdings larger than that needed for subsistence; with the new requirement of one acre available for tea cultivation, KTDA has further restricted the possibility of participation by the smallest farmers in the area. One acre was chosen by KTDA as the most ecnomical unit for several reasons:

1. If a tea garden is too small, the farmer will not make the commitment of time necessary to insure high yields and quality.

2. If the garden is too small, there is not enough yield to justify the farmer's travelling to and from the buying center.

3. If a garden is larger than one acre, then outside labor is required; if prices and, therefore, revenue drop, the farmer will be inclined to get rid of his labor and his tea crop suffers.

Moreover, KTDA sees tea as an integral part of a farmer's total production on his holding which should contribute to spreading the risk of crop failure. Taking account of the investment required as a proportion of the farmer's total farm investment, KTDA has focused on those farmers who can earn subsistence from their other land and who can handle the labor requirements for raising tea.

Compared to other parts of Africa, the functional literacy rate is high. About 60 percent of the adults in tea growing areas are literate. However, KTDA staff members indicated that frequently illiterates are most receptive to extension advice and most conscientious in following it.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The tea plant was first introduced into Kenya in Kiambu and Kericho districts around 1907. Commercial development did not begin, however, until 1925. From 1925 to the early 1950's practically all tea planting took place on European estates. As early as 1925, Kenyan farmers in Kiambu had expressed interest in growing tea, but up to 1950 they were prohibited from doing so by government and commercial regulations. Many of the estates were unwilling to assist the introduction of tea production to smallholders because they believed that the farmers were incapable of handling the sophisticated techniques required to insure a high quality leaf.

In the late 1940's, the government became interested in developing the agricultural production of native lands, and tea was one of the cash crops designated to be developed on an experimental basis. Through government discussions with smallholders, officials learned that the farmers preferred individual small plots for raising tea rather than working communal blocks. The experimentation with smallholder tea production (which was started in 1953 on 40 acres) was interrupted by the Mau Mau Emergency. By 1959, there were about 6000 smallholders growing tea on 2281 acres; the demand from other smallholders to raise tea was high. Moreover, the quality of tea produced by the smallholders compared favorable with the leaf grown on estates.

The Ministry of Agriculture identified the need to develop a full-scale commercial operation (with adequate financing for factories) before tea production was extended to other smallholders. The Kenyan government responded by setting up a working committee in 1959, which recommended the establishment of an "authority" with tight control over tea development. The authority was established in 1960 as the Special Crops Development Authority (SCDA), with tea as its initial responsibility; later it was planned that the authority would assist in the development of other smallholder cash crops. In 1964, the SCDA was replaced by the Kenya Tea Development Authority with responsibility only for the development of tea.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Project Organization

Central Administration and Responsibilities

KTDA is a semiautonomous government crop authority. Policy is controlled by the KTDA board, which consists of the Permanent

Secretary to the Ministry of Agriculture, the Director of Agriculture, other Ministry representatives, the Chairman of the Tea Board of Kenya, grower representatives and representatives of foreign lenders. Operations are controlled by an executive staff in Nairobi (all Kenyans except for two foreign accountants) and are implemented by local staff for field development and for leaf inspection and collection.

The responsibilities of KTDA include the following: the raising of external loans, control over the timing and areas in which tea may be planted, the establishment of factories along with arrangements with private companies to manage the factories, the production and transportation of the planting material, the training and supervision of growers, the maintenance of planting records and the inspection and collection of green leaf. Technical information is provided by the Tea Research Institute. The construction and maintenance of tea roads and the provision of housing for the agricultural staff are the responsibilities of the Kenyan government.

The Local Staff

The local staff of KTDA is divided into two components: the field development or agricultural staff which is seconded from the Ministry of Agriculture, and the leaf inspection and collection staff who are direct employees of KTDA. Heading the operations in the field are two Senior Tea Officers, one responsible for east of the Rift, and the other for west of the Rift. The Senior Tea Officer supervises both staff components.

Each of the ten districts growing tea has a Tea Officer who is responsible for field development operations; in larger districts, there is an Assistant Tea Officer. Both the Tea Officers and Assistant Tea Officers must hold a Diploma in Agriculture. The actual extension work is carried out by Agricultural Assistants (AAs, who have Certificates in Agriculture) and Junior Agricultural Assistants (JAAs, who have seven years of primary education). There is a total of 792 AAs and JAAs (ratio of one to four) seconded from the Ministry of Agriculture, though KTDA reimburses the Ministry for the cost. This means that there is approximately one extension worker for every 100 tea growers. Both the JAAs and AAs receive training from KTDA which lasts about four weeks.

The leaf inspection and collection staff are directly employed by KTDA. They are responsible for insuring that the leaf reaches the factories in good condiiton, as well as for the purchase, inspection and recording of each grower's output.

The Tea Committees

Tea Committees are formed at the division, district and provincial levels, consisting of KTDA, private company, Ministry of Agriculture officials and elected representatives of the licensed growers. Although advisory in nature, these committees provide forums for discussion of local problems. The representatives of the growers are usually articulate and influential members of local communities. The committees allow them to communicate grower concerns on a regular basis to appropriate officials at each administrative level. There is a continuous upward flow of information to the KTDA board through this system of committees.

Also, the tea committees are a means for explaining and gaining acceptance by the growers of new KTDA policies. Because of the influence of the elected representatives, they can normally persuade other growers to accept even unpopular decisions. Moreover, the representatives set an example for other growers, especially in maintaining production standards.

The Technological Package

The basic technology for raising tea was developed by the large estates in Kenya. Building upon this technological base, KTDA, in cooperation with the Tea Research Institute and the Ministry of Agriculture, developed several innovations which would increase the return from tea growing to the smallholder and reduce the operating costs to the Authority. Much of this experimentation went on in the 1950's when few smallholders were growing tea. The innovations involved: a shift to vegetative propagated (v.p.) planting material which rapidly increased the supply for potential growers while reducing the costs of the planting material to the farmer; the creation of a system of pegging the tea plants rather than pruning, which facilitated the farmer's work; and the development of a collection and delivery system which allows the transport of the tea leaf over extended distances without damage; this was one of the critical needs before wide-scale smallholder production could be encouraged.

The KTDA procedures and standards are clearly defined and strictly enforced (see below), so little discretion is left to the smallholders. However, demands made on smallholders involve both time and money. Before the v.p. planting material is delivered, the farmer must clear and prepare his plot (about one acre) and build a small nursery. When the v.p. units are delivered from one of the KTDA nurseries, they must be planted immediately in the farmer's nursery; if the transfer takes more than 24 hours, the v.p. planting material will die. Nursery work alone requires an estimated 69 man-days of effort. The

farmer then must plant, weed, mulch and shade the cuttings in his plot. As the bush grows, it must be pegged or pruned.

In addition to the 69 man-days for nursery work, another 206 man-days are required over two years before the farmer receives any return. After the second year, the bush will start bearing, though it will not reach full yield potential until the eighth year. Continuous maintenance of the plot is required (pruning, fertilization, weeding, etc.).

When the bushes start bearing, they must be plucked by hand almost daily. To maintain high quality, KTDA requires that two leaves and a bud be plucked. The enforcement of this regulation has led to a uniform high quality of smallholder tea, and a higher average price on the international market than the average price for all Kenyan tea. Quality and yields are important if tea production is to be beneficial to all growers; if the quality or yields fall off, the operating expenses of KTDA cut into the smallholder's profits.[1]

In addition to the labor required for tea, the financial investment for the smallholder is large. The basic cost of a v.p. unit is US$10, with a minimum of four units required for an acre, though five units are recommended. In addition, there are the costs of the nursery, pegging and pruning which add up to approximately US$32; this makes an initial financial investment (without labor) of about US$82 before the farmer receives any return. Later on, the farmer will have to purchase fertilizer and additional pruning assistance.

Until recently, credit was only available to established growers for fertilizer after the fourth year. Because of the established profitability of tea, farmers were willing to make this investment, though only the larger, above-subsistence farmers could afford it.

However, in 1972, the Vihiga Special Rural Development Program, sponsored by USAID and the Kenyan government, started experimentation with tea credit.[2] Credit provision in Vihiga helped expand the acreage under cultivation where the demand for tea was not high mainly because of the long-term financial investment. Following this initiative, KTDA developed a credit

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[1] As will be explained later in the text, KTDA covers its expenses by a cess (tax) on all tea purchased. If the amount of tea sold to KTDA falls, it must raise the cess which reduces the return to all the smallholders.

[2] See Vihiga Project write-up, page D-2. Credit may be a misnomer for the Vihiga effort; it may turn out to be a grant program. No USAID contract person, KTDA or Ministry of Agriculture official could tell the field collector in August 1974 how the loans were to be repaid or at what interest rate; nor do the farmer contracts specify the terms of the loan. Some farmers (about 895) may be in for a shock.

program in 1973 which covers 85 percent of the cost of planting material. Farmers are required to pay off the loan in nine years (three-year grace period) in fixed amounts for each year; the annual interest rate on the loan is 9.9 percent. Loan repayment in the past has not been a problem for KTDA because the repayments are deducted from the purchase price to the farmer.

Project Implementation

Introduction of the Technological Package

Most farmers in the ten growing areas have observed tea development operations on other farms in their area and know the potential profits from raising tea. Therefore, when KTDA designates an expansion area, most farmers are receptive to the idea and are knowledgeable about the requirements as well as the length of time before returns on their investment should be anticipated. The first step in a new area is for the KTDA AA or JAA to ask an assistant chief for a sublocation (small geographic area within a division) to call a *baraza* (village meeting). At this meeting the AA or JAA explains in detail the requirements for labor and funds: farmers then decide whether they wish to pariticpate and KTDA checks the land which would be cultivated to insure the correct soil type.

In the past the farmers had had to put up the full costs for the planting materials. KTDA believed that this commitment of the farmer's own resources was an excellent indicator of his seriousness in producing tea. With the institution of the smallholder credit program, a farmer only has to put up 15 percent of the cost (in addition to the labor). There has been some fear on the part of KTDA officers that the farmers who received credit would be less willing to invest the time required. Initially, the AAs and JAAs have found that the repayment requirment is an effective lever which they can use to encourage farmers to follow their advice, and so far they have not encountered problems in terms of these farmers following established procedures .

Grower Training

The new growers receive intensive training, either at the four training centers in the area (which train about 1000 farmers per year) or in the field by the extension staff. The program at the farm training centers lasts about one week, and farmers have to pay about US$1 to attend the course. In the field courses, the AA will conduct a series of about 18

training sessions of about one and one-half hours in length. The AAs have training manuals, and each session concentrates on a different aspect of cultivation which is taught during the period when it is relevant to field operations.

Extension Support

In addition to the training, strict extension supervision is exercised by KTDA. On average, a farmer will be visited by an AA or JAA five times a year. Each time, the agricultural officer will fill in a card evaluating the procedures used by the farmer. If the farmer is doing something wrong, he will be revisited to make sure that the correction in the field operation is made. Normally, the intensity of extension visits is highest when a farmer is first starting his plot. During the first year, one main visit and two follow-up visits are made every three months.

The "report card" system allows KTDA to know what a farmer is doing which, when set against his sales to KTDA, will give a full picture of individual smallholder operations. If a number of smallholders in an area are deficient in an aspect of cultivation, a special training program will be set up. Moreover, it enables KTDA to keep better administrative control of their field staff.

Farmer Incentives

To maintain high yields and the quality of leaf, KTDA has recognized the need for built-in incentives for the smallholders. One mechanism is quite simple: KTDA holds field days at which the best tea growers are recognized at the division, district, provincial and national levels. These competitions spur significant interests among growers and the field days are well attended. Senior KTDA officials attend the field days to get informal feedback from the farmers on how they are doing.

More complex is the KTDA cess. The farmers sell their tea to the buying centers (always located within three miles of the plots they serve) at a fixed price per pound of US$.12. From that KTDA deducts a cess to cover operating expenses with the farmers receiving the remainder. If tea yields are high quality and sufficient, the cess goes down; however, the reduction in the cess has to be approved by foreign lenders. Over the past four years, the cess has been reduced from about US$.05 to $.04; this reduction is an incentive to the farmers to maintain leaf standards. In addition, if the factories make a high enough profit, a second payment is made to the farmers which may be US$.01-.02 per pound.

A more recent incentive has been the selling of shares of financially-established factories to smallholders in the surrounding areas.

V. PROJECT SUCCESS

Project Benefits

Even though about three years are required before a smallholder starts receiving any return on his investment, the profits are high and regular once the tea has reached full potential. A farmer with one acre of land will net on average about US$20 per month. The life span of tea plants is over 50 years. This gives the farmer a regular source of income which he can depend on for paying school fees and other expenses.

Beyond the direct income benefits to small farmers, their operations (even on the average one-acre farm) employ part-time labor. Moreover, the 12 KTDA factories and supporting operations (leaf collection and transport) employ other labor in the area. During the peak periods of production, a factory will employ up to 250 people.

Another benefit for the entire growing area is the road network which has been constructed by the Ministry of Public Works in support of KTDA field development operations.

Except for the rural infrastructure, the primary benefits of the project have been going to those farmers with above-subsistence level holdings. It remains to be seen whether the introduction of credit will open up for basic subsistence level farmers, or whether the one-acre requirement will be too much for them to manage.

Potential Spread

Earlier, it was mentioned that there are approximately 1.5 million acres in the tea growing region. However, the expansion of the smallholder project will depend on the internal capabilities of KTDA to provide the manpower, factories, support and on the world market for tea; at some point an international quota system may be developed which would limit further expansion in Kenya.

Self-Sufficiency

The yearly internal revenues of KTDA from sales of planting material and the smallholder cess cover its operating expenses. However, in support of the KTDA operation, over US$11 million has been spent on road development. In addition, there are loans from foreign donors -- primarily the International Development Association and the Commonwealth Development Corporation -- to help finance the field development operations. At an eight percent annual rate of interest on the funds for road construction and loans from foreign donors, the amount of yearly interest would be equal to 89 percent of KTDA's yearly internal revenues (at the 1973 level).

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

KTDA has successfully introduced a complex technological package to small farmers. There are several elements in the process which hold potentially useful lessons for other projects. *First,* the technological package was developed, tested and proven before wide-scale introduction began. This was done primarily in the 1950's and early 1960's, though there is continued experimentation directed towards reducing farmer costs and the costs of the KTDA operation. *Second,* KTDA has developed an effective two-way communication system, mainly through the tea committees and in part through the field days and extension work. There is a system for getting information up to the top of the organization and back down to the farmers.

Third, an important element in KTDA's success has been the quality and frequency of extension assistance to the farmers. The Authority exercises strict supervision over its extension staff and over farmer operations. By keeping detailed records on each holder, KTDA can keep tabs on how he is doing and make corrections if necessary. *Fourth,* KTDA has sought incentives which help insure high quality production of the tea. These incentives range from farmer recognition at field days to sharing of the profits of the overall operation. Just as important as providing these incentives has been keeping the farmer informed about progress -- the reasons for the reduction in cess. Because of this effort to communicate with the farmers, to respond to their needs and to give them a share of the operation, their cooperation has been forthcoming.

Information Sources

A. Field

Field visits took place in February and September 1974, during which discussions were held with the Nairobi staff of KTDA, the Senior Tea Officer East of the Rift, the Kericho Tea Officer, and AAs and JAAs in Kakamega and Nyeri. Factory operations were visited near Kericho and smallholder operations in Kakamega.

B. Reports

Several studies have been done about the KTDA. The primary ones used for this write-up were: *A Partial Review of the Kenya Smallholder Tea Project*, prepared by Deborah Sullivan, IBRD, in 1972 and *An Econometric Analysis of Smallholder Tea Production in Kenya*, East African Literature Bureau, Nairobi, 1973. In addition, the KTDA annual reports and accounts were reviewed.

Data Adequacy

The data for this write-up should be considered to be reasonably accurate having been drawn from KTDA internal and academic studies. The major deficiency is the lack of data on which farmers within an area are participating and with what effect on total family income; these figures had to be estimated by drawing on several of the above mentioned field sources.

ISINYA, KENYA

MAASAI RURAL TRAINING CENTRE

I. PROJECT BACKGROUND

The Maasai Rural Training Centre is a church-initiated project engaged in education and income-generating activities primarily on behalf of the Maasai people (roughly 410,000) located in the Kajiado District.

The area covers 5,462,486 acres or 8,535 square miles. Following droughts in 1961, the project started as a famine relief center, when it took over the buildings and grounds of what had been a detention camp during the emergency of the 1950's.

The project covers its annual operating budget of roughly U.S. $85,000 from private foreign grants (most of which are channeled through the National Christian Council of Kenya), payments by the government of Kenya, and its own income-generating activities.

Organizationally, the Centre is an extension of the Diocese of Nairobi which has established a Board of Governors consisting of both private and public citizens to set policy. Each major activity has its own subcommittee. A project director and treasurer (both from England) and Ministry of Agriculture official seconded to the Centre are in charge of daily operations.

It is probable that 1000 Maasai, living within a 50-mile radius of Isinya, are involved in one or another of the Centre's activities each year. Two outposts, one in Kalema and one at Olkiramatian, together involve perhaps another 150 Maasai. In addition, roughly 100 Kenyans who are not Maasai attend courses at the Centre each year.

II. LOCAL ENVIRONMENT

The Kajiado District consists primarily of undeveloped range land that until recently was the grazing area for wild animals and the cattle of the nomadic Maasai tribes. Isinya is less than 40 miles south of Nairobi; and because of the expected pressures from population growth and industrialization, the government is attempting to adjudicate the land. This process involves giving title deeds to individuals or groups; and once this is done, the land can be fenced off.

The Maasai have held steadfastly to their traditional ways; even today, they use spears to kill lions and other wild animals that attack their cattle. Another example is the custom that women should cut back on their food consumption when they become pregnant. By conventional economic accounting standards the Maasai appear to be quite wealthy. The average Maasai tribesman owns 100 head[1] of cattle, the market value of each head being $100. The Maasai subsist primarily on the produce of their cattle and on wild animals they kill. Rough estimates suggest the average Maasai family will sell five head of cattle a year[2] and consume 15 head. At market values, this would suggest a subsistence income of $200 per Maasai family! This is of course inaccurate. For one reason or another, the Maasai do not think of what they could earn if they sold off the 15 head of cattle earmarked for their consumption.

As mentioned earlier, the Maasai are nomadic people and this creates obvious problems for a geographically-based project. For example, the Isinya area was hard-hit by drought, and consequently many Maasai migrated south into Tanzania and other areas of Kenya. This has led to a curtailment of Maasai enrollment in training courses for a short period.

Despite their nomadic tendencies, the Maasai travel in "village" groups and play well-defined leadership roles. The elders hold frequent meetings with other tribesmen to discuss ways to cope with common problems, such as defending their cattle against wild animals.

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[1] This is a very rough estimate. The Maasai believe it is bad luck to count their cattle, and this makes it extremely difficult to get an accurate head count.

[2] Contrary to popular belief, the Maasai have little reluctance to sell their cattle at a good price. However, their primary motivation for selling cattle is to get cash to buy food, clothes, cattle and medicines. They will willingly sell but only if in need.

There are no other tribes living in the project area, and it appears that there are no frictions among different Maasai tribal groupings. Estimates suggest that the literacy rate among Maasai is as high as 25 percent.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

In 1961, a severe drought hit Kenya and the Maasai lost a large portion of their cattle[1]. The Maasai elders made it known to church missionaries living in the area that they would appreciate training to avoid similar disasters in the future. The Diocese of Nairobi agreed to manage the training activities; the buildings and area of a famine relief center in Isinya that had been used as a detention camp in the 1950's became the center of operations.

The National Christian Council of Kenya (NCCK) agreed to administer the funding for the program. For the first five years of operation, the primary source of funding was Christian Aid of London. A British missionary was sent to Kenya as project director. Prior to his arrival, a Board of Directors was appointed by the Diocese. The Board included the Archbishop of Kenya, the chief administrative officer of the NCCK, representatives of the Kajiado County Council, a senior Maasai chief, the District Agricultural Officer for Kajiado, the Veterinary Officer in Kajiado, local ranchers (Maasai), and the project manager. The Board was not established until the Maasai elders had been consulted about the organizational structure.

The Board of Directors agreed that the primary objectives of the Centre should be:

- teach improvements in ranching methods and land use;
- bring the Maasai into the money economy;
- teach literacy; and
- teach knowledge of the Christian faith.[2]

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[1] It is estimated that 300,000 head (or 60 percent) of their herd were lost.

[2] While conversion to Christianity is clearly one objective of the project, this is not reflected in program requirements for participants; and there is no discrimination against persons with different religious views.

Over the years the Centre has developed a number of activities which include:

- a primary school attended by 200 local children;
- various types of training courses;
- a vertically integrated tannery;
- a demonstration and breeding ranch;
- a church;
- a distribution center for cattle medicines;
- a demonstration poultry farm;
- a health clinic;
- two growth centers; and
- a *shamba* (garden).

Each of the major activities (i.e., the primary school, the training activities, the tannery and the ranch) is controlled by a project activity committee. Members include the local Maasai chief and headman, various district officers, community and church representatives and appropriate local experts. These committees meet several times a year to discuss problems and progress. The language spoken at meetings is either Swahili or the local Maasai dialect.

In addition to their role as effective monitors and problem-solvers for ongoing activities, project activity committees have generated several new ideas. Committees also develop strategies to implement ideas, as the following two examples demonstrate.

> The point was made at the training committee that while the Ministry of Agriculture was paying the salaries of the instructors, no provision had been made for housing, and existing housing facilities were inadequate. The suggestion was made that perhaps community assistance could be provided to help with new housing construction. The county council representatives, working with

> Maasai tribe representatives, were able to mobilize the needed manpower from the local Maasai community.

The responsibility for mobilizing the manpower fell primarily on the Maasai representatives. They held a meeting of the Maasai village group, explained what was needed, and the group agreed to help. It does not appear that there was a formal workload allocation made. Instead, everyone was expected to show up and contribute as they could.

> Last year, the Range Committee pointed out that one way to guard against droughts was to store hay. This had been done to a limited extent in the past, but not on the scale needed for a major drought. It was concluded that with two tractors a significant amount of hay could be baled.

The project had been given a tractor several years earlier; the tractor needed a few repairs and it was effectively repaired. Funds from local sources were found by the Range Committee to do this.

IV. DYNAMICS: PROJECT IMPLEMENTATION

As indicated earlier, the project had a number of activities associated with it. Here, those activities with the most interesting local involvement components will be described.

Perhaps the most interesting activity from a local involvement standpoint is the vertically integrated tannery operation. The original idea for a tannery came from an FAO expert who was visiting the country in the mid 1950's. At that time, the idea was limited to buying skins from the Maasai, tanning them and reselling them. The tannery operated for a time, but because of bad management, it was closed down in the late 1950's.

The tannery was reconsidered in the early 1960's after the arrival of the project staff. It was known that Maasai women traditionally made and marketed at roadside handicrafts made out of beads, thread and tanned skins (i.e., leather). The project staff came up with the idea of trying to develop a local market for the tanned skins by including them in women's handicraft activities.

There were a number of obstacles to implementing this idea. In the first place, the Maasai were not in a position to pay cash for the needed inputs. Secondly, the local market for handicrafts was not large enough to absorb any volume. To avoid these and other obstacles, new arrangements were instituted after lengthy discussions with all parties.

The tannery operation was started up again under the supervision of the project staff. It employs 12 Maasai workers (paid roughly $25 per month) plus a tannery instructor/supervisor and a clerk. The tannery has established prices it pays for various types of skins. Once the skins are tanned, they are given to handicraft women who are loaned prescribed amounts of beads and thread, and also a needle; and in return, the Maasai women agree to provide a prescribed number of well-defined handicraft products. For this they are paid per unit prices net of the interest payments they have incurred. The products are then either sold at a retail outlet at the Center (which is located on a main road from Nairobi to Tanzania) or they are transported to a retail outlet in Nairobi.

In mid-1974, approximately 250 Maasai women were involved in handicraft production. The women can produce as many handicraft articles as they want, under the arrangements outlined above. It is estimated that the average woman engaged in the production of handicrafts earns $85 per year.

A side-product of this activity is that women producing handicrafts on their own initiative have formed an association which performs three functions:

- it offers handicraft training to new women;
- it provides a quality check on the production; and
- it pressures project management for higher per unit prices.

In actual fact, the tannery operation is run on a break-even basis. To realize this objective, the per unit price to women is adjusted upwards or downwards.

It is difficult to estimate exactly how much of an income increase has resulted from this operation because some handicraft production and marketing was already carried on by the women. However, a conservative estimate is that 80 percent of the income earned (including the income of tannery employees and the women) is a net increase. This works out to a net income generation of about $20,000.

The *shamba* or garden activity is also interesting as a means of affecting a behavior change on the part of the Maasai. As mentioned earlier, the Maasai are nomadic ranchers and have had little knowledge of or interest in growing crops. Part of the requirement for persons who come to the Centre for training is that they spend time growing and harvesting garden crops to be consumed by the Centre staff and the trainees. Unfortunately, there is no evidence of any carry-over effects on the farm households from this practice. Nonetheless, the project staff believes it is the most effective farm training being offered the Maasai. However, the Maasai have not received much farm training in the past; today there are roughly 1000 Maasai households per farm extension worker in the district, and most of the extension advice concerns animal husbandry.

It is clear that the shop set up to sell animal-related chemicals and medicines is servicing a real need. The store is turning a profit of slightly less than $4000 annually, and this profit level was maintained in the drought year of 1973. The operation is supervised by the project staff. It is operated by a Maasai, who receives on-the-job training.

Three types of formal training activities are carried on at the Centre. First, the Centre serves as an agent for the Kenyan government for two national educational programs. One program offers a two-year village polytechnical course at which students learn one of four crafts: masonry, carpentry, welding/metal work, or vehicle mechanics. Part of the time, the students engage in actual work for which they are paid a wage. One-half the wage is paid directly to them; the second part is put aside and paid to them in kind at the end of the project in the form of tools they will need in their profession. Tuition for these courses is about U.S. $14. Room and board are extra.

The second government-sponsored course enrolls students for one-to-two week courses monthly. These courses cover a number of specific subjects which the Training Activity Committee, in consultation with the Kenyan government, decides are needed. Students pay about U.S. $1 to attend these courses. For both courses, the government provides the instructors.

Finally, the Centre offers a one-year course in range management, the only course of this type in Kenya. The fee for this course is U.S. $64 which includes room and board. Even with the drought situation, this course attracted 21 students in 1974.

Students for these courses are recruited from the Maasai tribes. Leaflets are sent to District officers who then distribute them in the community. The training courses have gained a reputation outside the Maasai area, and the Centre is being asked to take increasingly larger non-Maasai groups. However, the Centre maintains a firm policy of taking non-Maasai only if there is room after all the Maasai desiring to enroll have been accepted.

The Centre has been given 2000 acres for ranching by the Maasai village, for demonstration and teaching purposes. In addition, the ranch will develop strains of cattle that are drought resistant. Until the drought year of 1973, the ranch, which employees 14 Maasai as shepherds at roughly U.S. $21 per month, has made a profit through the sale of cattle and stud fees.

V. PROJECT SUCCESS

Because of its many activities, many of which do not generate easily measured benefits, it is extremely difficult to measure the success of this project in quantitative terms. However, if it is assumed that the government-sponsored training activities are provided on a *quid pro quo* basis, then external grants of about U.S. $23,000 per year are involved. Earlier, it was estimated that the tannery operation above was generating a net income to the Maasai of U.S. $20,000.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The Maasai Rural Training Centre is an example of a project that has evolved gradually through time with very

modest doses of outside funding. Much of its success has depended on the willingness of the foreign project manager to work closely with local committees to develop new direction and overcome existing problems.

The project management is concerned about the effects of the project being limited to the Isinya area and has consequently set up two substations 100 miles inland.

The project has demonstrated an ability to work with government in a constructive fashion. A Kenyan national is scheduled to take over the management of the project this year, and many will observe with interest whether the project continues on its successful course.

The project manager believes the Centre has been constrained by a lack of funds. He believes the project could have a much larger impact with more funds, provided that it had the time:

- to develop good working relationships with local institutions, and
- to develop meaningful project activities.

Information Sources

A. Field

Two visits to the Centre were made in August 1974. Discussions were held with officers of the project. In Nairobi, discussions were held with H. F. Miller, Secretary for Rural Development Services of the National Christian Council of Kenya.

B. Reports

The 1973 and 1974 annual reports and budget documents of the Centre were drawn upon for this write-up.

Data Adequacy

There is very little quantitative data on the project beyond that mentioned previously. The data were carefully worked through, but for the most part consist of estimates of knowledgeable people. Comments were received from R. P. Slade, the project manager for the Maasai Rural Training Centre.

ANNEX E

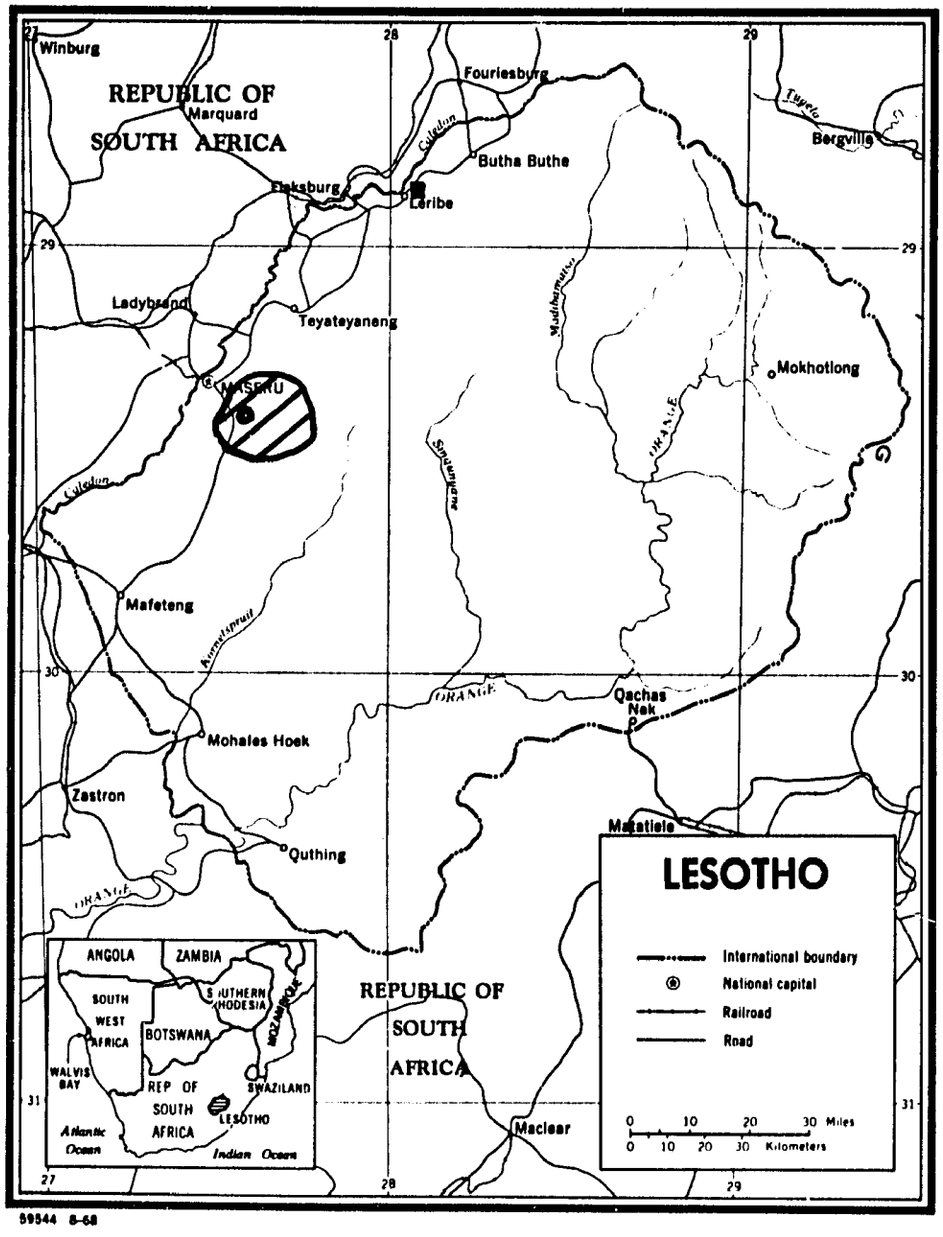
LESOTHO

LESOTHO

Area: 11,720 square miles
Population: 1,100,000
Population growth rate: 1.8%
Density per square mile: 93.8
GNP per capita: $100
GNP per capita growth rate: .5%
Capital: Maseru (18,800)
Major language: English, Sesotho
Religion: Christian, tribal
Literacy rate: 40-50%

Thaba Bosiu Rural Development Project - This project covers the shaded area in the Thaba Bosiu District, with a subproject at N'tsane (○).

Leribe Pilot Agricultural Scheme - This project covers a small area (■) in the Leribe District.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THABA BOSIU RURAL DEVELOPMENT PROJECT

I. PROJECT BACKGROUND

The Thaba Bosiu Rural Development Project is located in an area about ten miles east of Maseru, the capital of Lesotho. The purpose of the project, which covers an area of 300,365 acres, is to increase the incomes of 12,000 (or 80 percent) of the households living in and around the 490 villages in the project area. The primary mechanisms being used to accomplish this end include attempts to:

- increase yields, from traditional crops through the use of more fertilizer and improved seed;
- introduce new cash crops;
- improve livestock production practices; and
- improve soil quality by means of a large land conservation program.

With a planned life of six years, the project started in April 1973 after agreements with International Development Association (IDA) and U.S. AID had been signed to provide most of the $9.7 million to be spent over the lifetime of the project.[1]

The project operates as a semiautonomous institution within the government of Lesotho, and has almost complete control over economic activities in the Thaba Bosiu area. All

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[1] A percentage breakout by source of the finances (U.S. $9.8 million) for the project is as follows: IDA credit (57.3 percent), U.S. AID (28.7 percent), UNDP (.5 percent), commercial banks (5.4 percent), government of Lesotho (5.2 percent), and farmers' contributions (2.9 percent).

extension workers from the Ministry of Agriculture working in the region have been seconded to the project, as have a number of other government officials.

II. LOCAL ENVIRONMENT

Over 80 percent of all crops in the area are grown for subsistence purposes; the major crops are maize, sorghum, wheat, beans and peas. Productivity is low (although it is relatively high by Lesotho standards), and there is evidence that it has declined in recent years because of the overstocking of livestock and soil erosion. The area is subject to torrential rainfalls and hailstorms, mainly in the summer.

Social tensions in the area are growing as a result of competition between the country's two major political parties. Tension is also rising between stockmen and farmers as the population increases in an area that is already densely populated (over 500 persons per square mile of cultivable land). Further tensions are likely to develop if rumors that the traditional land tenure system is breaking down prove to be correct. Under the traditional system, tribal chiefs allocate the rights to land to their people. Field discussions suggest money is now playing a role in the allocation decisions of some chiefs.

Average farm size in the project area is about 4.8 acres, with the largest farm being about 25 acres.[1] Per capita income in the area is in the US$80-90 range. While income from farming has apparently dropped in recent years, total family income has probably increased because of higher incomes from work in the South African mines (80 percent of all farm households have a person earning income outside of Lesotho). The literacy rate for Basotho in the area -- slightly more than 40 percent -- is relatively high by African standards.

In past years, it was believed that foreign traders were exploiting farmers by charging them too much for farm inputs and offering them too little for the small percentage of the crops they sold. Consequently, Co-op Lesotho (a national cooperative) has been given exclusive control over the sale of farm inputs and crop purchases.[2] Co-op Lesotho does not have the resources to adequately service farmers' needs, and this is manifested in unreliable input deliveries and crop purchases.

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[1] For further information on these points, see the Leribe write-up, page E-12.

[2] There are a few exceptions to this rule. The Thaba Bosiu project was granted approval to provide these services in the project area.

In 1969 the government initiated a program whereby small farmers associations could purchase farm inputs on credit. Technical assistance on how to organize associations and obtain credit was provided by extension workers from the Ministry of Agriculture. Although there were far too few extension workers to provide the needed assistance (nationwide, there are 3000 families per extension worker), a number of associations were formed in the Thaba Bosiu area that bought inputs on credit. In addition to these associations, there are several other types of small farmer groupings operating in the project area. Presumably, these existing organizational structures should be assessed on a village by village basis as to their potential usefulness for implementing project activities.

As mentioned above, a sizeable proportion of farm households have a member working much of the year in South African mines. This presents a serious barrier to effective extension work since the male head-of-household is usually the mine worker and is also the person who has final say on what is produced on the farm and how.[1]

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The problem of land erosion has been recognized for many years in Lesotho. Indeed, contour farming was introduced in the 1930's to deal with the problem. However, the program has had only a marginal impact because of the government's reluctance to interfere with traditional grazing and cropping practices.

In early 1970, the government of Lesotho requested agricultural project support from the World Bank. In November 1970, a World Bank mission outlined to the Ministry of Agriculture the type of agricultural development project the Bank would be willing to support. The project outline was based on the Lilongwe Land Development Program in Malawi.[2] The Ministry was asked to identify an area for the project. The following month, several representatives from the Ministry of Agriculture visited the Lilongwe project as guests of the Bank.

The government suggested the Thaba Bosiu area for the project. A proposal for the project was drafted by a team of foreigners with only a token input from the Ministry of Agriculture

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[1] Interestingly enough, some government officials mentioned possible experiment whereby extension workers would visit South African mines to talk with absentee farmers.

[2] In one potentially important way, the Lesotho project has not reflected and will never reflect what was done in Malawi. In Malawi, the need for a land conservation program evolved out of a lengthy dialogue between a village chief and a government extension worker.

The proposal was not accepted by the Bank initially because estimated rates of return were not high enough. However, the project was accepted in 1972 when U.S. AID agreed to co-sponsor the project; operations began in mid-1973.

The stated objectives of the project are:

- to control erosion and improve crop production and rural living within the existing social system, and thus move from subsistence to cash cropping for import substitution and export;
- to transform land use custom so that integrated farming, combining rotational cropping with improved livestock production, can be introduced;
- to provide a more assured subsistence and to increase considerably the income derived from crop and livestock production; and
- to provide data for the preparation of similar rural development projects in other areas.

To achieve these objectives, the main project components, as originally designed, included: (1) farm inputs to be financed by short-term credit in kind; machinery-farm credit for implements, tractors and dairy cattle; (3) extension and marketing assistance; (4) farmer training and agricultural research; and (5) road development and soil conservation.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Project Organization and Approach

The Thaba Bosiu project is a semiautonomous inistitution within the government of Lesotho, and is responsible to a Project Authority which consists of senior Basotho government officials. The Project Manager is a British expatriate, and the project unit has seven divisions:

- Conservation and Roads Division: implementation of the roads and soil conservation program;

- Extension and Training Division: communication with farmers through field days, pitsos (village meetings), training courses and other extension activities;

- Supplies and Marketing Division: distribution of farm supplies and marketing of produce;

- Finance and Credit Division: control of financial matters and accounting for farm inputs, stores and credit;

- Administration Division: administrative and logistical support;

- Research Unit: agricultural experimentation; and

- Planning and Evaluation Unit: planning and monitoring project operations, project reports, economic evaluation and socio-economic studies.

Even though the Project Manager is responsible to the Government of Lesotho Project Authority, it was apparent at the time of our visits that primary decision-making is controlled by the foreign technicians with little input from either the government or the Basotho field staff. Much of the planning is based on the studies of the Planning and Evaluation Unit, which is headed by a foreign agricultural economist and supported by a staff which includes a U.S. AID-sponsored anthropologist. To date, the studies have emphasized data collection on farm economics and farming practices, with little priority on sociological and anthropological data collection and analysis.[1]

The project area is divided into three subareas, of which Area I was designated as the core area. The plan was to test schemes in Area I, and when proven successful, the schemes would be extended to the other two areas. As was the case with the village distribution points (see below), the tendency has been to extend project activities without a full assessment of their impact.

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[1] Regrettably, most of the anthropologist's time was consumed in the mechanical work associated with the taking of surveys (i.e., the recruiting and training of ennumerators, developing the coding instructions for the results). Since she had no past experience in this sort of work, she had little time to carry on the anthropological/sociological studies that appeared to be needed for project success.

Initial Project Activities

One of the first activities of the project staff was to hold a series of two-day meetings with 83 chiefs and headmen from the first subarea (comprising 40,000 acres). From these meetings, it was concluded that the farmers' primary problem was obtaining farm inputs when needed (in particular, improved seed and fertilizer), and *not* the inability to pay for these inputs. These and other considerations lead to a reduction in the credit component of the project, with primary emphasis being given to delivery of farm inputs on a timely basis.

To accomplish this latter objective, a plan was developed to establish eight project-operated stores and 80 village distribution points (VDPs) in the three subareas. The latter are owned and operated by private persons on a commission basis. Each VDP was intended to serve four or five villages; by October 1974, 51 VDPs were in operation. Getting the inputs to the VDPs presents a serious problem in many cases due to a lack of roads and the presence of streams that must be forded. Consequently, a crash program to provide feeder roads to the VDPs is underway.

The village of Ntsane, a VDP location about 25 miles east of Maseru, was visited to gain a better understanding of local interactions. An extension worker asked the village to elect someone to run the VDP. This was done, and the village has provided a house to store the farm inputs. The project staff decided to set VDPs up as independent entities rather than work through existing local institutions. In Ntsane, this policy is having unfortunate effects on an existing small farmer association which has been used in the past to obtain credit and inputs for farmers. Clearly, the association cannot compete with the heavily-subsidized activities of the project.

In addition to establishing the supply centers, the project has experimented on a limited basis with the introduction of asparagus and orchards. A small amount of credit was offered as an incentive to produce beans and potatoes. The project also sold planters to the farmers and repaired planters already owned by farmers.

The project also organized over 50 group activities (involving more than 2600 farmers) in an attempt to improve farm practices. This involved demonstration plots to encourage the use of fertilizers, two-day training courses at a farm training center and village "field days."

Ratau was selected as the first site for the land conservation program. This site was selected by the project staff despite objections of the District Officer and the staff

anthropologist, who did not feel Ratau was a desirable location because of jealousies between tribal chiefs. Difficulties arose requiring the personal intervention of the District Officer.

The program for the Ratau area was developed by the project staff. At a meeting called by the chief, villagers elected a committee which reviewed and approved the plans. There is some question as to whether all village residents who will be affected by the plans know of them and whether compensation will be offered those who will be hurt by the plan's implementation.

V. PROJECT SUCCESS[1]

As regards project success, it is too soon for any conclusive judgments.[2] In terms of our success measures, it should be noted that distributional considerations were not mentioned explicitly in the statement of project objectives and have not received much attention. Rather, the underlying philosophy has been to identify the most progressive farmers on the grounds that by working through them, the project has the greatest chances to maximize increases in output and income. The project staff resisted suggestions made by AID officials that a small part of the research budget be devoted to gaining an understanding of why certain farmers showed a willingness to engage in project activities while others did not.

So far, despite more than 11,000 reported contacts with farmers, the project appears to be a top-down operation in the sense that minimum use has been made of readily-available information sources on local socio-political conditions and local institutions in project design and implementation. This could be done if deemed desirable, since the Basotho on the project staff would have little difficulty in obtaining the needed information. However, the staff's philosophy is that good ideas will sell themselves. This might or might not be a valid premise; however, it is probably not a good operating assumption in a

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[1] Our interpretation in this section differs markedly from that of the project staff. For a summary of their views see the Appendix to this project write-up.

[2] Some might find the following information on project expenditures and activities to be of interest. By the end of August 1974, the project had spent $1,317,982 and was operating with a staff of 120. It had set up 51 VDPs. Of the planned 57 miles of all-weather access roads, 28.6 miles were under construction. In addition, five miles of feeder roads to VDPs had been built. The project has sold 51 planters and repaired 245 others. It has extended a small amount of credit to slightly more than 50 farmers. It has sold 1740 fruit trees and 451,308 pounds of seed and fertilizer combined. Whether these latter sales were net new sales or simply represented a change in the sales agent will not be known until the results of a recently completed survey are in.

country such as Lesotho where it is not easy to promote an idea that will make things markedly better. If it is then assumed that only marginal changes for the better are possible, it would probably follow that two-way communications with farmers are absolutely essential.

In part, the above orientation may be due to the domination of project decision-making by foreign technicians. Basotho staff members, particularly the experienced extension workers, appeared to place more priority on identifying the local institutions and individuals through whom the project should work. A Basotho conservation officer illustrated this point in conversations by explaining why the first contact in a village should not necessarily be the village chief (the normal channel used by the project); in certain cases, it is necessary to obtain the cooperation of the local primary school teacher or another influential individual and have him explain the program to the chief who will then be more receptive to the innovation. Some chiefs cannot act, for if they take the initiative, it is doubtful that major segments of the village will participate because of political reasons.

While 44 VDPs were operating in June, 1970, it remains to be seen whether these will be a positive or negative factor in the long run. It was clear that Co-op Lesotho was not yet doing a satisfactory job; however, it is also questionable whether the heavily subsidized project operation[1] that does not work through existing local institutions will survive for very long; if it does not, will the farmer in fact be better off than if he had been sensitized on how he might try to improve on the situation himself?

Rather than play an active role in the project, the Ministry of Agriculture has ceded responsibility for the Thaba Bosiu area to the project. The project has a planned life of only six years,[2] and attention is not being given to what steps are needed to perpetuate whatever beneficial activities the project undertakes.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

At this point, it is hard to draw any definite lessons from the project since it is still in its early stages. However,

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[1] The project buys the farm inputs in advance; it is constructing roads to many VDPs, and it provides the transport vehicles and drivers.

[2] Indeed, it will not be able to last that long unless additional funds are made available, since actual expenditures are exceeding original projection.

there are already certain general observations that can be made. In order to justify the IDA locan to the Executive Board, the World Bank staff had to calculate rates of return on the investment. A major component of the project was to be seasonal credit in kind to farmers. Certain assumptions were made regarding the resulting increased use of seeds and fertilizer and what this, in turn, would mean for output. On the basis of these calculations, a 15-20 percent return on the integrated farming part of the project was estimated. The project staff has now decided that credit is not a constraint.

These facts raise certain questions about the appropriateness of the Bank's justification requirements and procedures for planning rural development efforts. Following the plan set forth in the Bank's appraisal report, the project would quite probably have lead to complete failure. Indeed, it is to the credit of the project staff that they have taken the initiative to revise the plans. However, now that the staff has exercised some flexibility, the calculations used to justify the project initially are meaningless.

A second lesson the project might offer concerns the area's absorptive capacity. With very little prior research, a project was set up with the mandate to spend about US$ ten million in a six-year period to help 12,000 families. A main question is whether this injection of outside resources can be made, and whether it will have a lasting beneficial impact without much more preliminary and/or ongoing investigative work.

The project's land conservation efforts will be closely watched. Clearly, changes in land rights and physical appearance are most sensitive issues. It will be interesting to see whether the prior experience in Lesotho with land conservation efforts will help in attempts to implement the planned program and whether the project will receive the information to monitor what is happening at the local level and to make modifications, if needed, to help insure farmer acceptance.

Information Sources

A. Field

Field visits occurred in February and August 1974, during which time discussions were held with: project staff headquartered in Maseru, a project extension worker, project participants living in Ntsane, U.S. AID officer and Peace Corps officer located in Maseru, officials from the Ministry of Agriculture and the Economic Planning Department of the Government of Lesotho.

B. Reports

In addition to the reports prepared by the project staff, information was taken from: *The 1970 Census of Agriculture Report* by the Bureau of Statistics; various memos by J. Jenness.

Data Adequacy

Most of the data referred to in this report came from studies done by the project staff. With the qualifications mentioned in the text, they are believed to be reasonably accurate.

Comments were received from V.E.M. Burke, Project Manager, who disagreed with several of our judgments; the summary of his comments is appended. Factual errors were incorporated in the revised write-up.

APPENDIX

SUMMARY OF THABA BOSIU PROJECT STAFF COMMENTS ON FIRST DRAFT OF DEVELOPMENT ALTERNATIVES PROJECT WRITE-UP

2.1 The main theme identified in the report is that the Project was planned and is being implemented by foreigners who do not make "an effort to understand local situations...". Moreover, "due to the domination of Project decision making by foreign technicians" Basotho staff who know the situation better do not feel themselves free to use more suitable methods. As a result thriving local institutions (farmers associations) are ignored. Project sponsored VDPs compete with them unfairly and project activities have been extended before full assessment of their impact has been made.

2.2 The omissions and errors summarised below were probably responsible for the emergence of this theme.

- Basotho participation in Project preparation is ignored (see para 3.8).
- The fact that two of the seven division/unit chiefs were Basotho is ignored. (see para 3.9)
- Project strategy has been derived from continuing meetings with field staff members and farmers representatives. Such meetings, reported in Project papers, have been ignored. (see para. 3.19).
- Local experience of three of the foreign staff members and the special studies of the Project area done by a locally experienced foreign staff member of the Ministry of Agriculture are ignored. (see para 3.19).
- The description of the VDP system is distorted and the suggestion that the system was extended prior to a reasonable assessment of its impact is unwarranted. (see paras. 3.6, 3.12 and 3.13).
- The suggestion that it was Project policy to ignore and undermine thriving local institutions (farmers associations) is incorrect. (see para 3.20).

2.3 Other important errors include the following.

- It is meaningless to report tension berween "cattlemen and farmers" as this classification is not applicable in Lesotho conditions. (see para 3.2)
- It is erroneous to state that chiefs begin to sell off their lands. Land cannot be alienated in Lesotho. (see para 3.3)
- The statement that the Project shows a lack of concern for small farmers' welfare is without foundation as over 97% of Lesotho's farm households have holdings of less than fifteen acres. (see para 3.18).

LERIBE PILOT AGRICULTURAL SCHEME

I. PROJECT BACKGROUND

The Leribe Pilot Agricultural Scheme is being carried out in the northern part of Lesotho by the Food and Agriculture Organization of the United Nations and the Ministry of Agriculture. As a pilot scheme, its basic purpose is to determine the approaches and applied technology which offer the best potential for improving agricultural production within a particular area. More specifically, it was expected that the project activities would:

- demonstrate the potential for significantly increased yields through the systematic application of good husbandry, improved planting materials, fertilizers and the integration of proven livestock enterprises within viable mixed farming systems;
- provide a model for the implementation of similar projects in Lesotho with a view to increased food production and import substitution on a national scale; and
- insure the maintenance and expansion of production-oriented projects through the establishment of a well-trained cadre of Basotho agricultural staff.

The project was officially launched in March 1969 with an area survey by a FAO sociologist and his Basotho counterpart. This survey described in detail the Leribe area, its physical and infrastructure characteristics, its social history and organization, and current holdings and agricultural practices of the people living there. In the process of conducting the survey, the sociologist laid the groundwork for project implementation by explaining the aims of the project in village meetings and establishing the relationships with local leaders and people necessary to gain their views and cooperation. From this interaction, the basic strategy for the project's initiation was planned.

The Leribe project covers an area of about 7000 acres in villages, rough grazing and field tracts, and is situated in the Tsikoane Ward, Leribe District, in the northern part of Lesotho. There are over 1000 farmers and their families in the area. To carry out project activities, there is a project unit which consists of 16 FAO and Basotho counterpart officers. Its planned duration is five years, at a cost of US$1.5 million provided by FAO/UNDP.

II. LOCAL ENVIRONMENT

Little progress has been made in the development of the agricultural sector of Lesotho because of bad climate conditions, poor soil, and a lack of knowledge of improved agricultural and conservation practices. Land in Lesotho belongs to the nation and control is vested in the hands of the king. Acting on behalf of the king, village chiefs divide the land up among their tribesmen. While some favoritism (based on family ties) has been apparent in past years, there is an increasing tendency for tribal chiefs to sell off their lands.[1] The average holding in the project area is 5.8 acres (normally two fields), with a range of .4 to 24.6 acres. About 65 percent of the 1034 heads-of-household are male, and 35 percent are female, having received from the village chief their husband's land when he died or was separated for a long time due to migrant labor. While actual land tenure appears to be reasonably secure, there is a fear, particularly among the female heads-of-household, that their land will be reallocated to others.

As in the rest of Lesotho the major subsistence crops (maize and sorghum) dominate crop production in the project area, while beans, wheat, and peas are grown as cash crops. The Basotho are stockmen as well as farmers, keeping herds of cattle, sheep, goats, horses and donkeys; the livestock fulfill social (bride gifts) and status needs and provide small supplies of meat, milk, and wool. Certain land is open for communal grazing, which, combined with the depleted organic content and poor structure of soils, has caused serious problems of erosion. However, the erosion problem in the Leribe area is not as severe as in other parts of the country due to relatively high-quality soil and basic adherence to conservation measures by the people.

In terms of agriculture, the Leribe area is one of the best developed and progressive parts of the country, with a rapid expansion of fertilizer use, the development of communal gardens, the establishment of poultry enterprises and grain

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[1] While this is illegal, field discussions indicated that chiefs were selling land.

mills, and a relatively large number of tractor owners (67 tractors in all). In part, this may be attributed to the area's closeness to the Republic of South Africa, where many of these innovations are in use. Also, the infrastructure in the area is well developed for the same reason. There is easy access to good roads, regular bus service, and postal, telephone, and health facilities. Both Basotho men and women work in South Africa as miners and household servants, though in the project area only 21 percent consider this outside employment as their primary source of income. For the other 79 percent, their primary income comes from the land. About 60 percent of the population is estimated to be literate in the local language, which is Sesotho.

The traditional and political organizations of the Leribe area are complex and have been in turmoil in recent years. Traditionally, the king is the paramount chief of Lesotho, and authority is passed from him down to district chiefs, ward chiefs, higher chiefs (responsible for villages) and lower chiefs (responsible for settlements within a village). Because of their position, the chiefs must serve the people, the government, and the interests of the chieftaincy. This puts them in a situation where they have to respond to people's needs, to assist the government in development efforts, and to respond to the directions of higher chiefs. In several cases, the chief will not involve himself in the interaction between people and government because of his ambiguous position, though he has to be consulted before any development effort is launched. In Leribe, the chiefs' influence has been weakened because most of the village headmen (leaders of extended families) represent an older stratum of authority. While the headmen act as advisors to the chiefs, they also have the power to undercut their authority, so they must be consulted before action is taken.

In addition to the traditional ruling structure, the country has a government structure patterned on the British system. The strongest single person in the government is the Prime Minister, who in 1969 cancelled the planned elections and put members of the opposition party in jail; this turmoil delayed project initiation. The opposition party remains quite active and there is considerable party competition in the rural areas to win farmers' loyalties. Indeed, people believe if an election were held today, it would be close. To monitor local happenings, the government in power has set up Village Development Councils, under the chairmanship of the village chiefs. These councils report on the activities of elements in opposition to the primary national political party and as such are feared; therefore, they are not effective vehicles for promoting development efforts.

In the Leribe project area, there are three main villages and 13 settlements. Since the project boundaries did not take

account of the traditional authority structure in the area, fields of farmers from four additional settlements were included, making a total of 17 settlements with which the project had to work. In addition to the traditional structure, there were a few farmers' associations in the area, the most important of which was the tractor owners' association.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

How the Idea Developed

The idea for the project grew out of discussions between FAO/UNDP and the Ministry of Agriculture which, at the time, was engaged in working out the projections for the agricultural sector portion of Lesotho's first Five-Year-Development Plan. Recognizing that many schemes had been tried and failed, the Ministry desired assistance in identifying new approaches and technology which could be used in comprehensive agricultural development schemes, and in training the government's personnel to carry out these efforts. The Ministry selected the Leribe area, primarily for ease of development and political reasons; and the preliminary plan for the pilot scheme was put together by the Ministry and FAO. An important component for working out the details of project design was to be a survey by an FAO sociologist.

Rural Sociology Survey

Preliminary Inquiry

The FAO sociologist arrived in Lesotho in December 1969. However, there was considerable political turmoil at that time, so the field work had to be delayed until April 1970. During that period, preliminary background information was gathered on the project area through discussions with government officials and leaders of local schemes. A major focus of the inquiry was to find out why various development schemes had worked in the past or, more frequently, why they had not. From these discussions, the work plan and initial surveys were designed.

Political differences subsided sufficiently in April for the survey work to begin. The first step was for the sociologist to meet with all the village chiefs (and some of the headmen) who had responsibility for the project area; the meeting was called by the Leribe District Administration. Until this meeting, these local leaders had received little information

about the project, and there were several rumors about the possibility of the government turning the area into a government farm. The sociologist explained the project and elicited the chiefs' views of what they wanted the project to do, and also what they did not want the project to do. Following this meeting, the sociologist met with each village chief at his own headquarters. The thrust of these meetings was that the chiefs wanted the project to work within the ongoing framework of land tenure and administration.

After being satisfied that the village chiefs understood the purpose of the project, the sociologist asked them to arrange village meetings *(pitsos)* in order to introduce the project to the farmers. One difficulty was immediately encountered. Meetings were called but not held, or were called but not well attended. The reason for this was that the headmen had not been fully consulted in the beginning, so a special effort had to be made to gain their cooperation through personal meetings. About 25 village meetings were held to explain the project and respond to the farmers' questions. This interaction allayed the farmers' apprehension about losing their land and provided an opportunity for many questions to be answered about how the project would operate.

These initial meetings performed several functions. First, they alleviated fears and anti-project feelings caused by misinformation. Secondly, it helped the sociologist begin to plot the structure of the area and to identify potential areas where the project could assist. And thirdly, it laid the groundwork for the five surveys.

Area Inventory and Landholder Survey

The area inventory, which began almost simultaneously with the village meetings, was the initial data collection effort of the sociologist and his counterpart. It began with a mapping of all the settlements, roads, and tracks in the project area. In addition, an attempt was made to identify all the fields of landowners there. The inventory was extended to include the history of the area, a plotting of the important leaders and their jurisdictions, and land tenure patterns. Of particular importance in the area inventory was identifying and sorting out the roles of the chiefs and headmen through whom, because of their influence with their people, the project had to be initiated.

To complement the area inventory, a landholder survey was initiated in July 1970 and completed in November, just before initiation of project field work. The landholder survey collected data on households, holdings and land use. It included data on sources of family income, on farming practices and who (male or

female) carried them out, and on who made decisions about changes in agricultural practices.

The combination of the area inventory and the landowner survey produced the basic information for project design. It was complemented later on by surveys of the tractor owners and livestock owners, as well as a livestock census. Several of the findings of the surveys were used in the initial phases of project development.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Organization

The Project Unit

The project unit is located in Leribe and consists of FAO personnel and their Basotho counterparts; the project is highly demanding on the limited resources of trained manpower in Lesotho's Ministry of Agriculture. The major positions (with counterparts) provided for in the project team are:

- Project Manager
- Rural Sociologist
- Agricultural Extension and Training Specialist
- Agronomist
- Agricultural Mechanization Specialist
- Farm Management and Production Economist
- Watershed Management and Soil Conservationist
- Credit and Marketing Specialist
- Range Management and Livestock Specialist
- Soil Surveyor
- Administrative Officer

Major project staff meetings are held every three months to assess overall progress in light of the project's objectives. In addition, there are meetings every Monday morning to outline problem areas and prepare work programs for the coming week. In these meetings, the Basotho staff members are encouraged to bring up problems, particularly as they relate to the local population. However, the tendency in these meetings is for some of the FAO technicians to dominate the discussions, frequently failing to see the implications of the Basotho staff's comments on people's reactions to innovations. As will become apparent, this has resulted in the introduction of technological packages beyond the understanding and financial resources of the local farmers.

The project unit is responsible to the Ministry of Agriculture and is advised by a national cosultative committee. There has been continuing interaction between the Ministry and the project unit, assessing developments and their implications for Lesotho's future planning.

Rural Organization

At the time of the project's initiation, the project staff met first with the Ministry of Agriculture and then started a series of meetings from the district level down to the village level. Because of the knowledge acquired by the sociologist in preproject survey work, these meetings were easily organized, i.e., called by the appropriate chief with the support of the headmen. The purpose of the meetings was to discuss project objectives.

The project staff asked each of the village chiefs to organize Village Pilot Scheme Committees. These committees consisted of the village chief, one representative each from the Village Development Council and Village Land Use Committee, and three representatives elected by the local farmers. This organization is interesting for several reasons. First, it acknowledged the role of the village chief, not upsetting the traditional administrative and land use structure of the area (as the chiefs requested). Second, the inclusion of the representatives of the Village Development Council and Land Use Committee recognized different local area power elements but did not allow them to dominate the effort. Third, the election of the farmer representatives gave a voice to the people in the area.

The Village Pilot Scheme Committees were responsible for the organization of the effort at the local level. They were instrumental in planning and carrying out the conservation program (discussed below) and assisted in carrying out the agricultural production activities with less success, mainly because of inadequacies in the technological packages.

In addition to the Village Pilot Scheme Committees, there were committees at the district and national levels, both with farmer representatives.

Introduction of the Technological Packages (Agricultural)

Overall Strategy

After the initial village meetings, project staff members went back to the villages to determine which farmers wished to participate in the demonstration program. The program entailed introduction by the project of improved seeds, fertilizer use, improved planting techniques, and mechanization on the selected farmers' land, with the farmer both financing the operation through project-provided credit and also doing the hand labor. The project also assisted in making market arrangements for the crop.

After the farmers indicated their willingness to participate, their fields were identified and demarcated. Then the project selected the initial participants based on land distribution: demonstration blocks of fields had to be large enough to permit economy of effort, particularly with regard to machine operations. Those farmers whose land fell into the blocks were allowed to participate.

Another component of the overall strategy emerged from the surveys. The survey indicated that there were 29 tractor owners with 32 working tractors in the project area and 26 owners with 35 tractors in nearby settlements. Farmers either hired the tractors for individual tasks such as plowing and/or planting, or entered into a sharecropping arrangement with the tractor owner. The most common arrangement was the traditional one, which resulted in a 1:1 split of harvest, usually after some deductions by the contractor for cash inputs such as fertilizer. The basic theory behind the 1:1 split was that the landholder's field was equivalent to the contractor's plowing and planting. A second type of arrangement resulted in a 2:1 split. In this case, the contractor handled everything from plowing through transport of the crop to market and took 2:1 for the effort.

The survey of tractor owners showed that they were the most progressive farmers in the area and were inclined to adopt innovations such as the use of chemical fertilizer. Seeing these owners as a resource to be tapped, the project decided to assist them by helping with the maintenance of machinery, provision of credit for new machinery, and instruction on improved agricultural practices. To get their cooperation, a meeting was held with the tractor owners' association shortly after project initiation.

Implementation

The project has developed package deals for winter wheat, summer wheat, beans, peas, sunflower, potatoes, sorghum and maize. These were developed by the project unit with no farmer involvement in the design of the various packages. The farmers are first introduced to a package when it is explained at a village meeting where, among other things, the costs of the package are outlined. To cover these costs, the project operates a revolving fund to extend seasonal credit to farmers who agree to accept the package deal. Originally, the farmer was expected to make a down payment of US$6 before operations commenced on his land; this requirement has been discontinued because most farmers in the area could not afford this upfront cost. The farmer has the option of paying off the credit during the growing season; the balance must be paid within three months after harvest. Interest is charged at a 12 percent annual rate. In order to recover any outstanding credit balances and assist the farmer to pay, the project's marketing effort is geared towards finding the best prices for the crop and making arrangements with buyers to purchase (and in some cases to transport) the crop. In addition, on an experimental basis, hail insurance was offered on winter wheat. Finally, on some new crops, the farmers were guaranteed a return on each acre which was planted.

The main operations were carried out on the farmer's land by the project and contractors with whom the project was working. The farmers were required to cover the costs of the operation, and to do the hand labor required such as weeding. Demonstrations were held monthly to show the farmers how to take care of the crop once it had been planted. However, the actual requirements were high because of the costs of the various package deals.

There were several problems in the implementation of project activities, which have led some Basotho staff members to question the direction (heavier reliance on mechanization) in which the project has moved:

- As identified in the survey, about 50 percent of the farmers hired tractors for specific tasks. However, the farmers were reluctant to pay for a comprehensive package which included mechanization, improved seed and fertilizer, credit, and insurance. An illustration of this is the potato package deal. The overall cost of the package was US$375 per acre, and the average gross was US$582. The project

sold the crop for the farmers and deducted the input costs. Knowing the market price for potatoes, farmers were disappointed at the amount that they received and only a small portion have been willing to continue with the package deal.

- Another problem encountered was that the farmers did not effectively carry out their portion of the work. They were content to let the project and contractors do everything; in other words, they did not perceive the farming operation as their own, and so were unwilling to commit the required labor.

- Because of the complexity and cost of the various package deals, it is questionable (even with the training of the contractors) whether any of the packages will be viable. Indeed, the extension agents at the village level have seen a deterioration in the willingness of the farmers to accept existing packages with project support.

In retrospect, the Basotho extension workers believe the project should have gradually introduced innovations, one at a time, so that the farmers would understand and accept the increased costs for intensifying production. It should be noted that the packages (in most cases) resulted in significantly higher yields than traditional methods. There is an apparent trade-off in terms of increasing aggregate output quickly and building farmer capabilities and understanding to sustain the new production practices. This trade-off, while apparent to the Basotho staff members, did not appear to be a concern of the foreign advisors; nor was it clear that the Basotho views were understood.

The project has had more success in improving the equipment and practices of the contractors. In the long run, they may become the primary mechanism for continuing the improved practices.

Watershed Management and Conservation Activities

Beginning in February 1971, the project assisted the construction of various earthworks in the project area, which have included fish ponds, dams, diversion banks, and track improvement. Also, over 40,000 trees have been planted in the project area. The labor was carried out by local people

and paid for by Food Aid[1] (maize and wheat flour, cooking oil) donated by the Catholic Relief Service and World Food Program.

As a first step in launching the conservation activities, the FAO advisor met with the three village chiefs. They were receptive to improved conservation practices because they had seen the results of the work of the British colonial Soil Conservation Service. Next, the advisor toured the village area with the chief, his advisors, and members of the Village Pilot Scheme Committee. Then, with the chiefs and the Village Pilot Scheme Committee, the FAO advisor worked out a plan for improvements. Since the FAO officer expected to be moved to another area, the plan he developed with the village leadership was quite simple, one which the village could carry out itself without much technical supervision. Also, the Food Aid approach was worked out. It was agreed that the village chief would recruit teams of 50 to 100 laborers to construct the various earthworks and plant the trees. Each team would elect a foreman and a secretary who was responsible for recording the days worked for payment by each team member.

The teams commenced work, supervised by the FAO advisor and his counterpart. The response to the recruitment effort was high, with over 80 percent of the participants being women. The incentive was the food, so much so that there was a tendency to neglect farming to participate in the work teams. Over the past three and one-half years, 13 fish ponds have been constructed, and 40,000 trees planted in addition to other earthwork projects. A rough estimate of the number of man-days that went into these projects is about 65,000. In terms of costs, the FAO conservation officer has found that Food Aid labor is cheaper than mechanization, but the difference is slight.

V. PROJECT SUCCESS

Project Benefits

As a result of the project, improved crop production methods have been adopted on over 1600 acres (out of the 5600

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[1] Food Aid is a Lesotho Government program to provide food to the people in payment for their labor on small infrastructure projects. All food distributed by the Food Aid Program is donated free through the World Food Program and the Catholic Relief Service. The Government of Lesotho meets the cost of transport, storage, and administration of distribution within the country.

arable acres) in the Leribe area. There has been an increase in the number of acres planted in cash crops, which for the average family in the area has meant that about 38 percent of their net income now comes from cash crops as compared to 22 percent prior to the project. The actual yields of different crops have improved. For example, winter wheat yields have increased from 2.5 bags per acre (preproject) to the current average of 6.65 bags, and beans have increased from one bag per acre to two bags. Roughly calculating the net income from the acreage in the project area before the project and after three and one-half years of its activities there has been a 30 percent increase.

In addition to the project area, farming communities near Leribe are becoming aware of the innovations through the work of the contractors assisted by the project. They are introducing some of the new techniques on the lands they are working to earn increased profits.

The conservation program has resulted in improved land use and protection from erosion. The 13 fish ponds are providing a new source of protein to the villages, and infrastructure such as roads has been improved and expanded.

The project has not succeeded in developing viable local organizations. Farmer participation in the Village Pilot Scheme Committees has declined, mainly due to their unfavorable reaction to the technological packages. Also, the committees have not, as was planned, offered the farmers an opportunity to become involved in planning and carrying out agricultural production activities (except for the conservation program activities); this role was assumed by the project and its supervised contractors. Currently, the project is experimenting with the creation of a farmers' association; but the response by the local farmers has been poor because, according to the extension officers, of disillusionment with project activities.

Self-Sufficiency and Replicability

From the outset, the Ministry of Agriculture and FAO/UNDP recognized that the costs of the project would far outstrip the income generated, because it was designed as an experimental and investigative effort. The cost of the project per farm family has been about US$290 per year; the actual jump in average family income has been about US$22 since project initiation. The US$1.5 million investment in the area will never be recovered by income generated in the project area. However, it should be noted that the project has developed the capabilities of the Ministry of Agriculture staff members and the contractors working in the area, though it is doubtful

at this point that the complex project activities can be handled by them without continued foreign advisory assistance.

One justification for the high cost of the project was that it would help develop a model on which future agricultural planning could be based. The value of the project in this respect is highly questionable. First, the project area is one of the most developed and progressive areas of the country, with market access, minor soil erosion problems, good infrastructure, and several contractors. This provided a foundation, on which the project could build, which does not exist in other parts of Lesotho. Secondly, it is questionable whether the complex and expensive technological packages are appropriate even for the Leribe area; the problems (and costs) of introducing them in other locations would be almost insurmountable. Thirdly, there are few lessons which can be drawn from the organizational work at the local level. The survey work did identify the elements that a project should take into account when planning to intervene at the local level, but the experimentation has not yielded approaches that will build viable local organizations. There may be components of various technological packages, or some useful insights on the organization of labor-intensive conservation activities, which can be applied in other areas. Overall, however, the project is several steps too far ahead of the necessary local capabilities to be of much use.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The basic concept of the pilot scheme, in which activities are launched on an experimental basis to find out what works, offers potential in areas such as Lesotho where there are no well-developed technological packages. Moreover, the project started with an information base that allowed the staff to gain cooperation and participation at the local level from the beginning. In addition, the project identified and developed a local resource (the contractors) to help implement project activities. Further, there was significant local involvement in the planning and carrying out of the conservation program activities. Throughout the project's duration there has been an effort to develop Basotho capabilities. These points offer some positive lessons for future project design.

On the other side, the project shows some of the problems of introducing a technology far more advanced than local farmers can understand and afford. It has experimented with comprehensive packages which do not appear to take account of farmer constraints such as their willingness to commit a large amount of resources (for them) for ventures which are perceived

to be high risk. Even though the packages have proven to be profitable, their unacceptability to farmers suggests that they will not be continued if the project unit is withdrawn, though certain innovations such as the use of improved seeds and chemical fertilizers may still be used by the contractors.

Information Sources

A. Field

The Leribe project was visited in August 1974, during which time discussions were held with both Basotho and FAO staff members. Two of the three villages in the project area were visited and the leaders of the Village Pilot Scheme Committees were interviewed. Discussions were also held with the UNDP representative to Lesotho and with FAO officers in Rome concerned with the project.

B. Reports

The quarterly reports (1971-1974) of the Leribe project team were reviewed. In addition, the following materials were used: an FAO paper entitled "Agricultural Pilot and Development Projects in Lesotho" (1973); the Rural Sociology Report prepared by J. Jenness and H. L. Khethisa, entitled *Development of a Pilot Agricultural Scheme in the Leribe Area, Lesotho* (1972); the Leribe Project Information Paper on "Some Comparisons and Costs of Earthworks Built by Food Aid Labor"; and the report of the Agricultural Economist on income and production in the Leribe area.

Data Adequacy

The data for this project were quite comprehensive, and the estimates used in the write-up are drawn from the above-referenced documents. The major deficiency is in data on the effects of the project on income distribution in the area. In his letter of 21 March 1975, T. H. Mather, Country Projects Officer, FAO Operations Division, said that the Project Manager had read this case study and disagreed with a number of points but was not able to devote time to a detailed comment. Other comments were received from FAO Headquarters in Rome and were considered in the case study rewrite.

ANNEX F

NIGERIA

NIGERIA

Area: 356,669 square miles
Population: 79,758,969
Population growth rate: 2.6%
Density per square mile: 223.6
GNP per capita: $140
GNP per capita growth rate: 2.7%
Capital: Lagos (970,262)
Largest cities: Ibadan (758,332), Ogbomosho (386,650), Kano (357,098)
Major language: Native tongues and English
Religion: Muslim, Animist, Christian
Literacy rate: 10-20%

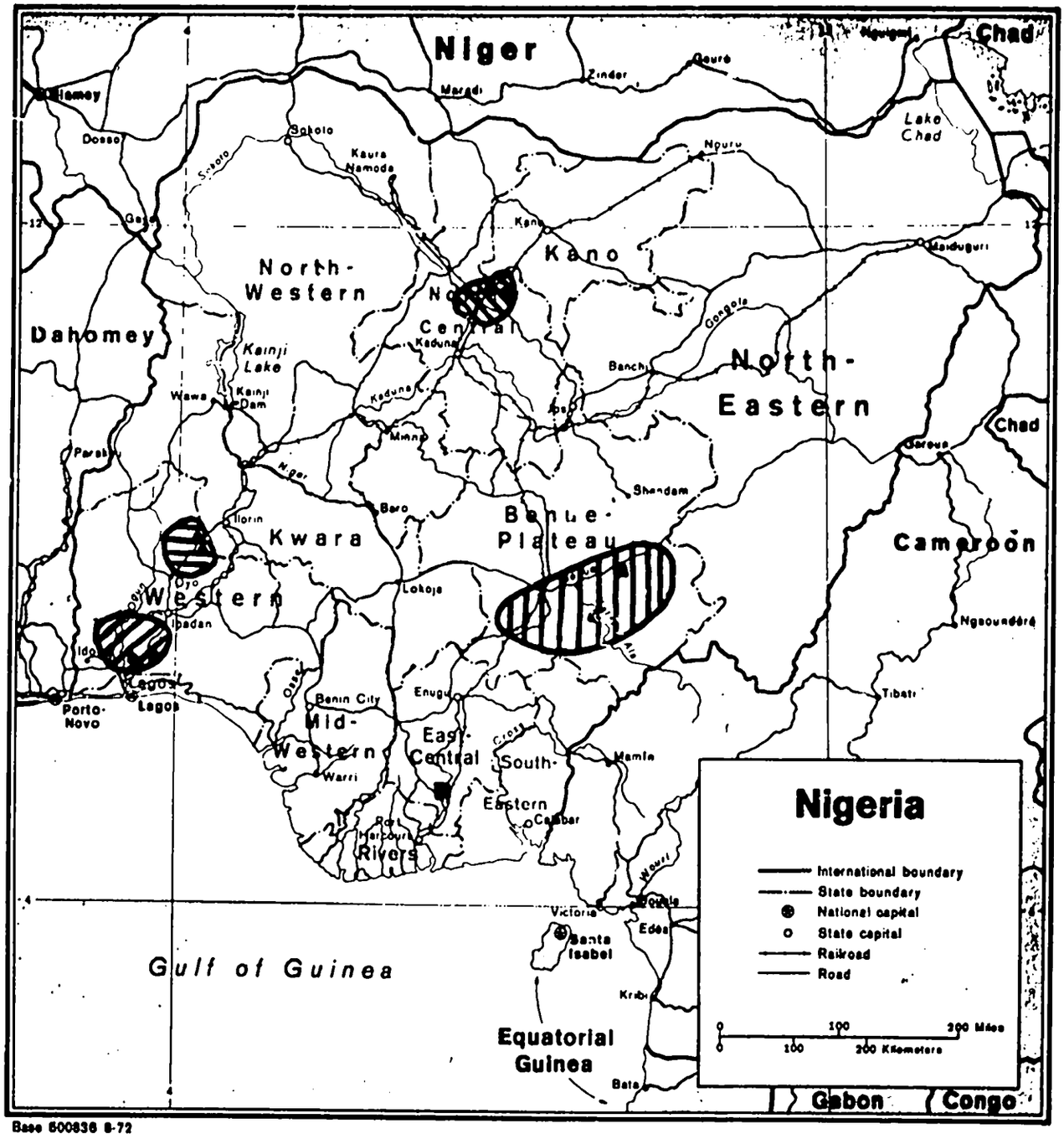
Abeokuta Rice and Maize Development Project - This project covers the shaded area [illegible] in the Western State, with subprojects at Erunbe Lawal and Isofin (●).

Nigerian Tobacco Company - This project covers the shaded area [illegible] in the Western State with subprojects at Otu and Ilero (●).

Zaria Tomato Production Project - This project covers the shaded area [illegible] in the North Central State, with subprojects at Tamuwa and Dan Ayamaka (●).

Tiv "Bams" and Farmers' Association - This project covers the shaded area [illegible] in the Benue Plateau State, with subprojects at Zaki-Biam and Gboku (●).

Uboma Development Project - This project is located in the East Central State (■).



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201 WESTERN STATE, NIGERIA

ABEOKUTA RICE AND MAIZE DEVELOPMENT PROJECT

I. PROJECT BACKGROUND

The Rice and Maize Development Project was initiated in the Abeokuta area of Western State, Nigeria, in 1970. Growing out of a major technical research effort, supported in part by USAID, the project is designed to expand rice and maize production through the introduction of mechanization, improved seed, fertilizer and credit. It is being carried out jointly by the Federal and Western State Ministries of Agriculture and Natural Resources. In the Abeokuta area, primary emphasis has been placed on increasing rice production, because the land is suitable and because improved maize varieties which are acceptable to the farmers have not yet been developed.

Field operations in the Abeokuta area are controlled by a Senior Agricultural Officer, with the help of 11 agricultural assistants. Using a variety of extension methods, including radio broadcasts with local farmer interviews four times a week, the staff has gradually replaced traditional rice seed with improved varieties in the area. To facilitate the use of tractors and to receive credit, farmers form groups of two different types, usually on their own initiative. The most frequently-used arrangement is the "group farm" where farmers communally work a ten-to-twenty-acre plot in addition to their private plots; the less common arrangement is the "grouped farms" where farmers with contiguous private plots join together, basically to secure tractor services from the government. Since 1970, about 70 groups have been formed, with the participation of 2000 farmers. This is a small portion of the over 50,000 farmers in the area. The estimated yearly operating costs to the state Ministry of Agriculture and Natural Resources is U.S. $81,000. This estimate does not include the inputs of the Federal government and foreign donors to the overall project.

II. LOCAL ENVIRONMENT

Rice is fast becoming the major food crop grown in the Abeokuta area; other crops include maize, yams, cassava, and beans. The normal farm size is from four to five acres, though an average farmer only cultivates 2.2 acres. Using traditional seed and methods of cultivation, a farmer can only earn about U.S. $175, which means that if he has a family of six, they must earn about U.S. $125 from off-farm employment to meet basic subsistence requirements.

With the increased priority on education, the percentage of young people who receive primary schooling is increasing rapidly. Many of the educated young are moving to the larger cities for employment, leaving farm work to the elderly. This is one argument which the government uses to explain its emphasis on mechanization. Of the 2000 farmers who accepted the full technological package, about 30 percent are literate, while the functional literacy rate for all the farmers in the Abeokuta area is approximately ten percent.

The dominant tribal group in the project area is the Yoruba, a progressive and cohesive ethnic group. The Yoruba have a strong inclination towards communal work, with a traditional system of organizing. The heads-of-household will meet, sometimes weekly or biweekly, determine what communal project should be conducted and set a day for the work. In farming endeavors, heads-of-household will normally participate, while in community efforts family members are designated to do the work. Since the 1950's when mechanization was first introduced, there has been a growing tendency, particularly for larger and more progressive farmers, to form groups to secure tractor services.

To purchase inputs in the Abeokuta area, even the larger farmers become indebted to the urban-based market women. The way the system works is that the urban market woman will provide credit to the farmer in return for a guarantee that he will sell his crop through her, at a price determined during the negotiations; the woman sells the farmer's produce at the market price, making an estimated 25 percent annual rate of return on her loan. The Nigerian government has been attempting, with little success as yet, to break the control of the market women over rural production and marketing

The Western State Ministry of Agriculture and Natural Resources has placed priority on large-scale, government-controlled schemes for increasing aggregate output. As a consequence, few resources (fertilizer, extension, etc.) have been available to smaller farmers. The ratio of farm units to

extension worker is 5000 to one. Moreover, because of administrative complexities at the state level and conflicts between the state and federal ministries, the delivery of fertilizer and other inputs has been delayed and the supply is inadequate. While the Division submitted its order for fertilizer as required in July 1973, the state ministry failed to forward the order, so no fertilizer was available in April when it was needed, causing many complaints from farmers.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The project is an outgrowth of major technical research on how to increase the yields from food crops in the Savannah area. This research has been conducted by several foreign and domestic organizations which include the Moor Plantation (the federal government experimental station which has been assisted by USAID and FAO), the International Institute of Tropical Agriculture (supported by the Ford and Rockefeller Foundations), and smaller state-controlled experimental stations.

The rice and maize technological packages were initially tested on the more than 30 farm settlements. The farm settlements (which have been consuming over 50 percent of the Western State budget for agriculture) are designed to attract graduates of advanced agricultural training schools to commercial farming. Even though land, housing, furniture, machinery and transportation are provided, there is a frequent turnover of participants, for the graduates prefer to work in the urban areas. The Igbogila Farm Settlement, for example, started with 20 farmers and has had a turnover of over 200 over the past ten years; the remaining 31 graduates are cultivating an average of 20 acres under the supervision of seven extension workers. Despite the failure of the farm settlements to hold the agricultural graduates, they have provided a testing ground for new technological packages in remote areas of the state; the farmers who were employed on the Igbogila farm or lived in nearby villages saw the increases in yields from the improved rice seed and use of fertilizer and adopted these innovations on their own plots.

The pitfalls of the farm settlement scheme, combined with a concern for increasing aggregate output, led the food crop production officers to consider alternative ways of introducing the technological package. There had been some experimentation in earlier rice and maize development programs with different organizational arrangements. It was found that there were only slight variations in yield between "group farms"

(communally worked land plus small private plots) and "grouped farms" (contiguous, 14-15 acre private plots). The agricultural officers figured that more opportunities to expand acreage under cultivation were offered by the "group farm" approach. The larger farmers with 14 or 15 acres could not handle additional acres even with mechanization. However, groups of smaller farmers could pool their resources to purchase tractor services and agricultural inputs to work a communal plot of 10 to 12 acres; moreover, the extension officers believed that this additional commitment would not have been made individually. The "group farm" approach received priority, though the option for larger farmers to form a "grouped farm" was maintained.

Ongoing research, combined with past experimentation and projects, formed the basis for project design. Rather than being a new project, the effort is one in a series with greater government priority than previous ones, innovations in the technological package and a more clearly defined organizational approach. As the project evolved, a credit component and more systematic methods for farmer feedback were added (discussed below); however, throughout the design phase, there was little involvement of, or consultation with, the farmers of the area.

One consequence has been that the maize varieties initially developed were unacceptable to the farmers; the yellow grains are more difficult to chew than the traditional white grains and so are not easily sold on the local market except to livestock owners.

IV. DYNAMICS: PROJECT IMPLEMENTATION

The Technological Packages

The technological packages for rice and maize are similar. The packages include: the use of improved seed, which was distributed free the first year and, as acceptance grew, was sold at increasingly higher prices until the costs of multiplication were covered; the use of fertilizer, which is subsidized by the government but the purchase of which still represents a major financial commitment for the farmers; and the use of improved practices such as spacing and regular weeding.

More is expected of the farmers who adopt the complete technological package rather than just the improved seed and

use of fertilizer. These farmers, usually 25 to 30, form a group, sometimes with the help of the agricultural assistant but more often on their own initiative. The group and the agricultural assistant then locate a piece of land which is large enough (ten to 12 acres) to make the use of government tractors cost-effective; they work out rental or loan arrangements with the owner (or in some cases three or four owners). Owners have proven receptive to the plan, for their land was generally uncleared: they were willing to have it cleared and cultivated for a nominal amount (about U.S. $5 in rent per acre/year) or even free of charge. After the land is cleared, tractors are used to plow, harrow and plant the field. Per acre, tractor costs have been about U.S. $8.56, which were shared by the farmers. The leaders organize weekly or biweekly meetings of the "farm group" to set the work schedule and to discuss the finances of the operation. Following tradition, the group designates a day about once a week on which all the members work on the communal land; few disagreements arise over the question of meeting labor commitments. Monthly, the agricultural assistant meets with the group to provide extension assistance as well as to get feedback from the farmers on innovations. As will be seen, this feedback is used to determine research priorities.

Introduction of the Packages

Several extension methods were used to introduce the packages to the farmers. First, radio broadcasts informed farmers about the innovations. Farmers listen to the radio broadcasts because they participate: farmers in the field are interviewed by agricultural officers about various innovations and problems that they are having on their farms; the agricultural officer gives suggestions on the air about what to do. The broadcasts occur four times a week for one half-hour and are scheduled at times when farmers are not normally in the fields. After the radio announcements about a new innovation, the agricultural assistants put up posters in village meeting places.

Demonstration plots were another important part of the introduction process. The local agricultural assistant prepared and took care of the plots, which were located along well-travelled roads and on the land of a local farmer (with his permission). There were usually four or five small plots with different varieties, spacing, or applications of fertilizer, clearly marked so that the farmer could tell the agricultural assistant which variety he would like to grow or discuss the innovation being demonstrated. Having the agricultural assistant cultivate the plots helped insure his availability to farmers in the field and encouraged farmers to stop and

talk with him. Moreover, the radio broadcasts and posters had given them forewarning about what was being tried.

Formation of "Group Farms"

Initiative for forming a group farm almost always has come from the farmers; however, it should be noted that so far only the better educated and more progressive farmers have taken this initiative. There were several reasons for this: first, these farmers were more knowledgeable about the services offered by the Ministry of Agriculture and Natural Resources and about what was required to get these services; second, they were usually compound heads and controlled more land than the average farmer, so they were capable of paying for the additional costs of tractor use; and third, as compound heads, they had had experience working together to handle village problems.

Once the group was in the process of formation, the leaders would contact the agricultural assistant. He would assist the farmers in identifying a plot of land which was suitable for tractor cultivation; primary considerations were nearness to a road and ease of clearing. Members of the "group farm" either owned the land or knew the owner(s) well enough to negotiate the use of the land. Smaller and less prestigious farmers would not have this bargaining power.

Structure of the "group farms" varied; some formalized their group and registered it as a cooperative; most did not. Reciept of government services was not tied to registration with the Ministry of Trade and Industry.

Farmer Interaction and Support

Ministry Support

The Ministry of Agriculture and Natural Resources provides seed free the first year and sells fertilizer at a subsidized rate. Also, the Ministry provides tractor services. The improved rice seed is now sold through the local markets so there are no delays. The problems lie in the delivery of fertilizer, as mentioned earlier, and the frequent delays in providing tractor services. To a large extent, these problems are due to administrative complexities at the state and federal levels and are beyond the control of the local agricultural officers.

Extension Worker/Farmer Interaction

The agricultural assistant is responsible for helping 200 farmers. He visits the "group farms" from one to three times weekly during the rice crop cycle. In addition, he attends meetings of the farmers each month, both to get farmer reaction to various innovations and to provide additional technical assistance. These meetings were in part responsible for the addition of the credit component to the technological package, as is discussed in the next section.

Also, unlike other areas in Nigeria, there appears to be an interest among extension and research personnel about farmer needs and reactions. Every three months, research personnel meet with the extension workers (who present farmer reactions to different varieties and innovations) to determine what the research concentration should be. In part, this interaction takes place because of the enthusiastic leadership of federal food crop officers working in Western State.

Provision of Credit

During the meetings between agricultural assistants and farmers, the problem of the availability of credit was discussed, in particular the control exercised by the market women. These discussions, combined with the ministry's assessment that the rice technological package was working, led to the addition of a credit component to the package in 1974. Also, federal funds for agricultural credit had become available. The credit was made available through the Western State Credit Association at a subsidized interest rate of five percent a year. It was late in coming the first year, and it is too early to predict what the repayment rates will be. The "group farm" as a group is responsible for repayment. Since traditional credit was available, the lateness of the credit did not prevent the "group farms" from moving ahead with land preparation and planting.

Subproject Dynamics

Field visits to several of the groups confirmed that "group farms" involved larger, more progressive farmers who had established positions as compound heads in their villages. Moreover, the groups were self-generated in response to possible services from the ministry. One exception was the Erunbe Lawal Group Farm. In this case, village farmers were younger and

poorer, with only 3.5 acres each under cultivation. A "senior brother" (relative) in Abeokuta suggested to them that they form a group to get more inputs from the Ministry of Agriculture and Natural Resources. Because the agricultural assistant had been in the area for several years and had talked to the farmers when they had stopped at the demonstration plots, he knew that they were hard-working and took the lead in helping them to rent ten acres of land to work communally. Not being a part of the traditional hierarchy of the area, it was difficult for these farmers to secure this land on their own. During the first crop cycle, the agricultural assistant visited the "group" three times a week, though once a week has been sufficient for the three subsequent years. Before the project, the 14 farmers averaged a net annual income of U.S. $277; after project initiation, they averaged U.S. $654.

V. PROJECT SUCCESS

Project Benefits

Adopting the full rice technological package has brought a 200 percent increase in yields over those from traditional seeds and methods. Taking account of the additional costs, of which fertilizer and tractor services are the largest, the farmer stands to gain about 179 percent in net income per acre. His major gain in income, however, comes from the increased acreage worked communally. In addition, the prices for food crops are gradually increasing.

As regards the maize technological package, the increase in yields is 125 percent per acre, and the increase in net income is 97 percent. However, there is a limited market for the improved maize, though as yet a sufficient amount is not grown for the cattle raisers in the area. Because of the discrimination in the local market against the improved varieties and the farmers' dislike of them for family consumption, acceptance of this technological package has been minimal. The desirability of cash sale is outweighed by the need for food.

Beyond the increases in income from the project, there are few side benefits. The "group farms" tend only to formalize a traditional process that has been going on for many years, without increasing participation of non-traditional leaders. Moreover, the project tends to increase the disparity in income and landholdings in the project area, because the already wealthy farmers are the ones benefiting.

Potential Spread

According to a 1971 study of the Nigerian Institute for Social and Economic Research, improved rice seeds are being used by over 90 percent of the farmers in Western State. Because of the cost of fertilizer, less than 20 percent of the smallholders (other than project participants) use any fertilizer on their crop. And less than 35 percent of the farmers weed their crop correctly.

The acceptance of the improved rice seed has been high for several reasons. One is that the farmers have seen the increased yields demonstrated, first on the agricultural assistants' plots and then on the farms of the project participants. Another reason is that, as acceptance increased, the ministry successfully flooded the local market with the improved seed. In contrast, the improved maize seeds have not been adopted because of farmer reaction.

Because of the limited number of extension personnel, it is doubtful that the complete rice package will spread rapidly. Further, there is only a small portion of the farmers who can afford the upfront costs of tractor services, and it will be difficult to increase the supply of credit for expansion because of manpower and administrative limitations rather than the potential availability of funds (which the federal government has the capability to provide).

Self-sufficiency

Because of the subsidies for fertilizer, credit and tractor services, planning and time will be required before the project is self-sustaining. In light of the manpower and administrative constraints within the Ministry of Agriculture and Natural Resources, this will probably not occur unless commercial channels are developed for the delivery of the necessary agricultural inputs. The profitability of rice is high enough so that farmers could pay unsubsidized rates for credit and fertilizer.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

Despite some of the pitfalls in project design and implementation already identified, certain positive lessons can be drawn from this project. *First*, the project effectively used radio to introduce innovations; the credibility of the broadcasts

was reinforced by the participation of farmers talking about their own experiences. *Second,* the demonstrations were carried out on farmers' land in strategically located areas where they would be seen; equally important was that the agricultural assistant cultivated the plots and was available to respond to questions. *Third,* extension follow-up was frequent, with the agricultural assistants handling about 200 farmers apiece; however, to maintain that level of supervision for all 50,000 farmers in the area would require far more trained personnel than most extension services have. *Fourth,* there was an effective feedback mechanism through the monthly meetings between the agricultural assistant and the members of the "group farm." More importantly, the reactions of the farmers to seed varieties and other innovations were considered important in shaping future extension and research efforts.

Information Sources

A. Field

Field visits occurred in May and August, 1974 during which time discussions were held with: USAID officers in Lagos, Ford Foundation personnel assigned to the Office of Agricultural Planning, the Federal Ministry of Agriculture and Natural Resources officers assigned to Western State and Abeokuta, the Senior Food Crop Production Officer and staff members in the Western State Ministry of Agriculture and Natural Resources, the Senior Agricultural Officer for Abeokuta Division, the Senior Agriculture Officer and Agricultural Assistants assigned to Abeokuta Circle, the Director of Moor Plantation and the Officer in Charge of the Abeokuta Experimental Station, the extension officers assigned to the Igbogila Farm Settlement, and the leaders of the Erunbe Lawal, Isofin, and Oko-Lemo "Group Farms."

B. Reports

In addition to the statistics drawn from the Rural Economic Survey of Nigeria prepared by the Federal Office of Statistics, the author drew from R. A. Tempelman's *Rice Group Farming in the Western State of Nigeria*, published by the Nigerian Institute for Social and Economic Research (1971).

Data Adequacy

The data on yields came from the Ministry of Agriculture and Natural Resources. Estimates on literacy, land holdings and income were based on discussions with above-mentioned sources.

NIGERIAN TOBACCO COMPANY (FLUE CURED PRODUCTION)

I. PROJECT BACKGROUND

The Nigerian Tobacco Company was started by the British American Tobacco Company in 1933. NTC first introduced the growing of green leaf to small farmers by providing seedlings, extension assistance and purchase contracts for the leaf grown at a fixed price; the company bought and flue cured the leaf. Gradually production expanded, and NTC's main plant was constructed in Ibadan, Western State, in 1948. In 1954, NTC decided that the company would get a higher quality leaf at less cost if farmers did the flue curing and grading themselves. Moreover, this innovation would substantially increase the profitability of tobacco production for small farmers.

The project area (where flue curing has been introduced) is located in Iseyin Division, Western State, where there are about 7000 "green leaf" growers. To cure the leaf, there are over 1000 barnsites[1] owned by about 3000 families. Originally, flue curing was introduced through cooperatives which mainly involved the larger farmers in the area. The company provided interest-free loans to the cooperatives for covering production costs as well as the costs of constructing the barnsites. More recently, NTC has developed Farm Family Units (FFUs) which construct their own barnsites and do the curing and grading using family labor. Not only have the FFUs succeeded in getting the benefits to smaller farmers, but they have also proven to be sufficiently profitable that Barclay's Bank provides seasonal and medium-term (three-year) loans for barnsite construction at commercial interest rates. Since 1969, the number of FFUs has grown from four to 704, with continued potential for expansion.

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[1] A barnsite consists of a small piece of land (usually located near the tobacco fields), which has on it a clay or brick, chimney-like building in which the leaf on racks is cured by the heat of burning firewood; there is also a shelter for grading the cured leaf.

The small holder tobacco production and curing operation in the Iseyin area is managed by the Division Leaf Instructor who is responsible to the company leaf instructor in Ibadan. He is assisted by four senior leaf instructors and 32 leaf instructors.

II. LOCAL ENVIRONMENT

Tobacco is the major cash crop grown in the area, though there is some cotton under cultivation. Mainly, food crops prevail and include maize, rice, yams, cassava and beans. An average farmer will grow about an acre of tobacco and one and two-tenths acres of food crops.

Two crops of tobacco are grown each year. The first crop, which produces the highest yield and best quality leaf, is sown in February and transplanted in April when the rains break. The harvesting and curing extends over the months of June and July. The second crop is sown in May and transplanted in late June. The curing starts in August. This crop suffers from the heavy rains in July and September, which leach the soil and cause unwanted rapid growth.

In the project area, there is a high disparity in landholdings and income. Holdings range from one acre to over 50, with the average farmer cultivating 2.2 acres. A larger farmer with 15 acres may net US$1768 from his land, while the average farmer nets US$179. Literacy rates are low, about ten percent, though the NTC has found that illiterate farmers tend to accept technical advice more conscientiously than the larger, better-educated farmers (who follow the same flue curing procedures).

The Yoruba is the primary tribal group in the area; it is a progressive and cohesive ethnic group. In the early days of its operations, NTC worked with the tribal chiefs to introduce green leaf growing. However, over the years, as the commercial operation became established, NTC leaf instructors have tended to work directly with the farmers. Because of the business orientation of the Yoruba, this shift does not appear to have created problems between the company and traditional leaders.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

Flue curing is a complicated process which requires specially constructed curing barns, in which the tobacco is tied to sticks

supported on racks and gradually dried out (cured) by means of artificial heat. The heat is supplied from a furnace built into the back of the barn. The curing process takes approximately five days and requires considerable knowledge and experience to produce good quality leaf. After the leaf is cured, it is graded according to quality (ten major grades) and baled.

In 1940, the NTC built its first two flue curing barns. Seedlings which were grown in company nurseries were issued to local farmers free of charge. With extension assistance, the farmers grew the tobacco on their farms and sold the uncured leaf (at a fixed price) to the company, which operated the barnsites and supervised the curing. Over the next 14 years, the number of barns and acres under cultivation increased. To further the expansion of company operations, NTC decided in the early 1950's to introduce flue curing by farmers, despite warnings of the Ministry of Agriculture and Natural Resources that the work was beyond the capabilities of local area farmers.

The process of introduction is characterized by constant experimentation directed towards obtaining high quality leaves while building the self-reliance of the farmers. The remainder of this section describes the series of innovations which have led to the creation of the Farm Family Units, the current approach being used by the NTC.

Flue Cured Producers

Originally, NTC contacted the largest green leaf growers and helped them organize groups called Flue Cured Producers (FCP). Each FCP consisted of a group of farmers who worked together to raise the seedlings, plant the acreage required by NTC, harvest, cure, grade and bale the tobacco. Each FCP was registered as a business company or cooperative with the Ministry of Trade and Industry. NTC would sign a contract with the FCP, agreeing to purchase a set amount of cured tobacco each year. Since the FCP members were usually too few in number to plant and maintain the acreage required to fulfill their FCP's contract, they would give out seedlings to non-members to grow for them. From this approach, there developed a system of "green leaf" growers (or subcontractors) which continues today.

The first FCP was successfully launched in 1954. NTC initially sold the company's existing barnsites to the FCP. As requirements for more barnsites grew, the company would finance the costs of construction with interest-free loans to FCPs, payable over ten years. Further, NTC supervised the building of new barnsites which were handed over to the FCPs when all construction was completed. In 1962, another step was taken to make the farmers more self-reliant. The farmers were given the plans and specifications of the necessary buildings and

were made responsible for engaging their own contractors and supervising the erection of the buildings. NTC continued to finance the cost of the buildings, but only of those constructed according to the prescribed specifications.

During the first year, NTC provided each FCP with field staff to train and assist its members; thereafter, the FCP would receive periodic field visits from the NTC leaf instructors. In addition, the farmers had the option of attending a six-month training program, provided free by the company. In addition to providing cash for construction and the seedlings, NTC furnished credit (interest free) for purchasing fertilizer, firewood and other inputs, as well as the produce of the "green leaf" growers. To insure that the cash advances were well spent, monthly limits, derived from past records, were laid down at the beginning of each season.

The FCPs delivered their leaf in graded bales to the buying centers where the bales were opened and inspected by the Chief Instructor who determined whether each bale would be purchased, downgraded or rejected. The value of the leaf purchase was credited to the FCP's account, from which repayments of the cash advances were taken.

Evolution of the FFUs

Through the FCPs, the ability of farmers to handle the flue curing process was proven. However, NTC recognized several problems in the use of the FCPs. First, the FCPs were growing into large-scale operations with hundreds of "green leaf" growers, and because of the large bulk of leaf handled by FCPs, quality of the cured leaf was declining. Second, the interest-free loans for construction and inputs were costly to the company. Third, the leaf instructors were spending a considerable amount of time working out internal conflicts among FCP members over the distribution of profits, rather than providing technical assistance. Fourth, the benefits of the flue curing were going to a small portion of the farmers, in most cases the larger farmers in the area who were members of the FCPs. It was felt by NTC that smaller units, farm family ventures, could be designed to insure the production of a higher quality leaf without the problems which surfaced in the FCP approach. At the suggestion of the Senior Leaf Instructor in Iseyin, experimentation with Farm Family Units began in 1969.

IV. DYNAMICS: PROJECT IMPLEMENTATION

The Farm Family Units (FFUs)

From 1969, the number of FFUs has expanded from four to 704, and several of the FCPs have been divided into smaller groups. There are several requirements for forming an FFU Three heads-of-household who are blood relatives must form the unit and be willing to assume responsibility for repaying the credit for constructing the barnsite if one dies or withdraws from the project. In addition, the three families must hold sufficient land to grow six acres of tobacco. A further requirement is the endorsement of the local leaf instructor.

Because many of the farmers in the area (primarily small "green leaf" growers) were aware of the profitability of flue curing from the FCP operations, NTC received immediate requests to help them establish FFUs. After a unit is formed and approved, the FFU opens an account in Barclay's Bank and is provided with the specifications of the barnsite. Guaranteed by NTC, the bank provides the loan for constructing the barnsite at a regular commercial interest rate (ten percent per year). Using primarily family labor, the FFU builds the barnsite, which normally requires 180 man-days of effort.

The FFU grows two crops of tobacco on its six acres each year; NTC provides the seedlings and delivers the other inputs and Barclay's Bank provides credit for these inputs. Since almost all the FFU members have grown green leaf previously, there are few problems in insuring that correct agricultural practices are applied. The major requirement of the project is for the farmers to acquire the needed knowledge and experience to handle the curing and grading operation. This is accomplished by strict supervision of the FFU operation by the NTC leaf instructors, which in the early stages is on a daily basis.

NTC Support and Assistance

Contractual and Credit Arrangements

The NTC reduces the risks of the operation by entering into a contract each season with the FFU to purchase an agreed-upon number of pounds of cured leaf at fixed prices for different grades. The farmers grade and bale their leaf, and then transport the bales, usually by bicycle or on head, the three to five miles to the NTC buying center. At the center, the Senior Leaf Officer inspects the bales to determine whether the leaf

is graded correctly and is of the same grade throughout each bale. He then agrees to purchase the bale from the FFU, and the sale is registered. After purchase of the cured leaf, NTC deposits the value of the leaf bought into the FFU's account, and the bank deducts the amount due for paying off the seasonal and medium-term credit. The FFU can withdraw the remainder from its account as desired.

Both seasonal and medium-term loans carry a ten percent annual interest rate. The loans for the barnsites currently average US$522, with three years to repay. Seasonal loans for the inputs to cultivate six acres average US$391. Under the system outlined above, repayments are running just over 95 percent; arrears occur only when there are crop failures or major mistakes in curing the leaf.

Extension Assistance

One key to making a FFU profitable is the level and quality of extension assistance. There is one leaf instructor for every 200 farm units growing tobacco in the area. A major portion of his time is spent working with the FFUs and remaining FCPs. During the harvesting, curing and grading periods, the instructor visits each FFU weekly.

There are several checks on the quality of extension assistance which is provided to individual farm units. First there are the reports of the local leaf instructors on the FFU's activities. Second, the NTC divisional office keeps track of the level and quality of leaf produced by each FFU. Third, the senior leaf instructor meets monthly with the heads of the FFUs to discuss production problems. These meetings are effective in promoting two-way communication between the company and farmers. Fourth, at the buying center, mistakes in curing and grading are uncovered, and the farmer is shown how to correct them.

The Leaf Instructors

The effectiveness of the extension effort is in large part due to the quality and training of the local leaf instructors. Because of good salaries and incentives (as compared to similar government positions), NTC has numerous applicants for these jobs, most with college degrees or advanced training (two years) at the Ibadan agricultural school. An important part of the training (and screening) of those selected takes place in a remote village without water or electricity. According to NTC officers, living under the same conditions as farm families for an extended period increases the understanding of the leaf

instructors of farmer constraints. The remainder of the training takes place on the job under the strict supervision of senior instructors. Moreover, the means for the instructors to perform their duties are available, such as transportation, housing and overtime.

Subproject Dynamics

The subprojects selected for examination included one FCP which is gradually being divided up into smaller groups and one FFU. The FCP, Otu-1, consists of 26 farmers with an average holding of 15 acres. In addition, Otu-1 has about 300 "green leaf" growers (subcontractors) cultivating on average two-thirds of an acre each. After paying for the green leaf, the costs of the labor hired for curing and grading and other costs such as firewood, the FCP clears about US$63 per acre each crop cycle. It is basically a business venture managed jointly by the FCP members with each having his own subcontractors.

In contrast, the Ilero Road FFU consists of three illiterate brothers who hold a combined total of 12 acres of land (six for tobacco). Previously green leaf growers, they asked the NTC to help them form their FFU and open their bank account at Barclay's in early 1971. Barnsite construction took place from January to April 1971. Over the past three years, the FFU has paid off its medium-term loan and all seasonal credit as well as saving a portion of its earnings. All work is done by the labor of the three families. Annually, each family nets US$667 from its land, as compared to a net income of US$311 for a family with a similar sized holding growing only green leaf. According to the NTC senior leaf instructor, the quality of cured tobacco is higher from this family venture than from Otu-1.

Continued Experimentation

An important aspect of the NTC operation is that it continues to experiment both organizationally and technically to improve the quality of leaf and the profitability of flue curing to small farmers. For example, when the FFUs were initiated, the cost of a barnsite was US$978. By modifying the design twice over the past five years, NTC has reduced the cost of construction to the farmer (now US$522) and in the process, developed a barn which will yield a higher quality of leaf in a shorter curing period. Suggestions for changes in operating procedures or setting up a special training program come from the local leaf instructors, and are usually based on their meetings and discussions with the farmers in the FFUs.

V. PROJECT SUCCESS

Project Benefits

The difference in net return per acre between plain green leaf growing and growing plus flue curing is US$81. For a family in a FFU, this means a percent increase in on-farm income of 93.9 percent. It should be noted though that the farmers in the FFUs own slightly larger holdings than the area average. For those involved in the project, the increased income has provided better education for their children, more amenities and some savings. An additional benefit has been increased yields of maize grown in rotation with the tobacco (because of the use of fertilizer).

Beyond the direct income benefits to the participating families, there have been few additional benefits.

Potential Spread

The growth rate of the FFUs is one indicator of their potential spread. The limiting factors are the rate at which NTC can expand its technical assistance, the capacity of the Ibadan plant and the size of holdings necessary (six acres available for tobacco) for farmers to participate in the FFU.

Self-sufficiency

One purpose of the FFUs was to reduce costs to NTC. The provision of credit through commercial bank channels rather than interest-free loans from the company is one step towards developing viable, unsubsidized operations at the local level. The other subsidies provided are seed (which NTC will continue to provide for quality control) and extension assistance, the need for which has become greater with the increased number of FFUs. The costs for administering the Iseyin Division operation were US$89,000 in 1973, or approximately $80 per barnsite. It would be difficult, if not impossible, for the FFUs and FCPs to absorb this cost.

Replicability

While the technical aspects of the operation can only be replicated in comparable areas where flue cured tobacco is

produced, some elements of the NTC approach have broader application. One is the potential use of families as basic organizational units, particularly in areas where there is a high disparity in landholdings and income. Another element is the recruitment, training and supervision of extension workers. A third is the constant experimentation by NTC to make ventures more profitable to small farmers.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

There are several lessons which can be drawn from the NTC experience. *First,* the project shows that farmers, even illiterate ones, can handle complex technological packages if given adequate supervision. *Second,* it demonstrates the need to consider the type of organizational arrangement at the local level so that benefits accrue to the smaller farmers. *Third,* it illustrates that with special organizational arrangements and a profitable crop, commercial channels can be used to provide credit.

Information Sources

A. Field

Field collection took place in May and August 1974, during which discussions were held with: the Managing Director, NTC Ibadan, the NTC Senior Leaf Instructor, the Iseyin Divisional Leaf Instructor, several of the senior and local leaf instructors in Iseyin, the leaders of Otu-1, and the farmers in the Ilero Road FFU. In addition, visits were made to several other FFUs and FCPs.

B. Reports

Two written reports were drawn upon for this study: the NTC's description entitled *The History and Development of the Flue Cured Tobacco Crop,* and Richard Harrison's study for the Nigerian Institute for Social and Economic Development on the NTC extension service.

Data Adequacy

The data on yields, costs, credit and income came from the records of NTC in Iseyin Division. Land holding data came from the Rural Economic Survey of Nigeria prepared by the Federal Office of Statistics. Income figures for the FFUs and FCPs were worked out with the local leaders and leaf instructors and should be considered reasonable estimates.

ZARIA TOMATO PRODUCTION PROJECT

I. PROJECT BACKGROUND

The Zaria Tomato Project was initiated in late 1971 in North Central State of Nigeria. The purpose of the project was to develop a commercially-viable tomato paste industry. More specifically, the project was designed to introduce irrigated tomato production into the Zaria area and expand "wet" cultivation. Responding to national pressures to reduce imports, the North Central State Ministry of Agriculture and Natural Resources identified the project, arranged for the feasibility studies and invited Cadbury Ltd. to consider the investment. Cadbury Ltd. was selected because of its existing operation in Nigeria. Primary funding for the project comes from Cadbury Ltd., though major support is provided by the state Ministry of Agriculture and Natural Resources. There is also an FAO advisor to the project.

To grow tomatoes using irrigation, farmers are organized by village chiefs into groups of about 24 to cultivate eight acres of land (which is divided into private plots). Since the first year, the number of groups has increased from three to 40, or approximately 960 farmers cultivating 320 acres of land. This number of farmers cannot meet the needs of the Cadbury plant on a regular basis, so there is potential for expansion. However, even with such an expansion, the project will only reach a marginal percentage of the more than two million farmers in the state.

II. LOCAL ENVIRONMENT

The project area is normally dry and barren, though both cash and food crops are grown in the rainy season. While cash crops such as grounduts, tobacco and cotton have been introduced into the area, the concentration has been on increasing the output of millet, guinea corn, vegetables and other food crops. During the dry season, there is usually migration out of the

area to Kaduna and Kano for employment. However, as an alternative to off-farm employment during the dry season, some farmers grow sugar cane; tomato production was well-received as another alternative.

Farm size in the area averages 4.57 acres, though there is a significant variation in size of holdings, ranging from one to over 200 acres. A major government effort is under way to improve educational facilities, though currently the literacy rate is only about ten percent.

Locally, there is a strong traditional hierarchy in the villages, with the village head controlling a large part of the land. In many cases, the village head will favor his own family members, so problems are encountered when working through the traditional structure. Moreover, there is a tendency on the part of the village heads to enrich themselves from the labors of farmers participating in projects.

The state Ministry of Agriculture and Natural Resources is understaffed, with an average of 2500 farm units per extension worker.[1] Moreover, there is poor delivery of agricultural inputs to the farmers. Even though the Ministry has adequate transport and logistics personnel to handle the project, delays are frequent because of inefficient management. Both of these deficiencies (a lack of trained extension workers and a poor delivery system) hinder project implementation.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

During the war, a tomato paste and pepper combination was imported for retail outlets and the Nigerian army. In 1969, the federal government levied a high import tax (100 percent) on the paste. Using feasibility studies which had been prepared by Ahmadu Bello University and by a private business firm (Zagreb), the North Central State Ministry of Agriculture and Natural Resources set the guidelines for the project, which were basically that it should be a commercial operation and production should be carried out by small farmers.

The technological package for irrigated tomatoes had been developed in Ghana. Cadbury Ltd. (which was then importing

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[1] In Nigeria, the responsibility for providing extension assistance rests primarily with the state government. The federal Ministry provides mainly technical support to the state.

tomato paste) conducted field trials in 1970-71 after an agreement had been reached with the Ministry. Cadbury Ltd. asked the Ministry to invite FAO to provide technical assistance.

From the outset, there were problems with the division of responsibility between Cadbury Ltd. and the Ministry of Agriculture and Natural Resources. The Ministry wanted to play a major support role and Cadbury Ltd. did not want to usurp the Ministry's prerogatives. The Ministry was allowed to play this role which included the provision of extension assistance and fertilizer, and the design, construction and maintenance of the irrigation systems. Cadbury Ltd. was to assist with the extension effort and provide and administer small farmers credit and handle spraying, purchase and transport of the crop. Gradually, Cadbury Ltd. has expanded its support functions to include importing its own fertilizer and developing an extension staff. Through the design phase, there was little interaction between the government/project and the farmers.

IV. DYNAMICS: PROJECT IMPLEMENTATION

After the river basin areas were surveyed by FAO and the Ministry of Agriculture and Natural Resources, the possible sites for irrigation were identified. Because they usually controlled the land, village heads were then approached and the package was explained. They were asked to form a group of 24 farmers to cultivate eight acres of land (see below). The Irrigation Division of the Ministry laid out and installed the system, assisted by tractors from the Ministry's pool.

The growing of tomatoes is complicated because of the high vulnerability of the crop to disease and its need for water. Cadbury Ltd. would provide the seedlings and do the spraying of the crop. The project staff decided that each farmer could only handle one-third of an acre of tomatoes because of family labor constraints. Cultivating this amount of land required 50 man-days of effort over the 13-week growing period. Under supervision, the farmers would plant, fertilize and harvest the crop. Cadbury Ltd. would go to the fields at harvest, purchase the crop on the spot and transport the tomatoes back to the plant in Zaria. Each time a purchase was made, the firm would deduct one-third of the value to cover the costs of the inputs until these were repaid.

Timing throughout the operation was important. The crop cycles had to be set up in such a way as to insure that Cadbury would receive an adequate amount of tomatoes each day.

The schedule was tightly organized and land preparation, irrigation system maintenance, spraying and marketing were worked out on a daily basis for each location.

Project Shortcomings and Resulting Changes

Delays in the Provision of Support

The timing of the operation has broken down frequently because of delays in providing the necessary support. One major problem has been the inadequacies of the Irrigation Division of the Ministry of Agriculture and Natural Resources. After a site has been identified and a farmer group has been formed, there is frequently a delay of several weeks (and sometimes months) before the irrigation system is installed. In most cases, the farmers have given up hope that the project will be initiated. Moreover, once the system is installed, there are significant delays in the provision of maintenance; this is crucial because an entire crop may be wiped out if water is not available regularly. This problem has not been resolved.

Originally, the Ministry was to provide fertilizer. However, the supply was undependable so Cadbury has been forced to import its own fertilizer at regular commercial rates (rather than purchasing it at the government's subsidized rates). Because the farmers had seen the difference that fertilizer makes in the first crop cycle, they reluctantly paid the higher prices.

A third problem area has been the provision of technical assistance. Cadbury Ltd. considers the Ministry's support to be inadequate and so has begun to build up its own extension staff. While the backgrounds of the extension workers recruited by Cadbury Ltd. do not differ much from those of the Ministry staff (graduates of agricultural colleges or advanced training schools), the firm provides transportation, higher salaries and closer supervision. Related to the problem of extension assistance are the continual problems of coordination and communication between Cadbury Ltd. and the Ministry. The FAO advisor is required to do a considerable amount of troubleshooting.

Another problem has been the delays encountered when Ministry tractors have been used. Because of the government's emphasis on mechanization, this problem has been partially alleviated by the Ministry providing credit to larger farmers to purchase tractors; these farmers are then contracted to do the land preparation work for the project.

Delays occur also in the purchasing of the harvest. Cadbury trucks frequently miss scheduled appointments with farmer groups. Once harvested, the tomato crop spoils rapidly, so, in spite of the purchase agreement with Cadbury, the farmers will sell the tomatoes in the local market. These problems in the delivery of services notwithstanding, farmers are willing to grow tomatoes because of the high profits and the ease with which they can default on advances. Moreover, tomatoes are sometimes grown on land that otherwise would not normally be used. Further, the project allows farmers to remain on their land during the dry season.

Local Organizational Problems

Since the village head normally controlled the land to be irrigated, he was given responsibility for organizing the farm group. FAO and the Ministry of Agriculture and Natural Resources decided not to intervene in this process, because they did not anticipate major difficulties

Local organizational problems were immediately apparent. First, the village heads tended to favor relatives when selecting those farmers who would participate. This reinforced the traditional control of the village heads and members of their families over local area wealth. Moreover, when non-relatives were included in the project, the village head favored family members by insuring that their land was irrigated first. Frequently, the village head (who was usually responsible for handling the marketing to Cadbury Ltd.) cheated these farmers by taking part of the profits from their crops. When this occurred, the farmers had recourse to the district head, who was willing to rectify the situation in most cases. Further, the project began to become more involved in local level arrangements, sometimes setting up separate farm groups for non-relative farmers. In retrospect, these problems could have been uncovered if an analysis of local level organization and power structure had been conducted during the initial survey period.

A detailed analysis of the farmer groups in six villages was done recently by an Ahmadu Bello University sociologist. He found a high level of discontent with the organizational arrangements due to the problems of village head leadership and favoritism towards family members. As will be seen in the next section, this dissatisfaction with local arrangements had serious effects on the supply of tomatoes to Cadbury Ltd.

Problems of Supply and Credit Repayment

The one-shift capacity of the Cadbury Zaria plant is 30 tons per day, though the company has only been receiving about eight tons per day from the farm groups. Trials at Ahmadu Bello

University have yielded an average of over 20 tons of tomatoes per acre. It is estimated that the yields from the farm group plots have been about 14 tons, of which Cadbury Ltd. receives only 45 to 50 percent; the other half of the crop appears to be marketed locally.

The farm groups have a "gentlemen's agreement" with Cadbury to sell the firm their entire crop at a fixed price of about two cents per pound. Cadbury schedules a market day for a farm group, and though there are delays, sends a truck to purchase and pick up the harvest. The costs of the inputs, which average US$132 per acre, are deducted at a rate of one-third of the value of the crop purchased. So far Cadbury Ltd. has only been able to recover an estimated 60 percent of the loans in kind because of the diversion of so much of the crop to the local market.

There are several reasons for this large-scale diversion of the tomato crop. The first is that the cost of inputs is rising, resulting in a lower return to farmers at the processing price set by Cadbury Ltd. Another is the frequent failure of Cadbury to meet the purchase appointments. The farmers recognize that the harvest will spoil, so to protect themselves they sell to the local market. A third reason is that the farmers have found a way to avoid repayment of the inputs costs. A fourth, and perhaps most serious, reason is that the farmers have found that the village head will frequently cheat them and they are inclined to smuggle their crop to the local market. This was one of the findings of the Ahmadu Bello sociologist. A final reason is that the local market price is sometimes as high as five cents per pound. This problem is being alleviated because the Ministry is attempting to expand overall tomato production in the area. Nonetheless, for a combination of these reasons, Cadbury Ltd. is not getting a sufficient or regular supply of tomatoes, nor is it recovering the costs of the inputs. Cadbury and the Ministry have the option of dropping farmers from the project, but this sanction has not been applied with any regularity.

Subproject Dynamics

Some of the more serious local organizational problems were found in the Dan Ayamaka Farmer Group. In 1971, the village head was approached by the Ministry of Agriculture and Natural Resources. He organized a group of 24 farmers which consisted of both family members and other small farmers. The village head gave priority to irrigating the plots held by members of his family and at purchase time cheated the non-family members of the group. From the first to the second year, the number of tons marketed to Cadbury Ltd. dropped from 8.6 to 5.2, in large part due to the actions of the village head. The district head was asked to intervene, and it was decided to set up separate operations for relatives and other farmers.

In the Tamuwa Farmer Group, the above problems did not occur. Being a newer settlement, it did not have a strong traditional hierarchy. Three landowners (progressive farmers and relatives) were asked to organize the farmers' group. Over a three-year period, the number of participants increased from 24 to 35, and the acreage from six to ten. However, Cadbury Ltd. has only been getting an average of seven tons per acre, mainly because of the farmers' desire to avoid loan repayment.

V. PROJECT SUCCESS

Project Benefits

The introduction of irrigated tomato production has proven profitable to small farmers, in addition to providing an alternative to off-farm employment during the dry season. Irrigation has increased yields sevenfold over those of traditionally grown tomatoes. Growing only one-third of an acre, a farmer stands to net US$184, which is about a 52 percent increase in his yearly net income. The sociologist has uncovered tangible evidence of the increase in wealth of the six farmer groups that he examined. He found that several amenities had been bought, such as bicycles, and that the number of people visiting Mecca each year had increased from 100 to 500. Beyond this increase in income there are few institutional or communal benefits derived from the project.

Potential Spread

Cadbury Ltd. has a need to extend both "wet" and "dry" cultivation of tomatoes. However, this will require increased efficiency and expansion in the provision of support. Moreover, to be profitable, future expansion may require alternative local credit and organizational arrangements.

Self-Sufficiency

The cost of the project to Cadbury Ltd. and FAO in 1973 was approximately US$260,755; this was supplemented by the support of the Ministry of Agriculture and Natural Resources, which was about US$94,000. The income generated for small farmers on the 320 acres under irrigation was about US$284,832.

This shows that it is unlikely that the income generated on the land will cover the costs of the operation for some time. However, the data on Cadbury Ltd.'s profits were not available and it is possible that the firm is able to continue to carry these costs and make a profit from the sale of tomato paste throughout Nigeria.

Replicability

The project shows some of the requirements and pitfalls of attempting to build a commercial operation on small holder production. Without major design changes, replication would be unsound.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The project offers several lessons. *First*, it illustrates the problems which occur when there is a division of responsibility for project implementation. *Second*, it shows the need for the timely provision of supporting assistance. *Third*, it shows the need to take account of the local power structure and the attitudes of the farmers towards that structure. To accommodate these attitudes, flexibility is required at the microlevel in structuring a project. In certain cases, a community-wide organization was appropriate, for there was little exploitation of the smaller farmers by the larger; in others where there was this tendency to exploit, sister organizations for separate groups were the best approach.

Information Sources

A. Field

Field visits to Zaria took place in May and August 1974, during which the following persons were interviewed: the Managing Director of Cadbury Ltd., the FAO Project Advisor, the North Central State agricultural extension workers assigned to the project, officials in the Irrigation Division of the Ministry of Agriculture and Natural Resources, the Ahmadu Bello University sociologist and the Chairman of the Department of Agricultural Economics and leaders of several farmer groups.

B. Reports

In addition to the Rural Economic Survey of Nigeria, prepared by the Federal Office of Statistics in 1972, data and local level information on organizational arrangements came from the thesis of the Ahmadu Bello University sociologist.

Data Adequacy

The information on yields, costs and income were collected from the Ministry of Agriculture and Natural Resources, the FAO advisor and the Cadbury Ltd. Managing Director and checked against the estimates of the Agricultural Economics Department of Ahmadu Bello University. Overall project costs had to be estimated based on raw data. The figures on loan repayment are estimates, for they could not be drawn from the accounting system of Cadbury Ltd. in Zaria. The case study was reviewed and commented on by Kenneth McLean, FAO Horticultural Crops Advisor, who is assisting the project.

TIV "BAMS" AND FARMERS' ASSOCIATION

I. PROJECT BACKGROUND

The Tiv bams are indigenous savings and credit groups found throughout the three Tiv Divisions located in the southern part of Benue Plateau State. The bams were designed in the early 1950's by the traditional Tiv leadership when the availability of government credit and support depended on political loyalty. Since the initial experiments in a few locations near urban centers, over 5000 bams have been formed, with the participation of 300,000 farm families. This involves nearly all of the families in the Tiv Divisions which have a combined population of 1.6 million people. Formed annually, the bams provide consumption and production credit; in addition, they assist in planning and carrying out community development efforts.

Building on the pattern of the bams, the Benue Plateau State Ministry of Agriculture and Natural Resources and the Tiv tribal leadership have formed farmer associations. Having started with a group of 60 representatives in 1966, the Tiv Farmers' Association now has over 33,000 members. Technical assistance is provided by the Ministry through these associations, organized from the village to regional level. In large part due to the Tiv bams and farmer associations,the area has moved from subsistence farming to production of yams and rice for other markets in Nigeria.

II. LOCAL ENVIRONMENT

The major crops in the Tiv region are rice, yams, groundnuts, guinea corn, and millet. Groundnuts are the traditional cash crop, though over the past ten years a surplus of rice and yams has been grown and marketed in other parts of Nigeria. An average Tiv farmer will cultivate about five acres of land, though the range in the area is from two to over 50 acres.

Because of the profitability of rice and yam production, he will use fertilizer on these crops.

The Tiv have a strong traditional social structure, though one which is not highly stratified. Unlike other parts of Nigeria, leaders at the village and district levels are elected by adults eighteen years old and over. In most cases, this means approving the traditional leader in line for the job; however, it does allow the Tiv the option of rejecting individuals who might be unsuitable. Once the election is held, the leaders are formally appointed by the government. In elections for determining the leadership of non-traditional organizations such as the bams and the branches of the Farmers' Association, the Tiv tend to vote for the individual, male and more recently female, whom they consider to be most qualified for the job because of honesty, education, management skills, farming expertise and so forth.

The cohesiveness of the Tiv has been reinforced by their religion. Most are Christians, belonging to either the Dutch Reform Church or the Catholic Church. In part due to the influence of the Dutch Reform Church, the Tiv have become known for their strict rules of discipline in their own lives and in their social and political institutions.

Support from the Benue Plateau State Ministry of Agriculture and Natural Resources is another factor in the development of the Tiv area. The ministry has recruited Tiv agricultural extension officers who know the region and efficiently provide technical assistance and agricultural inputs. In addition, recent construction and improvement of the roads has facilitated the delivery of inputs and opened markets in other parts of Nigeria. The level of education in the area is improving, though adult functional literacy is only about ten percent.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The Tiv have traditionally borrowed money or food from other families when need arose. Tiv women accumulated surplus yams as savings to be used in times of emergency; these were distributed first to extended family members and then to other families in the area if the supply held out. However, this intra-family system of borrowing could not meet the requirements for purchasing fertilizer and other agricultural inputs to expand production. In spite of this credit need, the Tiv resisted borrowing from the government. The availability of government credit was tied to providing political

support for the regime in power (before the military took over the federal government). The Tiv leadership reacted against this requirement and considered alternative sources.

The Tiv leadership designed the bam system. One of the better-educated Tiv leaders had travelled abroad and had seen how local banks function in other countries, particularly the savings and loan parts of their operation. The senior Tiv leaders evaluated his observations during several of their meetings and designed the bam system. Several elements were considered in the overall design process: first, the traditional system of saving yams would facilitate the inclusion of a savings component in the system; second, the tradition of electing leaders would be incorporated into the system; and third, the strict discipline of their people would allow a stringent enforcement of loan repayment. In addition, the Tiv leaders decided to operate the bams on an annual basis. This would allow a family to participate without feeling that this would be a permanent commitment. Moreover, it would encourage competition among bams, so if a farmer was dissatisfied he could join another or start his own. Also, the regular assembling and disassembling of the bams would prevent individuals from taking advantage of the bams to build their personal power and financial position; exploiting a bam in this way would be harder to do if it did not have an extended life.

The initial experiments took place about 1950. Gradually, Tiv farmers in nearby areas saw or heard about the bam system, and the more progressive started their own with the assistance of the senior Tiv leaders.

IV. DYNAMICS: PROJECT IMPLEMENTATION

The Tiv Bams

Organization

As mentioned above, the bams are formed annually. Each January farmers from the same village, or ones which are closely situated, are called together to form a bam. The initiative for forming a bam comes from progressive farmers in the area, teachers, religious leaders, or the elected village chiefs. Normally there are ten to 100 members, with the average size being 60 members. Each individual decides which bam he will join, for there are usually several in his

area, and the group decides what structure the bam will have. Almost always, a bam will have a chief, secretary, and two treasurers -- one who holds deposits of the members and a second who holds the interest and fines. In addition, there will be a finance committee which verifies the amounts each member deposits and decides who will receive the loans. Depending on the size of the bam, there will be one or two judiciary boards with the power to fine members for not attending meetings and to handle cases of default on loans. In larger bams, there will be a lower and higher judiciary board. Elections are held to fill all the positions.

The members decide how frequently the bam will meet; usually it will be every two weeks. The chief of the bam appoints the day of each meeting and hosts it. At each meeting the secretary calls the roll of members according to compound. The member gives his deposit to a collector, and the amount is verified by the Finance Committee and recorded. Deposits range in size from U.S. $.32 to U.S. $32. After the deposits have been collected, food and beer are served and a general discussion of community problems takes place. The finance committee reviews the applications for loans and approves them (up to the amount collected on that day). An informal sponsorship system is employed to increase the likelihood of loan repayment. If a member misses a meeting, he is fined from U.S. $.05 to U.S. $10.

Loans are made for the purchase of fertilizer and improved seeds, school fees and taxes. The size of the loans varies considerably, though they average from U.S. $33 to U.S. $49. The interest rate, set by the bam members and varying from bam to bam, is 30 percent per annum or higher. As is explained below, this is not the true interest rate, for in December when the bam closes down, those who borrowed the most money get a higher proportion of the meat purchased with the accumulated interest and fines. The repayment period for the loans is set by the finance committee in consultation with the recipient. Loans are made after each meeting through the end of September or October. All loan repayments are due by December.

If a member is in default, the judicial board will review his situation. In almost all cases if a member fails to repay, the bam will, with the support of the local authorities, sell his land, personal belongings or livestock to recover the funds. The local authorities are willing to support the sanctions of the bams because their existence insures a higher local tax collection rate by providing funds to pay tax assessments.

In December, the deposits are returned to the members, and the interest and fines collected are frequently used to purchase cattle for slaughter. The meat is divided

proportionately among the members, with the largest shares going to the bam chief, the other officers, and those who borrowed the most money. Recently, this money has been used more for community development projects. Also, in many cases, the officers of the bams are paid salaries.

The same cycle is followed the next year; however, if a farmer believes that he did not get sufficient credit, he will change bams. In most cases, the groups do not change from year to year and are called together by the prior year's leadership. Nonetheless, the competitive element still exists, and the amount of meat each member receives at the end of the year and the credit terms of each bam are widely discussed. Often, the leadership changes as individual members are recognized for having performed lower level tasks well.

While the system outlined above is fairly straightforward, it should be noted that the amount of funds that passes through a bam with 100 members is considerable, usually between U.S. $15,000 and U.S. $20,000.

Possible Transition of the Bams

The senior Tiv leaders recognize the need for longer term credit for the purchase of tractors and the development of small agro-industries. Some bams have extended their life spans to three to four years and have secured tractors; others have been using the funds generated from interest and fines to make community improvements.

The extension of the bams' life has been debated, for several of the Tiv leaders see a need to develop financially viable institutions. However, they also recognize that one of the appeals of the bam system to the farmers is that it is an annual affair, giving the farmers a yearly opportunity to decide which bam will best service his family's needs. This explains in part the success of the system, for priority is given to the quality of service delivered rather than the preservation of the institution.

State cooperative officers have been attempting to convince the Tiv to restructure and register the bams as cooperatives; the strong negative reaction of the Tiv is probably due both to a fear that the healthy competition within the system will disappear, and a suspicion that the government will once again attempt to use the cooperatives as political tools. On the other hand, state agricultural extension officers see the potential to develop associations along the same pattern of design as the bams to increase agricultural production more directly.

The Tiv Farmers' Association

A Tiv agricultural extension officer familiar with the functioning of the bams suggested to the senior tribal leadership the idea of building a broadly-based farmers' association to increase production by improving extension coverage. The Tiv council agreed and discussions began on the most effective organizational vehicle, with a major concern being how to make the association financially viable.

A senior council was established initially in 1966. It consisted of 60 representatives of various Tiv areas; over the next two years, it grew to about 1,000 members. One reason for its growth was that the extension officers started consulting the farmers about the acceptability of innovations. After determining the interest of the Tiv Farmers' Association, the extension officers worked out plans for introducing the innovations in cooperation with the Association. For example, to introduce the use of fertilizer on rice and yams, the extension officers took the leaders of the Association to demonstration plots and convinced some of them to test the use of fertilizer on their own land. When the results were successful, the Tiv Farmers' Association decided that a distribution system should be developed and, in consultation with extension personnel, decided where the distribution points should be and which Tiv farmers should be appointed as fertilizer agents.

In 1968, the Farmers' Association decided to organize at the village level, using the same approach as was used to start the bams. The one exception was that the associations were to be permanent, with a monthly system of dues (U.S. $.16 per member) to finance the operation. At its current level of over 33,000 members, the Association has a yearly operating budget from dues of U.S. $64,680.

The development of the village branches was a result of the combined effort of the agricultural extension officers and the leaders of the central Tiv Farmers' Association. Its expansion was facilitated by the informal communications network of the Tiv. At church bam and village meetings and in the bars, the Tiv evaluate what is occurring in their area. Word of the Farmers' Association spread rapidly, and in these forums the possibility of more technical assistance and agricultural inputs was discussed. This informal communication was reinforced by meetings of Tiv village chiefs where the Farmers' Association was discussed.

The initiative for forming a village branch usually came from the extension officer. He would contact the village chief and the most progressive farmers in the area. The

village chief would call together all the heads-of-household who were farmers to meet with the extension officer. The individual farmer made the decision as to whether to join or not; in most cases, the farmers would join because of the positive thrust of local discussions.

The village branch elects a representative to the district organization, which in turn elects a representative to the division organization. Representatives from the three divisional groups form the overall council which governs the Farmers' Association. This organizational arrangement is similar to that of the Gambia Cooperative Union;[1] an important element in both movements is that farmers control decision-making from the local to the regional or national level.

The village associations meet monthly with the local extension worker. An extension worker handles from three to four village branches. At the meetings, specific innovations such as the use of fertilizer on rice and yams, which have been tested in other parts of the state or Tiv region on the farmers' own land, are demonstrated and discussed. Frequently the extension worker will take the farmers to the areas where testing has been done and have them discuss the innovation with the farmers using them. After the meetings, follow-up visits are made by the extension officer, usually three or four times a year. The introduction of the innovations is speeded once again because of the Tiv internal communications network.

Moving up the organization structure, more comprehensive development efforts are planned. These have included planning the location of markets and roads and the creation of agrobusinesses. The most progressive farmers provide the leadership at each level of the Farmers' Association. However, as in other Tiv organizations, evaluation sessions are held with the full membership expressing its views. From these evaluation sessions, courses of action are determined.

V. PROJECT SUCCESS

Project Benefits

As mentioned earlier, the Tiv Divisions have moved from

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[1] See Confectionary Groundnuts Package Deal write-up, page B-40.

a basically subsistence economy to being a food surplus area which supplies rice and yams to other domestic markets. For the average farmer with five acres, this means that approximately 43 percent of his net income from his land currently comes from the cash market, in contrast to the situation ten years ago when his family consumed almost all their farm produce. Also, it has meant a substantial increase in overall family income and fuller employment for family members. Using current value figures, the average increase in on-farm income over the past ten years has been U.S.$328, which represents a 72 percent increase.

It is difficult to determine how much the Tiv bams and Farmers' Association contributed to the increase in family income, compared to other factors such as road improvement, the availability of fertilizer and other inputs or the introduction of tractors. At a minimum, the bams on a yearly basis mobilize substantial amounts of local capital; a conservative estimate for the 5000 bams would be about U.S. $5,000,000 annually. As mentioned above, the actual interest rate on this money is lower than the stated 30 percent annual rate. Those farmers who borrow the most money receive a larger share (usually in the form of meat) of the interest and fines collected over the year; also, part of the interest and fines is spent on salaries for the leaders of the bam, so those providing the funds for loans receive a lower interest rate. A more accurate estimate of the rate might be 15 percent, which could be seen as a reflection of the anticipated return from the loans.

Beyond the potential income benefits from the bam loans, the project has successfully developed a broadly-based institutional structure which has improved management and planning capabilities at the local level. Moreover, the system has given Tiv farmers a voice in local decision-making and, through the Farmers' Association, access to information about improved production techniques.

Potential Spread

The bam system has spread throughout the Tiv Divisions. The basic problem, perceived by the Tiv leadership, is how to extend the lives of the bams so that they can undertake larger and longer-term economic development ventures. Gradually this transition is occurring.

The major limitation to the continued growth of the Farmers' Association is the availability of trained extension workers. On average, in the Tiv Divisions, there are 1650

farm units for each extension worker. At most, a worker can handle 800 farm units through the village branches, so at least a doubling of the number of state extension workers, or locally recruited and trained workers, is required to give adequate extension support to all the farmers in the three areas using the farmer association approach. However, it should be noted that the innovations introduced to the local farmers' associations tend to spread to non-members if they appear reasonably profitable.

V. LESSONS FOR DESIGN AND IMPLEMENTATION

To a large extent the Tiv bams and Farmers' Association are successful because their design is determined by Tiv who are quite aware of the social and political characteristics as well as the needs of Tiv farmers. More importantly, however, the project shows how many of the essential elements for developing an area were created through an indigenous system. Among the more significant were the evolution of a complete savings and loan operation, the development of management and leadership skills from the village to the regional levels and the creation of mechanisms for receiving technical assistance and agricultural inputs. Due to the building of these local capabilities, growth in production has been rapid over the past ten years. Moreover, the Tiv have gained bargaining power which has brought more roads, opening up markets for their rice and yams. The area and people are now in a position to use foreign assistance and investment efficiently and effectively. Indeed the procurement of foreign investment in agrobusinesses is a priority of the current Tiv leadership.

Beyond illustrating how these capabilities were developed indigenously, the project holds some important lessons for project design. First, it shows the importance of farmer involvement and control over decision-making. Perhaps more significant than the election process is that there were formal and informal mechanisms through which farmers could react to different organizational arrangements and technological innovations. Second, the organizational arrangements were flexible, allowing farmers to set their own rules and giving them the option to choose among competing organizations. This stemmed from the priority placed on the efficient delivery of services rather than on building permanent institutions. Third, the project shows how, when there is a credit need, a complete savings and loan program can be developed locally, with relatively high interest rates and strict enforcement of repayments.

Information Sources

A. Field

Visits were made to Benue Plateau State in May and August, 1974 during which discussions were held with: the Senior Agricultural Officer and other members of his staff in Jos, the agricultural extension and cooperative officers of two of the Tiv Divisions, the Farmers' Associations in Gboku and Zaki Biam, the leaders and members of the Zaki Biam bams. Much background information and assistance in arranging the visits came from John Yuwa, the Agricultural Officer in Oturkpo.

B. Reports

No written reports appeared to be available, except for census figures and statistics on yields and agricultural production in the three Tiv Divisions obtained from the Benue Plateau State Ministry of Agriculture and Natural Resources.

Data Adequacy

Because of an apparent lack of research on the Tiv bams, several of the figures on number of bams and amounts handled by the bams are based on estimates from several sources, including both government officials and senior Tiv leaders. Moreover, the income figures have been estimated, though they are based on actual yield data from the Ministry of Agriculture and Natural Resources. John Yuwa, the Agricultural Officer in Oturkpo, commented on this write-up after having discussed it with Tiv leaders and securing their approval for publication.

UBOMA DEVELOPMENT PROJECT

I. PROJECT BACKGROUND

The Uboma Development Project is sponsored by Shell-BP Nigeria[1] in association with the East Central State Ministry of Agriculture. Uboma Local Council area covers approximately 25 square miles and consists of six villages with a current population of 40-45,000 people; it is situated in southern Nigeria near Umuahia. About 75 percent of the families are small farmers. Following a three-month search in 1963 by a Shell agronomist, Uboma was selected because it was representative of farm communities in the area; this fact, Shell believed, would allow the lessons from the planned technical assistance effort to be applied in other locations.

Following guidelines developed from Shell rural development projects in Italy and other countries, the Shell agronomist (a Nigerian who was to become the first project manager) sought the approval of local leaders (traditional, religious, educational, and political) through a series of meetings to conduct a detailed socioeconomic survey of the area as the basis for planning a low-cost technical assistance effort. The survey was approved by the local leaders and was initiated by the Shell agronomist and the University of Ibadan in September 1963. From this survey, the objectives of the project were formulated, which were:

- to improve the yields of major food crops;
- to improve the diet of the people through additional protein;
- to increase earnings from agriculture by expanding and diversifying the production of cash crops; and

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[1] The project was launched by Shell Nigeria and has been recently brought under the umbrella of Shell-BP Limited.

- to improve the quality of social services and infrastructure in the area.

Moreover, the survey uncovered the patterns of local cooperation on which the implementation of the development strategy was based, and revealed simple innovations which would have a high initial impact on the local population.

The technical assistance phase of the project was launched in November 1964 on completion of the survey; field work began with the aid of the Shell agronomist. Over the past ten years, one Shell agronomist, helped by one or two seconded government officials and occasional outside experts, has acted as a catalyst for helping the people of Uboma tap into government programs, and has provided technical advice for improving agricultural production in the area. The cost to Shell Nigeria and Shell-BP has been about US$220,000, which is in addition to regular government expenses in the area. There has been an estimated five-to-one return in net income generated in Uboma over the Shell-BP investment of technical assistance funds.

II. LOCAL ENVIRONMENT

Farming is the major occupation of heads-of-household in Uboma. Lying within the rain belt, Uboma is subject to a dry season which lasts from November to March, with an average monthly rainfall of less than four inches, and a rainy season which brings the total annual rainfall up to 90 inches or more. As in most of East Central State, the agriculture of Uboma is dominated by root crops (yams, cassava and cocoyams) which are grown for domestic consumption. These are intercropped with maize, vegetables, beans and other food crops. The major cash crop in the area is wild oil palm and, though less important, fruits (oranges, banana, plantains, pineapples and coconuts) are grown and sold in the Umuahia market; the closeness of a major market is one factor which has contributed to the success of the project. As a result of the project, both "wet" and "dry" cultivation of rice have been introduced and have spread rapidly.

In 1963, at the time of the survey, average farm size in the area was just under eight acres, with about 2.9 acres under cultivation and 4.8 acres lying fallow. However, Uboma has been subject to severe fluctuations in population growth as a result of the civil war from 1967-70. There has been a net increase in population of between ten and 15 thousand people since 1963, and the estimated average farm size is now about 5.36 acres.

Except for the main roads which border Uboma, infrastructure is poorly developed in the project area. Because of the prevalence of tsetse flies, there are no draught animals, so produce is transported by bicycle or carried on people's heads. There are several primary and a few secondary schools in the area, all controlled by the State's School Board, but adult functional literacy is only about 15 percent.

The social organization of Uboma is complicated, and the project leadership found that an understanding of the interrelationships was basic to the development of group endeavors. The smallest unit of social organization in Uboma, and the most important production and consumption unit, is the nuclear family; this consists of a male, his wife or wives, children, and perhaps an unmarried brother of the husband. A group of nuclear families which are related along the male line form the next largest unit, the extended family, which lives in a single compound. Several extended families, who are related in either the male or female line, compose the kindred group. Several kindred groups who live in the same locality form the next higher social group, the quarter or ward, and a number of these make up the village group. There are six villages in Uboma which form the Uboma clan. Loyalties at the village level tend to be stronger than those at the clan level. Village activities were, therefore, used for providing general extension advice, though kindred and ward groups were used to establish specific schemes.

Primary decision-making in the area is done through the councils of elders at each level. Nuclear family heads participate in the compound councils, and the most senior head in the compound participates in the kindred council of elders, and so forth, up the organizational structure; the Uboma clan is ruled by an elected local council.

This basic structure is complicated by the traditional Ibo system of age-grades, whereby men and women are divided into groups of the same age. While in some Ibo areas they are declining in influence, age-grades remain important in Uboma as a means for developing cooperative efforts in the provision of labor and credit. Most of the age-grade organizations in Uboma are organized on the quarter or even kindred levels. Age-grades are given specific duties to perform in the villages, and members of an older age-grade will collaborate in a joint production endeavor such as operating a palm oil press.

Another important social and economic grouping are the local credit asociations called the Isusu Clubs. In 1963, there were 100 of these clubs whose members contributed monthly payments which were loaned to other members (though normally not for production purposes); the number of Isusu Clubs has doubled over the past ten years, in part because of the increased income from project activities.

Prior to the project, two attempts were made in Uboma to establish the Farmers' Cooperative Movement. According to the 1963 survey, these attempts failed because the government did not use existing social organizations such as age-grades and Isusu Clubs; instead, individuals who were strangers (and did not trust one another) were asked to form the cooperative. Also, the attempts were made at the clan level.

The establishment of the Uboma project took account of previous attempts to initiate group activity and paid careful attention to the social and cultural traditions of the local population. The project successfully sought the cooperation of a junior minister in Enugu and other influential individuals from the Uboma area who assisted in getting regional government support.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

Guidelines for Project Design

The guidelines for the design of the Uboma project came from Shell's experience in other countries, in particular its rural development project at Borgo a Mozzano in Italy. Among the factors which Shell had identified as important for success were the following:

- the project must be long-term, for a crash program over a shorter period will almost certainly fail to produce permanent results;
- the project area should be one that is manageable, that is, one in which all families can be reached in a few hours; in addition, Shell estimated that one field worker (playing a catalytic role) can handle 10-15,000 people;
- the quality of field personnel is critical; they must have backgrounds in agricultural economics, sociology and psychology, and technical expertise which can be used to help solve small farmer problems; the field project manager should be a host country national, though answerable to someone who can provide supervision and links with outside experts;

- an initial socioeconomic survey is essential, and should be conducted in a reasonable amount of time (ten months); a shorter period will not capture enough of the farming calendar, and a longer period may lead to frustration on the part of the community and project staff; the survey is necessary as a planning document, and for evaluation purposes -- to measure overall social and economic changes in the area; and

- project activities should be directed initially at simple problems which are easily solved; more complex problems can be tackled as the local population gains confidence.

In addition to the above, an underlying assumption of the Shell approach is that people will begin to take the initiative in identifying and solving their own problems if they are involved in the process from the outset and provided with timely technical advice.

Project Evolution

The first step in the evolution was Shell's appointment of a Nigerian agronomist to plan and organize the effort. He was given responsibility to locate a suitable area of about 25 square miles in the southern part of the then East Central Region. The area was to be typical of other farm communities in the area, unexceptional in terms of agricultural production potential and with only a few progressive farmers. In addition, Shell wanted to work in an area where there was a reasonably progressive local agricultural extension staff. This initial screening was to be done quietly without raising expectations.

After selecting Uboma from the three locations identified as suitable, the Shell agronomist collected background on the area through a search of the local archives, census material and village records. He developed a basic profile of the area leadership which was to be included in the initial discussions.

This initial effort took three months. The Shell agronomist then contacted the junior minister in Enugu and other influential leaders from the area to explain the idea and approach. After securing their cooperation, the agronomist and junior minister drew up a list of the local leaders to be invited to the first meeting; it included leaders from the elders' councils, age-grade organizations, Isusu Clubs, religious and educational groups, and elected officials. To legitimize the

meeting and insure participation, it was called by the junior minister. The idea of having a detailed socioeconomic survey was debated, and care was exercised not to raise expectations about possible technical assistance.

At the second meeting, after several discussions with the local leaders who had attended the first session, the idea of the socioeconomic survey was approved, though somewhat reluctantly. The fear expressed by the leaders was that the government (and even the project) would use the survey as a basis for taking over the people's land.

Prior to the third meeting, the Shell agronomist selected a sample of individuals from the tax rolls to be included in the survey. Their names were read at the meeting, and because the list included the names of some individuals who were dead or had been declared insane, fears about sinister intentions on the parts of the government or project were alleviated.

The Socioeconomic Survey

The Shell agronomist, in cooperation with the Department of Agricultural Economics and Extension of the University of Ibadan conducted the survey. The study had five major parts:

1. The Physical Environment of Uboma, which included its geology, physiography, climate, soils, vegetation, land capability classification, hydrology, and means and costs of transport;

2. The People of Uboma, which included their history, settlement pattern, housing, demography, social organization and culture, traditional religion, political organization, and economy;

3. The Diet, Food Economics and Health of the Uboma People, which consisted of an analysis of their diet, food economics and nutrition;

4. Land Tenure in Uboma, which involved an analysis of land holdings, acquisition and disposal of rights in land, and forfeiture of rights in land; and

5. Agriculture in Uboma, which included an examination of food crops, cultivation practices, storage, processing, cash crops, livestock, labor, other economic activities and the income of farming families.

Most of the field collection work was done through interviews lasting from four to six hours, conducted by the Shell agronomist over a nine-month period. This interaction with a representative sample of farm families gave the agronomist a basic understanding of the problems facing them, as well as ideas of specific innovations which could be initiated rapidly with tangible results. Moreover, the interview process helped build people's confidence in the project's leadership. According to the Shell agronomist (now with the International Institute for Tropical Agriculture) the rapport which developed came from the long conversations in the evenings over dinner, rather than during the formal interview.

In addition to the basic socioeconomic data, several other types of information were collected which had direct operational implications. First, a farming calendar for the area was developed, with the specific roles of men and women in agricultural production outlined; the timing of various agricultural assistance efforts was planned according to this calendar. Second, the family backgrounds and interrelationships were plotted for the entire Uboma area so that "natural" groupings of people could be used as means for launching various schemes. In addition, the market days for the six villages were plotted, because the age-grade shelters at these markets provided an excellent location for planning cooperative efforts. This and other information was collected to determine the best means for building local involvement in the project.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Project Initiation

The technical assistance phase of the project began formally in November 1964; it was planned so that it would coincide with *Ibuzo* ceremony, a period of reunion when nonresidents returned to their village areas. This made it easy for decisions to be made because nonresidents could be fully consulted, and since there was not much farm work, people were willing to attend meetings to plan next season's activities.

Thirteen showings of films (selected for their agricultural content) were used to arouse the interest and attention of farmers in different locations in the area. There was particular interest because this was the first time films were shown at village centers; the following day in each center, the Shell agronomist met with the farmers to exchange views. In addition to the films, leaflets with simple illustrations of improved agricultural practices were distributed throughout the area.

Following this mass approach, the Shell agronomist turned to group meetings and individual contacts to begin planning specific innovations. On average, he met with five groups and 80 individual farmers per month (initially the more progressive farmers); in addition, he visited with farmers and their wives on market days, contacting them primarily at the age-group shelters. Initial plans were drawn up for demonstrations and the areas for further research such as fish culture and irrigated rice were identified.

Basic Approach to Project Implementation

From the outset of project activities, local leaders played a major role in helping to determine needs, arouse interest and enlist support. Whenever possible, the Shell agronomist would first discuss new ideas or outstanding problems with the locally-elected Member of Parliament, and with his support a general meeting of the Uboma Progressive Union, local councillors and warrant chiefs (senior village chiefs) was then called. A Local Council messenger took a circular around to each of these leaders, and they in turn used the village drums to spread the invitation to the meeting. A follow-up meeting was held in each of the six villages to determine specifically who might be interested in trying an idea. Then the Shell agronomist regularly visited the interested groups or individuals.

In implementing the agreed-upon innovations or programs, priests and school teachers proved helpful. Important announcements on the timing of certain activities -- such as the completion date of bush clearing for planting oil palms or when and where to sell the improved maize to the Ministry of Agriculture -- and news of extension visits were announced from the pulpit after the Sunday worship service. School masters and mission teachers helped the youth to organize and made land available for demonstrations or vegetable plots; classrooms were used for village-level meetings.

Certain activities like fish cultivation, irrigated rice production, and the growing of improved oil palms required cooperative action, because many farmers were handicapped by land fragmentation, and the schemes required land consolidation. Arrangements for redistribution had to be worked out through age-grade organizations or kindred groups. However, whether land consolidation was required or not, the project found that group activity speeded the adoption of innovations. When chiefs, councillors or progressive farmers adopted a new technique, other members of the group, and frequently those outside, followed their lead. This occurred mainly because the farmers developed increasing confidence in the methods proposed by the Shell agronomist.

Many of the technological packages which were introduced in Uboma came from established government programs, and the Shell agronomist was the catalyst for getting them implemented in Uboma. According to the agronomist, the most frequent obstacle to farmers' adopting improved farm practices was their ever-present fear that the government would take over their land. Indeed, he argues that in the early stages of the project the ability to convince a farmer that his land would not be confiscated made the major difference between adoption and rejection. This could only be done through sustained interaction with the farmers.

Implementation of Project Activities

Introduction of Improved Oil Palm

At the time the Uboma project was launched, the government had created an oil palm rehabilitation scheme. Under this scheme, the government would give seedlings and fertilizer free and in addition would pay a cash subsidy of US$33 per acre to those farmers who rehabilitated a minimum of five acres of wild oil palm. A few farmers in Uboma knew of the plan and had planted about 38 acres. Since oil palms were a major crop in Uboma and the project was aware that yields were more than double in other areas, the Shell agronomist decided with the approval of local leaders, to encourage the scheme on both an individual and group approach basis.

The first task was to build awareness of the scheme and respond to the many questions that farmers had: "Since oil palm is a long-term crop, will we live to harvest what we plant? By giving seedlings, fertilizer and a cash subsidy, what does the government hope to gain? Was the government not planning to take the land away from the people once the palms started to yield?" The Uboma project staff helped the farmers to evaluate the scheme and to recognize that it would take about four years before the new palms started to bear and ten years before they attained full bearing. In addition, working through age-grade organizations, the project convinced smaller farmers to pool their land to take advantage of the scheme. Two factors helped to convince the farmers: one was that a few respected farmers had adopted the plan; the second was that the Shell personnel helped the farmers calculate the costs and potential profits from the scheme, which would net approximately US$117 per acre over wild oil palm, Also, it is unlikely that the farmers would have adopted the package without the subsidy (because of time required) or without the Uboma project staff transporting the seedlings to the area.

Improved oil palm production has increased from 38 acres to 864 acres in 1973. The first planted oil palms are now in the full bearing stage and the farmers have seen the results; applications for new plantings are now pouring into the project headquarters.

Introduction of Rice Production

Prior to the project, rice had not been grown in the Uboma area. The survey uncovered several locations that had suitable soil for growing swamp rice. The Shell agronomist found that the government had a rice scheme under which it would develop suitable land for rice growing for a community if that community would sign an agreement with the government to refund the cost of capital development (clearing, stumping, levelling, dam construction, and channel building) at a rate of US$10 per acre per year. The project concentrated on one community (Umuobike) with four extended families, and through persuasion convinced them to try the scheme. This was possible because the land was in addition to that being used by the community for basic subsistence crops. In 1965, two acres were developed and, in 1966, this was expanded to seven acres. Through the meetings of the councils of elders, word of the experiment spread and people came from different areas of Uboma to see the results.

In spite of the initial success of the Umuobike project, the project had difficulties in convincing the Umuoparaonyima community to attempt the scheme in 1967. The problem was that the land suitable for rice cultivation was being used for production of yams, a basic subsistence crop. When all efforts to persuade the community to substitute rice production for that of yams failed, the project leaders exploited the community's desire for a bridge and road across the stream, which separated the village from the main road, five miles away. In return for the bridge and road (which was feasible because of dam and reservoir construction for irrigation), the farmers agreed to grow rice. Another problem immediately arose over the area submerged by the reservoir, because an upstream community would lose its land but not benefit from the rice production. This was resolved by several meetings between the two communities; an agreement was signed that the reservoir would be stocked with fish, and the fish harvest would be shared in the same proportion as the area of land which each man was contributing. Because of its success, rice cropping has now spread beyond the initial irrigated area.

The project has also introduced upland rice production. The process involved identifying a progressive farmer who was willing to demonstrate the crop on his own land. The project then organized visits by farmer groups (village, ward, kindred,

and cooperative) to see the demonstration. As a result of project efforts, over 1,600 acres of rice are being cultivated as compared to almost none in 1964.

Introduction of Improved Citrus

In Umuahia, there was a market for citrus (oranges), and farmers from Uboma were growing a local variety. The project identified an improved variety which could start yielding after one year. This innovation was easily introduced because a community (Umuduruoma) had won a land case against a neighboring group and was anxious to firm up this decision by planting the land with permanent crops so that its opponent would not re-enter the land; it quickly agreed to plant five out of the 55 acres with the improved variety. The introduction process was further speeded by the project leader convincing the catechists of St. Silas Mission to grow the improved variety on church land. People going to church saw the "miracle" citrus and were further convinced that the catechists could do no wrong and thus followed their example. The number of stands increased from 479, introduced in 1965, to 1,955 in 1973.

Introduction of Other Innovations

Several other technological packages (improved maize, groundnuts, cassava, pineapples, dry season vegetables) were introduced. The procedure was similar for all these packages. It involved convincing progressive farmers to try the innovation on a small portion of their land. In some cases, where serious changes in practices were required, the agricultural inputs were provided free by the project or the government. Whenever possible, the demonstration plots were located in areas where people travelled. For example, on average, 20 fertilizer demonstration plots were planted each year near the meeting places of the kindred groups. In all cases, before starting a crop or livestock operation (pig or poultry farms), the project assessed the market for the produce, and usually had to assist with the marketing arrangements for the first few crop cycles.

In addition to church announcements, sign boards mounted at central meeting places, such as the markets where people go once a week, were used to spread word of innovations or to communicate practices to be followed.

Uboma Cooperative Union

As mentioned earlier, two attempts to form cooperatives in the Uboma area had failed. In contrast to the initial efforts, the project encouraged existing groups such as kindred or age-grade organizations to form cooperatives around a productive enterprise; earlier efforts were concentrated on organizing a clan-level group. The first cooperative society was formed in 1965, and eight more had been formed by 1970 when the Uboma Cooperative Union was established. Now there are 17 cooperatives operating under the umbrella of the Union.

Once a productive endeavor has been started, such as rice growing or operating an oil palm press, the project encourages the group to formalize its structure to facilitate credit and contractual arrangements. This is possible because the groups are small and closely knit. The Union was also established for an initial purpose, that of raising sufficient funds to buy a rice mill; each of the six societies contributed US$326. Once a cooperative is formed around one activity, it is encouraged to expand its services. For example, the Uboma Cooperative Union now distributes cement as an agent of the East Central State Cooperative Marketing Association; it also distributes fertilizer as an agent of the Ministry of Agricultural Extension; and privately it distributes livestock and credit. The Union has also taken over the marketing of aldrin dust from the project.

Achievement Days

An important catalyst for getting farmers to adopt new practices has been the yearly achievement day. The most progressive farmers are recognized through awards of certificates of merit. Over the years, this has stimulated farmers to compete, which the project feels is necessary for progress.

Rural Services

From the outset, the project assumed that if the incomes of farm families were improved they would invest in community improvement projects. Experience has proven this assumption correct. As a result of local initiatives, roads have been constructed or widened throughout the project area. There has been a shift from the traditional thatched roof huts to more solid structures with tin roofs. To improve education, village groups are being levied for expanding school facilities and for sending young people out of the area to attend higher-level schools. The main markets at Eke-Umuawuchi and Eke-Egbu have been renovated through communal efforts. In some of these cases,

the project has provided technical assistance or inputs. For example, during the civil war, bridges in the area broke down due to neglect. The project contributed written-off pipes and some cement for the rehabilitation of five bridges and the construction of one bridge and seven culverts; the local population provided the labor and initiative as they have done for most improvements in rural services.

V. PROJECT SUCCESS

Project Benefits

Even though project implementation was hampered for 30 months during the civil war, the aggregate results of the project are impressive. Some of the most significant are:

- over 1600 acres in rice production;
- 864 acres in improved oil palms;
- 1955 budded citrus stands planted;
- over 70,000 pineapple stands planted;
- 29 acres of fish ponds constructed and stocked;
- 88 acres of irrigated dry vegetables grown annually;
- 15 small poultry and ten small piggery farms in operation;
- two rice mills and a mobile rice processing unit established; and
- the formation of 17 farmer cooperatives, and creation of the Uboma Farmers' Cooperative Union.

Using rough estimates of the net income generated from these innovations, the increase in average family cash income from the land (4500 families) over the past ten years approximates 37 percent. Unfortunately, the data does not allow an assessment of the distribution of this increased income. Clearly, the most progressive farmers, through whom the project has worked, have benefited significantly, particularly from

from improved oil palms. Field interviews indicate that about 75 percent of the smallest farmers, who hold two to three acres, have adopted one or more of the innovations. However, there is still the possibility that the project has caused an increased disparity in income distribution within the area.

Beyond the direct income benefits, the project has strengthened institutional capabilties in the area so that community improvement activities are now initiated, financed, and carried out locally.

Self-Sufficiency

Shell-BP's major input into the project has been technical assistance personnel; this investment, as mentioned earlier, has been about one-fifth of the total net income generated in the area over the past ten years. The intent of this assistance was to exploit a community's resources whether they were funds from the government, or the labor and latent skills of the people themselves. While Shell considers these inputs to be totally external to project costs, the availability of government funds played a vital role in bringing about behavioral changes at the local level.

Perhaps a more significant question at this point is whether the project would collapse if Shell personnel were withdrawn. In terms of those innovations that have been widely accepted by the farmers, the delivery and marketing systems for the most part are functioning effectively. Moreover, there has been an increase in management capabilities, both farmer and institutional (through the cooperatives and other associations). Still, the Shell personnel play an important catalytic and troubleshooting role; without their support, project activities would continue and grow, though perhaps not as efficiently. It is doubtful at this point that the Uboma Local Council or the Farmers' Cooperative Union would finance this technical assistance, not because of a lack of appreciation, but because of a shortage of available funds.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The Uboma Development Project shows how local resources, government and private, can be mobilized in a development effort with an infusion of technical assistance. Moreover, it suggests strongly that the effectiveness of technical assistance depends largely on the manner in which it is given, not necessarily on the amount of aid funds.

There were some unique features to the Uboma project which contributed to its success. Perhaps the most important of these was the rapport that the Shell agronomist who initiated the project was able to develop with the farmers. In addition, the availability of a major market in Umuahia provided an outlet and probably an incentive to farmers for increasing their production. However, many of the techniques (outlined above) can be applied in similar agricultural development projects, as Shell-BP is currently doing in Rivers and Mid-western states.

More broadly, the Uboma Project offers major lessons for future project design.

First, the information collected in the socioeconomic survey was used to plan and implement the development effort. More specifically, it illustrates the types of information necessary for operational planning. For example, it is doubtful that the cooperative endeavors could have been launched without a detailed understanding of the social organization of Uboma. Further, through the interaction which took place during the data collection effort, the Shell agronomist, or field operator, got a better understanding of the needs of the local population and the importance to them of various local organizations and family relationships.

Second, the project illustrates the importance of local involvement in decision-making from the outset. Local leaders, because they were involved, understood the purpose of the project and were able to enlist local support.

Third, simple technological innovations were introduced. They were tested on the farmers' land, and usually on a small portion of his land, and were located in areas which people frequented. Once an innovation proved to be successful, the project staff was able to draw on its knowledge of local organizations, communication channels, and customs to promote adoption.

Fourth, the project concentrated on income-producing activities, assuming that as capabilities increased at the local level the leaders and groups would take the initiative in improving rural services.

Information Sources

A. Field

Arrangements for the visit to Uboma were made by the Washington and New York offices of Asiatic Petroleum. Initial discussions took place with T. Griffith-Jones, Rural Development Advisor, Shell International in London. Data collection took place in Uboma in August 1974, during which discussions were held with: Kanu Offonry, Third Party Affairs Manager, Shell-BP Nigeria, Gilbert Heys, Head of the Community Development Projects of Shell-BP Nigeria, Innocent E. Nwaoha, the Assistant Project Manager, the government agricultural extension and cooperative officers assigned to the project, the leaders of the Uboma Farmers' Cooperative Union and other local leaders throughout the project area. Field visits were made to several of the project activities.

B. Reports

Information for this write-up was drawn from several reports, to include a special brief and charts prepared by the project staff for the visit; *Uboma Development Project (1964-1972)* prepared by Drs. Q.B.O. Anthonio and M.O. Ijere for Shell/BP in 1972; *Uboma, A Socio-Economic and Nutritional Survey of a Rural Community in Eastern Nigeria*, by H.A. Oluwasanmi, I.S. Dema, *et al.*, Geographical Publications Limited, Lon. ı, 1966; *Shell in Rural Development*, prepared by Shell International, October 1972.

Data Adequacy

The socioeconomic and crop yield data have been systematically collected by the Uboma Project staff. The major weakness in the data base is the inability to examine the distributional effects of project activities. In addition, the estimates of average farm family income are based on rough calculations. Comments on the case study were received from T. Griffith-Jones, Rural Development Advisor, Shell International in London. Consolidated with his comments were those of Kanu Offonry, Third Party Affairs Manager, Shell-BP Nigeria, and Gilbert Heys, Head of the Community Development Projects of Shell-BP Nigeria.

ANNEX G

BOLIVIA

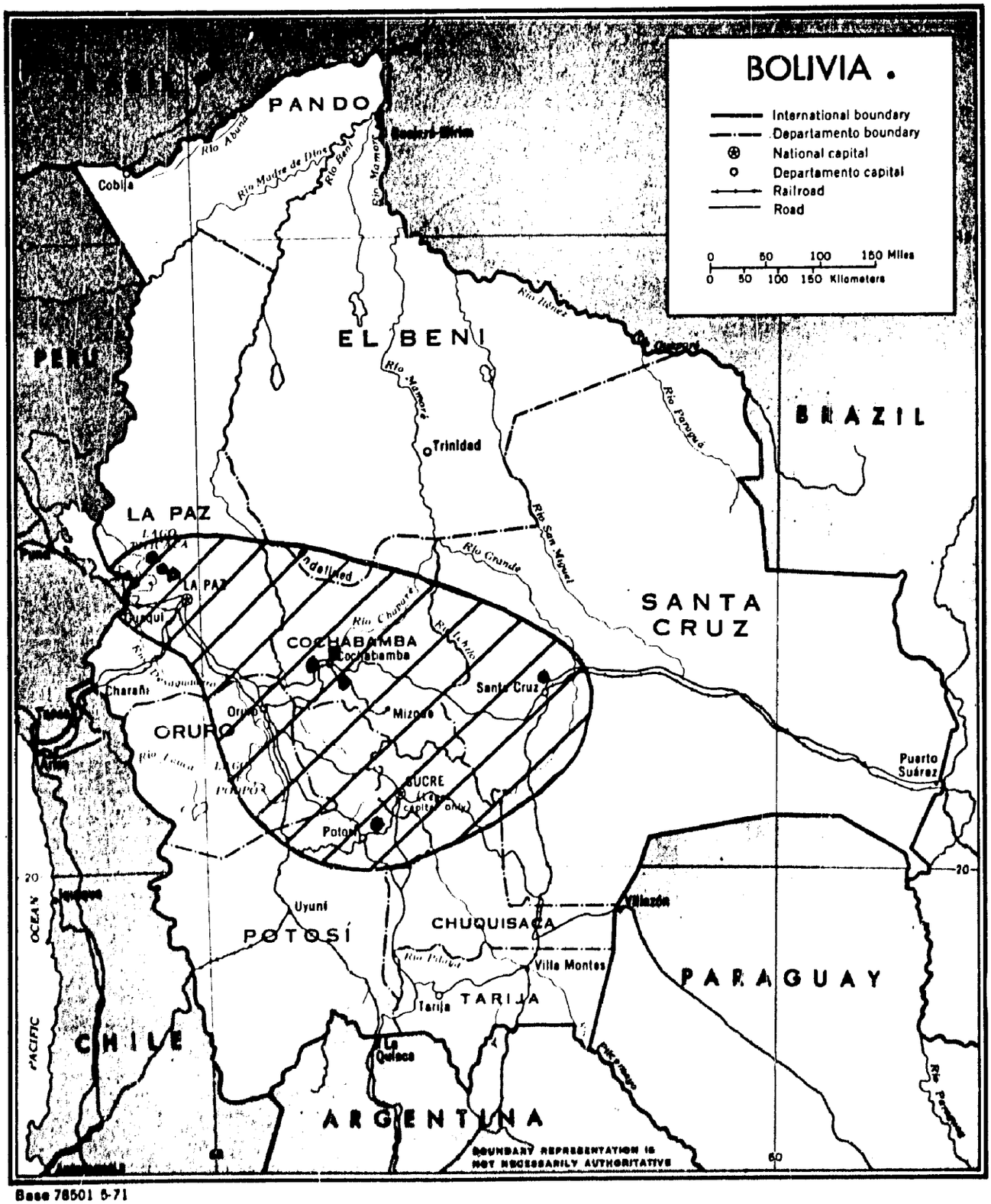
BOLIVIA

Area: 424,162 square miles
Population: 5,460,000
Population growth rate: 2.4%
Density per square mile: 12.9
GNP per capita: $190
GNP per capita growth rate: 2.2%
Capital: Sucre (69,800)
Largest cities: La Paz (850,000),
Cochabamba (157,000)
Major language: Spanish, Quéchua, Aymará
Santa Cruz (108,720)
Religion: Roman Catholic
Literacy rate: 35-45%

DESEC Center for Social and Economic Development - This project, with many scattered subprojects (●) is located within the shaded area [illegible] of the Santa Cruz and Altiplano regions.

ASAR/ARADO Potato Production and Seed Improvement Project - This project is in the highlands near Cochabamba (■).

National Community Development Service (NCDS) - This project serves the entire country. There are three subprojects northwest of La Paz at Chunapi, Colquencha and Machacamarca (○).



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DESEC
CENTER FOR SOCIAL AND ECONOMIC DEVELOPMENT

I. PROJECT BACKGROUND

Initiated in 1963 on a regional basis and currently national in scope, DESEC[1] is a private sector program dedicated to assisting Bolivian *campesinos* (peasants) overcome their marginal socioeconomic status. DESEC seeks to promote, on the one hand, the organization of democratic rural base institutions run by and for peasants. On the other, it seeks to assist the project activities of these base institutions by making available to them a variety of professionally-administered technical assistance services. In the process, DESEC attempts to mobilize both the human and capital resources of the peasants as well as foreign funding to finance income-generating and social betterment endeavors on behalf of the rural poor.

Since its inception, DESEC has organized 200 local (community) groups with a combined membership of some 3000 rural Bolivian families from five of the nation's nine departments. Some 120 of these groups are affiliated into a national peasant federation known as ARADO. Most of the base groups have been organized, in turn, into zonal and regional interest groups along project or product-specific lines to form cooperatives, input and marketing centrals, and producer associations. To channel technical assistance and other outside resources to these peasant-managed institutions, DESEC created four service agencies: ASAR (for agricultural, livestock and artisan craft promotion), VIPO (to assist housing projects), ICE (to support peasant education), and SEPSA (to provide rural health services). While DESEC hopes to eventually place the services of these agencies on a self-supporting basis, their continued operations are still largely dependent on outside grants, mainly from Canadian and European sources.

DESEC was conceived, organized, and continues to operate through the efforts of Juan Demeure, a Bolivian national totally dedicated to the social and economic improvement of the rural

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[1] Centro Para El Desarrollo Social Y Economico.

campesino. With university degrees in pedagogy and psychology, and coursework in sociology and economics, Demeure was a consultant to DESAL[1] between 1958 and 1962. His assignment was to help organize and evaluate rural development projects -- first in Chile, then in Bolivia, Peru, and Venezuela. From this work he acquired the conviction that the only way peasants could overcome their socioeconomic disadvantages was through organization of interest groups. Work in the field taught Demeure how to organize peasants and the appeals which would draw them together. Determined to begin directly assisting Bolivian peasants, Demeure started full-time in 1963, opening an office of DESEC in La Paz but spending most of his time in Cochabamba, where he had previously identified organizations he felt might serve as the nucleus for a rural development program.

II. LOCAL ENVIRONMENT[2]

Bolivia has often been cited as a case where land reform did not lead to rapid growth or development. The reform, in 1952, left rural Bolivia with fragmented agricultural holdings; an average peasant in the high plateaus or mountain valleys will own three to four hectares (seven to ten acres) scattered over six to eight different plots. Poverty is oppressive, and a combination of harsh climate, overworked soil, dense population and irregular rainfall has led to continued low agricultural productivity.

The high plateau *(Altiplano)* surrounding Lake Titicaca has proven virtually intractable to modern agriculture techniques except when irrigation is possible. Other highland plateaus suffer from too many animals and people. A voluntary resettlement program, from the highlands to the tropical areas, is in progress but requires improved agricultural techniques. Tropical soil fertility is rapidly depleted unless there is continued use of fertilizer, and huge tracts (about 50 hectares or 125 acres) are necessary to support one farm family using slash and burn methods.

The political climate has worked against the provision of assistance to the rural campesino. Urban workers, teachers and miners have been the most politicized citizens and the

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[1] Centro de Desarrollo Economico, Social Americano Latino, Chile, an organization funded by MISEREOR, an Institute of German Catholic Bishops.

[2] See the National Community Development Service (NCDS) write-up, p. G-24.

government has been concerned with appeasing or opposing worker/miner/teacher demands. The Cochabamba area has been notorious for its disregard of the central government and has occasionally been the seat of peasant uprisings -- shots and attacks against government outposts.

In the Bolivian Andes, road transportation in the wet season is limited to major highways; and national arteries from Cochabamba to Santa Cruz are cut for months due to flooding or landslides. Bolivia, with an average farm family income of approximately $300, lacks agricultural extension services, or for that matter any services other than education in the rural countryside; it is a truly underdeveloped country.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

Demeure began his organizational work with existing Rural Catholic Action groups in the Cochabamba area; they were affiliated with the local parish churches and 80 percent of their members were women. By working through the priests and wives of campesinos, Demeure convinced husbands to attend meetings, where they talked about what could be done to better their lives. After what Demuere describes as several months of "promotion," 34 such groups met, agreed to a name and established a founding charter and set of principles. This was the beginning of the ARADO regional organization in Cochabamba. With his previous contacts as a consultant, Demeure sought and obtained funding for further organizational and promotional work -- $12,500 from MISEREOR in 1964.

Demeure (and DESEC) focused on economic rather than religious activities. This emphasis was opposed by both the Catholic Action groups and the Christian Democratic Party, which had strong religious affiliations. Demeure's insistence that a better life required more than piety led to a schism, wherein DESEC, in order not to further widen the split, withdrew. Subsequently, Demeure, with the assistance of several other staff members in DESEC, began to build new base organizations in the Cochabamba region in spite of strong negative propaganda from the church and the Christian Democratic Party. The years 1964 and 1965 were difficult for DESEC and were marked by meetings in rural schoolhouses, peasants' homes, market day promotion -- any way to reach the campesino and convince him to join with his neighbors to change his existence.

The work of DESEC is an attempt to overcome the marginalism of the rural Bolivian peasant -- by-passed by modern technology, unable to take advantage of opportunities, channelled into the same fundamental rudimentary existence as his forefathers. Demeure first pushed the recognition of the possibility of change and improvement; then the requirement for unity, to give weight to each individual's position; and finally, the need for the positive act of joining a formal association, with local leadership, rules and regulations and membership dues. This was done without any promise, explicit or implied, of the receipt of outside assistance, and the ARADO base units were formed and continued years before technical assistance became available.

In 1966, DESEC was officially recognized by the Bolivian government, and in that year DESEC received a $250,000 MISEREOR grant to finance a network of institutions to serve the ARADO groups. Of this sum, $60,000 was to pay administrative costs of promotion of new ARADO base units, the salaries of ARADO base leaders and construction of ARADO headquarters and its rural training facility in Cochabamba. The MISEREOR grant also established the funds to create four service organizations, which were:

- ASAR (Association of Artisan and Rural Services);
- VIPO (Association of Popular Housing);
- ICE (Institute of Peasant Education); and
- SEPSA (Institute of Popular Health).

All four groups were designed to serve the ARADO affiliated and other peasant base organizations. This allowed DESEC to bring together the two elements it believed necessary for the improvement of the social and economic status of campesinos -- a peasant base organization which begins in rural communities and extends through regional and national headquarters, and service organizations of professionals who can work with and respond to the needs of the peasants. The problem during the years 1966-69 was not funding, but an organizational scheme which would bring together the two necessary parts of the development process in the most effective way. With the receipt of major funding, DESEC was able to implement its overall plan for rural development.

IV. DYNAMICS: PROJECT IMPLEMENTATION

To understand DESEC, it is necessary to describe the wide assortment of rural base institutions it has promoted, together

with the kinds of activities sponsored by DESEC's four support agencies.

The ARADO Base Institutions

The base institutions are of two types: (1) community groups known as "centers," and (2) functional groups or "committees" which are aggregated into zonal and regional organizations. A "center" is a voluntary association of peasants who reside in the same community, village, or colony who elect to organize themselves to collectively resolve common problems. Each center has its own democratically elected board of directors.

When several centers have been formed in a given region, they elect representatives to a regional ARADO federation, of which there are now eight, the most powerful located in the departments of Cochabamba and Santa Cruz. In turn, the regional federations have leadership councils, and each sends representatives to national-level ARADO federation meetings held several times a year. Regional ARADO leaders are often members of other Bolivian farmer institutions such as the National Federation of Rice Cooperatives, the Association of Sugar Cane Growers, the Federation of Agricultural Laborers of Northern Santa Cruz, etc. Members of a local ARADO center must pay an entrance fee and periodic capitalization quotas which are determined with respect to the projects which the group undertakes and the financial capacity of the membership. Both ARADO centers and regional ARADO federations meet once a month.

Once an ARADO center begins to undertake specific project activities, its members may join specialized "committees." For example, there are committees of milk, potato, rice or livestock producers; also committees for marketing, house construction and consumer goods purchasing. Following the creation of several committees of a similar type in a given zone or region, these will organize into second-level entities such as centrals, cooperatives and producer associations (called *redes* or "networks" by DESEC). To date, seven committees interested in housing have organized a regional Housing Savings and Loan Cooperative; 14 committees of potato producers have formed an Input and Marketing Central; 25 committees in two separate highland provinces of the Altiplano have organized two Consumer Goods Centrals and a chain of local stores; ten artisan committees have organized an outlet in Cochabamba; 39 committees of rice producers have organized two agricultural cooperatives in the Department of Santa Cruz; 52 committees participate in an adult literacy program.

Activities of both the ARADO centers and their spin-off committees are coordinated at the regional and national level by periodic meetings of ARADO leaders meeting with DESEC staff and personnel of the support agencies. It should be noted that in addition to the DESEC-sponsored activities mentioned above, ARADO base institutions also undertake a large number of self-help projects, either on their own initiative or in collaboration with other programs such as that of the National Community Development Service. For example, 40 schools, social centers, consumer stores and clinics have been built in different regions by ARADO groups; more than 60 miles of roads have been completed in Northern Potosi, Yungas de La Paz, Cochabamba, and Northern Santa Cruz; several small micro-irrigation projects have been undertaken. DESEC estimates that in the 200 communities where base institutions have been organized, their activities have directly or indirectly benefited 10,000 families, representing a population of 50,000 inhabitants.

The Service Agencies

ASAR (Association of Artisan and Rural Services) is DESEC's major service agency. Organized in 1965 in Cochabamba, and now with regional offices in Santa Cruz and La Paz, ASAR works with ARADO centers, committees, cooperatives, producer associations, etc. It provides such services as technical assistance in seed production and crop cultivation; implements, fertilizer, insecticide and fungicide supply; tractor rental; veterinary assistance; livestock and pasture improvement; artisan production and marketing programs in general. Aside from the Cochabamba potato project (see ASAR/ARADO potato production and seed improvement project write-up), ASAR's principal activities include the following:

- In the Cochabamba valleys, a dairy program which covers cattle improvement, pasture improvement and the marketing of milk in conjunction with a regional milk processing plant;

- In Santa Cruz, ASAR's technical assistance to rice, cotton and fruit growers as well as beef raisers is self-financed by income from a rice mill which it operates in cooperation with ARADO centers and cooperatives in the region;

- In the highlands of Cochabamba, a program to better potatoes and increase seeds is complemented with the distribution of seeds to various zones, mainly Mizque and Comarapa-Vallegrande. This program has been extended to the introduction of oats for fodder;

- In the Melga zone a program similar to that above concerned with improving potatoes and increasing seeds is being developed. A program to introduce fodder to improve sheep production is also underway;

- In Chapare, work is being done along two principal lines; experiments with varieties of rice seeds, and the introduction of fodder and the fattening of cattle; and

- ASAR's Department of Artisan Promotion assists ten artisan committees from two provinces in Cochabamba to market their products both domestically (to markets in La Paz, Oruro and Santa Cruz) and internationally (U.S. and Europe).

VIPO (Association of Popular Housing) promotes housing committees, supervision of self-help home construction and has completed housing studies (rural and urban) in several regions of Bolivia. In coordination with ASAR, it is assisting in the construction of a model rural village which will be financed with an income-generating potato improvement project backed by a grant from the Inter-American Foundation. VIPO also provides technical assistance to a regional housing cooperative, La Rural Ltd.

SEPSA (Popular Health Service) provides health services to peasants who pay an inscription fee and monthly quotas through a clinic operated in the city of Cochabamba. At present, some 300 peasant families are enrolled in the SEPSA health program.

ICE (Campesino Education Institute) is dedicated to the training of peasant leaders, both in basic education and technical subjects. Courses are given at the Institute's headquarters in Cochabamba as well as in the countryside at ARADO centers. All ARADO center leaders receive periodic training courses in Cochabamba, and this education has been instrumental in providing the ARADO movement with its own esprit de corps and cohesiveness.

ICE's three-man professional staff are from peasant stock, speak all the local dialects and are highly regarded by the peasants. They offer courses in general education (literacy, numbers), special education in all fields of concern to peasants -- nutrition, cooking, child care, health -- as well as courses in modern agriculture techniques, planting density for various crops, the use of improved pasture for high-grade animals, etc.

Records show that more than 7000 peasants have attended the courses, either at training centers or in their own villages. It is a long-term attempt to improve the understanding of the peasant and to make him more capable of dealing with the outside world -- a fundamental part of the DESEC philosophy.

If rural peasants are to be literate, there must be something for them to read, and this is a second function of the ICE staff, in conjunction with other DESEC/Service organization professionals in the Cochabamba office. The AYNI is a monthly newspaper selling for approximately $.04.[1] It is filled with news of ARADO leaders, projects underway, information about campesino training courses, the formation of cooperatives by some local ARADO units, stories and pictures about human and animal diseases, football (soccer) schedules, and potato and milk production from ASAR/ARADO projects, etc.

The AYNI is the communications link which helps keep all diverse aspects of the project informed; it promotes exchanges of ideas and continued effort. It supplements the small booklets produced by ICE, and is passed from hand to hand among ARADO base unit families, being read to the illiterate. Larger than a newsletter, the 12-page tabloid is written in very clear and simple Spanish and fulfills an important part of the DESEC/ARADO promotion/education objectives.

The DESEC Umbrella

Although the organization, staff and location of DESEC have changed since 1965 -- often reflecting the availability or absence of funding -- its three functions have remained constant.

First, DESEC has assisted peasants in forming their own organization, an apolitical lobbying group which concentrates on what peasants can do for themselves, rather than on what should be done for peasants. There have been no funds for general promotion or organizational work since 1969, and the size of the peasant base has not grown significantly since then. However, local, regional and national meetings have continued with training and retraining to increase the skills of the peasant base and leaders so they can better choose among options. DESEC, which was the "organizer," now serves as the official advisor to ARADO. Juan Demeure and his staff attend regional and national meetings and have regular sessions with the full-time peasant leader of ARADO, charting new campaigns, bolstering flagging base units or regional organizations.

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[1] Officially, AYNI is a publication of the Department of Communications of DESEC. It not only addresses itself to the activities of ARADO but also

The second role has been the organization and occasional management of the service organizations. They were originally designed to be independent of DESEC, but the termination of MISEREOR funding (the use of the entire $250,000 grant) required cutbacks in the service organizations, and the managers resigned. DESEC -- primarily Juan Demeure and a few staff -- took over the leadership of the service organizations, keeping them going until new funding and managers could be obtained. The service organizations now fall under the general DESEC umbrella.

DESEC's third role has been as fund raiser for both ARADO and the service organizations. His international connections, and a history of consulting work in several Latin American countries has enabled Juan Demeure (who speaks very acceptable English) to generate grant funds, first from MISEREOR and later from assistance organizations who would support one particular part of the DESEC/ARADO program. OXFAM, an English organization, funded the Cochabamba potato project; the Inter-American Foundation supported a self-help housing project as one part of a large rural development venture; and commercial bank loans allowed the establishment of a rice mill in Santa Cruz.

These specific funding requests require professional preparation, which DESEC has been able to provide. However, when specific projects are funded, money flows in for the service organizations, but not for DESEC, which becomes an overhead support item in budget requests. In addition, Demeure/DESEC have conducted a number of studies for international organizations, such as the Inter-American Development Bank; Demeure/DESEC have performed feasibility studies, evaluations and basic socioeconomic research on specific areas of Bolivia, or occasionally other countries in Latin America. DESEC's profile and visibility have been increased, and needed funds have been brought into the DESEC account.[1]

V. PROJECT SUCCESS

In the one ASAR technical assistance project total income of participants increased ten percent (30 percent increases of cash income). There were also significant demonstration benefits, at least three to one, suggesting that other non-participant small farmers were benefiting from the knowledge which the project made available. None of the other projects were investigated in detail, but we have no reason to believe they do not deliver income benefits.

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[1] DESEC, while not mentioning the fund-raising function in its report submitted to the Inter-American Bank, does list as its first activity the scientific investigation of the social and economic realities in Bolivia, and the elaboration of models of problem solution. During the period 1964

DESEC reports previous technical assistance failures -- e.g., attempts in Cochabamba to introduce improved sheep prior to the development of improved pasture, attempts in the Altiplano to increase agricultural productivity. Recognition of these failures should ensure that ongoing technical assistance programs will benefit small farmers, as well as become self-sufficient -- another of DESEC's goals. In addition, the continual interaction with the ARADO peasant organization suggests that non-functioning projects, or projects non-applicable to local circumstances will be quickly identified, modified or dropped.

Probably more important than delivery of benefits is the increased capability of peasants, united in an organization -- which pyramids from rural community to national headquarters -- to complement outside assistance with their own resources, land, labor, cash and management. The failures in the program have been technical failures (the technology did not work), not failures of local involvement; insofar as voluntary contributions could make a project successful, they have been forthcoming. Increased literacy, the building of leadership positions, the election of community, regional, department and national leaders, the strong and positive interaction with DESEC and service organization professionals have led to increased confidence that development is possible.

While there has been a flow and ebb of ARADO membership (around 3000 families on average) depending on the success of programs, the steady trend has been toward more membership and more peasants directly involved in development projects. DESEC's policy of expanding the peasant base appears to have been curtailed in 1970, due to a funding constraint requiring existing service organizations to become self-sufficient. Since there are upfront costs to most new projects, those underway received priority, and new promotional or organizational efforts were delayed until funding and self-sufficiency were assured. In 1974, DESEC/ARADO appear to be in a position to make good use of more external funding, with a prepared peasant organization and an established service mechanism. There is every reason to believe they will become a major factor in the rural sector in Bolivia in the future.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

DESEC/ARADO appears to be a model of successful rural development in a very poor, traditional country. Dedicated leadership from outside the rural peasantry helped motivate, train and assist in the creation of a national peasant organization, with roots firmly in the countryside, responsive to outside cooperation and assistance, but financially and

politically independent. In a country where political tremors have often rocked the rural countryside -- there was a state of martial law in Cochabamba for months during 1974 -- ARADO has maintained its apolitical alignment, while still serving as a focus for peasant interests. The thrust has been the optimization of local resources and capabilities with outside assistance introduced as required and available. A dependency relation has been avoided, and ARADO base units promote change in areas where there are no technical assistance projects underway.

Interaction between the service organizations and the peasant organizations appears to be excellent. Projects were modified as they were unsuccessful, transferring as many functions to the peasant organization as they could handle - particularly those projects which needed community and group pressure to insure success (i.e., credit repayment). ASAR in Cochabamba was experimenting with the provision of technical extension assistance to rural cooperatives on a pay-for-service basis, which would give the local members strong incentive to make their needs known, and to use the advice they were paying for. The wide diversity of projects types, organizational schemes and methods of financing suggests that the project takes to heart its own policy of adapting the assistance to local circumstances. It has proven to be very successful, on a modest but significant scale, in rural Bolivia.

The DESEC organizational scheme offers insights into the community-versus-individual base for project organization, another oft-debated consideration for countries at very low levels of development. Although good results have been obtained by projects which include the entire community in Bolivia, (see the NCDS write-up), DESEC has deliberately sponsored a peasant base organization which contains much but not necessarily all the community. *Individuals* join ARADO; there is no requirement for automatic participation by all community residents. The functional committees of ARADO may be joined by non-ARADO members, a rule which further extends the project to non-joiners and gathers support from those interested in one development subject, but not in peasant organizations per se.

The evolution of DESEC's and ARADO's local-to-national organizational structure has involved a great deal of high-level professional talent, in organizing peasants as well as technical assistance to complement peasant organizations. The peasant base, ARADO centers and committee with their related networks, centrals and cooperatives, and the service organizations, with their interlocking directorates with DESEC, are complex and demanding organizational entities. Only a man like Juan Demeure could conceive and bring into existence such a complex development project. Replication in other environments would require similarly qualified leadership.

Another lesson not to be overlooked is the fragility of peasant organizations. Leadership, cooperation and management are underdeveloped skills; there is often no history of the kind of decision-making necessary to make such an enterprise function. DESEC has provided just the right kind of help -- training to increase peasant capability, bolstering the faltering steps toward independent decision-making, assisting with funding, housing for leaders, transportation -- while promoting autonomy and independence. Juan Demeure is an exceptional man, and his innate sense of when to help and when to step back has lifted ARADO to its present prominence. His and DESEC's role has not ended, and there will be a continuing need for the kind of respectful outside cooperation which DESEC has brought to rural development in Bolivia.

Information Sources

A. Field

Two DAI staff members visited the DESEC offices in La Paz, Bolivia, and spent four days in Cochabamba, Bolivia, working with ASAR staff in early May 1974. They met with DESEC founder and Director Juan Demeure, and his La Paz Deputy Director. In Cochabamba, they worked with the ASAR chief, the education officer and half a dozen staff professionals and subprofessionals. DAI staff surveyed two field sites (ARADO base units which were part of the potato project) and talked with peasant farmers, ARADO base unit leaders and ASAR extensionists. Both La Paz and Cochabamba were revisted in October 1974, with the same Bolivian staff who had been so helpful on the original trip being consulted. Information gaps were filled, and more detailed information obtained on the results of the 1974 potato crop.

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The most comprehensive coverage of the DESEC project is presented in *DESEC, Informe Preparado a Solicitud del BID*, August 1972. In addition, we made use of some DESEC socioeconomic studies, particularly those on the Cochabamba area. Other information of special revelance to the potato project came from the monthly newspaper *AYNI* which is published in Cochabamba and which reports all DESEC, ASAR and ARADO activities.

Data Adequacy

ASAR measures all fields and carefully records all potato seed weights. Since ASAR is entitled to 50 percent of the harvest, the output and yield estimates are carefully calculated. All input costs, expenses, Input Central sales, etc. are from ASAR/ARADO records. The first draft of this write-up was reviewed by Juan Demeure, Director of DESEC.

441 COCHABAMBA, BOLIVIA

ASAR/ARADO POTATO PRODUCTION AND SEED IMPROVEMENT PROJECT

I. PROJECT BACKGROUND

The Association of Artisan and Rural Services (ASAR) is a technical assistance agency administered under the auspices of DESEC (See DESEC project write-up). It provides technical, administrative and financial assistance to peasant-managed base institutions which undertake agricultural, livestock, artisan and marketing projects. ASAR activities began in the Cochabamba region in 1965. By 1974, the agency had expanded its services to four regions of Bolivia and had regional offices in La Paz and Santa Cruz.

ASAR's potato production and seed improvement project (the agency's principal project activity) was initiated in 1968 at the request of the regional ARADO[1] federation of Cochabamba. ARADO leadership was anxious to develop a method of increasing potato yields based on the use of modern inputs. Potatoes were suggested by the peasants as the first priority because this was the region's primary staple as well as major cash crop. Potato yields were low, insect blights frequent, and credit available primarily through a variation of the *compañía* system, in which middlemen advanced cash and inputs in exchange for half or more of a farmer's harvest production.[2] Initial assistance with modern potato technology began in 1968 and evolved into a unique sharecropping arrangement by 1974.

The project operates in 14 rural communities, with 142 farmers cultivating a total of 33.6 hectares (82.9 acres) of seed potatoes in 1973-74. The population to be reached numbers in the tens of thousands, since potatoes are the main crop produced in the highlands surrounding the regional center of Cochabamba.

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[1] Acción Rural Agrícola de Desarrollo Organiazción (ARADO). ARADO organizations are peasant-based units in rural communities.

[2] At the suggestion of the peasants, this system has been expanded to include more inputs (such as improved seeds, adequate amounts of fertilizer and pesticides), technical assistance and the establishment of just weights

II. LOCAL ENVIRONMENT

While the average farm size is 3.4 hectares (8.4 acres) in the Cochabamba highlands, ranging from two to six hectares (five acres to 14.8 acres), land actually cultivated averages no more than 1.8 hectares (4.4 acres) per farm family. This is a result of poor soil, requiring heavy fertilization and a fallow period of three years or more. Communal or extended family work obligations have limited the amount of labor which is available, as there is no "cash" labor pool in this subsistence area; and this in turn has restricted the area cultivated.

The altitude ranges from 2400-3900 meters (8000-13,000 feet in the upper valleys and the potato crop is subject to severe insect and fungus incidence, requiring strict sanitary controls and frequent fumigation. Modern potato production techniques require improved seed potatoes, and these are in scarce supply; this shortage has limited both the number of farmers and the acreage (an average of .57 acres or .23 hectares) per participant in the project.

Regular government extension services in agriculture are unknown in this part of Bolivia, but the government enters the area through syndicates -- government-sponsored peasant political organizations which everyone joins, since the syndicates are responsible for titling land provided by the agrarian reform. There have been positive associations with the National Community Development Service (see write-up) and an occasionally moderninzing parish priest, often from Spain.

While local area literacy is rising as a result of newly constructed and staffed rural schools, functional literacy is estimated to be less than 50 percent among farm family heads, although for those in the project who are the younger and more progressive farmers and have been given special instruction in reading, literacy is likely to run as high as 80 to 100 percent. Total farm family income in 1973 was estimated at US$300, with the family size averaging 4.5 members.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The prior organization of peasants into self-governing interest groups, as well as the formation of complementary technical assistance agencies designed to support rather than

dominate the peasant organization and leaders, set the stage for the project. In 1968, at the request of the regional (Cochabamba) peasant ARADO organization, a potato production and seed improvement program was initiated. Using grant funds from MISEREOR, the German Catholic Bishop Institute, ASAR assigned two technicians (high school agricultural graduates) to work with selected Cochabamba farmers and provided 100 percent interest-free input credit for a package which included improved seeds, seed selection, planting density, fumigation, fertilization and weeding. These recommendations as well as improved seeds were drawn from the Ministry of Agriculture's research station. All inputs were for potatoes, which was the only crop regularly marketed. There are little data available on the output or income increases as a result of this first year of the project, but a good deal of ASAR's professional staff time was spent in attempting to retrieve delinquent payments. Extended discussions with the peasant leaders, as well as all members of the peasant base organizations, eventually led to a set of recommended solutions to the delinquency problem.

First, there was a decision to adopt a credit system which was very close to the traditional *compañía* system. The project would provide the cash requirements and the farmer the land and labor. The output was to be divided in the field, with half for the farmer and half for ASAR; the ASAR technician helps with the harvest and is on the scene when the crop is divided. Second, there was a decision to transfer the responsibility for the provision of credit, as well as the collection of overdue accounts, from ASAR, the technical organization, to ARADO, the peasant base organization. Fourteen ARADO base organizations, with ASAR assistance, elected to create an Input and Marketing Central which would provide necessary inputs for the farmers and finance 50 percent of their cost, payable at harvest time. ASAR agreed to pay for the salary of the Central's managers for the first few years, until the institution was able to pay for itself. Regional ARADO leadership agreed to use the power of group persuasion on delinquents. Both were successful, and delinquency rates were not a factor in the operation of the Central through 1973 when the provision of credit ended.

During this period of time there was no explicit interest rate charged to farmers. Expenses were covered by the project's ability to buy in bulk, at a cost as much as 40 percent below small-lot sizes. The Central would then charge the going market price for the inputs, mainly fertilizer to the farmers, and run their operations off the price difference. Savings (profit) were divided equally between the ARADO member and the Central, with the Central's portion used to increase capitalization. Each ARADO member has a savings account with the Central. Every time he makes an input purchase, one-half of the Central's margin on that

commodity is credited to the member's account. Non-ARADO members could buy from the Central but were excluded from the profit sharing arrangement.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Improved potato production is complicated by the degeneration of potatoes and increased susceptibility to disease if each year's crop constitutes the seeds for next season. ASAR purchased seed potatoes from the GOB Agricultural Research Station and over the past four years has imported two shipments from Holland in an attempt to improve the basic stock available to project participants. In their plots, they use three domestic and three imported varieties, and each has a slightly different set of input, weather and land quality requirements.

The particular type of seed to be used is decided upon in a dialogue between the ASAR technician and farmer -- a discussion which includes the plot of land to be included in the project. Farmers then select their seed potatoes at the local ASAR warehouse, where the seed is placed in special boxes registered in each farmer's name. ASAR then delivers the seeds and the needed inputs to the farmers and gives technical supervision in the planting.

The ASAR technicians also supervise the harvest and help in the grading of the potatoes, the dividing of the crop into seed and marketable potatoes and in categorizing marketable potatoes into four grades. The ASAR truck picks up potatoes and as much of the farmer's harvest as he would like to have ASAR sell for him. Prices are those obtained at the regional market in Cochabamba.

The technical package also requires disinfectants for the seed and soil, a rotation plan, 400 kilos of fertilizer per hectare (356 pounds/acre) applied at planting and a close and careful watch for disease or insect penetration. The basic extension technique, established early in the project, was a visit by the ASAR extensionist to each farm plot every two weeks, frequently to treat for disease/fungus control. Even after seed selection and planting techniques have been learned by the farmer, there is a problem with the timing and kind of insecticide or fungicide to combat the particularly virulent strains which attack potatoes in this area.

Demonstration and experimental plots were established in 1969-70, with ten leaders of the ARADO peasant base units. As agreed, ASAR provided all technical assistance and cash

input requirements. At harvest, ASAR helped the farmers divide their output into seed potatoes and sale potatoes, and purchased all the seed potatoes (although the farmers prefer to keep their own seed) and as much of the farmer's share of the potato output as he desired to sell.

ASAR used the ten plots in different communities to show the optimum techniques to other farmers, many not participants in either potato project. In 1970-71 there were 25 project participants, and a decision was made to attempt to enlarge the size of the program. A request for funding was submitted to OXFAM, an English foundation which provided $60,000 for the project, including a revolving fund for input purchases and funds for land purchase to regenerate and store seeds. Beginning in 1971, the project expanded to 60 farmers, 92 in 1972, 136 in 1973 and 142 in 1974.

The strong and positive peasant reaction to the sharecropping system was not deterred when the Bolivian peso was devalued in October 1973 and rapidly increasing inflation stopped the provision of supplier credit to ASAR, which had been the basis for the 50/50 credit program through the ARADO Input Central. Starting in the 1974 crop year, all sales from input supply stores were on a cash-and-carry basis, while fertilizer prices jumped almost 300 percent. This increased the demand for inclusion of more peasants into the ASAR program, but a severely limited supply of seed potatoes has restricted both membership and acreage planted.

Each cropping season ARADO community meetings are used to determine how many farmers want to be a part of the system for the next year. When this number is transmitted to ASAR, it is inevitably far larger than the number of available seed potatoes. Each community is assigned an acreage which can be supported by the program, and the local peasant-led base units make the distribution of their portion to individual farmers. When there are more requests to join than there are seed potatoes available, those members who have been with the program the longest are given preference. In the project, all plots are between one-tenth and one-half of a hectare (one-quarter and 1.2 acres).

V. PROJECT SUCCESS

Yield increases in potatoes are simple to calculate because potatoes are planted by weight, making it easy to establish a definite ratio between the weight planted and the crop output. While traditional methods in Cochabamba produced an average of 5.8 metric tons of potatoes per hectare (2.58 tons

per acre), the ASAR project averaged 14.5 metric tons per hectare (6.5 tons/acre) over the last three years. Even when the ASAR-assisted crop is divided, there is still a 25 percent increase in volume to the farmer. More advantageous to the farmer is the difference in grades and pricing from the output of improved potatoes. Seed prices are higher; and the number of grades have increased from three, for local potatoes, to four for the local and imported varieties used by ASAR. Net income calculations suggest that the average farmer, with only 1.8 hectares (4.4 total acres) under cultivation, can increase his income by nearly ten percent on a potato plot one-quarter hectare (three-fifths of an acre) in size. This means that for that part of the crop which goes to the farmer, his cash income goes up 30 percent as a participant in the program.

Although the ASAR staff has done no extended research, it seems clear that the peasants would prefer the project even if total yields did not differ. There is no upfront cash cost to the project participant since the elimination of the 50 percent credit, and cash is extremely hard to come by in rural Bolivia. Those farmers who are forced to use their own resources on the potato crop will pay for fertilizer but not at the recommended levels for optimum productivity.

In addition, non-project farmers are slower to spend cash for insecticides and fungicides, and this has led to a reduced output for all farmers, project and non-project, as diseases spread into contiguous fields. The ASAR staff said that the 1973 crop was severely damaged from non-fumigated potatoes, but by 1974 most farmers working near ASAR project plots had learned the benefits of spraying. ASAR will offer and frequently has offered technical assistance to any of the area's farmers who are not enrolled in the project, suggesting how to improve their output or save their crop from disease.

The total area of the ASAR project is small, and a strong demonstration effect is necessary to give the project generalized impact. The Input Central reports that it sells three times as much (cash value) as the inputs required for the ASAR project, suggesting that some of the farmers are using their own or privately borrowed resources (there is no government credit available) to improve their potato crops. Since the ASAR plots are only a fraction of what farmers in the project themselves grow, they apply newly acquired knowledge of better methods first to their non-ASAR plots; the knowledge gradually spreads to neighboring non-ASAR farmers as well.

The major problem remains the scarcity of seed potatoes. ASAR has attacked this problem in two ways: first, it has continued to cajole the GOB Research Station into producing

larger amounts of seed potatoes, as well as purchasing imports from Holland. Second, it has purchased land for seed duplication (a previous attempt failed, due to unsuitability of the land) and for a seed warehouse. Only by significantly increasing the ability of the farmers to grow, select, store, fumigate and regenerate their own high quality seed will the project pay large dividends to participants. This is the often-discussed and agreed project goal.

While project spread is limited by seed availability, ASAR hopes to be able to replicate the original project in a new area through grant funds for the first several years. ASAR has been able to cover all input costs when yield rates are equal to or exceed 14.3 metric tons per hectare (6.4 tons per acre). The project does not presently meet all extensionists' salary and transportation expenses, although it comes close. The goal is to reach 17 metric tons per hectare (7.6 tons per acre) which would not only cover costs, but allow a surplus for use elsewhere. Although this output was achieved only in 1972, project staff remain convinced it will again be reached.

The ASAR project has strengthened the ARADO peasant organization, as demonstrated by improved communications between the peasant and the technical expert. At monthly meetings ARADO leaders explain what they expect and do not hesitate to critize the technical extension effort -- ARADO is *their* organization. Success has also given the peasant base unit reason to try and support other development efforts; improved pasture and the introduction of sheep breeding stock is the latest innovation of ASAR and ARADO in Cochabamba. It is a development project responsive to those it seeks to assist, which strengthens the desire of the local peasant to join, cooperate and invest. This has been the history of ASAR/ARADO projects in Cochabamba.

VI. PROJECT LESSONS FOR DESIGN AND IMPLEMENTATION

The ASAR/ARADO potato production and seed improvement project utilized a system familiar to all participants -- a variant on the traditional sharecropping method in which the *patron* puts up all cash costs and then splits the crop with the farmer. In the ASAR/ARADO system, technical advice and assistance, high quality inputs and honest weights at harvest return the peasant far more than did the traditional approach. It also assures that the most modern techniques will be adopted. Its general acceptability depends upon the reaction of other farmers watching a successful demonstration, who then take the initiative and make the commit-

ment necessary to improve their output. In this particular case, a technical constraint prevents a major spread effect, a problem recognized and being worked on by the project staff.

Early in the project's history, other lessons became obvious when credit delinquency problems were transferred from the technical support agency to the organization of the peasants themselves. Credit delinquency declined once collection responsibility was transferred from ASAR staff to ARADO leaders. Since the savings on inputs were divided between Central and peasant, there was a positive incentive to join, buy inputs and partake of project benefits. Such a program calls for a delicate balance of peasant leadership and participation, and outside external assistance which keeps the inputs, finances and technical assistance in harmony.

ASAR also began their work with an optimum local organization -- participants with their own leadership, communications and structure, who desired services. The ability of ASAR to generate successful development projects is heavily dependent upon grass-roots organization of the *campesinos* in Cochabamba, a process which has evolved over the last ten years.

Information Sources

A. Field

Two DAI staff members visited the DESEC offices in La Paz, Bolivia, and spent four days in Cochabamba, Bolivia, working with ASAR staff in early May 1974. They met with DESEC founder and Director Juan Demeure, and his L[illegible]z Deputy Director. In Cochabamba, they worked with the ASAR chief, the education officer and half a dozen staff professionals and subprofessionals. DAI staff surveyed two field sites (ARADO base units which were part of the potato project) and talked with peasant farmers, ARADO base unit leaders and ASAR extensionists. Both La Paz and Cochabamba were revisted in October 1974, with the same Bolivian staff who had been so helpful on the original trip being consulted. Information gaps were filled, and more detailed information obtained on the results of the 1974 potato crop.

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NATIONAL COMMUNITY DEVELOPMENT SERVICE (NCDS)

I. PROJECT BACKGROUND

Geographically, Bolivia is a single nation in name only. Culturally, Bolivians are divided into two sharply distinct and mutually suspicious societies: the Spanish-speaking, *mestizo* and predominantly urban minority, and the non-Spanish-speaking, Indian and predominantly rural majority. Outnumbered by the Indian population perhaps ten to one, the mestizos control the government and in general run the country. Therefore, it is not surprising that in Bolivia today there are many rural areas where the staff of government agencies are not particularly welcome; consequently, few programs to assist the rural poor have ever encountered much success.

However, the National Community Development Service is a notable exception. NCDS personnel can travel virtually anywhere in the countryside and be welcomed by its indigenous residents. This is partly because the NCDS works only with communities which request its assistance, and it receives more requests that it can handle. Of far greater significance is the fact that the NCDS has almost an many Indians on its staff as non-Indians. In addition it has trained thousands of rural leaders as volunteer paratechnicians at the community level.

As an autonomous government agency, the NCDS has only been in existence since 1970; but under varying names and institutional structures, the agency's program activities can be traced back to 1964. Broadly defined as a program intended to integrate Bolivia's 3.4 million rural inhabitants into the mainstream of national socioeconomic progress, the NCDS is dedicated to strengthening the capability of rural communities to carry out self-help development projects -- mainly schools, clinics, roads, bridges, potable water systems, sheep dips, livestock shelters, silos and irrigation infrastructure. Local level female extensionists working with mother's clubs provide training in domestic arts, artisan crafts, hygiene, infant care and other activities. In the absence of an active farm extension service, the NCDS provides veterinary and crop promotion services for small farmers. In all, the program has assisted some 2000 rural Bolivian communities. From 1970

through 1973, communities assisted by the NCDS completed 664 projects valued at US$1.8 million of which $1.2 million represented the value of local cash, labor and material contributions.

The NCDS is currently funded by a $3 million four-year loan from USAID, as well as approximately $1.5 million in counterpart contributions by the Bolivian government. The program's administrative structure consists of a national-level office with 98 staff members, 12 regional and subregional offices with 318 staff members. At the community level the NCDS is assisted by some 1100 trained volunteers drawn from the indigenous population. Finally, the program operates five regional training centers staffed with 60 instructors. During the 1970-73 period, some 4400 man and 1500 womer from rural communities were trained at these centers.

II. LOCAL ENVIRONMENT

The NCDS conducts its activities in practically all ecological zones in the country. These range from near sea level to 14,000 feet (4267 meters) or higher, from humid jungle to frigid *Altiplano*. Depending on the region, the communities assisted by the program may consist of small farmers, sheep herders, fishermen, miners or any combination of the above. Due to a rather violent and wide-ranging land reform movement in 1952, large private estates in the most densely populated areas of rural Bolivia were redistributed, so that the majority of the nation's farmers enjoy secure individual or communal title to the land they farm. Nonetheless, farm size remains small, seldom more than 2 to 2.8 hectares (five to seven acres) per family, of which only a fraction is normally cultivated in any given year.

The land is left in fallow for two reasons: first, because soil fertility is exceedingly poor, and fertilizer use is unknown or regarded as too expensive; and second, the land must also support the family's sheep herd. In the Altiplano region, farm properties have been subdivided and fragmented to such an extent that they are often measured not in hectares or meters but by furrows. This situation is forcing a steady flow of rural-to-urban migration throughout Boliva. Increased public education opportunities in the countryside have apparently contributed to the exodus of rural youth in search of non-agricultural employment. Nonetheless, some 68 percent of the nation's rural population is still classified as illiterate.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The first significant effort in Bolivia to assist the rural poor via a community development program was that of the Andean Mission of the United Nations from 1956 to 1962. It was to incorporate and expand this project that the Ministry of Agriculture and Rural Affairs created the Rural Development Program in 1964, an enterprise financed by a US$435,000 loan from the Inter-American Development Bank. In the beginning, the RDP strategy -- like that of the Andean Mission before it -- proved too paternalistic. No resource contribution was solicited from assisted communities except unskilled manual labor. Even so, the program experienced serious difficulty in persuading rural communities to request outside assistance.

In 1965 the RDP began to work out a new approach. Cognizant that the program lacked a viable mechanism for communication and motivation at the community level, the RDP began to train and hire members of the rural population as paratechnicians called TDC's (Tecnicos de Desarrollo Comunal). The following year a policy was implemented requiring that assisted communities finance at least half the costs -- in cash, materials, and labor contributions -- of any local project undertaken. With these two modifications in approach, the RDP program began a period of rapid expansion. Regional and subregional offices multiplied. Dozens of Peace Corps volunteers were recruited -- architects, engineers, as well as B.A. generalists -- to supplement scarce Bolivian professionals. And when a first AID loan of US$1.7 million was approved in 1968 to support the program's expansion, it became apparent that the RDP was much too big to remain a dependency of the Ministry of Agriculture. Renamed the NCDS, it became an autonomous agency in 1970.

IV. DYNAMICS: PROJECT IMPLEMENTATION

In the old days the RDP had to search out and persuade communities to undertake self-help projects. Today the NCDS can afford to pick and choose from requests for assistance from rural communities. The question is: why the change? In part, the explanation lies with the RDP decision to train and use members of the rural population as paratechnicians at the local level, i.e., as change agents. These individuals were obviously considered more trustworthy representatives of outside technical assistance services and were more effective in promoting ideas for self-help projects that appealed to the perceived needs of rural community residents.

Part of the success achieved by the peasant paratechnicians in generating community involvement in self-help activity is explained by the fact that many -- at least among the males -- were drawn from the traditional leadership structure of the rural communities, chiefly the peasant syndicates. Virtually no village in the countryside is without at least a semi-active syndicate, for this is the institution with primary responsibility for the administration of local government.

Syndicate membership embraces all families living within its jurisdiction, and general assemblies are held periodically when important decisions are to be made. Syndicate leadership is popularly elected to carry out the day-to-day responsibilities associated with local government, which are distributed along functional committee lines: the school, water, agriculture, livestock, market, fiesta and propaganda committees, to name a few. Thus, in some areas of the country virtually every civic activity or undertaking is controlled by the syndicate, and little will happen without its authorization. Upon returning to their communities, many TDCs simply resumed their former responsibilities within their local syndicates or were elected to posts within these institutions. This increased their leverage and influence at the local centers of power.

It is no accident that the NCDS insists, as its first prerequisite for assisting a community, that the latter organize a project committee. In those areas where the syndicates are powerful this amounts to asking the local syndicate to take charge of the project as a community-wide undertaking. By obliging the syndicate to assume responsibility, the NCDS can tie in to a pre-established network of local communications and resource mobilization mechanisms which assure that an adequate supply of labor and local financing will be committed to the project. It also permits the community to tap resources available outside the local area -- especially cash donations. This is because the syndicates usually maintain ongoing ties with committees or associations of ex-residents organized in La Paz and other major cities.

Then too, the syndicates are wired into the power structure of the National Federation of Peasant Syndicates, by virtue of a delegate system. Such linkages guarantee the rural syndicate channels for pressing its interests at the regional and national level and for assuring the supervised purchase and delivery of supplies required to allow the local project to advance -- if not on schedule -- at least as quickly as possible. Needless to say, rural syndicates are also in contact with each other; and should multi-community projects be

undertaken, once again it is the syndicate system which assures its adequate organization and implementation.[1]

The form in which each local project is planned and executed today remains basically unchanged from the days of the RDP. The following procedures apply:

1) The interested community must file a formal written request for assistance with a specified project. This form is presented to the nearest regional or subregional NCDS office. If approved at that level it must be submitted to the national office in La Paz.

2) Local NCDS staff visit the community, discuss the features of the desired project, take necessary measurements and appraise the availability of local materials and labor resources.

3) The project plan is designed and a budget prepared. The budget specifies what portion of total costs must be financed with the community's resources. In most cases a cash contribution is mandatory

4) Once the community approves the budget, it is submitted to the NCDS national office. However, final approval and procurement of required materials is not granted until the community deposits the full sum of its obligatory cash donation in a bank account in the name of the NCDS.

5) When construction of the project begins, local NCDS staff provide continuing technical supervision until the job is completed.

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[1] It should be noted that all three subprojects examined in the NCDS program were on the Altiplano, located within three hours' drive of La Paz, where syndicate activity is most organized and powerful. In other areas of the country, notably Cochabamba, the peasants have far fewer ties or sympathy with the central government. There the syndicates, although they exist, are representative more of the political aspirations of the government than of peasant interests. A review of approximately 30 NCDS projects in 1971 showed distributions of community subproject committees whose leadership could not be said to be dominated by the syndicates.

The functions of the local project committee -- sometimes organized within the local syndicate structure, as mentioned previously -- are fairly straightforward. The committee collects cash contributions from local residents, recruits and programs labor inputs, safeguards construction materials or equipment and generally oversees the project's construction. Since many projects entail ongoing costs of maintenance and repair, the committee may become a permanent addition to the structure of local self-government.

The training and use of selected members of the rural communities as paid and voluntary paratechnicians merits special attention. As noted previously, the idea of using these individuals as change agents evolved from the RDP's inability to elicit the indigenous population's trust and acceptance of its offers of assistance. This constraint was overcome by creating a new echelon of local level program staff called TDCs (Community Development Technicans). Both male and female TDCs were recruited by asking communities to nominate candidates for a one-month leadership course at one of the program's training centers. Subjects covered included civic education, social organization, modern agricultural and livestock practices, principles of community development, supervision, evaluation and group dynamics. Female trainees were given specialized courses in home management, domestic arts, child care, hygiene, first aid, nutrition and literacy. (Spanish, Quechua and Aymara-speaking instructors were used.)

Upon returning to their communities, the most promising trainees were offered a modest part-time salary in exchange for their efforts to promote and supervise CD activities in their own and surrounding communities. Since these individuals were intimately familiar with the local settings in which they worked, and had the additional advantage of being known and respected by the local population, their initiatives carried weight with their neighbors. Moreover, the TDCs did not require expensive logistical support. Getting around on foot and horseback, these paratechnicians could reach remote rural villages that outsiders who depended on jeeps might never have visited. Resident in the countryside, the TDCs had the additional advantage of being able to maintain frequent visitation schedules.

The innovation of the TDC was largely instrumental in "legitimizing" and expanding the RDP program throughout Bolivia. But by the early 1970's, the NCDS had cause to re-examine the TDC role. Once the program was known, and once communities were willing to solicit outside assistance on their own initiative, the importance of the TDC to the program began to wane. In 1973-74 the NCDS began to progressively cut back on its paratechnical staff. But at the same time the program's training of male and female rural leaders was stepped up. Only now, trainees were being prepared for volunteer service

in their own communities. NCDS decision-makers insist that the performance of these volunteers is at least as effective, if not more effective than that of the TDCs.

Coincident with the phasing out of the TDCs, the NCDS has begun to move in another new direction. Heretofore, perhaps 90 percent of the projects it has promoted have been of the social infrastructure type. For example, it is difficult to find many communities on the Bolivian Altiplano which do not have a school, clinic or potable water system constructed with NCDS assistance; yet the fundamental economic plight of the region's agrarian population has become more acute than ever.

Accordingly, the NCDS has resolved to place a budgetary quota on the social infrastructure projects it will support, so as to free more of its resources to promote income-generating projects on a multi-community basis. The major prototype to be followed is construction of irrigation projects such as dams, reservoirs, and canal systems, to be followed by organizing the projects' beneficiaries into agricultural cooperatives.

The strategy makes good sense in many parts of highland Bolivia, where water sources originating from glaciers could be utilized more effectively if their courses were channeled and surplus flow stored in man-made lakes. By regulating water supply for irrigation in the dry season, it would be possible for farmers to advance their planting dates. This has significant potential. Throughout the Bolivian highlands farmers must usually wait for the rainy season. Since the frost-free growing season is normally no longer than 120 days, a two to four-week delay in the arrival of the rainy season forces the farmers to plant late, which in turn greatly increases their risks of losing their harvests due to frost. Such risks are a major reason why these farmers are so reluctant to invest in expensive, modern, yield-increasing inputs such as fertilizer and improved seed. But by solving the water constraint, solutions to many of the region's agricultural dilemmas finally become feasible.

V. PROJECT SUCCESS

The most obvious indicator of success in the NCDS program is the number of communities which, after completing one project involving NCDS/community cooperation and shared expenses, will request a second, third and fourth project. In this poor Third World country with something less than representative government, peasant communities will put cash upfront, to be deposited in an account controlled by the NCDS.

That a community would make such a commitment once, could be attributed to undue pressure from the local syndicate leaders. That a community which elects its own leaders will commit itself to a second project -- which takes their cash, labor and material contributions -- says a great deal about the trust and reputation earned by the NCDS over the past ten years. An examination of the records in the NCDS central office revealed that in 1974, more than 50 percent of the requests for project assistance came from communities which had already completed a project. In an era when community development programs have lost favor and advocates, the Bolivian program is swamped with opportunities to work with communities who will pay half or more of the cost of the project. Few other programs reviewed in our study generated such positive client contributions.

Although income-generating projects represent an insignificant fraction of the NCDS and RDP program during the last decade, DAI staff members were fortunate enough to visit three -- two sheep dips and an irrigation system. What proved surprising was that all three cost so very little to construct, yet generated very significant income benefits to the rural communities which built them.

Sheep Dips: Thanks to the efforts of a TDC, the residents of the indigenous community of Colquencha built a sheep dip in 1966. Members of the neighboring community of Machacamarca were invited to bathe their sheep there and were so satisfied with the results that they built their own dip the following year. The first dip cost Colquencha US$150 in voluntary labor, cash donations, materials and the purchase of the property on which the project was built. The RDP donated an additional $30 for materials, and 12 man-days of skilled labor valued at $10. Total cost of the investment: $190. Machacamarca's sheep dip cost that community $140, while the RDP contributed $10.

In both communities, animal mortality was cut in half, from four deaths per 25 sheep to two. The sheep population of Colquencha at the outset of the project was about 3750; in Machacamarca, 2400. In the former community the dip was responsible for saving 300 animals each year; in the latter 192. At a market value per animal saved of $8 per head, the Colquencha dip generated a first year gross income for the community of $2400; in Machacamarca $1536. To pay for the chemicals used in both dips a user charge of $.01 per animal was levied. Subtracting the construction cost and user charge of the two projects gives Colquencha a first-year net income of $2212.50; in Machacamarca $1372. In both communities the typical farm family raises an average of 25 sheep. Thus, the net income per family was $16 in the first instance, and $14 in the second.

Colquencha and Machacamarca are Altiplano communities. All told, the RDP/NCDS promoted the construction of eight sheep dips in this region. However, program staff estimate that since 1966 some 200 dips have been built there. Such figures suggest a very strong demonstration effect for this type of project.

Irrigation System: In 1970, seven communities in the Palcoco district of the Altiplano elected representatives to form an irrigation project committee. They proposed to build a five-kilometer (three-mile) canal to irrigate some 2100 acres of cropland cultivated by the district's 434 farm families. Under the guidance of a TDC, they solicited a canal construction permit from the Ministry of Agriculture in 1970, obtained permission in 1972 and requested NCDS technical assistance the same year. Construction began in late 1972 with each participating community sending a 50-80 man labor crew to work on the canal one day per week. The project was completed in mid-1973 at a total cost of $3292 in voluntary and hired labor, materials, and cash donations. Of this amount, the local communities contributed 64 percent, the NCDS 36 percent. Each water-user must pay a service charge of $.25 per month, which yields about $100 in revenue per month, to cover the repair and maintenance costs of the system.

Unfortunately, the first crop season under the new system (1973-74) brought excessive rains and flooding which destroyed most of the district's potato harvest. Nonetheless, the system enabled the local residents to recuperate with a second crop of barley which was used as forage for feedlot cattle. In pre-project days the typical family bought, raised, and sold one bull per year, earning a net income of about US$44. In the first post-project year, the same family was able to support three bulls. Assisted by a huge hike in beef prices, the family's net income was not $132 but $386.

The above examples, all requiring relatively inexpensive initial investments, generated sufficient community income to more than pay for themselves in the first year of operation. Had a decision been made to do so, the communities involved could also have paid the NCDS the full costs of its technical assistance. The sheep dip projects' demonstration effect resulted in their wide-scale replication throughout the Altiplano. The Palcoco irrigation project proved so successful that the district's residents are now planning, with NCDS assistance, to construct an earth-fill dam and a reservoir to supplement the benefits of their irrigation canal. Yet these projects are exceptions to the rule. The fact remains that until very recently, the NCDS has been predominantly occupied with non-income-generating, social infrastructure projects. As such, the program has demonstrated benefits of spread and replicability. However, its self-sufficiency has been only partially implemented at the local level, and at

the national level the project is still heavily dependent on outside financing.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The NCDS program has a variety of unique features well worth the scrutiny of rural development planners in other parts of the world. The first is the program's use of small farmers as paratechnicians -- on a paid basis initially, and more recently as volunteers. It is important to recognize that this strategy requires the implementation of an extensive training program. In its five training centers the NCDS instructs over a thousand rural men and women per year in the basic principles of community development, rural leadership and a variety of practical subjects in the field of agriculture, animal husbandry and home economics. To reinforce and expand this activity, as well as to reinforce the qualifications of those already trained, the NCDS is now conducting training courses at the local community or multi-community levels. In 1973 alone, 190 such courses were given throughout rural Bolivia involving some 3700 participants, male and female.

A second vital feature of the program is the way it builds the promotion and implementation of self-help community projects into the local power structure. The key to obtaining the cooperation and initiative of local leadership is the presence of NCDS trained leaders in many syndicate posts. The syndicates, in turn, assure that the required labor and cash donations to implement local self-help projects will be forthcoming. They also provide structures for all necessary project communications at the local level and provide a source of leadership for project supervision composed of individuals who are democratically elected and responsible to community residents. In sum, the NCDS program has made conscious and effective use of existing institutions at the local level, and this strategy has enabled it to legitimize its activities and services in the eyes of the local population.

A third feature of the NCDS program is its requirement of an obligatory cash contribution from the community *prior to* the provision of outside material and technical assistance. There is no evidence to suggest this requirement has retarded the pace of project activity; rather, it appears to have stimulated community initiative. If so, the reasons are not entirely clear. Perhaps in the case of a predominantly barter-based agrarian economy such as Bolivia's, the requirement of an up-front cash contribution by the community has great symbolic value in committing the rural poor to a self-help endeavor.

NCDS staff have confessed some surprise that rural communities that are literally and figuratively "dirt poor" typically seem to have no trouble in raising substantial sums from their residents.

No doubt the fact that the local syndicate is probably sponsoring the collection as an obligatory levy on its members has something to do with both the rapidity with which cash contributions are generated as well as the amounts generated; quite simply, "everyone pays or else." That the contribution is forced rather than voluntary does not preclude the fact that it is the result of a democratic decision of the community, reached either by its representatives or by the residents themselves meeting in general assembly. Only the total sum required is fixed by the NCDS. But the community is still free to decide whether or not it wishes to pay this sum. And even the sum itself is frequently the product of dialogue and joint agreement between NCDS staff and community leaders.

Finally, the NCDS experience in Bolivia demonstrates that very significant improvements in small farmer net income can be generated with relatively inexpensive investments in productive infrastructure -- sheep dips and irrigation systems, for example. Starting "small," a community which succeeds in its first, modest income-generating endeavor can acquire the motivation, experience and organizational strength required for launching more ambitious economic projects in the future. However, the NCDS also demonstrates that the growth path need not be smaller economic projects to larger. The strategy can also be one of non-economic projects in the beginning -- schools, clinics and other social infrastructure -- followed by economic projects.

After a decade of community-level projects, the NCDS is beginning to promote multi-community irrigation and cooperative projects. But it is entering this stage from a position of strength. The program is well known and respected in the countryside. Its local level staff and community volunteer leaders are well trained. It has proven its capability for mobilizing local resources. It is sensitive to the constraints of the indigenous environment. And it is wise enough to consult with, rather than dictate to, the rural population. These are impressive credentials.

Information Sources

A. Field

Subproject visits were conducted in July and October 1974 in the company of NCDS central and regional office staff. In conjunction with field support activities in the design of a program evaluation system, the NCDS was visited on three occasions, for a total of approximately two weeks. Interviews with the NCDS Director, Col. Gustavo Ramirez, and many senior staff members have been held on numerous occasions. Field staff in the regional offices of Patacamaya and Huarina have been formally interviewed both individually and in groups.

B. Reports

NCDS, *Informe-1973*; also the program's Capital Assistance Paper was consulted, as well as subproject file documentation available in the regional offices.

Data Adequacy

Subproject benefit data are based on the estimates of local leaders and file documentation, with calculations and conclusions checked with regional office field staff. The first draft of this write-up was reviewed by the AID advisor to the NCDS.

ANNEX H

COLOMBIA

COLOMBIA

Area: 439,735 square miles
Population: 23,925,000
Population growth rate: 3.4%
Density per square mile: 54.4
GNP per capita: $370
GNP per capita growth rate: 2.3%
Capital: Bogotá (2,825,000)
Largest cities: Medellín (1,091,600), Cali (1,003,900), Baranquilla (682,300), Bucaramanga (324,400), Cartagena (315,200)
Major language: Spanish
Religion: Roman Catholic
Literacy rate: 70-80%

The Cáqueza Project, ICA Rural Development - This project covers the shaded area east of Bogotá in eastern Cundinamarca.

ICA Rural Development Pilot Project for Northern Cauca - This project covers the shaded area which is the State of Valle de Cauca.

Futuro Para La Ninez (Futures for Children) - This project covers the shaded area which is the State of Antioquia.

Base 77847 4-70

THE CÁQUEZA PROJECT (ICA RURAL DEVELOPMENT PROJECT FOR EASTERN CUNDINAMARCA, COLOMBIA)[1]

I. PROJECT BACKGROUND

Cáqueza is one of six rural development projects initiated by the Colombian Agricultural Institute (ICA) in 1971. Its name is taken from the major municipality and market town which serves as the center for nine rural communities in the eastern portion of the Department of Cundinamarca, southeast of the capital of Bogotá. The project was conceived as an experimental program to reach small farmers, based upon studies of other projects with similar goals and visits in 1970 by ICA central and regional staff to the Puebla Project in Mexico. The ICA commission to Puebla returned to Colombia convinced of the value of experimental plots conducted on small farmers' land to transfer technology and increase productivity. They were also convinced of the need to transcend productivity considerations and create an integral development approach which combined social and economic considerations. Both have been objectives of the Cáqueza Project.

ICA was given responsibility over all extension services of the Colombian Ministry of Agriculture in 1967. It performs basic agricultural research as well -- mostly at ICA Headquarters at Tibaitatá near Bogotá. ICA assistance to small farmers is coordinated with other Colombian government agencies which provide credit (the Caja Agraria) and land distribution and titles (INCORA, the Agrarian Reform Institute). The Cáqueza Project is directed by an ICA regional staff of 16 professionals and subprofessionals, assisted by research and evaluation support from the Canadian government's International Development Research Centre (IDRC), which has maintained two full-time professionals in Colombia since shortly after project initiation.

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[1] The Spanish language abbreviation is *PDROC*, taken from *Proyecto de Desarrollo del Oriente de Cundinamarca*.

The project area embraces nine communities with 12,218 families farming 227,200 hectares (561,184 acres). A total of 976 farm families with land holdings of 2125 hectares (5249 acres) are considered to be the project participants.

II. LOCAL ENVIRONMENT

The nine communities forming the Cáqueza project are composed of mountain-side farms, ranging in altitude from 900 to 3000 meters. To a visitor driving into Cáqueza, there does not appear to be one square acre of level land in the entire area. While 64.5 percent of all farms are below five hectares in size, 42.3 percent of the total area is made up of farms with 30 hectares or more -- suggesting a wide diversity between the many small farmers and the few very large landholders in the region. Average annual income in 1972 was estimated at $645 per farm family with 7.5 members -- a per capita income of $86.

Of the 976 farm families assisted by the project, 42 percent have two hectares or less, while none of the participants have more than three hectares. This was a requirement when the project was initiated, since it was directed specifically at small farmers.

Colombia is one of the more developed countries in the Third World and both the ICA staff and the farmer participants in the project reflect this advancement. ICA is reported to have more than 150 Ph.D.'s trained abroad on it staff, and correspondingly larger numbers of well-educated and trained holders of lesser degrees. In addition, ICA operates a rural development school offering masters degrees as part of its Tibaitatá Headquarters. Farmers in Cáqueza were using large amounts of fertilizer on certain crops before the project was initiated. Credit is of great importance to small farmers, since, as will be shown, cash is not available for necessary inputs; thus, the maintenance of a good credit rating is considered essential. The Colombian government has made a good deal of credit available to smallholders and there are private sources which almost all small farmers in the Cáqueza area draw upon.

Since the use of credit increases the risk of the farmer in years of bad harvest, repayment will be difficult and a subsistence income base may be threatened; credit is only used when absolutely necessary. However, credit is common among Cáqueza small farmers for potatoes, onions, tomatoes and other crops which require cash inputs. Farmers are very reluctant to use credit for corn, which can be grown without significant

cash inputs. In addition, to minimize the possibility of loss, farmers will grow many different varieties of the same vegetable, e.g. beans, since some beans are resistant to frost, some to drought, some to rain, etc.

While 50 percent of the area's farmers have completed one to three years of primary education, estimates of functional literacy are much lower. Land titles are held by nearly 70 percent of all farmers, and those who rent land have reasonable security that their plots will be available in future crop cycles.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

After the ICA commission returned from Puebla, a plan was developed which was to become the Cáqueza project. The area was chosen because of the large number of small farmers with low income levels. It moved ahead on three fronts: first, beginning in early 1971, the project staff began a campaign to unite leaders of the local municipalities (which correspond to districts or subcounties) in an attack on rural poverty. The project helped to organize municipal development councils, composed of farmers, clergy, businessmen and all local government leaders in an attempt to mobilize resources behind their new campaign. In addition, they attempted to work with small farmers' groups, or councils, as one lesson from Puebla was the success in working through small farm units, rather than with individual farmers. Although local non-farm resources have played a minor role in the project, the activity has continued, and school teachers, vocational teachers and many of the better educated citizens in the market towns of the region take part in some extension programs, meet with farmers on pre-arranged days and organize three-day workshops in an attempt to improve the transfer of technical knowledge to project participants.

The second effort of the project was straightforward extension services by full-time staff, offered on market days, at community fairs and in private homes. Wherever and whenever farmers congregated, demonstrations were organized and farmers persuaded to attend. In all, in the eight months between March and October 1971, the project staff estimated they held nearly 200 meetings, with a total farm attendance of over 7000 persons, more than half of them males. The extensionists were offering the technological knowledge gained at the Tibaitatá research station on improved seeds, planting densities, fertilizer use, weeding, insecticides, fungicides, etc. In addition, home economics and nutrition were discussed with rural women.

Interlocked with the promotion activity was the actual demonstration of improved techniques on land held by small farmers, inputs and technical assistance being supplied by the project. In 1971, 19 plots were conducted, 1000 square-meter (seven quarters-of-an acre) plots in corn and 400 square-meter (12 tenths-of-an-acre) plots in potatoes. No special incentives were required to obtain farmer cooperation. Results from the trials on small farmer land were good, but adoption rates were estimated to be low by project staff.

Although it was undertaken in 1972, the creation of baseline data on the project area can be considered as the third part of the evolution and design of the project. Baseline data were created by a survey of more than 600 farm families, and included very detailed demographic, social and economic studies. Some of the most useful information concerned the cropping associations[1] and the relative percentages of the farmers' land devoted to particular uses. Subsequent reevaluation of the income data obtained as a result of the farm surveys revealed that it was unreliable, due to farmers' reluctance to offer income and expense data to government representatives.

In summing up the evolution of the project, staff are inclined to talk and write about a decided lack of enthusiasm by small farmers for the technological knowledge being offered by the project. There were several reasons: previous INCORA attempts in the same area in the recent past had aroused farmers' fears that their land was to be confiscated by the government. INCORA apparently had attempted to institute a land consolidation scheme to end the fragmentation of plots scattered in many parts of the valley. This lead to a good deal of initial resistance by farmers to cooperation with the ICA/Caqueza staff.

Second, farmers in the area are highly independent and often politicized. The use of organized groups for the dissemination of technical knowledge did not seem to be effective. Instead, natural leaders from among the more progressive of the small farmers were identified and used to conduct local meetings, demonstration plots and in general provide a transmission line between project staff and the rest of the small farmers. Third, technical recommendations, based upon the central research stations results, were only partially suited to the small farmers in the area. ICA hybrid corn grew well at some altitudes but poorly at others. Both potatoes and corn were grown as single crops in the demonstration plots,

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[1] E.g., corn and beans, or potaotes and beans, grown together at the same time.

and this method was encouraged by the ICA staff. However, local farmers had a long-established practice of intertwining both corn and potatoes with beans or some other legume and were not especially interested in single-crop demonstrations. As a result of the first year's effort, the Cáqueza staff reevaluated its methods, and reoriented the program for the 1972 cropping season.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Adapting the Technology to the Region

The project was designed to be reiterative, so that project staff could learn from each year's interaction with the small farmer clients. Beginning in 1972 the staff attempted to adapt the technological recommendations being offered by ICA Headquarters in Tibaitatá to the specific land and environment of farmers in Cáqueza. There were 39 test plots that year, 15 in corn mixed with beans, 13 in potatoes and 11 in cash crop vegetables (onions, cabbages, tomatoes, lettuce, etc.). The tests utilized not only ICA hybrid seeds, but also local varieties.

The results were clear: depending upon the altitude, the hybrid corn could produce more than 3.5 to 1 over traditional methods, while the simple use of the recommended package on local varieties could increase output more than 2.5 to 1. For potatoes and vegetables, it was found that the recommended fertilizer doses and planting densities, etc., were already being followed by the local farmers or could be accepted without difficulty. Only for corn, the main staple, was there significant resistance to adoption of new methods. There were major problems in getting the farmers to accept high cash costs to pay for the recommended inputs on a crop which they could grow without those inputs, although at a greatly reduced yield per acre. This led to a series of special studies conducted by the IDRC advisors and ICA staff on the determinants of adaptive behavior among local small farmers in new corn technology.

These studies were conducted under the direction of the IDRC professionals (an agronomist, economist and anthropologist) with ICA staff members studying for advanced degrees at the ICA rural development graduate school, as well as with the ICA regional staff in Caqueza. This combination produced significant research results on the perceptions, constraints

and behavior changes of small farmers involved in development projects. A few of the more important conclusions were:

- small farmers in Cáqueza had cash availability constraints which eliminated the possibility of using their own funds for the cash inputs necessary for more productive agricultural technology;

- small farmers had access to credit, and nearly all drew upon credit sources: government (30 percent of farmers), commercial and private individuals (59 percent of farmers);

- the real cost of credit was found to be much higher than stipulated interest rates when costs of loan administration, time spent in procuring the loan, hospitality and bribes offered to lenders and co-debtors were included; for government bank loans the stipulated annual interest rate of 13 percent rose to a real credit cost of 24 percent; and

- labor shortages during peak periods reflected the alternative costs of employment elsewhere, rather than full employment in the farm sector in Cáqueza; there were no major labor shortage constraints to adoption.

Investigating Constraints to Adoption

Using the constraints-to-adoption approach, the project began investigating corn producers' responses to the now-proven technology. Credit studies in 1972 determined that of those farmers who drew credit specifically for corn, 86 percent adopted the project's planting density recommendations (which involved no cash costs but was a significant behavior change from the traditional method), but only 22 percent followed the expensive fertilizer dosage recommendations. This was rather conclusive evidence that Cáqueza small farmers, in the absence of credit or labor constraints, would not follow proven recommendations on a crop which could be grown without incurring cash costs, even when net income increases of over 200 percent had been demonstrated.

With these data in hand, the project assumed three different tacks: first, it attempted to simplify the recommended input schedule, dropping fertilizer applications from three to two and then to one at the beginning of the planting cycle. Second, it attempted to improve extension techniques -- more farm visits, greater use of respected farmers to spread the word in their area of influence, greater use of leaders in the market towns to attempt to convince small farmers of the profitability of new techniques. While these new attacks on the problem made headway, they still failed to solve the problem. A second series of studies then attempted to focus on the particular constraints surrounding the use of cash inputs in the production of corn.

The project found that use of the recommended method increased cash costs from $21 to $142 or nearly six times. Since cash was not available to make these payments from the farmers' own savings, the credit costs of the recommended package (at the stipulated 13 percent) was $21 -- equal to the total cash requirement of the traditional production method. Returns to cash as a factor of production dropped with the use of the recommended package.

Risk, Uncertainty and Small Farmer Adoption Practices

An excellent overview of this project is presented in a recently completed dissertation in agricultural economics at Michigan State University.[1] Previous research has centered on the derivation of a theoretical model of farmer's behavior (e.g., the Friedman-Savage Utility Model, applied to farmers), which was then empirically tested by examining small farmer practices. However, in the study of adoption behavior of small farmers in Colombia,[2] the researchers derived a dollar value for risk, showing the relationship between the risk incurred under new adoption methods and risks incurred under traditional production methods. H.G. Zandstra writes:

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[1] David L. Peacock, *The Adoption of New Agricultural Practices in Northeast Brazil: An Examination of Farmer Decision-making,* Michigan State University, 1972, pp. 10-76.

[2] *The Cáqueza Project,* a report by the ICA-CIID Rural Development Team, a series of papers presented for the Agriculture, Food and Nutrition Science Field Staff Symposium of the International Development Research Centre (IDRC) November 18-21, 1974. All data on corn technology is drawn from H.G. Zandstra, "Two Corn Production Systems in the Cáqueza Project," one of four papers in the overall project.

> Calculated risks on total investment more than doubled and risks associated with cash inputs increased 15 times (Table 3 [included in the appendix]). As the farmer needs to borrow money for the recommended production method, this means that he acquires a risk liability to his community of at least $53, a sum that represents 23 percent of his per ha. annual income. This risk may be excessive for the farmer, particularly if weighed against the low returns on cash inputs that he obtains from the recommended system. If the farmer does not change his actual production system, his risk equivalent is only $3.25 (Table 3, last line), which would not be vis-a-vis the community, as he is probably able to raise the $21 cash requirement without borrowing.

Since this is one of the few attempts to make explicit a risk calculation for small farmers, it deserves considerable attention. The analysis is divided into two parts: first, the technical methods by which the researchers generated the numbers; and second, what the numbers could be said to represent.

Methods Used to Obtain a Risk Calculation

Unfortunately, it is not possible to evaluate the methods used without some complex calculations. We have reproduced four pages of Zandstra's Appendix I (see the last four pages of this write-up), which gives the formula for the calculation of the expected loss. No details are provided, however, and the reader is left to his own devices if he wishes to regenerate their conclusions.

The formula, page one, Appendix I, is for a normal distribution, which is a completely specified probability density function when the mean and standard deviation are known. Using cumulative normal distribution tables and standardizing the scores, it is possible to predict the probability of yields below that needed to:

- Recover all costs of production, including land and labor; and
- Recover all cash costs of production.

One illustrative calculation is as follows:

Calculating the probability of obtaining yields below the breakeven point for all production costs using traditional methods of corn production in Cáqueza.

F_y (corn yields) $N(\bar{x}, \sigma^2)$, in kilograms

$\bar{x} = 907$
$\sigma = 660$
y = yields in kilos
p = estimated price ($.16 per kilo in 1974)
c = costs, in this case total production costs = $85

The breakeven yield is: 531 kilos

Standardizing to obtain "z" scores for use in the cumulative tables of normal distribution probability density:

$$\frac{-531 + 907}{660} = .5697 = 28 \text{ percent.}$$

Thus, P (0 <531) = .28. This is as shown in Appendix I, Table 3.

Calculation of the Expected Loss (See page 1, Appendix I).

$$E(L) = E(C-yp) \text{ for } Y \frac{c}{p}$$

$$E(L) = -p \cdot E(y) + C \text{ for } y \frac{c}{p}$$

$$E(L) = -p \cdot E(y/y \frac{c}{p}) + C$$

substituting

$$E(L) = -.16 \cdot E(y/y\ 531) + 85$$

The Expected Value of a normally distributed variable with known mean and variance should not be a conceptual problem. However, it cannot be read from the tables, since the line which splits the two areas into equal parts is the median, not the mean. Thus, the numerical answers to the problem must be obtained by integrating the function. At this point in time we must assume this is what the authors did, since their answers are close to, but do not equal the "median" solution.

The risk figures, given in Appendix I, Table 3, are as follows:

	Traditional	Recommended	Percent Change
Risk, all costs	$37.00	$78	111
Risk, cash costs	3.25	53	1530

The Meaning of a "Risk" Calculation

In the conclusion to Zandstra's paper a "risk equivalent" is discussed, suggesting that farmers acquire a $53 liability to the community when they undertake the recommended production methods. This assumes the money for the cash inputs will have to be borrowed. The risk is also uniquely defined; it applies only to those farmers who fall below the breakeven point. Thus $53 is the expected loss for that percentage of all farmers who do not obtain a yield of 1431 kilos. Clearly, if the percentage is small enough, that is if very few small farmers stand to lose, then the figure of $53 may not be a powerful inhibitor to the adoption of new techniques. This is true because risk is some combination of the size of the loss and the expected frequency of losses. Both attributes must be calculated. In the "risk equivalent" calculated by Zandstra, only the former is given.

The following table reperesents the risk to all farmers of incurring a loss and the dollar value of that loss. It is calculated by multiplying the dollar amount of expected loss, for the losers, by the probability of the farmers being losers.

	Traditional	Recommended
All costs	$10.36	$10.14
Cash costs	.39	3.18

The above table is neutral towards incurring risk. However, the small farmer is far from neutral, and his strong risk aversion is based upon very sound survival techniques. He cannot incur a major loss and survive, at least at anything like his present level of living. In this sense, the "risk equivalent" calculated by Zandstra probably holds a good deal more meaning than the neutral loss possibilities calculated above. The farmer will want to know what he stands to lose, if indeed he must be counted among the losers. In addition, the table only considers yield variance and takes no account of the other possibilities which could reduce the farmer's income: input and output price changes, imperfectly developed market for corn (suggesting the possibility of no buyers at any price), lack of inputs at a critical time, depletion of the soil by the hybrid corn (making traditional methods difficult to return to) and a host of other possibilities which work against the small farmer. Clearly there is a greater risk from the new technology than from the old. This risk must be borne from credit sources, since there is no cash surplus in the small farmer's income/expenditure cycle. And credit is necessary for a good crop in many areas, meaning that credit default is a serious and penalized action.

Thus, the small farmers grow corn by traditional methods all the while realizing that output and income could be substantially increased if they would, or could, stand the increased risk. This constraint to the modernization of agriculture can be overcome, and experimental programs in Cáqueza offer one model which seems to work. Zandstra concludes:

> The above analysis suggests that resistance to acceptance of the recommended production methods lies in the high initial cash requirement, the low returns to cash invested and the high risks related to the change.
>
> Acceptable recommendations must apparently satisfy a set of requirements that are defined by the producers' community. The lack of knowledge of researchers and planners of action programs about these conditions and their relation to the rural community, has probably been the overriding reason for the failure of new production technologies in the small farmers' community.

Complementary Cáqueza Project Activities

While in-depth research and experimentation with corn production was ongoing, the Cáqueza project staff was conducting a variety of other programs with the small farmers.[1] By 1973 there was a clear realization that the perceptions of the farmer, his view of the constraints and profitability, must be a major input to changes in rural production behavior. To reflect this knowledge, several organizational changes were made in the Cáqueza project. The Investigations Division (agricultural and livestock) was combined with the Popularization Division (the extension service), and both were decentralized. The subprofessionals were moved from the market town of Caqueza out into the nine municipalities and given broad responsibility for four to six districts within each municipality. The project felt that the interaction with small farmers, the ability to communicate and be convincing, were more important attributes than specialized technical knowledge.

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[1] The Cáqueza staff have also assumed the role of extension agents in support of the Caja Agraria, the Colombian government's bank which lends to farmers. Project staff help prepare the farmer's loan papers, acting as an interface with bank officials. The staff estimates that each approved loan requires four visits to the individual farm by the ICA extensionist.

As one additional project acitivity, the Home Improvement Division, especially concerned with nutrition, health and child care, continued its training of wives of farmers. A study involving a U.S. Peace Corps volunteer separated those nutritional deficiencies which were correlated with income (protein and calories) from those which were not (calcium and vitamin A) and which could be dealt with through nutritional education programs.

The Establishment of a Marketing Network

A farmers' consumers cooperative was formed as one outgrowth of the local municipal development councils promoted by the project in 1971. The farmers felt that consumer goods were too expensive and decided to organize a local cooperative. Since cooperatives in this part of Colombia have not been successful, project staff were less than enthusiastic but finally agreed to support the farmers' requests. The raffle of a cow started the capitalization, and with this initial money purchases were made in bulk from Bogotá. This has grown, over time, to include agricultural input purchases.

The cooperative had 180 small farmer members in early 1974. More important than its size was the fact that it allowed an organized voice for small farmers and provided a focus for a marketing scheme.

Project staff had been promoting the profitability of garden vegetable plots which required high cash inputs but yielded very high net income returns. When the staff recommended the planting of cabbages, many farmers complied the next season. When the price of cabbages fell below the labor cost of harvesting and transportation, the farmers dumped them onto the main highway as an explicit indication of the worth of the project's recommendations.

With major support and seed money from the IDRC advisors, the project then initiated a marketing scheme which was just beginning to take effect in 1974. Research established that in Cáqueza neither farmer nor trader had an advantage, since excess truck capacity and too many buyers reduced profits all around. The project set out to establish a marketing network with the other ICA clients around Bogotá, using a warehouse and purchasing arrangements with 20 of the city's independent stores. This effort had little farmer involvement, except in the demand for its operation.

Marketing is a very complex and specialized field in Colombia, necessarily involving many areas such as Cáqueza in order to insure a continual flow of garden vegetables to

the major market in Bogota. Grading and packaging are two of the most important aspects of the marketing plan, and these are done at the warehouse in Bogota, not in Cáqueza.

An Experimental Output-Sharing Scheme

The next step in the encouragement of improved corn production methods was a natural extension of the findings of the first three year's research. The IDRC advisors suggested and financially supported an experimental output-sharing program, initiated in the corn season of 1974. Twenty-seven small farmers each agreed to plant one hectare (2.5 acres) of corn using methods directed by the project. The farmers were allowed to choose their own native seeds or use the project's hybrid seeds. For a $10 joining fee, the project would supply the farmer with technical assistance as well as all cash inputs required for the recommended package, while the farmer supplied all the necessary labor and the land. The farmer was allowed to take the first 800 kilos (1760 pounds) of corn production, after which the farmer and the project shared equally. The expected costs and returns are given in the following table.

Description of the Corn Production Plan
Developed in the Cáqueza Project (1974 Prices)

	Cdn$/ha	
Entry Fee	$10	
Farmer's Investment	$102 (land + labor)	
Plan Investment	$106 (inputs)	
Minimum Yield for Farmer	800 Kg./Ha	
Expected Farmer Yields	1770 Kg./Ha (800 + 970))	) 2740
Expected Yield for Plan	970 Kg./Ha)	
Net-Return to Farmer	$168 (cash equivalent)	
Net-Return to Plan	$48 (cash equivalent)	

Pre-harvesting yield estimations in December 1974 have established the actual yields for the 27 farmers at an average of 2200 kilos per hectare (1960 pounds per acre) approximately 80 percent of the estimated output of 2740 kilos (2500 pounds). The lowest yield was estimated to be 1100 kilos (980 pounds).

while the highest was 3600 kilos (7920 pounds) per hectare. Although no prices were included with the summary of yield estimations, assuming the 1974 prices of $.16 per kilo ($.07 per pound) held through the corn harvest, the following returns were likely.[1]

	Project	Traditional	Percent
Farmer's return	$128	$59	210
Project's return	6		5.6

In this instance, the project assumed the risk, and lower yields than anticipated reduced the project's return significantly. The project estimated that the area-average corn yields were below 600 kilos per hectare (534 pounds per acre), substantially lower than the four-year average of about 850 kilos per hectare (757 pounds per acre). Thus those farmers who were part of this corn production plan gained several ways. Understandably, all 27 have requested to join in the scheme next year, as well as numerous small farmers in the Cáqueza area. This raises some interesting questions concerning what is a fair and equitable, as well as feasible, output-sharing plan.

Considerations in Designing an Output-Sharing Plan

Assuming the small farmer is a maximizer with a strong risk aversion, then he will be very interested in a plan which eliminates the upfront cash costs, but offers a guaranteed subsistence yield. From the farmer's point of view, the following considerations may be important:

> If the floor is set high enough, it will pay him to assign very poor land to the project, since under tratiional methods he would produce a yield significantly less than the average on such land; and
>
> Once in the plan, the farmer gains as he is able to divert the production before it is transported, shelled and weighed.

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[1] Data contained in a letter dated February 3, 1975, covering a handout entitled, "The Cáqueza Project Corn Production Plan," undoubtedly written by Hubert G. Zandstra. The absence of price data is an ominous sign, since the local corn market has been non-existent, corn being a subsistence staple.

From the project's point of view, output-sharing calls for:

The best possible land, labor availability and growing conditions (planting at the right time, fumigation when needed, etc.) and a responsive farmer who is interested in increasing yields; and

No diversion of the crop before it is ready for market.

The Caqueza project has a staff of 16 professionals, and the 27 farmers received excellent extension support and technical advice during the corn growing season. However, if the project is to prove its point --that output sharing is generalizable--it must show that an expansion to 100 farmers in the next season, with less time and attention per farmer will still produce the impressive results of the first year. Since there has been no established marketing system for corn in the Caqueza area and no commercial method of thrashing the corn, both will have to be developed to make the project generalizable.

The policy issues for the project generally revolve around the kind and quality of land the farmers nominate for inclusion in the output sharing arrangement and the level of "subsistence income" which represents the floor or the guarantee to the farmer. For the two to be consistent, farmers should use average land, and the subsistence amount to be taken prior to the equal output split should be the average for the area. The former quality can only be controlled by inspection of the land by the project staff, while the latter can be obtained from a three or four year average of corn yields of the local area. Other output sharing arrangements in Bolivia and Nigeria do not make use of the guarantee subsistence amount, which might make the administration of the project easier. In such cases, it is not in the farmer's interest to use his poorest land, since in doing so the 50 percent share he receives may fall below the subsistence output. At the least, the project should revise downward the subsistence guarantee, taking the 600 kilo per hectare (534 pound per acre) average into account. This might help to motivate the farmers to increase output.

Working against the farmer's natural instincts to divert part of the crop from the equal sharing arrangement may take longer. With only 27 farmers, all are subject to a good deal of supervision. If the project expands to include 100, as is planned, this may not be possible, particularly at harvest. Examples in Africa suggest that when alternative markets exist for output which is to be shared with the input supplier, it is easy to divert the crop. A potato output sharing

scheme in Bolivia works because of an effective local organization which directly involves all small farmers and commits them to the undertaking. The farmers believe they are a part of the project and that diversion would hurt their own development efforts, since some of the gains go into mutually useful cooperative or central capitalization. This has not been the case in Cáqueza, even though the project was handled through the local cooperative; it was an afterthought, and not a well-designed plan to involve local farmers through their own organization. Some of the farmers who were part of the project in the 1974 corn season were not, so far as we could determine, cooperative members before the project started.

While there are apparently real obstacles to the initiation of a viable farmer's organization in Cáqueza, due to past failures, strong individualistic cultural patterns and a great deal of politicization in the countryside, such an organization may be necessary if a large-scale output sharing scheme is to work. There is no effective way to police such a plan; the farmers must voluntarily cooperate. Such voluntary cooperation is far easier to generate among farmers than it is between farmers and a well-funded government project.

A report of a recent project staff meeting contained a discussion of many of the failures and mistakes made during the first year.

- The plan had been initiated too late, thus entering into late seeding dates which would result in lower productions. The plan had not been selective about farmers' fields, thus allowing farmers to include the poorest fields into the plan.

- ...In spite of these errors, the plan managed to break even and estimates are that it can generate considerable capital for the Cooperative. This again led to a lot of discussion: whether higher-producing regions should subsidize lower-producing regions; whether the basic insurance level of 800 kg/ha should be reduced to be able to include any field or any farmer; or if, alternatively, stricter field selection should be applied in order to generate more capital for production investments in the region.[1]

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[1] *The Cáqueza Project Corn Production Plan* (ICA-IDRC, Hubert G. Zandstra, Coordinator Rural Development).

Clearly the risk-sharing experiment is needed. The results may prove valuable in improving the design of rural development projects.

V. PROJECT SUCCESS

The project has determined and then demonstrated, under small farmer conditions and constraints, that major net income increases of 50 percent are possible (from $645 to $963 for the average farm) and has offered the necessary extension services to spre d knowledge of new techniques. Since potatoes presented an insurmountable problem to the Cáqueza staff (it is the lack of the highest quality potato seed which prevents greater income increases with this crop) and since garden vegetable production was increasing significantly (so long as marketing facilities could be assured), the major constraint to increased small farmer income was the continuing importance of the corn crops and low corn yields. The attack on corn productivity created an experimental crop-sharing program which seems to be a model which will work among small farmers.

The project had a budget of $109,000 in 1974 and was augmented by both professional staff and operating funds from the IDRC. Over the course of a five-year program (1972-76) the project is scheduled to receive $575,000 (again omitting the IDRC contribution). This is a significant amount for 976 farmers ($590 per farm family) and can be justified only as an experimental research program design to improve all ICA research and extension methods. Seen in that context, the effort and expense at Cáqueza is a miniscule proportion of ICA's and Colombia's overall agriculture budget.

ICA has both extension and research responsibilities, and one part of the project involved determining how best to work with small farmers. The reiterative process began with the assumption that research results at ICA's headquarters at Tibaitatá near Bogotá were applicable to Cáqueza. It became clear this was not the case, and after long and difficult regional-versus-national headquarters battles, ICA Headquarters has instituted research on crop associations and ordered the decentralization of the staff for all rural development projects along the lines developed in Cáqueza. Thus to the extent that the results of Cáqueza have improved the state of knowledge of the entire ICA organization, the project has been successful.

As concerns small farmers, if the 1972 adoption rates in corn technology as very conservative figures are applied to 1974, the $12,400 in corn loans will bring in additional net income (over traditional techniques) of $3717, which represents a 253 percent increase in net income per acre (for the adopters). Adding in the $64 per acre ($158 per hectare) increase in net income from the 20 farmers in the experimental crop-sharing program, as well as an estimated 50 percent increase over pre-project area planted to garden vegetables, the project has generated an annual income increase of $30 per farmer taken over 976 farmers. This could be significantly increased if modern corn technology, the major component of the Cáqueza project, is widely adopted. The potential for income gains is greater than the actual benefits in 1974.

In other areas there have been some improvements, but they are hard to measure or quantify. The cooperative still relies upon projects' volume buying and pricing of consumer goods and agricultural inputs, as well as project marketing of garden vegetables. A great effort has been made to contact the small farmers in meetings, demonstrations, fairs, workshops, etc., by staff as well as by community and educational leaders. At the same time, resistance by Cáqueza's small farmers to formal organization has led to the use of informal leadership groups and a great reliance upon contact between project staff and individual farm families. These are proven but high-cost methods of spreading modern agricultural technology.

VI. PROJECT LESSONS FOR DESIGN AND IMPLEMENTATION

The major lessons of this project are well-stated in the preface to the ICA-IDRC 1974 report:

> Agricultural research at both the national and international level is strongly oriented towards technological change. Much of this research seeks to develop components of agricultural production systems or complete production systems which will increase food availability from improved agricultural production.
>
> The experience of the Cáqueza project is that much of the technical effort invested into agricultural production research may not necessarily improve the well-being of the small farmer, unless the technical innovations are accompanied, at least in the

> first instance, by a comparable expenditure on activities to investigate the farmers' limitations to the incorporation of research results into their production systems.[1]

In Cáqueza, the project staff had to learn to listen to the farmers; this was the first real step toward improved adoption rates for corn. But when the farmers reported that "credit" and "marketing" -- rather than technology and productivity -- were their main problems, this information did not automatically obviate difficulties. "Credit," it was learned, was the farmer's way of talking about a risk function involved in high cash inputs in a crop he can grow without cash requirements. The provision of more credit specifically for corn did not solve the problem. More "marketing" was not a solution; rather, too much marketing appeared to be responsible for the low price paid to farmers by middlemen. A marketing system which worked to capacity was one answer, but this required arrangements which could not be expected from small farmers themselves.

In 1974 the Cáqueza project represented one of the best researched and most responsive extension efforts seen by the DAI team. And yet, after four years of dedicated effort, there was still much to be accomplished. However, communications had been opened between project staff and small farmer and the process established whereby each year's lessons were being translated into next year's project redesign. In the complex world of Colombian small farmers, this is probably the only way a project could interact with and actually increase the well-being of small farmer participants in rural development.

Other lessons of the project concerned evaluation systems and the methods used to collect baseline data. The original 1972 survey data results gave a per capita income of $50; this was revised to $86 by utilizing expenditure data, and the project now estimates this figure is approximately 20 percent too low. In Colombia, survey methods which attempt to record wealth or income run into strong opposition from smallholders who are suspicious of the purpose of the data collection. While the project has excellent data on net income potential from proven modern packages as well as books of

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[1] *The Cáqueza Project*, preface to four reports prepared by the ICA-IDRC interdisciplinary team for the Agriculture, Food and Nutrition Science Field Staff Symposium of the International Development Research Centre (IDRC) November 18-21, 1974. The authors of the paper were C.A. Zulberti, Ronald J. Duncan, Hubert G. Zandsra and Kenneth G. Swanberg.

statistics on meetings, demonstrations, extension contracts, etc., it has virtually no information on the number of adopters, the acreage changes as a result of adoption and total output and income increases as a result of project endeavors. The evaluation system has focused on the "why" questions, and there is no systematic attempt to answer the fundamental question of "how many" are receiving benefits or to attempt to quantify benefits other than those under controlled conditions in the project.

Finally, the project has demonstrated a need to take account of non-technological decisions of small farmers, building upon the constraints they face and the potential benefits they perceive. It has also launched an innovative experiment which attempts to work directly against the reasons why farmers do not adopt new and "proven" agricultural methods and practices. However, it has yet to define, as the project staff most readily admit, an operationally proven solution which will take account of these constraints and which will have a broad-ranging and positive impact on large numbers of small farmers in rural Colombia.

Information Sources

A. Field

ICA Headquarters at Tibaitatá were visited four times in 1974. Discussions were held with the Cáqueza project director, who later became the overall director for Region I, which includes Cáqueza; Drs. Zandstra and Swanberg of the IDRC staff; and Wallace Hawkins, the education advisor to ICA (supported by a grant from the Kellogg Foundation). Cáqueza was visited by two DAI staff on 7 and 8 May, and discussions were held with all project personnel, as well as with the U.S. Peace Corps volunteer working on the nutrition study.

B. Reports

A large number of research reports have been written on Cáqueza. Four of the most useful were:

- The afore-referenced ICA-IDRC Report to the Field Staff Symposium of IDRC held in November 1974;
- Luis Alfonso Chudt L. and Kenneth G. Swanberg, *Evaluación de Las Estructuras Institucionalizadas en los Proyectos de Desarrollo Rural*, Bogotá, October 11, 1974; and
- German Escobar Paez, *Proyecto de Desarrollo Rural del Oriente de Cundinamarca: Diagnóstico Socio-Económico*, Bogotá, July 31, 1973 (the baseline socioeconomic study).
- *The Cáqueza Project Corn Production Plan* (Hubert G. Zandstra, ICA-IDRC Coordinator.)

Data Adequacy

While the yields, net income, factor costs and returns, and other aspects of the benefits of the recommended technological packages, along with the risk calculations, have been elaborately documented by the project, the number of beneficiaries (adopters) had to be estimated. The draft of this write-up was reviewed by Messrs. Zandstra, Swanberg and Hawkins.

CALCULATION OF EXPECTED LOSS

Let f_y be the probability density function of corn yields and assume:

$$f_y \sim N(\mu, \sigma^2)$$

Let f_L be a corn function in terms of costs, yields and prices so that

$$f_L = \bar{L} \text{ for yields} < x$$
$$f_L = 0 \text{ for yield} \geqslant x$$

where x is the break even point.

Then the expected value of the loss will be:

$$E(L) = \int_{-\infty}^{\infty} f_L \cdot f_y \, dy$$

In this sense, the loss function specified is not an actuarial loss function, as it does not take on negative values (See Halter and Dean, 1971).

As in this document the loss function for the two production systems can be specified as:

$$L = C - yp \quad \text{for } y < C/p$$
$$L = 0 \quad \text{for } y \geqslant C/p$$

where y = yield; p = price of corn and C is costs (total or cash).

Then the expected value of the loss is

$$E(L) = E(C-yp) \quad \text{for } y < C/p$$

$$E(L) = -p \cdot E(y) + C \text{ for } y < C/p \quad \text{1/}$$

$$E(L) = -p \cdot E(y \mid y < C/p) + C$$

So that the expected loss can be calculated from the cost of production, the price of corn and the expected value of the truncated (normal) distribution of the corn yields.

1/ As the price of corn and costs of production are independent of yield for each of the production systems compared.

Table 1: The actual corn production method in Cáqueza*

Costs /ha	1972	1974
Cash: 1) Land preparation	$ 13	$ 16
2) Seed and others	$ 5	$ 5
Land (Cost of rental)	$ 30	$ 36
Labour (26 days)	$ 23	$ 28
Total	$ 71	$ 85
Yield, kg/ha	907 (S.d. = 660)	907 (S.d. = 660)
Returns /ha		
Value Product	$ 91	$144
Net gain	$ 20	$ 59

* $ = CdnS

Table 2: The recommended production method in Cáqueza*

Costs /ha	1972	1974
Cash: 1) Land preparation	$ 13	$ 16
2) Fertilizer and seed	$ 49	$ 97
3) Insecticides	$ 6	$ 9
4) Interests (24%/yr.)	$ 6	$ 21
Land	$ 30	$ 36
Labour	$ 41	$ 50
Total	$145	$229
Yield, kg/ha	2740 (S.d. = 1170)	2740 (S.d. = 1170)
Returns /ha		
Value product	$274	$434
Net gain	$129	$ 205

* $ = CdnS

Table 3: Comparison of actual and recommended corn production methods in the Cáqueza Region, assuming the 1974 corn price of 16 ct/kg.

	CdnS /ha		
	Actual	Recommended	% change
Yields /ha	907 Kg.	2.740 Kg.	202
Total costs	$ 85	$ 229	170
Net gain	$ 58	$ 205	253
Cash costs	$ 21	$ 142	575
Return to land /$	$2.61	$6.69	155
Return to labour /$	$3.07	$5.10	73
Return to Cash /$	$3.75	$2.44	- 58
P [gain < 0]	0.28	0.13	- 53
P [gain < cash costs]	0.12	0.06	- 50
Risk on total input *	$ 37	$ 78	111
Risk on cash input *	$3.25	$ 53	1,530

* See Appendix 1 for the method of calculation used.

Table 5 Cash requirements, returns to inputs and risks to the farmer of the Corn production plan, and the actual and recommended production methods.

	Actual	Plan	Recommended
Farmers Cash Required /ha**	$ 21.00	$ 31.00	$ 142.00
Net Gain /ha	$ 58.00	$ 156.00	$ 205.00
Return to Total Input/$	$ 1.68	$ 3.42	$ 1.90
Return to Labour /$	$ 3.07	$ 4.12	$ 5.10
Return to Land /$	$ 2.61	$ 5.33	$ 6.69
Return to Cash /$	$ 3.75	$ 6.03	$ 2.44
P (Yield 800)	0.44	0.05	0.05
Risk on total input /ha *	$ 37.00	$ 39.00	$ 78.00
Risk on cash input /ha *	$ 3.25	$ 0.50	$ 53.00

* For calculation method of expected losses see Appendix 1.

** $ = Cdn$

I.C.A. RURAL DEVELOPMENT PILOT PROJECT FOR NORTHERN CAUCA

I. PROJECT BACKGROUND

The Colombian Agricultural Institute (ICA) is the agency responsible for Colombia's agricultural research and farm extension services. The successor to a series of research and extension institutions dating back to 1952, ICA was organized in 1969 as a semiautonomous entity. It employs some 5350 people, administers 25 research centers and experimental stations and operates 47 so-called "rural development agencies" -- essentially farm extension service offices.

In cooperation with the Caja Agraria, the nation's largest agricultural lending institution, ICA began in 1971 to organize pilot rural development projects in 20 selected areas of the country. Inspired by the Puebla Project in Mexico, which ICA representatives visited in 1970, the purposes of these rural development pilot projects were:

- to transfer adaptive agricultural research activities out of sophisticated experiment stations and into the fields of small farmers;
- to develop high-yield technological packages appropriate to small farmer production environments; and
- to organize these producers in local groups through which credit, technical assistance, and other services could be more efficiently channeled.

No less than $7.8 million of a $28 million Colombian Agricultural Sector Loan has been made available by AID to finance ICA's rural development program.

The first ICA rural development project was established in the Colombian highlands near Bogotá (see Cáqueza project write-up), the second in a middle-altitude valley of south central Colombia. This is the Northern Cauca Project, launched in March 1972. Headquartered in the small market town of

Santander de Quilichao (population circa 8000), the Cauca Project is directed at a small farm population of some 38,000 families whose landholdings range from 0.2 to ten hectares (one-half to 25 acres), with an average of 1.5 hectares (four acres). These producers are scattered over 11 rural districts and are clustered in an altitude zone of about 760-1200 meters (2500-4000 feet) above sea level where, because of river water availability and favorable rainfall patterns, most farmers can practice a double-cropping cycle.

Of the 38,000 farm units within the project's zone of influence, the project claims to directly or indirectly benefit 3100. Some 250-500 participants (the number varies per crop cycle) receive credit to finance cash crops with modern inputs following project recommendations. Most of these producers are organized in 14 base organizations.

The thrust of the project concerns applied agronomic research and education. From the beginning, ICA staff have tested improved crop varieties against traditional strains to determine which yield best under small farm production conditions. These so-called "regional tests" have involved such cash crops as yuca, beans, soybeans, corn, rice, sugar cane and vegetables. Additionally, fertilizer, fumigation and plant density trials on these crops have been conducted on demonstration plots. Both activities take place on the land of small farmers.

Where especially positive results are obtained, the project organizes "field days" (usually at harvest) to expose local farmers to the benefits of a newly-proven technology. This activity is supplemented by crop-specific courses presented to the membership of farmer base groups. Over the first 18 months of the project, ICA staff carried out 43 demonstration plots, 47 regional tests, 20 crop courses, 24 field days and 776 meetings with base group membership.

The ICA project is not restricted only to agriculture. It also provides the region's small farmers with assistance on livestock raising. To date assistance has included education and veterinary services relating to dairy cattle, pigs and poultry. Additionally, some 800 wives of small farmers, organized in 12 mothers' clubs, meet weekly with ICA paratechnical home economists for training in nutrition, health, child care, domestic arts and other subjects.

In all, the ICA project office in Santander de Quilichao employs a project staff of four professionals and 16 subprofessionals. In the first category are three agronomists (including the project director) and a veterinarian. Of the subprofessionals, 13 are agricultural technicians assigned to field supervision and promotion tasks on a district basis, and three are females with special training to work with rural

mothers' clubs. Most of the subprofessionals have completed primary and some secondary education. It is noteworthy that the Director of the Northern Cauca Project has served as the local farm extension agent in Santander de Quilichao since the late 1950's, and several of his agricultural technicians have served under him for a decade or more.

II. LOCAL ENVIRONMENT

The North Cauca region contains some of the best agricultural land in all of Colombia; it also contains some of the worst. In the first category are the wide, flat bottomlands of the Cauca Valley itself. These are abundantly supplied by river water and are perfectly suited for mechanization. Perhaps 70 percent of this superb agricultural real estate is controlled by large and medium farmers operating modern, commercial -- even agro-industrial -- rice and sugar cane haciendas or cattle ranches. These properties extend to the base of the Andean foothills at the northern end of the Cauca Valley, where Santander de Quilichao is located; and then as the landscape begins to pitch upward, one encounters much poorer and more heavily crowded farm land: that held by most of the region's small farmers.

About 60 percent of these producers are owner-operators, cultivating properties which on the average do not exceed two hectares (five acres). An additional 30 percent of farms are worked by renters and ten percent by squatters. The land of the small farmers is severely eroded in some areas, and hundreds of plots have been abandoned for this reason alone. Soils tend to be seriously depleted on most properties due to limited use of fertilizer and over-cultivation resulting from the progressive fragmentation of holdings.

The region's small farmers are commercially oriented, and perhaps as much as 90 percent of their production is destined for market sale. However, cash crop specialization is not common since farmers prefer to spread their risks by growing a wide variety of products, including tree crops such as plantains, coffee and citrus. They attempt to supplement their crop income with livestock enterprises on a small scale. Off-farm employment on lowland haciendas is widespread. Traditionally independent and self-reliant, the typical farmer is reluctant to solicit public agricultural credit with which to finance yield-increasing modern inputs. Consequently, cash crop yields are far below what they need to be to provide rural families with a means of escaping subsistence-level living standards.

Credit resistance by Northern Cauca's small farmers is not due to ignorance; 85 percent of rural adult males are able to read and write. Nor is it the result of restricted access to public credit sources; to the contrary, credit is available almost for the asking. In Santander is located a large office of the Caja Agraria, Colombia's oldest and largest agricultural lending institution. The Caja is fairly liberal in its credit policies and has few qualms about lending to small farmers. For example, it will lend not only to farmers with land titles but also to those without, including renters and squatters. To qualify for credit, renters must have contracts limited to no less than three years; squatters are required to have occupied their property for ten years.

Of course, the Caja's generosity ends abruptly when a client fails to repay his loan on time. The bank's interest rate of 13 percent per annum is automatically doubled on all loans delinquent by more than 30 days and doubled again at 60 days. Moreover, foreclosure proceedings begin at 6-12 months unless justifiable cause can be shown for inability to pay. This is not just an idle threat; many foreclosures have in fact been carried out.

It is worth mentioning that the Caja has also been in the farm supply business for decades. Indeed, much of its credit is provided in kind -- fertilizer, insecticides, seed, implements -- rather than cash. Combined with the demonstration effect created by the lowland haciendas, which at some time or another have employed most of the region's small farmers as wage laborers, the Caja has been instrumental in generalizing knowledge if not use of modern inputs throughout Northern Cauca. But given small farmer resistance to bank credit, many producers have no way of financing recommended input use levels and therefore fail to derive much benefit from them. This is perhaps the single most important problem which the staff of ICA must overcome if their pilot project is to succeed.

Unfortunately, the problem is getting worse rather than better. Between 1972 and late 1973 the price of Caja-distributed fertilizer (the cheapest supplier around) rose from $7.60 to $10.30 per 50-kilo (110-pound) bag and despite a temporary price freeze on existing stocks which was imposed in December 1973, the world energy crisis is sure to eventually force the price of this commodity much higher.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

Like its counterpart rural development projects elsewhere in Colombia, the Northern Cauca project was the outgrowth of

a visit by ICA representatives in 1970 to Plan Puebla in Mexico. These representatives returned with the conviction that the Mexican project, innovative though it was, did not go far enough. Focused essentially on raising the corn crop yields and income of small farmers, it ignored the development of integral strategies for attacking other problems such as health, housing and nutritional inadequacies of the rural poor.

The Colombians vowed to be more ambitious; they began to talk about launching "multidisciplinary" and "multi-institutional" and "multi-crop" activities. Northern Cauca was selected as an appropriate region to convert these slogans into action for several reasons. First, the ICA farm extension agency in Santander de Quilichao was directed by a dynamic and respected agent, the kind of person that could be expected to "get results" quickly.

Second, due to its proximity to Cali, the project could draw upon a large number of public service institutions which might potentially be recruited for research and assistance activities directed at small farmers: universities, the Forest Service, the Federation of Coffee Growers, the Public Marketing Corporation, the regional offices of the Ministries of Housing and Health, etc. Third, the project region did face a terrible array of problems characteristic of many underdeveloped farming regions in Colombia, such that strategies and solutions proven effective in Northern Cauca might be replicated elsewhere.

Ostensibly for purposes of developing a project design which would innovatively cope with the region's priority problems, ICA staff undertook a socioeconomic survey based on a sample of 140 small families from five representative rural districts. The survey failed to generate a very novel strategy for assisting small farmers. In effect, project planners decided to continue basically with the services that the farm extension agency in Santander de Quilichao had been offering for many years: promotion of cash crop production using modern inputs, veterinary and educational attention to livestock raisers and home economics training for rural women.

Indeed, the only innovations offered by the project were borrowed from Puebla: 1) project services would be directed exclusively at small farmers of ten hectares (25 acres) or less, and 2) existing crop technologies developed on ICA experimental stations would be tested under small farm conditions, against prevailing traditional technologies.

In other words, the project strategy was a conventional extension with a Puebla-style focus. It was more ambitious than Puebla only in that it did not restrict its research efforts to just one crop and chose to scatter its energies over a broader range of activities. But in doing so, the Northern Cauca project sacrificed much of its potential usefulness as a pilot undertaking.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Faithful to their slogan of encouraging "multi-institutional" approaches, Northern Cauca project staff attempted to recruit the cooperation of as many as 12 government and private service agencies in a joint enterprise to organize and assist small farmers. Representatives of these entities showed high initial interest in the project, and over a two-month period in early 1972 ICA arranged numerous meetings with small farmers in the rural districts; dozens of would-be change agents from Cali arrived to make speeches about their plans for integral socioeconomic development of the farm population. Some 19 rural development base groups were organized in short order.

However, problems of maintaining their continuity quickly surfaced. In the first place, only two of the 12 cooperating agencies bothered to continue meeting with the base groups. Simultaneously, ICA was criticized for organizing base groups in the first place. Why organize *new* groups, the farmers complained, when they already belonged to old ones that had been active for years? Such groups, ICA discovered, were many: community action associations, civil defense groups, "friendship" credit and consumer clubs, burial societies, and sports clubs -- to name a few.

Faced with such institutional competition, ICA staff elected to drop their plan to work only with base groups they had organized, opting instead to work through existing entities wherever they were active and forming new groups where older ones were absent. However, there were no local objections to organizing mothers' clubs, of which nine were initially established.

ICA's next task was to recruit small farmers willing to volunteer part of their holdings for the establishment of regional tests and demonstration plots. When the project promised to pay all input costs of these experiments and allow their operators to keep all products harvested, many volunteers were found. The project was thus able to pick and choose among them, usually selecting those farmers located on roads who offered the highest potential "visibility."

As was the experience in Puebla, Northern Cauca project staff discovered that traditional crop strains used by small farmers performed equally or better than many of the more delicate hybrids imported from the experimental stations. With increased planting densities assisted by moderate to heavy fertilizer applications, yields on corn could be increased by 50-60 percent and those of yuca doubled. Bean and soybean yields demonstrated increases of 33 percent and 17 percent respectively. During the project's first crop cycle -- June to December -- regional tests were conducted on 40 small farms in all: ten for yuca, nine for beans, eight each for corn and soybeans and five for vegetables. During this period 13 demonstration plots and 12 field days were conducted, together with 91 field meetings with farmers. Also four courses in vegetable growing and three in yuca were organized.

However, the project was pushed too quickly. For even as it was developing a set of suitable technological packages on small farm experimental plots, it launched a campaign to get small farmers to request credit for cash crop production (and animal purchases) *before* these packages had been proven. ICA staff, in dialogue with small farmers, helped them to prepare farm production plans and credit requests for Caja financing. On this basis 521 farmers received cash crop loans for 1063 hectares (2626 acres) totaling $145,200, mostly for growing corn, soybeans, and yuca. Yield increases on these crops matched those attained on the experimental plots.

Unfortunately, by harvest time in late 1972 market prices for these products had fallen sharply. Although all loans were repaid on time, most producers did little better than break even. Unlike the Puebla project, where the marketing problem had been solved by government price support to the promoted cash crop, Northern Cauca project staff had left small farmers to fend for themselves at harvest time. In the process, the potential income gains from increased productivity were lost, which only served to reinforce the small farmer's traditional reluctance to assume the risks of bank credit.

The consequences of having pushed too fast with too much were immediately felt during the first and second crop cycles of 1973. Project participation not only sagged but so too, apparently, did the energy of project staff. In 1973 the number of regional tests dropped to seven. In the first crop cycle there were 18 demonstration plots and nine field days; in the second cycle 12 and three respectively. The number of credit recipients supervised by ICA staff dropped by half: 225 in the first cycle and 232 in the second.

Yields on corn and soybeans were maintained. Yuca yields gained an additional 50 percent, but this outcome only affected 41 producers. No marketing services were organized, however, and even today this area of activity remains neglected by the project.

The only areas of the project which seem to have maintained their initial momentum are those of livestock promotion and mothers' club activity. In the project's first crop cycle, nine courses on poultry and one each on pig and dairy cattle raising were held. Some 270 farmers attended, of which 59 received Caja Agraria loans totaling $26,500 to finance the purchase of 99 dairy cows, 52 pigs and 2700 chickens. With respect to mothers' club activities, nine groups totalling 800 members held 820 meetings for courses on vegetable gardening, sewing and weaving. It is noteworthy that 17 women received Caja Agraria loans, 13 to purchase sewing machines, three for weaving looms and one to finance her vegetable garden.

In 1973, another nine livestock courses with 250 participants were organized in the first crop cycle; six courses had an attendance of 129 in the second. Animal loans totaling $25,000 to 38 farmers in the first cycle and $24,700 to 33 in the second were granted. During these periods the number of mothers' clubs was increased to 12. However, Caja loans to women were terminated, and with this impediment ICA home economists turned their efforts to non-income-generating projects: courses in nutrition, baby care, personal hygiene and first aid.

Unfortunately, at the time the project was visited no data were yet available on its 1974 performance. But it is likely that project activities have declined even further, in view of the high cost of modern inputs resulting from the world energy crisis. The energy crisis is bound to make ICA's technological packages, based as they are on intensified use of modern inputs, much less attractive to small farmers, especially in the absence of efforts to solve the marketing problem.

V. PROJECT SUCCESS

It is hardly appropriate to make a definitive judgment on the success of the Northern Cauca project on the basis of its performance during a brief 18-month period. However, the available evidence suggests that it has accomplished far less than it hoped to. By pledging themselves to exceed the accomplishments of Puebla, ICA staff in Santander de Quilichao

attempted a much broader range of activities than their Mexican counterparts, but delivered less in net benefits to small farmers.

ICA did overcome the resistance of many project participants to bank credit, but this victory proved ephemeral, mainly because one of the basic lessons of Puebla was ignored: namely, increased productivity is no automatic guarantee of increased income in the absence of marketing arrangements which offer the small farmer remunerative prices for the crops he sells. Moreover, despite the proliferation of ICA-supervised experimental plots on small farms, these efforts demonstrated little continuity after the first crop cycle in which they were attempted and were sequenced inappropriately; consequently, credit promotion was launched prematurely.

The Northern Cauca project has made some strides in encouraging increased fertilization of several different crops when institutional credit was available to project participants. However, little effort was made to tailor the technological packages recommended by the research station to the particular local circumstances, the result being that the regional trials were hardly more than demonstration plots. While the project believes that real yield increases have been achieved, the relationship between output increases and increased income is unclear. In sum, the project has done little to establish either adaptive research or to prove itself as a non-conventional model for the extension of new agricultural knowledge.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

Nonetheless, the project offers many useful lessons. First, the project demonstrates that organizing farmers in base groups is a fine idea if the client population lacks pre-existing institutional affiliations of its own; but where farmers have already organized themselves it is often wise to work through them rather than start from scratch with new institutions. ICA staff in Santander now admit that they can get far better mileage out of working with rural sport clubs than with any group they themselves have organized. When the project wants to drum up attendance for crop and livestock courses or field days, it often gets the word out fastest by sending its staff to attend or compete in local soccer matches in the rural districts.

A second lesson involves the questionable advisablity of launching a new rural development project with veteran staff from conventional farm extension services. The Northern

Cauca pilot undertaking demonstrated an apparent lack of commitment to implementing those features of the project design which in any real sense could be considered "innovative." However, those activities which had been conducted for years were continued unchanged and apparently absorbed most of the energies of the staff.

The project also demonstrates that it is possible -- indeed quite easy -- to get immediate yield increases on small farms from the introduction of fertilizer. However, it is quite another matter to convert these increased yields into sustained income gains without facing up to the really hard questions of how to achieve remunerative price levels for the increased output generated. At the local level this may entail group storage and marketing arrangements. At the regional or national level it may entail the creation of price support policies, federal marketing agencies and other institutional infrastructure characterized by the requisite administrative agility and efficiency to establish staying power.

In brief, the challenge lies not in how to produce a discrete leap in cash crop productivity; it lies in assuming that such productivity, once achieved, can be sustained over time.

Other "negative" lessons of the project should be apparent and need only be summarized briefly here:

- the failure to address the marketing problem;
- premature credit promotion;
- lack of continuity in the adaptive research activities; and
- neglect of a reliable methodology, such as that used in Puebla, to collect yield data on the harvests of project credit recipients.

In general, the Northern Cauca project appears to be an undertaking which was designed and implemented with no clear commitment to get there. It appears to be an effort to make business-as-usual look like something more than it is or could ever become: namely, a pilot project.

Information Sources

A. Field

The Northern Cauca project was visited for two days by one DAI staff member in June, 1974, at which time the project director was not available, due to illness. However, extensive conversations were held with two project professionals, one field supervisor and one home economist. Two rural districts were visited, where conversations were conducted with the farmers of one base group and members of one mothers' club.

B. Reports

The AID Agricultural Sector Loan Paper (Colombia: 514-L-064) was consulted for an overview of ICA rural development pilot projects in general; also a brief Northern Cauca project description by Ernesto Navia G. the project's director, in *Memorias (1er Seminario Internacional de Proyectos de Desarrollo Rural Regional, Sept. 10-19, 1972)*, published by ICA. Data on project activities were drawn from Northern Cauca's *Informe Estadistico,* compiled on a bi-annual (crop cycle) basis.

Data Adequacy

Numerical data on project activities and participant loans, yields, acreage, etc., are all taken from published documents or project files cited above. The draft of this write-up was reviewed by Dr. J. Wallace Hawkins, advisor to the ICA.

FUTURO PARA LA NIÑEZ
(FUTURES FOR CHILDREN)

I. PROJECT BACKGROUND

Futuro is a private sector community development program based in Medellín, capital of the Department of Antioquia, in central Colombia. Its name reflects its fundamental working principle: that the strongest possible incentive for self-help endeavor by communities and individuals is their children's welfare. Futuro assists communities to identify and discuss their problems, to determine communal self-help strategies for resolving them and to implement community projects with a minimum reliance on outside resources -- all for the sake of their children. The program does not provide credit, materials or equipment. Its job is essentially motivational and educational -- a community counseling service.

Informally organized in the early 1960's by a North American sociologist to mobilize the voluntary services of Colombian professionals in support of self-help efforts by the region's urban and rural poor, Futuro has evolved into a small but extremely active organization of five full-time and two half-time paid community counselors. Despite this miniscule staff, the program is currently assisting eight urban squatter settlements around Medellín as well as some 150 rural villages throughout Antioquia and neighboring departments reaching about 5000 families representing a population of 35,000 people. In the last two years, Futuro-assisted communities have initiated and/or completed 541 projects valued at US$275,000. Since the program leaves the choice of projects completely in the hands of the communities, more than 30 different types of self-help projects have been completed -- from road, bridge, and school construction to fish ponds and vegetable gardens. Formerly financed exclusively with private donations, Futuro now receives an annual grant (US$52,000 in 1974) from the Colombian government.

II. LOCAL ENVIRONMENT

The community settings in which Futuro works are as varied as the projects which result from its community counseling efforts. Perhaps 90 percent of the program's clients are rural, but the diversity of their socioeconomic circumstances makes it virtually impossible to describe a "typical" community. Some rural communities are located on a paved road; others can only be reached on horseback or by canoe. Some represent predominantly commercialized settings, others predominantly subsistence farming. Literacy in one community may reach 80-90 percent, while in another only 20 percent. Most farm families have title to their own land, but both farm size and quality of land are subject to wide variation, as is their ecological environment. Generally, the only elements in common between Futuro-assisted communities are those which explain or reinforce their poverty, such as small farm size; severely eroded soil; scarcity of transport infrastructure, schools and social services; underemployment; malnutrition; and a collective inertia born of despair and distrust.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

Futuro was initially organized by, and receives continuing guidance from, Dr. Richard P. Saunders. He is founder and president of Futures for Children, Inc., a private community development program now based in Albuquerque, N.M., which primarily works with American Indians. In Dr. Saunders' view, conventional efforts to assist the urban and rural poor are altogether too paternalistic -- and hence, too expensive in the long run -- to effectively solve the problems of underdeveloped societies. Moreover, such efforts are usually designed only to alleviate the symptoms rather than eradicate the causes of poverty. In Saunders' opinion, poverty is more of a state of mind than the absence of acceptable levels of income and socioeconomic opportunities. Accordingly, Futuro is fundamentally committed to the task of human development. It seeks not to build projects but to build people through projects. Projects are merely a means to an end, which is the enhancement of positive human values such as self-respect, social cooperation and collective pride of accomplishment.

"Never do for others what they can do for themselves." This time-worn dictum has been given extensive lip service by community development practitioners for many years, but seldom has it been obeyed with the "purist" compliance which

Dr. Saunders and the Futuro organization have insisted upon since the beginning of their activities in Colombia. No community is too poor to materially and substantially improve its welfare, argues Dr. Saunders, and it can do so *entirely* with its own human and physical resources. The problem consists in motivating the community to do so. The Futuro program was launched on the premise that there exists no more powerful incentive for people to autonomously finance solutions to commonly-felt problems than a parent's desire to provide for the needs of his children.

From the beginning, Futuro has attempted to demonstrate how much people can do for themselves when the only outside assistance is limited to motivational and educational activities.

Dr. Saunders first visited Medellín at his own expense in 1961. During this first two-week visit he talked with private businessmen and academicians to stimulate dialogue on the idea of launching a community counseling service for rural villages, using professional volunteers. Accompanied by the Dean of the Medical School of the University of Antioquia, who served as his translator, Dr. Saunders visited a number of rural villages to demonstrate the motivational technique he had in mind. In each village a meeting was arranged with the community's adults. Dr. Saunders would begin by asking a simple question: "What have you done for your children?" The questioning would then continue: "What do your children need? Why haven't you done anything about it? If you don't do something, who will?" When community adults slowly began to offer excuses, problems would be identified. By a pure Socratic method of questioning, Dr. Saunders would move the dialogue from problem identification through the stages of selecting a priority problem, discussion of possible ways to solve it, selection of a solution strategy, to a decision to organize community resources for project implementation. Once this point was reached, Dr. Saunders would give the community a ringing challenge: "Every day you delay on this project is another day your children suffer." Often he would promise to return within six months to see what they had managed to accomplish.

With nothing more than this kind of verbal motivation, several communities embarked on road, school, or water system construction -- financed completely with local labor, material and cash resources. Convinced of Dr. Saunders' methodology, several Colombian professionals offered their voluntary services as counselors and pledged their assistance to recruit other volunteers. By 1962 an office was organized in Medellín to coordinate their efforts.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Futuro was by no means an instant success, and it was not until 1970 that the program began to generate the kind of consistent performance that would indicate it was more than just another well-intentioned but impractical approach to helping people help themselves. In practice, Dr. Saunders' motivational methodology proved exceedingly difficult for Colombian professionals to copy. College-educated Futuro counselors -- as volunteers at first and later as paid staff -- found it far easier to tell rural communities how to solve their problems and to procure outside funds and materials to help them, than to let villagers work out their own solutions with their own resources. In as many as four two- to three-week visits to Colombia per year, Dr. Saunders found himself retraining or firing old staff, or recruiting and training newcomers. Almost nine years passed before a small but carefully-tested and talented group of counselors was obtained -- among them two small farmers. In 1971 Futuro's current Director, Dr. Alvaro Villa, was hired. Totally committed to implementing a non-paternalistic CD methodology, Dr. Villa has provided excellent guidance to Futuro staff by setting an example for them to follow, for he works part-time as a counselor himself. He has been instrumental in placing the program on a sound financial footing by helping to recruit an active board of directors from among some of the most prominent businessmen of Medellín and in obtaining annual grants from the Colombian Ministry of Health to finance the purchase of vehicles and other equipment.

Futuro is run from a modest four-room office in downtown Medellín. Two of its counselors -- the small farmers -- live in the country and conduct their community visits from that base. The remaining staff members, which include an ex-priest, a female sociologist, an administrative assistant and the program director, operate out of the Medellín office. Except for a single secretary, all staff members have field work responsibilities, and each is assigned responsibility for covering a specified number of communities. As a working norm, each full-time counselor attempts to assist a minimum of 30 communities. All staff members submit a monthly schedule of community visits and a monthly report on project activities initiated, continuing or completed in the assisted communities. The staff also meets once a month to discuss and evaluate its efforts. On the occasion of a visit by Dr. Saunders -- usually twice each year -- Futuro staff may spend up to a week in intensive workshops or training exercises with the program's North American mentor.

Since Futuro leaves the choice of self-help projects entirely in the hands of the communities it assists, it does not promote a technological package per se. However, the program developed a very effective audio-visual component for its motivational work in the communities. This consists of specialized slide shows on different subjects. For example, if the community expresses a desire to improve the nutrition of its children, Futuro will present a slide show to demonstrate what other communities have done with their own resources to improve nutrition. This "nutritional package" may depict half a dozen different options -- from vegetable gardens and fish ponds to livestock raising and school restaurants. Similarly, if the community is concerned for the health of its children, Futuro can respond with a slide show depicting projects for potable water, sewers, community clinics, etc. The most striking thing about Futuro's slide shows is not *what* they show, but *how* they are shown. The community counselor is trained not to narrate the significance of the slides but rather to get the community to discover the meaning of the slides on their own. For example, instead of saying: "This is a picture of community X building terraces for vegetable gardens" the Futuro counselor asks: "What are the people in this picture doing? Why do you think they're doing it?" Thus, the slide show becomes a means to the motivational end of encouraging people to decide for themselves what problems they wish to solve with their own initiative and their own resources.

V. PROJECT SUCCESS

Before January 1973, Futuro made no attempt to estimate the benefits of projects undertaken by the communities it assists. This is in part due to the multiplicity of project types undertaken. Including only those projects completed in more than one community there are, in order of numerical frequency, the following: agricultural terraces, fish ponds, vegetable gardens, rabbit hutches, potable water systems, kindergartens, school improvements, school construction, bridges, roads, rural electrification, procurement of school teachers, legal suits and community first-aid facilities. An additional 15 project types are scattered in as many communities. All told, from January 1973 to August 1974, 278 projects were completed valued at US$89,194, with another 263 under construction valued at US$207,638. Note that the value of each project is not estimated by Futuro but by the community which undertakes it; hence there exist no uniform measurement criteria since one community may wish to include the value of local labor contributions and another not, etc. Nonetheless, the above figures are the only aggregate value

estimates available, and at least they provide a sense of the magnitude of local resources mobilized through Futuro's motivational efforts.

By far the most numerous project activities -- agricultural terraces (for vegetable growing) and fish ponds -- can be considered income-generating. Their popularity is partly explained by the fact that they are inexpensive to build and, more importantly, are usually built as family rather than communal projects. However, both contribute to the enhancement of social cooperation because (1) they are promoted on a community-wide basis, and (2) first adopters are encouraged by Futuro to assist their late-adopting neighbors. In the case of family fish ponds, the owner of the first pond built is given about six carp (tilapia) as stock on the condition that he donate first-generation fingerlings to subsequent pond-builders in his community, and the latter to their neighbors, until all ponds are stocked. In the case of agricultural terraces, several communities have organized communal construction crews to build four to six terraces on the farms of interested families. This procedure spreads the know-how so that after the first terraces are in place and their benefit demonstrated, the individual family can construct additional terraces on its own initiative.

From January 1973 to August 1974, 101 families built fish ponds. Depending on its size, a pond may require 10-20 man-days of family labor to construct but requires no cash outlay. Since the fish feed on cut grass and kitchen scraps there are negligible maintenance costs. After a gestation period of 15-24 months the fish stock is large enough for the farm family to extract six to eight fish per week. At 25 pounds each (market value US$.48 per pound) the family might consume between US$37 and US$50 of fish per year.

In the same period, 107 families built terraces -- some as few as two or as many as 50, the average being seven. The typical terrace measures 1.5 by 3 meters, and is filled with organic compost. Including compost preparations spread out over four to six months, the construction of a terrace probably requires one to two man-days. Again, using family labor, no cash outlay is necessary. The only cash cost for production is vegetable seed, which is seldom more than US$.40 per terrace. Each terrace can produce three vegetable crops per year. Assuming a yield per terrace valued at US$2, times seven terraces, times three crops, the farm family can consume or sell about US$42 in vegetables per year.

Futuro does not charge communities for its counseling services, and it evidently has no plan to do so. The program is dependent on government grants and private donations and can not be considered self-sufficient. Far more important, however, is that Futuro assists rural communities to *be*

self-sufficient. *That* is where the actual and potential success of the program lies. On the other hand, the fact remains that Futuro has yet to prove its replicability. Its community coverage can not be expanded without additions to staff, and to train counselors to effectively implement a non-paternalistic CD approach has proven difficult. Recently the program acquired the half-time services of a rural housewife, who together with two small farmers balances Futuro's counselors at three non-professionals and three professionals. Time will tell whether the use of members of the rural poor as change agents to assist others like themselves will provide the key to increasing program coverage and enhancing Futuro's potential replicability elsewhere.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

Futuro insists that the development process must be initiated, staffed, funded and carried forth solely by local participants, who may be given impetus from outside organizers and motivators. If this is possible, that is, if such locally-generated and implemented initiatives will begin a process which can lead to self-sustaining growth, then the Futuro experiences offer the following lessons: *First,* using children's welfare as an incentive to individual and communal self-help endeavor has proven to be very effective. *Second,* Futuro has demonstrated that many communities can -- with minimal outside guidance -- identify and solve problems by mobilizing their own resources; and in learning that this is possible, a process of human development can begin which attacks the very roots of poverty itself and serves to free energies for continued self-help efforts by the rural poor. *Third,* in many small farm settings there are opportunities for rapidly increasing subsistence income without the necessity of a large cash outlay by the farm family. Futuro found two such opportunities -- terrace vegetable gardening and fish ponds -- by listening to the ideas of small farmers. And *fourth,* there may be greater economies in designing programs which teach farmers to do without the assistance of outsiders, than in creating projects whose self-sufficiency is dependent on offering a service for which farmers are willing to pay.

An alternative development philosophy argues that even excellent local initiatives will flounder, over time, unless outside support is available to assist the community to increase its productive potential, particularly through the use of not-presently-practiced techniques -- usually requiring upfront capital and outside technical assistance. In this

instance, if only the Futuro thesis of local initiative is disputed, the project still offers useful lessons for the building of effective local involvement in development projects. First, the project has made use of private (family) incentives for the spread of improved farming techniques, while at the same time establishing a procedure where one adopting family assists another to make the needed improvements. (This is particularly true of terracing and fish ponds). This offers a way out of the private-versus-community-incentive dichotomy and could be a method of reducing the income distribution skew which takes place when successful private adopters become the community's "larger" farmers or land owners. Second, if the organization of the local community is one necessary part of the development process -- the other being the organization, training and mobilization of outside assistance to complement the local initiative -- then Futuro suggests how this can be done, with minimal resources. Although the long time involved (ten years to reach high performance) may be discouraging, it suggests that some limited resources could be directed at mobilizing the local population in their own behalf in one area, while the government works at intensive programs elsewhere. When the government's programs have become self-sufficient (probably not much before ten years), it could then move into an area successfully organized and motivated by a Futuro approach and find a local population capable of assuming much of the resource provision, including management, administration and control.

Information Sources

A. Field

Visits were made to community projects of the program in February and October 1974. On both occasions, program field staff went along. Aside from interviews with the *Futuro* Director, Dr. Alvaro Villa, discussions were held with the program's Board of Directors at a breakfast working meeting.

B. Reports

Aside from community project files and staff reports and a list of projects by value and phase of implementation compiled since January 1973, no written documentation on the *Futuro* program exists.

Data Adequacy

Estimates of yield and income benefits from family fish ponds and vegetable gardens are based on conversations by DAI staff with a number of farmers who have undertaken these projects; data on the overall program come from *Futuro* files and estimates by its Director and field staff. The draft of this write-up was reviewed by Dr. Alvaro Villa, *Futuro* Director.

ANNEX I

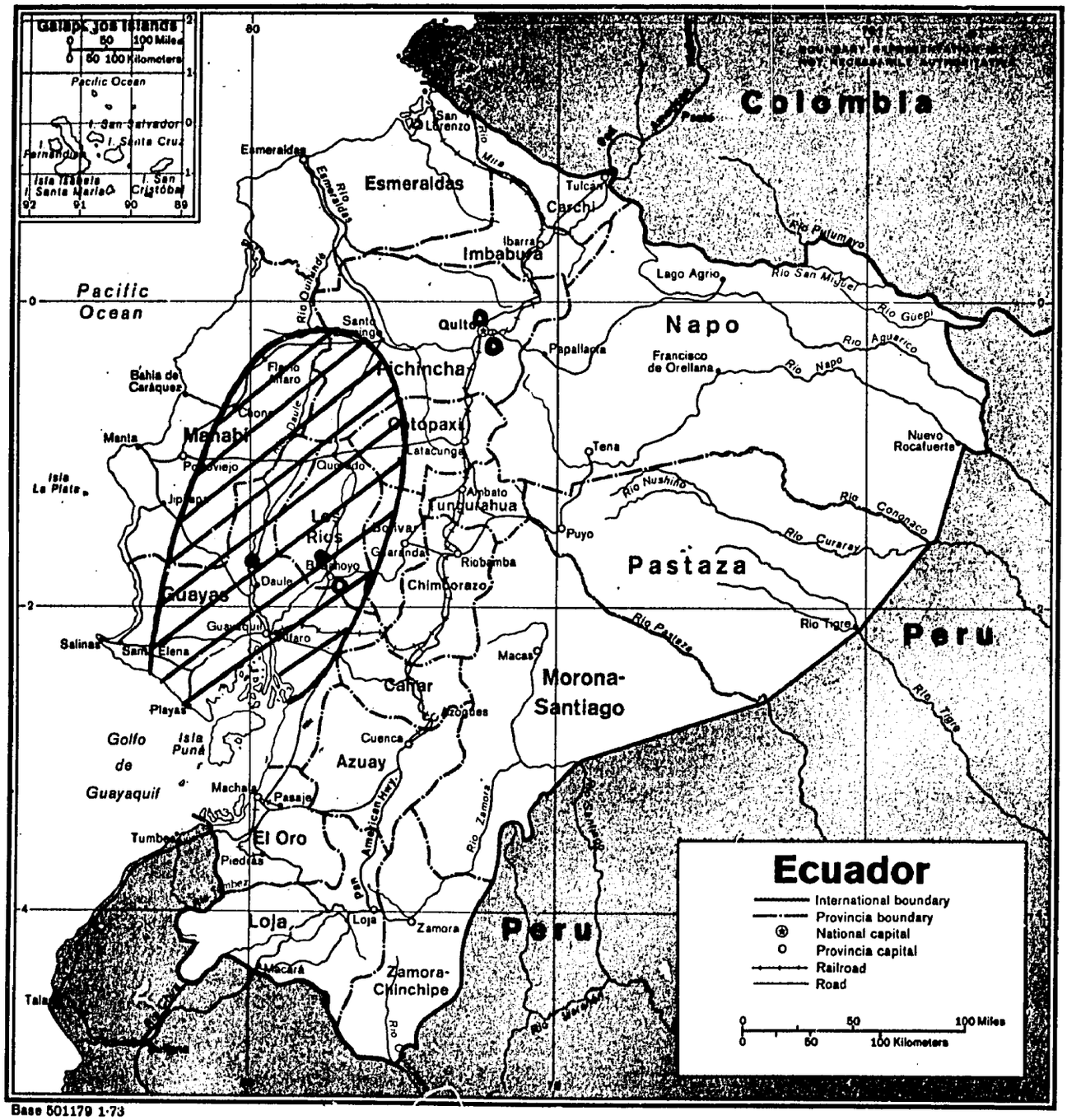
ECUADOR

ECUADOR

Area: 109,483 square miles
Population: 6,950,000
Population growth rate: 3.4%
Density per square mile: 63.5
GNP per capita: $310
GNP per capita growth rate: 2.6%
Capital: Quito (599,900)
Largest cities: Guayaquil (924,086)
Major language: Spanish, Quéchua, Jibaro
Religion: Roman Catholic
Literacy rate: 65-75%

Agricultural Enterprise Promotion Program (PPEA) - This project covers the shaded area ▨ in the Guayas Basin, with subprojects at Babahoyo and north of Duale (●).

FECOAC Directed Agricultural Production Credit - This project covers the entire country. There are two subprojects near Quito, Pedro Moncayo and Eighth of September (○), and one near Babhoyo (○).



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AGRICULTURAL ENTERPRISE PROMOTION PROGRAM
P.P.E.A.

I. PROJECT BACKGROUND

Initially organized in 1971, then restructured in 1973, the PPEA seeks to promote the modernization of Ecuador's small farmers in the coastal region, increasing their productivity, employment and income. The vehicle for achieving these objectives is the organization and support of agricultural cooperatives. By providing these institutions technical assistance in the development of production and investment plans, PPEA enables them to obtain long-term credit for irrigation infrastructure development -- acquisition of tube wells, pumps, tractors and other equipment -- and short-term production credit to finance double cropping of cash crops -- predominantly rice.

To qualify for assistance, each co-op must have a paid manager, who is subsequently trained by the program; his salary and other co-op administrative costs constitute a component of the short-term crop loans. Co-op accounting is conducted by a team of nine PPEA accountants, whose costs are shared between the co-ops and the program. The services of agricultural technicians are financed the same way. Currently the program is assisting 31 co-ops with a combined membership of 1463 small farmers cultivating 4406 hectares (10,883 acres), which represents about eight percent of the small farm population in the four coastal provinces where the PPEA operates.

Eventually, the PPEA hopes to reach a target of 73 co-ops with an estimated membership of about 3000 farmers. Of those co-ops presently assisted, seven represent predominantly or exclusively communal farming endeavors; the remainder are characterized by groups of individually cultivated plots.

The PPEA is supported by a USAID loan of US$3.6 million, of which $2.7 million was designated for agricultural credit, $.2 million for technical assistance, vehicles and equipment, and $.6 million for a land sale guarantee fund to encourage private banks to make loans to co-ops for land pur-

chase.[1] Working out of a central program office in Guayaquil and three regional offices, the PPEA has a staff of 62 professionals and technicians and an operating budget (in 1974) of almost $200,000. Included on its staff are an AID advisor, five agricultural engineers, five civil engineers, five topographers, three co-op educators, two central-level and seven field-level accountants and about 30 agricultural technicians.

About 80 percent of PPEA staff time is devoted to co-ops now receiving loans, the balance to those being considered for future participation in the program. As of mid-1974, long- and short-term loans totaling $5.8 million had been approved, of which 56.6 percent was for crop loans granted for periods not exceeding one year; an additional 21.9 percent was for land clearing and leveling and the construction of dikes and irrigation canals; and the remaining 21.5 percent financed the purchase of tractors, pumps and other machinery or equipment.

II. LOCAL ENVIRONMENT

Coastal Ecuador has a humid, tropical climate and abundant river water resources so that a double cropping system is possible throughout most of the region. Moreover, the land is relatively flat, which makes agricultural mechanization an attractive option. On the other hand, most of the region's potentially cultivable land is tied up in large estates owned by absentee landlords and predominantly exploited through rental arrangements with landless farmers. Denied access to public and commercial credit sources because of their tenure status, these tenants have long had neither the means nor the incentive to invest in irrigation infrastructure or yield-increasing modern inputs, although tractor use via custom rental (essentially for plowing) is fairly generalized. With rental holdings averaging about 1.4 hectares (3.5 acres) per

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[1] The land sale guarantee aspect of the program is not operating. No participating co-ops in the program have requested land purchase credit because of two factors: 1) a decree law in 1970 gave tenure security to tenant farmers by granting them provisional occupancy rights, and 2) once provisional occupancy has been certified by the Agrarian Reform agency, organized tenants can qualify for production and infrastructure loans from the National Development Bank. In other words, *future* ownership has been guaranteed and there is no incentive to purchase land (at the owner's potentially inflated price) until its value has been determined by the government and official transfer of title to the tenants has occurred.

family, probably no more than a quarter of the potentially arable land is cultivated, and that usually only once a year during the summer rainy season.

Traditional methods of rice cultivation in the zone average about 2185 kilos per hectare (1946 pounds per acre), of which about 15 percent is typically claimed as rent by the landlord. Yields are two to three times higher (four to six times higher if double cropped) on irrigated, fertilized and semi-mechanized properties. The average tenant farmer must finance his cash costs of production with advances from merchants, millers or truckers, to whom he is thereby obligated to sell his harvest; at best he does little better than break even. For this reason off-farm employment is high and so is seasonal as well as permanent rural-to-urban migration.

But the above situation has begun to undergo radical change, both as a direct and indirect result of Ecuador's land reform program, which was initiated in the mid-1960's. In the coastal region some 31 estates representing 16,550 hectares (40,879 acres) have been expropriated, of which 10,742 hectares (26,533 acres) have been redistributed among small farmers, predominantly ex-tenants. An additional 252 estates, comprising 103,569 hectares (255,815 acres) have been designated for eventual expropriation.

At the same time a 1970 decree-law has outlawed sharecropping and legally exonerates tenant farmers from paying land rent. Although not rigorously enforced, this legislation has encouraged tenants to organize themselves to resist rent payment demands by landlords. Thus, while the pace of land reform has not been dramatic, limited expropriations plus tenant rent resistance has created an environment of uncertainty for large landlords. Many are now willing to sell their properties voluntarily to any of their tenants who can scrape up sufficient capital for a down payment.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

It was precisely this situation which the PPEA program was initially designed to exploit: to make land purchase credit available to tenant farmers. The idea was conceived as an alternative to conventional -- and faltering -- official agrarian reform efforts. In 1969, co-op specialists of the AID/Ecuador mission discovered that many of the tenant farmers in the rice regions of the coast were financially able to make a down payment of about 10 percent of the purchase price for the land they farmed. Subsequent field research revealed that what tenants paid in rent over a three-year

period was often the equivalent to what it would cost them to purchase the land outright.

These findings resulted in a loan agreement signed with the Central Bank of Ecuador, which set up a trust fund unit to administer a $3.6 million loan, $650,000 of which was to guarantee private land sale transactions financed by private and public banking interests. The program envisioned the following arrangements: first, tenant farmers would be organized by co-op promotion agencies such as FENACOOPAR and others. Once a co-op was officially recognized, it would be given technical assistance in preparing a land-purchase agreement, together with a farm plan for financing investments in productive capital.

Upon approval of the credit package by a participating financial institution (PFI), the Central Bank and the Ministry of Production, the landowner would pass the land title to the cooperative, which would then agree to repay its obligations to the PFI over a five- to ten-year period, and the PFI to pay the landlord over the same period. Should the cooperative default on its obligations, the PFI would pay the seller anyway and then recoup its credit by either foreclosure on the co-op's available assets and/or making a claim against the guarantee fund in the Central Bank.

The choice of the Central Bank as the trust fund administrator and the location of the program's supervisory and technical assistance unit -- the PPEA -- was justified on the grounds that it was one of the most stable financial institutions in the country, was relatively free from political interference, paid higher salaries than the central government and therefore could attract and keep highly qualified personnel, and would be able to attract the participation of domestic banking interests in the country.

These advantages were considered to outweigh the fact that the Bank had virtually no experience in agricultural lending. Indeed, one of the secondary benefits anticipated by the trust fund program planners was to draw the Central Bank -- along with the PFIs -- deeper into the development finance business and enable the Bank to establish a technical assistance capability independent of more unstable government entities such as the Ministry of Agriculture. By presidential decree, the Bank's Trust Funds department was recognized in early 1971. The decree also established a Technical Committee consisting of the Ministers of Agriculture and of Finance and representatives of the Central Bank, with veto power residing with the latter.

Unfortunately, once the trust fund idea was designed and approved, several of its prime movers or sponsors transferred out of USAID and the Central Bank. Their replacements did not prove sympathetic to the idea. For example, the Bank's General

Manager resigned and was replaced by man who believed economic development was not an appropriate function for central banks but rather for governments. In early 1972 a new decree removed the Bank's veto power within the Technical Committee; although financial administration remained with the Bank, the program's technical supervision was passed to the Ministry of Agriculture.

Such restructuring was followed by a series of monetary reforms requiring commercial banks to maintain seven percent of their portfolios in agricultural or industrial loans (and 20 percent by early 1975) and reducing interest rates to borrowers from 12 to nine percent. These and other procedural changes not only delayed the disbursement of the AID loan but also made PFI participation in the program less attractive. This, combined with a situation to be described presently, has virtually eliminated all but one PFI.

It is noteworthy that the original intention of the PPEA -- to finance private land transactions -- became, for all practical purposes, obsolete even before the program was initiated in 1971. Only 12 of the 37 co-ops presently assisted have title to their land, but the others have received tenure security *without* it by virtue of the agrarian reform decree law of 1970, which classifies any land currently farmed by tenant farmers as designated for expropriation in their favor. Only one PFI -- the National Development Bank (BNF) -- regards provisional certification of occupancy as evidence of permanent tenure. Thus, any recognized co-op can qualify for credit from this institution provided it obtains a provisional certificate of title from the agrarian reform agency (IERAC). Hence, until expropriation and final adjudication of the property, the co-ops have little incentive to use the land guarantee mechanism.

IV. DYNAMICS: PROJECT IMPLEMENTATION

In a strict sense, subproject implementation does not begin until a co-op has been organized and legally recognized. PPEA largely leaves these activities in the hands of FENACOOPAR, which has a standard co-op promotion package which includes member- and leader-training in the principles and functions of cooperativism.[1] Where the services of other promotion

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[1] FENACOOPAR was established by AID in the late 1960's. It has received technical assistance from CLUSA contractors (Cooperative League of the USA) and has used Peace Corps volunteers in much of its field promotion

agencies are not available, PPEA will conduct education programs for pre-co-op groups. It also provides assistance -- as an intermediary -- in procurement with IERAC of provisional title certification. But when co-op prerequisites have been met, PPEA field staff move in to develop a production and investment plan. Meetings are held with co-op membership to discuss labor use, wages, input use, yields and other data concerning traditional practices to develop a pre-project baseline profile. Topographical studies are made to determine land quality, cultivated and non-cultivated areas and distribution of holdings to develop a plan for land leveling and expansion of cultivated acreage. Hydraulic studies are conducted to ascertain quality and abundance of river or subterranean water resources to develop a plan for irrigation that will permit double cropping.

Finally, an investment and operating budget is prepared to specify the financial requirements of the subproject's development plans. While co-op participants must approve the plans and theoretically have the right to suggest modifications and improvements, their participation can be considered nominal. In the typical co-op, over half the members are illiterate, which considerably enhances the likelihood that any investment package offered them will be approved enthusiastically.

PPEA's planning staff is diligent and its attention to detail generally excellent. In co-ops with individually cultivated holdings, farm plans are often prepared on a member-by-member basis. Separate budgets for summer and winter crop cycles are calculated, with revisions made at the end of each to accommodate input price changes and the lessons of experience. Administrative cost projections -- from the salaries of co-op manager, tractor driver, well operator and field supervisor to the depreciation on a typewriter or file cabinet -- are worked out and prorated per co-op member. Moreover, plans are reasonably well supervised. In addition to resident agricultural technicians in most co-ops, leaders and managers are continually traveling back and forth to Guayaquil to receive additional instructions and training, to consult with program staff and to report on co-op activities. Training programs are also held at individual co-ops and at the three regional offices.

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activities. By and large, it responds to requests for organizational assistance from tenant farmers and other small producers. After initial training and formation of a pre-co-op, FENACOOPAR helps these institutions to become legally recognized. It then puts them in contact with PPEA and/or banking services. FENACOOPAR will also buy member co-op harvests at government support prices, milling the rice in several agency-run mills located in different coastal districts.

The weakest link in the PPEA strategy is its accounting services. Although entrusted with a training function, PPEA accountants have failed to teach even the most rudimentary bookkeeping procedures to co-op managers. Each accountant has the responsibility of keeping several co-op records up to date; but at two co-ops visited by DAI, books had been removed from the premises for purposes of preparing the year's end balances and were still absent four months into the new year. In one co-op visited, the daily cash ledger was left behind; upon inspection it showed that no entry had been made for 16 weeks, during which time the co-op had conducted more than $50,000 worth of harvest sales. Even calculating an average of five co-ops for every one of the PPEA's field accountants, it is difficult to argue they are spread so thin that they are unable to spend two days per month at each co-op to keep its records from falling more than a month behind.

But far more inexcusable is the fact that co-op managers neither make bookkeeping entries nor understand what they mean. Rather than considering accounting as a management tool, the PPEA appears (more by default than intent) to have defined accounting skills as beyond the comprehension of co-op leadership, and therefore the appropriate monopoly of the program's accounting division. Co-op managers are often incapable, without consulting first with their accountant, of answering the most basic questions about the operations of their enterprise: How much income did the co-op make last crop cycle? How much does the co-op owe on long-term account? How long before your next payment is due? Yet they are expected to provide guidance to co-op members concerning investment decisions and proposals from PPEA requiring their approval which involve tens of thousands of dollars.

V. PROJECT SUCCESS

To ascertain program benefits at the local level, two PPEA co-ops were visited. The first, San Felipe, is a communal farming enterprise with 18 members controlling 247 hectares (610 acres), of which 132 hectares (326 acres) are under cultivation. Since entering the program in 1972, the co-op by late 1974 had completed five crop cycles, the last financed entirely with its own savings. It had acquired two tractors (paying half the purchase price of the second with co-op earnings) and was planning to buy a bulldozer to do its own land leveling as well as sell this service to neighboring co-ops. San Felipe lacked only one last installment (about $1600) to pay on the land it had purchase for $32,000 and was considering the purchase of a neighbor-

ing hacienda, along with about 80 head of cattle. The co-op has met all installments on long-term credit valued at over $43,000 and has repayed all crop loans valued at $59,400.

Only five years ago, San Felipe's 18 members were impoverished tenant farmers who could not break out of debt obligations to local intermediaries; today they control assets exceeding $100,000, rent tractor services to other co-ops and probably have the best access to public and private credit sources of any enterprise in the PPEA program.

In its first year of operation, San Felipe's members cultivated individual parcels. However, they subsequently voted to collectivize because they were persuaded -- with some help from PPEA staff -- that they could make more money by farming their land communally.

San Felipe's spectacular income increases can only be explained with reference to the sharp increase in the market price for rice. Since the co-op was initiated, the price of rice doubled, thanks to government price supports. Then too, price and productivity gains have been multiplied by an increase in per capita acreage cultivated by co-op membership. As tenants, San Felipe's current members farmed an average of 1.4 hectares (3.5 acres) each per crop cycle; today as owners, they cultivate 7.33 hectares (18.11 acres) each per cycle. Moreover, they no longer have to pay the crop land rent (roughly 15 percent of total yield) that was required in pre-project days. This in itself represents an economy in production costs of about $64 per hectare ($26 per acre) at the 1974 prices.

The second co-op visited was "Eleventh of August," whose holdings are individually cultivated. The co-op has received certification of provisional tenure to 360 hectares (889 acres), of which 175 hectares (432 acres) are currently being cultivated each year by 65 members -- half in the winter cycle, half in the summer cycle. Since entering the PPEA program in 1973, Eleventh of August has received some $34,814 in long-term credit, which it has invested in one tractor, two tube wells, land leveling and irrigation canals and dikes. The total of all short-term credit received by the co-op through the end of 1974 was $110,358. During the 1974 summer cycle, the co-op was providing an average of $660 per hectare ($267 per acre) to its members.

The co-op uses a very interesting strategy for maximizing the efficiency of tractor use on member lands. The total cultivated land is marked out in roughly equal lots among the membership, boundaries indicated by tall bamboo poles. The co-op then plows all the land at the same time, then plants it all with a mechanical seeder and finally applies the first fertilization. Thus prepared, planted and fertilized collectively, each member's parcel is turned over to his responsibility for all subsequent cultivating and harvesting tasks.

Labor time saved by mechanization is invested by members in off-farm employment. Note that most of the $660 per hectare ($267 per acre) is provided to the member in the form of mechanized services and input applications, thereby restricting the possibility that he will mismanage his loan.

While it appears that the average yields on the communally farmed lands (San Felipe) exceed yields on individually cultivated lands, it would be dangerous to draw any general conclusions about the relative merits of each system. Prior to project inception, yields were lower on Eleventh of August lands, and farmer mentalities differ between the two areas.

The individual cooperatives of this project have recorded increases in yield and net income resulting from the introduction of irrigated rice due to three factors. First, the provision of irrigation during the dry season has allowed two high yield (miracle rice varieties) crop cycles per year on most cooperative land. With approximately two hectares per farm family producing double crops each year, net income has gone up 234 percent, an absolute increase of $720 in current dollars; PPEA ranked the highest in income of any project reviewed in the study. The second factor significantly influencing success of the project was the rapidly increasing prices for rice. And the third was increased landholdings for members of some cooperatives.

One cannot help but appreciate the confident, outgoing and articulate manner in which co-op leaders and members talk about their co-op enterprises. These are men with a new-found pride and positive image of themselves. Although highly subjective, such impressions suggest that a distinct benefit of the PPEA project has been that of greatly enhancing human self-respect. In terms of self-sufficiency, the project has considerable potential for financing the costs of its technical assistance services, and to date the process is partially implemented by charging co-ops for PPEA-hired agricultural technician and accountant services.

Unfortunately, given the growing human competency visible at the co-op level, it would appear that the PPEA is wasting an excellent opportunity to train local leaders in the accounting skills which would permit them to achieve a high level of autonomy as businessmen.

Overall, the project's replicability in other Latin American countries must be considered low. It deals with wetland rice, a crop that requires physical conditions that rarely exist elsewhere in Latin America. In Ecuador, agrarian reform legislation plus a favorable government price support has made rice production so economically profitable that it is almost a "fail-safe" undertaking for the rural poor. Added to these advantages is the fact that PPEA staff -- in comparison

to agricultural bureaucracies elsewhere in Latin America -- are unusually diligent in their planning efforts and are supported in their efforts by cooperative promotion institutions such as the Rice Co-op Federation which permits program staff to concentrate its assistance almost exclusively on organized, recognized co-ops.

In general, the PPEA program is still much too young to have proven its viability; the majority of the co-ops it assists have yet to complete two consecutive years of production and credit use, with many of them still in their initial year "grace period" and not yet having to meet their first amortization of long-term credit.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

In other settings, the attractive opportunities offered by the new high-yielding varieties have been aggressively taken up by the prosperous and more progressive farmers. The result has been a widening of income differentials.

The PPEA project is focusing on smaller farmers and so far is producing dramatic results. Of all the projects surveyed in the present study, PPEA is the one which shows the most impressive income-generating impact. There is evidence to suggest the project is scoring income gains for small farmers of as high as 1000 percent or more over pre-project levels. The PPEA demonstrates that in close to ideal circumstances, the Green Revolution can benefit small farmers in exactly the same way it benefits medium and large ones.

The Guayas Basin of coastal Ecuador *does* represent about the closest thing to ideal conditions for launching large-scale agricultural modernization that are likely to be found anywhere in the Third World. Most of the truly serious constraints impeding rural assistance efforts elsewhere have been effectively disposed with in this case:

- High prices exist for the cash crop being promoted, as does a guaranteed market for increased output.
- A favorable climate and abundant river water resources make irrigated double-cropping possible.
- The land is flat, thereby making agricultural mechanization and land leveling for irrigation purposes eminently attractive options.

- Credit is readily available for financing agricultural investment at a subsidized rate (nine percent).

- Agrarian reform legislation has given the region's tenant farmers provisional but secure tenure rights to the land they farm and therefore both the means and the incentives to make modernizing investments financed by public credit.

- High-yield rice technology is available, along with a secure supply of all the modern inputs required to make it work.

- The hard work of organizing the region's small farmers in production co-ops capable of absorbing outside technical assistance efficiently is well advanced, and new organizations now have the luxury of copying the proven productivity and income-generating paths already established by older farm-level institutions.

However, it appears that PPEA has been able to effectively exploit these favorable conditions. PPEA does ensure that a conventional set of technical functions are completed: namely, making of topographical and hydrological surveys, preparation of investment and production plans, calculation of credit requirements and repayment schedules, packaging of this information in a fashion palatable to bankers willing to finance rural investment and once credit is approved, supervision and management of its correct use (technical assistance in agricultural practices and handling all necessary bookkeeping and accounting functions on behalf of credit recipients).

In short, PPEA provides services that large and medium farmers could perform themselves. However, PPEA is deficient in that it has not taught project participants to manage their own business enterprises, a step that is essential if the project is to ultimately become self-sufficient.

Information Sources

A. Field

The PPEA program was visited on three separate occasions in June, July and October 1974, during which time two visits each were made to the subprojects of San Felipe and Eleventh of August where co-op leaders were interviewed. On all but the second visit to the latter co-op the DAI staff member was accompanied by the program AID advisor and/or senior staff. Interviews were conducted with the Program Director and Deputy, as well as four professionals from the Planning Office.

B. Reports

In July 1974 the PPEA was evaluated in considerable detail by Dr. Clarence Zuvekas. Most of the program data are drawn from the preliminary draft of his report, *Agrarian Reform in Ecuador: An Innovative Program Evaluated,* August 1974. The program's Capital Assistance Paper, *Ecuador -- Land Sale Guaranty,* AID-DLC/P-854 was also consulted.

Data Adequacy

The income benefits at the subproject level are estimates based on data from co-op records, information from leaders and planning office records. The original draft of the write-up was reviewed by Frederick C. Hubig, Jr., General Development Officer, USAID/Ecuador, Guayaquil.

F.E.C.O.A.C.
DIRECTED AGRICULTURAL PRODUCTION CREDIT

I. PROJECT BACKGROUND

Directed Agricultural Production Credit (DAPC) was introduced into Ecuador in 1965 through FECOAC, the National Federation of Savings and Loan Cooperatives. Of the 180 FECOAC member co-ops, 54 are located in or near rural areas and include farmers in their membership; of these 54, 28 currently participate in the DAPC program. Situated primarily in the highland regions of Ecuador and to a lesser degree in the humid coastal area, their membership totals 15,000 -- some 9300 non-farmers and 5700 farmers. Most co-ops now participating in the DAPC program were initially organized by and for non-farmers, but subsequently -- in response to the promotional efforts of FECOAC -- have attempted to expand their membership to include farmers. Most DAPC co-ops are largely or exclusively controlled by urban residents. In many cases they are directly managed by local parish priests.

The objective of the DAPC program is fundamentally one of increasing the production and income of small farmers who have no alternative access to agricultural credit. Since there are no specific requirements preventing medium and large farmers from joining DAPC co-ops, some of the more advantaged producers have indeed joined (perhaps five percent of their total farmer-members.) However, large and medium farmers make little use of DAPC credit because they have no incentive to do so; they can get production loans much cheaper elsewhere. For example, the Agricultural Bank loans at nine percent per annum while DAPC credit costs 1.2 percent per month.

As originally conceived, the program sought to make short- and medium-term production credit available to farmer-members for amounts not to exceed ten times the value of their savings in their co-op. Loans were to be disbursed in cash and input supply installments, and recipients had to agree to accept periodic technical supervision from either co-op technicians or locally available farm extension agents. Each production loan was to be approved following preparation of a farm production plan which clearly specified how, when, where and for what the credit would be used. DAPC loans would be financed

not from co-op membership capital but rather from outside credit sources, principally the Cooperative Bank.

Additionally, farmer-members might also qualify for "ordinary" loans from co-op capital for non-agricultural purposes such as consumption purchases, house repair, education, medical emergencies, etc., but such credit would be limited to amounts not exceeding three times the value of a member's savings. The higher borrowing rights under the DAPC program -- 1:10 versus 1:3 (savings to loan) -- were expected to provide a significant incentive for small farmers to borrow for production purposes, as well as supply a strong impetus to generalizing the "savings habit" among the rural poor.

In practice, the DAPC program has fallen considerably short of the expectations of its founders. In the first place, the large majority of farmers do not welcome the requirements of farm plan preparation nor close technical supervision of credit use. They would rather receive a loan no greater than three times their savings, *but spend it as they see fit,* than be given credit on a ten to one basis but under close supervision.

On the other hand, the DAPC co-ops themselves have demonstrated reluctance to hire personnel for farm supervision functions, and the already scarce supply of local farm extension agents have not been eager to take on additional supervision responsibilities on behalf of the co-ops. While Ecuador's Ministry of Agriculture has made ten extension agents available on a part-time basis to work with DAPC recipients, this comes nowhere near to meeting the technical personnel requirements of a program which embraces 28 co-ops with 5700 farmer-members.

Thus, in reality the program provides "directed" credit in name only. DAPC loans are still financed with outside, non-co-op capital, but little to no supervision of credit use occurs, production plans are prepared but not enforced and the large majority of loans do not exceed the 3:1 restriction of "ordinary" co-op lending. Notwithstanding these limitations, the program has still managed to provide important services to small farmers.

DAPC was the brainchild of USAID, in conjunction with the Credit Union National Association (CUNA) of the United States. AID funded the initial DAPC pilot project undertaken in 1965, and funding of the DAPC program administrative costs within FECOAC continues to the present. AID also earmarked a significant portion of a $2.4 million loan to the Cooperative Bank for use in the DAPC program. FECOAC has obtained other sources of funding for portions of the program, and the individual cooperatives have used a variety of sources to obtain credit for re-lending to DAPC recipients.

II. LOCAL ENVIRONMENT

Ecuador, the second smallest republic in Latin America, is essentially divided into three zones: the *Sierra* (highlands), the *Costa* (coastal plain) and the *Oriente* (eastern jungle). The highlands consist of an inhabited plateau 8-10,000 feet above sea level, which is about 400 miles long and five to eight miles wide, representing one quarter of the country. The coast comprises another quarter, a rich agricultural belt of about seven to 125 miles in width where most of Ecuador's tropical export crops are grown. The Oriente is the remaining half of the country. DAPC co-ops have been formed in all three regions, but primarily in the first two, where almost all of Ecuador's 6.1 million inhabitants (evenly divided between both regions) are located. About 45 percent of Ecuadorians are Quechua-speaking Indians, with an additional 40 percent mixed bloods (*mestizo*) and ten percent Negro. The literacy rate is estimated at 68 percent. The great majority of the population earn their living from farming. A 1969 survey of the DAPC program revealed that roughly 70 percent of its credit recipients in the highlands have land titles, while the figure on the coast was less than 25 percent. There, very large haciendas co-exist with small family farmers, landless squatters, renters and sharecroppers.

But these inequities are also notable in the Sierra. A 1954 agricultural census revealed that 75 percent of all farms were smaller than five hectares (12.4 acres) and represented only seven percent of the total agricultural area. Moreover, a 1965 CIDA study classified 84-90 percent of all farms as "subfamily units," meaning they were too small to provide full and productive employment for two adults. In contrast, two percent of Ecuador's farm units of 100 hectares (247 acres) or more accounted for 64 percent of the land area. There is little reason to suspect that recent land reform efforts in Ecuador have yet altered in any appreciable way the fundamental inequities which characterize Ecuador's land tenure structure. Not surprisingly, credit for farm land purchase has become an increasingly important lending activity of DAPC co-ops, even though such loans are not financed with outside capital.

In 1970, agrarian reform legislation outlawed rental and sharecropping systems. Although there has been little forced redistribution or breaking up of the very large estates, the uncertainty and the potential for more aggressive reallocations has led many large holders to put their land on the market and sell to the small sharecropper or renters who can raise enough cash for a down payment. These sales and the credit which makes such purchases possible should figure crucially in the impact of the DAPC program. Unfortunately, such loans

are not broken down in FECOAC statistics as they are listed under the heading of "other."

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

Credit was considered to be an essential ingredient of a development program in the early 1960's, and agricultural credit, particularly for small farmers, was virtually nonexistent in Ecuador. Savings and loans cooperatives, although 50 percent rural, were not able to reach farmers, either with credit or to mobilize their savings. In 1963, the AID mission in Ecuador obtained the services of a North American CUNA expert in rural credit. His report furnished the basis for the DAPC program which was initiated as a pilot model in 1965.

The pilot project was undertaken at the Santa Teresita co-op in the highland province of Carchi. It was designed, controlled and managed by the CUNA contractor with heavy assistance from FECOAC staff personnel and Peace Corps volunteers. Given the high-intensity involvement of outsiders, it is not surprising that the co-op's assets grew from $1800 to $20,000. Abundant technical assistance was made available to DAPC loan recipients, both from local farm extension agents and trained co-op agricultural technicians. Agricultural output and small farmer incomes were substantially increased, assuring a virtually 100 percent recuperation of crop loans granted.

The pilot project was considered a great success, but the heavy outside resource commitment invested to produce this result did not bode well for replication of the DAPC program in other areas. In 1966 the program was launched in six additional rural credit co-ops. That same year, an extensive training program was started by the Ecuadorian national who was eventually to take over the administration of the DAPC program from the CUNA contractor. Simultaneously, the DAPC program was integrated into the total operations of FECOAC.

The success of the DAPC program led to plans for six additional cooperatives in 1966 and the take-over by Ecuadorians on the FECOAC staff from the CUNA pilot project manager. FECOAC's DAPC manager was given extensive training and was directly involved in the establishment of the next six cooperatives. The pattern remained the same: 1) a meeting with the local cooperative manager and board; 2) promotion and training until they agreed to the program; 3) then more extended training for the manager (up to three months); and 4) assistance to the manager to encourage farmer members to take advantage of the program, as well as encourage non-member farmers to join.

In 1967, FECOAC established a DAPC department to work directly with this program. A central staff with field promoters was assigned, to be aided by 12 U.S. Peace Corps Volunteers who were given special training in rural credit operations; they were assigned to individual cooperatives in 1968. CUNA technical assistance continued through 1968 in Ecuador, although it is difficult to separate the specific CUNA responsibilities for the DAPC program from CUNA's all-around charter to assist the organization and management of FECOAC. A US$1.2 million loan from AID to the Cooperative Bank provided the credit window for the DAPC program.

As has become clear over time, this auspicious beginning -- characterized by the interaction between local farmers, cooperative board leaders, FECOAC, the Cooperative Bank and the U.S. fieldworkers (CUNA and the Peace Corps) -- had little continuity in terms of the long-term development of the program and the lessons which can be extracted from the project. In what may be a typical example of pilot models, after the DAPC program was introduced into the first few cooperatives, the resources devoted to bringing the program into existence were diluted by the requirement to work in many, rather than a few locations. Technical assistance became spotty and credit became less available as more locations requested Cooperative Bank assistance for their DAPC program. The Peace Corps volunteers proved unsuited to their assignments and were moved to other responsibilities. The pilot model and the techniques which made it work were not expandable to the 28 cooperatives which formed the DAPC program in 1972, 1973 and 1974.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Numbers of cooperatives affiliated with FECOAC and entered in the DAPC program are listed as follows:

	1965	1966	1968	1969	1970	1971	1972	1973	1974
Number of Cooperatives	1	7	22	26	12	16	27	28	28

Only a few cooperatives have entered the program and remained with it. Just seven of the 26 DAPC cooperatives registered in 1969 were still in the program in 1974. Of the 16 DAPC cooperatives in 1971, only ten carried over into 1974. Each evaluation of the program, conducted in 1969 and again in 1971, has resulted in a re-evaluation of the status of the FECOAC affiliates and the elimination of those which were taken into the program but failed to "produce." (Essentially this

means they were not able to enforce acceptable levels of credit repayment.)

One reason for changes in cooperative participation in the program is the rather easy transition from DAPC to non-DAPC status. FECOAC decides who is in or out of the program and has all of the 54 basically rural savings and loan cooperatives from which to select. Once FECOAC promoters have convinced a co-op's manager and board of directors of the value of the program, training courses and credit-worthiness are the main requirements for entry. The basic lending pattern of the 28 cooperatives who are now in the DAPC program cannot be directly compared with the 26 outside, since records are not similarly maintained. However, most of the 26 outsiders lend to farmers, give production credit and request technical assistance from the Ministry of Agriculture's extensionists -- much like the 28 insiders. It is a difference in magnitude, rather than function or objective which distinguishes the DAPC cooperatives.

Membership and loans increased steadily for the ten cooperatives which were consistent members between 1971 and 1973. Cooperatives averaged a 66 percent increase in numbers of loans granted for agricultural and animal production, with an average of 84 loans per cooperative. Agricultural and animal loan funds for the ten cooperatives increased 101 percent between 1971 and 1973, while the value of the average loan increased 34 percent during the two years, to US$225 in 1973, a not inconsiderable amount for a small farmer, considering that some crops are financed twice a year.

That more loans were not going to the same farmers was clear from the increases in farmer membership and in farmer loans drawn. For all 28 DAPC cooperatives some 72 percent of the total of US$2,044,314 in loans were distributed for production uses -- a combination of agricultural loans (20 percent), animal loans (22 percent) and artisan and commercial loans (30 percent). This is a major switch from the beginnings of the savings and loan cooperatives in the early 1960's, when consumer credit was their mainstay. The 28 DAPC cooperatives had nearly US$1.6 million in savings in 1973, enough to serve as backing for the slightly more than US$2 million in loans -- except that the savings are not taken together. Each cooperative is a separate unit, and there is no pooling or shifting of accumulated savings among them.

The Promotion of DAPC Cooperations

FECOAC in 1974 had four DAPC extensionists, three of whom were responsible for the promotion of DAPC and basic training of the managers and cooperative boards in the operation of

production credit. Little work is done with farmer members; this aspect of the program is generally left to individual cooperatives, although some demonstration and short training courses are offered, depending on local circumstances. Most of FECOAC's attention is directed at managers and credit supervisors, who are taught to handle the paperwork involved in the program.

In addition to the basic training, which is said to last off and on for three months at the average co-op, there are special courses held in Guayaquil on the coast, or Quito in the Sierra, for selected cooperative leaders. FECOAC provides standardized bookkeeping forms, accounting systems, and loan request documents and attempts to assist managers in delivering technical assistance to farmer members. This involves bringing in technicians from the outside, generally from the Ministry of Agriculture, which has committed ten agricultural extensionists to the program.

Once training is completed and the board and managers agree to the DAPC program, the cooperative is counted "in" and is included as part of DAPC statistics. There is a continual follow-up program -- by the same FECOAC promoters who have nine or ten co-ops each in their area of responsibility -- to upgrade the understanding and capability of managers and credit supervisors. When a cooperative's delinquency rate goes above ten percent, FECOAC will send special envoys to the co-op to assist in resolving the problem before the credit window in the Cooperative Bank is closed. There is a significant amount of disguised delinquency, as loans are rescheduled forward if only the interest is paid or when co-ops cover their obligations to the bank from their own capital. Old unpaid loans with paid interest resemble new loans in all respects, a reality which prevents the cooperative from getting in trouble with FECOAC or the Cooperative Bank.

Technical Assistance

The DAPC program was designed to create increases in small farmer income and productivity through the application of modern agricultural technology paid for by production credit. The technical assistance aspect of the program is the weakest, with only a handful of cooperatives receiving assistance from the ten Ministry of Agriculture extensionists assigned part-time to the program. In each evaluation of FECOAC, the technical assistance has been reported as virtually non-existent. If all farmer borrowers were to be covered by the agriculture technicians, the ratio would be 1:200 -- a large task, considering the scattered location of the small farms.

Extensionists are also asked to perform *general* as distinct from *specific* extension responsibilities. That is, they do not concentrate on a specific crop or animal; their job is to improve all agricultural and livestock production. This further diffuses their impact.

FECOAC cooperatives maintain no yield statistics or cost of production data. Previous survey attempts to capture output increases from the DAPC program have been less than successful. However, surveys conducted in 1969 and 1971 indicate a change in production techniques attributable to the DAPC program. The use of fertilizer, improved seeds, insecticides and better veterinary practices correlates highly with entrance into the DAPC program. In the absence of other, better data, this correlation is indicative of the results of technical assistance, broadly interpreted. While farmers may not be maximizing their output, they have consistently improved their use of more modern techniques. However, in the absence of close supervision, there is no evidence that use levels of modern inputs are sufficiently close to those recommended for the high yield-generating benefits of this technology to be maximized.

Supervised and Directed Credit

The original concept of the DAPC program was to make an adequate and timely supply of production credit available, to be applied according to well-conceived and technically sound investment or work plans. The credit was to be distributed as needed, either in kind (as inputs) or in cash, phased over the production cycle. To assure that credit was linked with the availability of savings, a ten percent savings levy was to be attached to each loan, payable at harvest. DAPC credit was to be at appreciably higher savings-to-credit ratios than regular credit, and some of the cooperatives allowed credit of ten times savings in the first years of the program.

The vast majority of credit given in 1974 by the 28 DAPC cooperatives was at three times savings -- the normal ratio for savings and loan cooperatives. Farmers preferred less credit to more supervision, drawing credit in a lump sum rather than spaced over the year. In the absence of a proven agricultural technology or intensive technical assistance efforts which might assure a quantum jump in cash input use, farmers preferred to make modest, gradual changes in their production patterns. Although field visits showed that some farmers *do* make out production plans and that seven of the 28 cooperatives are reported to have DAPC credit supervisors, credit supervision remains a minor part of the program.

Only a few of the cooperatives enforce the ten percent savings rule for DAPC loans, and then only when the loans are drawn at above a three times savings ratio. In practice, many small farmers continue to increase their savings to allow increased borrowing, so the ten percent rule has not been needed to increase internal capitalization.

In addition to problems of inadequate technical assistance and how this results in a non-directed use of DAPC credit, participating co-ops are generally unable to afford to finance technical services themselves, as is the case of the DAPC program in Paraguay.[1] In Paraguay, DAPC credit is available from the National Development Bank (BNF) at nine percent interest per annum. But the Ecuadorian equivalent of the BNF, which also loans to agricultural clients at nine percent, is generally unwilling to lend to farmer-members of DAPC co-ops. This is because these institutions are not exclusively composed of farmers, and the Bank worries that its loans may be siphoned off by non-farmers into urban investments and consumption expenditures. This leaves the DAPC co-op little alternative but to obtain its outside capital from the Cooperative Bank, which lends at 13 percent per annum. The co-op, in turn, relends this money to farmer-members at 1.2 percent a month, or 14.4 percent on an annual basis. The interest rate spread is only 1.4 percent, hardly adequate for the co-op to self-finance its own technical assistance services. In reality, DAPC co-ops do not even make the full 1.4 percent, because in order to guarantee that repayment of their obligations to the Bank will be on time, they must begin collection on sub-loans to farmers no later than ten months after disbursement dates.

Subproject Dynamics

Some of the inner workings of the DAPC program are more easily explained in the context of specific cooperatives. Two of the following, visited in mid-1974, can be considered to be fairly representative cases of those co-ops which have remained with the DAPC program since they first joined. The third is a newcomer to the program.

Pedro Moncayo, Ltd.

Located about one and one-half hours' drive south of Quito, this co-op was organized in 1963 by the parish priest and

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[1] See CREDICOOP project write-up, page K-12.

initially was composed strictly of farmers. Leaders of six local rural communities agreed upon the need for the cooperative. There was no technical assistance available in this area, so the priest formed a local radio school and offered a very popular program designed to teach small farmers better agricultural techniques. When the savings of farmers were not sufficient to maintain production credit, the co-op was opened to urban members.

In 1966, the cooperative received outside credit from the Cooperative Bank, through the efforts of FECOAC. In 1969, two tractors were purchased for plowing the relatively level fields of the co-op members. Production credit has continued since 1969, and in 1973, there were 295 agricultural and animal loans totaling US$30,000. In addition, there were 52 artisan and commercial loans for US$17,336 and an "other" category valued at $40,000 which included land purchase loans for the 20 percent of the co-op members who are landless sharecroppers.

Bad weather has severely limited farmers' ability to repay over the last four years, but the cooperative has continued to lend to delinquents, so long as they pay the interest on old loans. Members estimate that credit has allowed them to escape from selling their harvests in advance, and this, they claim, has enabled them to double their harvest income.

Puebloviejo Ltd.

This coastal cooperative was originally organized in 1968 by the personal initiative of a non-farmer local leader and the parish priest. Seventeen people attended the first meeting, most of them landless renters who were being "suffocated" by three huge haciendas which dominate the local area; 85 percent of area farmers were landless. Following establishment of the cooperative, small loans were given -- US$8-12. The priest and the co-op leader gave talks after masses held in three rural districts; in two, local small farmer leaders were persuaded to join and their neighbors soon followed.

In 1969 the cooperative received a loan from the local Catholic bishop for production credit of US$2000 and a loan from the National Development Foundation for $245. With the assistance of FECOAC, a loan came in from the Cooperative Bank for $3400 in 1970. Production credit was given initially at a ratio of two times savings and was raised to three times savings in 1970. In each succeeding year, more credit has been extended to the co-op and more loans made to the membership. The Cooperative Bank lent $10,000 in 1973.

A FECOAC field promotor attended the first general assembly of the cooperative and promoted the idea of production credit.

It gave training to the manager and staff and promoted the idea of demonstrations for small farmers. In 1973, at the co-op's instigation, a field day was organized to demonstrate new agricultural methods to cooperative members. But in the absence of a co-op-paid agricultural extensionist, few farmer-members have modernized their rice production to any significant degree. Most farmers use credit to escape from advance harvest sales, thereby increasing their income. However, no data on the scale of the increase is available.

Of the 151 farmer-loans made in 1973, totaling US$21,708, $14,184 was in crop lending (124 loans), $3460 in livestock lending (16 loans) and $4064 in land purchase lending (11 loans). There were no credit delinquencies among the production credit or land purchase loans. The co-op's 464 members had US$25,672 in savings in 1974, of which approximately one-third had been contributed by farmer-members.

Eighth of September

Located just 28.8 kilometers (18 miles) from Quito in a community which can be considered an industrial suburb of the city but also has an agricultural hinterland including many Indian communities, Eighth of September was formed in 1969. Only consumer credit was offered by this co-op to its predominantly urban membership during the first seven years of operations, under the competent management of the local parish priest. Then in 1972, FECOAC promoters gave a training program in cooperative administration and directed production credit which lasted eight days.

Later that same year, the promoters returned to give a two-day DAPC orientation and training program at the co-op to 40 small farmers. The local Ministry of Agriculture extension agent promoted the idea, with the cooperation of the local priest, and in 1972 production credit was approved for 20 farmers. Since a successful "field day" in 1973 to promote modern agricultural inputs, the co-op has sponsored two agricultural fairs. In addition, the co-op organized an input supply store in 1973 and made the first loans available for land purchases. The local agricultural extensionist receives co-op members wishing to consult him at his office one day each week.

Although only 70 small farmers are among the 530 members, there were 50 crop and 45 livestock loans, totaling US$20,000 in 1973. Only three farmers complied with the requirements of the DAPC program, filling out a detailed investment plan, accepting credit in kind or in installments based upon the plan and thereby qualifying for more credit than the normal three times the value of their savings. The remaining farmers

drew normal credit and were satisfied that their cash input needs (as they defined them) were being met. In 1973, total crop lending to farmers and non-farmers reached 282 loans valued at $60,000. This successful cooperative planned to open a branch office in an adjoining town in 1974.

V. PROJECT SUCCESS

The DAPC program in Ecuador has been successful in generating production credit in rural areas with no alternative credit sources to small farmers, livestock raisers, businessmen and artisans. Farmer income has increased primarily because of two benefits: 1) the provision of credit which prevents the cash-poor farmer from being forced to sell his crop before harvest at prices up to 50 percent below those prevailing at harvest time; and 2) credit for the purchases of land from large estates whose owners are concerned with the possibility of expropriation.

There have also been benefits from modernization of production techniques, with DAPC members exhibiting more knowledge of the use of fertilizers, improved seeds, insecticides, pesticides and good livestock practices than their non-affiliated local area neighbors. Some positive behavior changes in farmer-member agricultural practices have been achieved by the DAPC program despite a paucity of formal technical expertise. The co-ops, at least those five visited, very clearly assisted members in attaining better living standards and were appreciated by the membership.

Besides providing credit for production, the DAPC program (when combined with "regular" consumer credit) mobilized a significant amount of savings -- amassing on the average US$146.45 for each of the 10,869 members who borrowed in 1973. Farmer borrowers were 38 percent of the total in that same year and received 42 percent of loan funds. The $1.6 million in savings generated $2 million in loans.

FECOAC, for all its financial and legal impotence, has played a necessary role in the success of the DAPC program. Besides providing assistance to member cooperatives, FECOAC cajoles the national ministries into supporting the program. What extension services are available result from FECOAC's pushing on the Ministry of Agriculture, which has assigned ten part-time technicians. FECOAC also attempts to help the member cooperatives get their loans through the Cooperative Bank and attempts to exert mild but realistic pressure on

lending institutions to meet the full credit needs of DAPC participants. The FECOAC staff believes in the efficacy of rural production credit and savings, and this professional enthusiasm carries the program a long way.

Getting DAPC underway has not been without cost. AID committed US$125,000 from 1965-1968 for the development of the first cooperatives and since that time has supported all FECOAC activities, including the DAPC program. Only in 1974 was a separate DAPC budget broken out, distributing the $84,200 total budget among FECOAC (24 percent), the Ministry of Agriculture (32 percent) for the salaries of ten extensionists assigned to the program) and AID (44 percent).[1] If extended back to 1968, an AID contribution of $225,000 seems a reasonable approximation of support to the DAPC program but would not include the salaries of CUNA advisors in earlier years.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The DAPC program of FECOAC in Ecuador provides an intriguing contrast with that of CREDICOOP in Paraguay: both were designed by the same individuals, both organized to accomplish the same objectives, both employing most of the same administrative modalities and supported by a cooperative federation. Yet in terms of translating credit for small farmers into productivity and income gains, the Paraguayan DAPC has been far more successful than the Ecuadorian program from which it was copied. In brief, the former *does* provide *directed* (i.e., supervised) production credit; the latter does not.

Yet, even having failed in terms of its primary objective, FECOAC's DAPC has been successful in other ways, offering small farmers important benefits that were achieved, apparently, almost *accidently*. Benefits were attained in response to opportunities available in the local production settings of member co-ops and in response to membership pressures for credit services required to exploit these opportunities -- namely, land purchase lending and the liberation of credit users from the need to sell their harvests in advance to local intermediaries. In other words, despite their common origin and purpose the two programs behave very differently from each other.

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[1] Some 25 percent of FECOAC operating expenses are paid by quotas levied on participating co-ops.

Paraguayan DAPC co-ops finance their own agricultural technical assistance services; FECOAC's DAPC co-ops cannot afford to. The difference is explained by the fact that in Paraguay, outside DAPC financing is available at four percent less than it is in Ecuador, thereby creating a sufficiently large interest spread for CREDICOOP's rural co-ops to finance most if not all of their agricultural promotion and supervisory services.

Lacking this capability, DAPC lending on a ten to one ratio would be eminently perilous for Ecuadorian credit co-ops, and they have wisely based their production credit operations with unsupervised farmer-members on a much safer three to one ratio. This decision has had the positive consequence of stimulating much higher levels of farm-member savings on a *voluntary* basis, whereas in Paraguay such capitalization must be supplemented with forced ten percent levies added to each DAPC recipient's loan repayment obligations. Hence, as mechanisms for mobilizing savings, DAPC co-ops in Ecuador are decidedly more efficient and certainly more democratic. More importantly, they are in a position to provide a higher volume of loans for agricultural purposes *from their own capital* than is the case with their Paraguayan counterparts. If one long-run objective of a DAPC co-op is to acquire the capability of self-financing all its agricultural lending, then there is no doubt that Ecuador's credit unions will reach this goal before those in Paraguay.[1]

The FECOAC experience also demonstrates the kind of problems which can occur when an effort to promote rural development is undertaken on a piece-meal basis -- that is, when the project offers only one of several services required by farmers to modernize their operations. To maximize the advantages of production credit, farmers also need technical assistance, input supply and marketing services. If these are available locally in the project setting, there is no reason for the project to provide them. Where such services are lacking, however, the project cannot afford to neglect their creation without seriously jeopardizing the possibilities of achieving its intended objectives. Confronted with the lack of outside agency services available to complement its DAPC credit activities and unable to finance their creation even on the most modest scale, DAPC co-ops have been forced to abandon -- in practice if not in theory -- the directed credit functions for which they were organized. These functions have been

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[1] It is possible that a fundamental trade-off exists between the rapidity with which a DAPC co-op can show quick results in terms of productivity and income gains on the one hand, and its ability to attain self-sufficiency from outside funding of its agricultural lending on the other.

replaced with other less ambitious functions that are more compatible with their resource availabilities.

In conclusion, FECOAC, by default rather than intent, is promoting *not* rural modernization *per se*, but a program which enhances rural security by mobilizing farm family savings, by liberating small producers from exploitation through advanced sale of their harvests and by providing them with a mechanism for purchasing land of their own. These are extremely important and necessary accomplishments, but they have little to do with directed credit.

Information Sources

A. Field

FECOAC central offices were visited three times in 1974. Through their arrangements, five affiliated cooperatives were surveyed, records examined and managers interviewed. This was part of an informal evaluation of the program conducted for the benefit of FECOAC management and staff, requested by AID/Quito. FECOAC was revisited in October 1974, to obtain latest data on membership, loans and the DAPC program.

B. Reports

There have been two previous evaluation reports on the DAPC program in Ecuador. The first was done by Jon S. Davis, *A Study of a Pilot Project in Directed Agricultural Production Credit in Ecuador*, November 1, 1969. The second was prepared as a chapter in the AID Spring Review of Small Farmer Credit Volume IV, February 1973, R. Hayes Keeler, R. Rodrigo Mera and Roberta Cruz P., *Evaluation of the Directed Agricultural Production Credit Program in Ecuador*. Neither offers usable income or output data which can be attributed to the DAPC program.

Data Adequacy

FECOAC maintains a set of statistics first begun in the Keeler, et. al., evaluation report in 1971. This includes total membership, total savings, borrowers by agricultural loans, livestock loans, artisan and commercial loans, and all other loans, to include consumer credit and land purchase credit. These data are received monthly from member cooperatives within a system which has been consistent for several years. There is no reason to suspect it is not reliable. None of the affiliated cooperatives attempt to keep cost of production, yield or output figures on their cooperative members who draw DAPC loans, and even those who make out a pre-planting investment plan are not interviewed after the end of the crop cycle to compare estimated output with actual output. Income increases attributable to a change in marketing pattern were estimated in the field -- from cooperative members and management.

ANNEX J

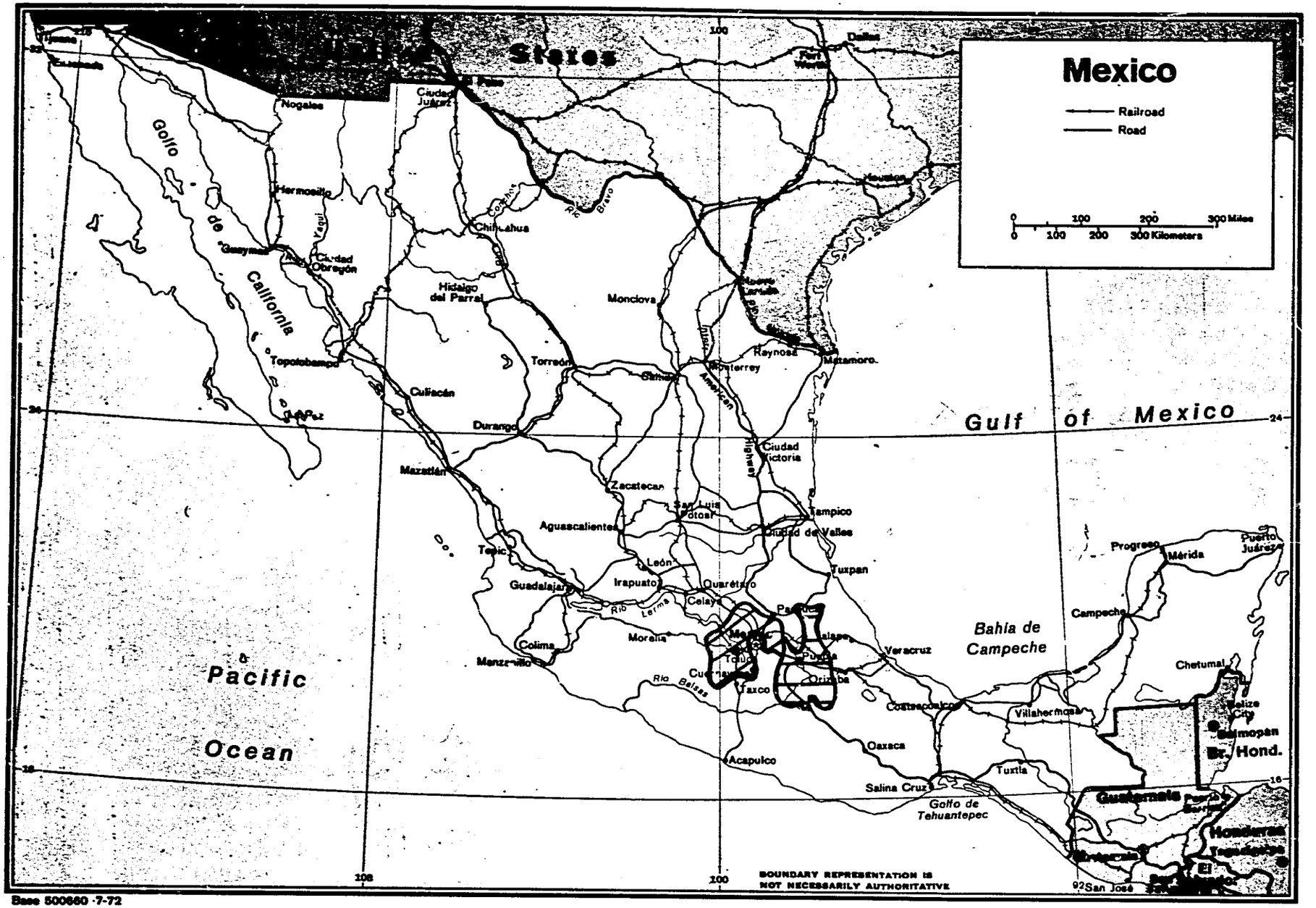
MEXICO

MEXICO

Area: 761,600 square miles
Population: 56,153,000
Population growth rate: 3.3%
Density per square mile: 73.7
GNP per capita; $700
GNP per growth rate: 2.9%
Capital: Mexico City (3,025,000)
Largest cities: Guadalajara (1,194,600), Monterrey (858,100), Netzahualcoyotl (580,400), Puebla de Zaragoas (401,600), Leon (365,000)
Religion: Roman Catholic
Literacy rate: 70-80%

Plan Puebla - This project covers the shaded area which is the State of Puebla.

Plan Maize - This project covers the shaded area which is the State of Mexico.



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PLAN PUEBLA

I. PROJECT BACKGROUND

The Valley of Puebla, located about two hours drive southeast of Mexico City, is a mountain plateau densely populated by some 43,000 small farm families cultivating approximately 126,000 hectares (311,220 acres) of arable land. A region of predominantly rainfed agriculture (only 15 percent of the farmland is irrigated), farms are uniformly small, averaging about 2.4 hectares (5.9 acres). Corn is Puebla's main crop, grown both for family consumption and market sale, and takes up about 90 percent of the typical farmer's cultivable property.

It was this setting that a group of agricultural scientists from CIMMYT[1] and the National School of Agriculture at Chapingo chose as their laboratory to launch one of the first efforts ever attempted to promote increased productivity and income among exclusively small farmers. Now beginning its eighth year of labor, Plan Puebla has been a training ground for rural development practitioners from throughout Mexico and the Third World. The subject of an extensive literature and several international conferences, the so-called "Puebla strategy" has become somewhat of a legend in its own time -- praised and criticized, imitated and ignored, but clearly an enterprise whose impact has been felt far beyond the geographical boundaries within which its activities have occurred.

Initiated in 1967, Plan Puebla is a pilot project designed to develop, field test and refine a strategy for rapidly increasing yields of a basic food crop -- corn -- on the farms of subsistence producers located in rainfed areas. An additional objective, added in 1970, is to train agricultural technicians -- professionals and subprofessionals, domestic and foreign -- in the elements and successful use of this strategy. The strategy itself consists of an integrated and

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[1] International Maize and Wheat Improvement Center in Mexico supported by the Rockefeller Foundation.

simultaneous delivery of the following prerequisites and services:

- applied research on high-yield crop varieties and cultivation practices at the farm level;
- effective communication of agronomic and other production-related information to small farmers;
- provision of adequate, timely, and accessible supplies of modern inputs, together with the credit necessary to finance their appropriate use;
- secure and remunerative market prices for small farm surpluses;
- promotion of farmer organizations and group action for credit procurement, marketing, and other activities which benefit the rural producer;
- provision of crop insurance; and
- the maintenance of ongoing program evaluation activities.

By the end of 1973, when CIMMYT's financial sponsorship of the program was terminated (the Mexican government through the) Graduate College of Chapingo has assumed responsibility for its continuation), Plan Puebla was directly reaching 7200 small farmers representing 22,343 hectares (55,187 acres), or about 17 percent of the producers in the project region. It had assisted in the creation of 284 rural groups. It had developed 16 different corn production technological packages. It had increased the corn yields of project participants by an average of 1099 kilos per hectare (979 pounds per acre) over that of pre-project levels. And it was generating direct net income benefits (excluding project costs) estimated at $1,367,643, or about $190 per project participant in 1973.[1] These were no small accomplishments for an undertaking whose staff at no time exceeded two dozen professionals and subprofessionals,

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[1] Participants refer only to farmers receiving production credit to finance input purchases following project recommendations. Plan Puebla also claims to have generated -- in its first seven years -- indirect income benefits totalling $2,600,000. See Heliodoro Diaz-Cisneros, *An Institutional Analysis of a Rural Development Project* (University of Wisconsin, 1974).

and whose total administrative costs have averaged $132,150 per year during its first seven years of operation.[1]

II. LOCAL ENVIRONMENT

According to a benchmark survey of the Puebla region by project staff in 1967, the following characteristics of the rural population were encountered: aside from the city of Puebla, capital of the state, the region's 43,000 small farmers were scattered in 157 villages and towns belonging to 32 rural districts. This area reflected a wide variety of distinct ecological micro-regions with varying conditions of soil quality, humidity, etc., such that Plan Puebla was eventually to divide the Valley in five separate zones and develop distinct production system recommendations to cope with the special constraints of each zone.

The land tenure system among the small farmers consisted of about 38 percent in the category of *ejiditarios* (members of semi-collectivized farming properties where each has use-rights but not individual title to a family holding), 27.5 percent were private smallholders (including renters and sharecroppers) and the remaining 33.5 percent operated both private holdings and *ejido* plots. Average farm family income in 1967 was $666 per year, of which 41.5 percent came from off-farm employment, 28.4 percent from animal production, and 30.4 percent from crop production. Family size averaged 5.5 members, and 77 percent of all farm household heads were able to read and write (2.4 being the average number of years of schooling).

It is estimated that the typical farm family requires for its own consumption needs about 1200-1500 kilos (2600-3300 pounds) of corn -- tortillas being the principal staple of rural Mexico; with traditional technology, the prevailing corn yield per acre of the average farmer does not surpass 522 kilos (1160 pounds) in most years.[2] Thus, given a farm size of 2.5 hectares (six acres), of which 2.2 hectares (5.4 acres) is cultivated in corn, a farm family would require a

[1] The total administrative costs of Plan Puebla from 1967 through 1973 was $925,045. Of this amount, $406,308 (44 percent) was spent on agronomic research activities, $107,975 (12 percent) for project coordination, $299,059 (32 percent) for communications, and $111,709) (12 percent) for evaluation.

[2] 1300 kilos per hectare (1158 pounds per acre).

minimum of one hectare's (2.5 acre's) production just to meet subsistence requirements. This would mean that seldom more than half the family's corn production can be grown for market sale.

It is important to mention that the Puebla region is fairly well served by a number of government and private agricultural service institutions. These include the Ejido Credit Bank, the Agricultural Credit Bank, the Federal Crop Insurance Agency (ANAGSA), the Government Marketing System for Basic Grains (CONASUPO) and a private fertilizer dealer called Impulsora de Puebla. Over time, all have participated significantly in the Puebla Project. Except for CONASUPO, which is the principal mechanism by which the government support price for corn is maintained, and ANAGSA, this institutional infrastructure represents a fairly agile credit system for financing and distributing agricultural inputs needed by the small farm population. While not administered or controlled by Plan Puebla, the coordinated and active participation of these institutions in the project is largely the product of Puebla staff efforts and should be considered one of their most significant accomplishments.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

Major credit for the design of the Puebla strategy belongs to a group of four CIMMYT agricultural scientists (North Americans) and a Mexican specialist in agronomic research from Chapingo whose collective experience in farm extension and investigation in Mexico totalled almost 70 years. These men had participated actively in the development of "Green Revolution" technology; they had seen its spectacular benefits monopolized by large commercial farmers, as extension efforts to modernize the production of small farm populations proved dismal failures, in one setting after another.

By the early 1960's several members of the group began to experiment with new alternatives to the conventional farm extension methodology, in an effort to discover mechanisms for delivery of yield-increasing technology to the most disadvantaged sectors of the agricultural sector. In a series of experiments conducted in dryland areas of the state of Guanajuato, Michoacan and Jalisco, it was ascertained that the use of modern agricultural technology generated in experiment stations was not adopted by small farmers because it did not fit their production conditions. To develop a more relevant technology it was considered necessary to initiate agronomic research on small farm parcels in different ecological regions. In this way new technological packages were developed which

demonstrated excellent results of direct potential benefit, and adoptability by, small farmers.

However, it was also found that development of relevant packages was not enough to insure their adoption; in addition, a program capable of effectively communicating information about the packages to small farmers was needed, together with a series of service institutions capable of providing adequate and timely supplies of credit and modern inputs required by the recommended technologies. Moreover, for these services to be channeled efficiently, rural clients had to be organized in local groups. Finally, it was believed that any adequate promotion program meeting these prerequisites could only be implemented under the direction of highly qualified, well-paid and committed agricultural professionals.

The essence of the Puebla strategy can be summarized by its comparison with a crop production system. To quote Heliodoro Diaz:[1]

> The limiting fertility factor affecting potential crop yield is the *minimum* amount of any one of the three essential elements: nitrogen, phosphorous or potassium. It is not the maximum amount that exists of any two elements.
>
> A development project is analogous to that system, with the limiting factors being: a) the availability of relevant technology; b) the efficiency of campesino organization and communication; and c) the availability and efficiency of services provided by existing agencies.

By the end of 1966, a plan of action incorporating these lessons had been worked out. The Director of CIMMYT submitted a proposal to the Rockefeller Foundation to obtain financing for the creation of a pilot project in the State of Puebla. When this grant was approved in early 1967, Plan Puebla was born.

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[1] Heliodor Diaz-Cisneros, *An Institutional Analysis of a Rural Development Project: The Case of the Puebla Project in Mexico* (University of Wisconsin: 1974), p. 72.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Project Inception

The first year of the project was mainly devoted to two activities: 1) adaptive agronomic research in a variety of local ecological zones to develop a relevant technology for small farm adoption, and 2) survey research on the socio-economic characteristics of the rural population to establish a set of benchmark data against which project accomplishments might be evaluated in the future. The first project team, recruited in 1967, was composed of a coordinator, two agronomic research specialists (in corn improvement and soil productivity respectively), and two research assistants. These professionals were assisted by ten field workers -- mainly the sons of small farmers in the region who had slightly higher educational levels than the average for rural adults with whom they would be asked to work.

The soil productivity program established 27 agronomic experiments at representative sites around the region for the purpose of determining the response of local corn varieties to chemical fertilizer. It also tested local varieties against improved hybrids, discovering that the yield performance of the latter was not significantly better than the former. Such tests were conducted on the plots of small farmers and managed by these producers with ongoing supervision by project staff. Through analysis of variance and regression analysis techniques, experimental harvest yields permitted the project to develop a variety of production functions for different input combinations from which one -- that which best maximized yield with minimum investment -- was selected for generalized promotion the following year.

Project Expansion

The project staff expanded in 1968 with the addition of a specialist in agricultural communications; the promotional phase of the program was launched with 103 small farmer participants. Project staff helped these producers to obtain fertilizer and other inputs on credit from Impulsora de Puebla and supervised their use. At harvest time, yield demonstrations were organized to which the neighbors of participating farmers were invited. At these meetings credit recipients implementing project recommendations were asked to explain in their own words why they had adopted the new technology, how they had used it, how they had obtained credit and what

they thought of the results. The project also filmed a movie featuring the activities of early adopters and recording their commentaries; this movie was to be extensively used in subsequent promotion activities.

Meanwhile, the agronomic research staff continued to organize experimental plots on small farms to further refine project recommendations, and by the end of 1968 had generated five new production systems specialized to meet the conditions of different ecological zones. These results were incorporated into the promotion program, which was beefed up to mobilize massive campesino participation in 1969.

The second year of the project was a major watershed for the Puebla strategy in two ways. It not only proved itself to large numbers of small farmers, but had also demonstrated its potential to outside credit institutions. In addition to Impulsora de Puebla, the Banco Ejidal and the Agricultural Credit Bank opened special credit lines for financing modern input purchases by small farmers who agreed to organize themselves in credit societies of so-called "solidarity" groups. Thus, Plan Puebla's promotional efforts in 1969 were designed to reach small farmers with a twofold message: 1) relevant and cost-effective corn technology was available, and 2) there was credit available to finance its adoption, even by producers who had never qualified for credit before. Access to both opportunities lay merely in joining together with one's neighbors to sign a collective credit repayment obligation, and in electing representatives willing to spend some time in completing the paperwork and other required negotiations at the bank or input supplier's offices in Puebla. On this basis, 2560 small farmers, organized in 128 local groups, were to join the program in 1969.

Local Credit Groups

It is appropriate to appraise briefly the performance of the local credit groups organized by Plan Puebla participants. One important benefit of these groups has been their ability to enforce timely repayment of credit received by their members. Overall, the level of loan delinquency (at least prior to 1974, when hailstorm losses were widespread) did not exceed eight percent. This result has been achieved because of two factors: 1) group pressure at the community level to force delinquent members to pay, and 2) the effectiveness of Puebla-generated technology in increasing the yields and income of credit users. Data collected by project staff reveals that about 43 percent of all participants make one or several loan repayment installments in advance of the dates their credit obligations fall due. This habit was well established

in the early years of the project, when Impulsora de Puebla was charging interest rates of 18 percent per annum. Since the farmers only requested credit for six months, early payment enabled them to pay interest rates of less than nine percent. Since 1971, by presidential decree, credit sales of inputs have been limited to nine percent per annum. Hence, with early repayment small farmers can reduce their interest costs to around four percent.

An important characteristic of the local credit groups is their small size. Ejido credit societies are the largest, but can be formed with a minimum of ten members. So-called "solidarity groups" composed of private farmers can be formed with as few as three members, just as long as one member of the group has clear title to his land and is willing to pledge it as a guarantee.

Group organization occurs as follows: farmers are told they must form a group in order to receive credit. They must then decide who they consider most trustworthy among their neighbors and/or relatives for sharing credit obligations; thus, group membership and size is left entirely to the farmers. Once formed, the group can request credit for an amount not exceeding the sum of the individual input needs of its members, but all members sign a credit contract in which they pledge collective repayment responsibility. Failure to repay his individual share by any group member carries the penalty that all members lose their credit rating (although in practice there is no available evidence to suggest that this sanction has been ever enforced). Given the small size of the group, intense pressure can be mobilized against a delinquent member.

In the opinion of Puebla staff, small groups have the additional advantages of facilitating dialogue and discussion between staff and project participants, thereby improving communication of agronomic information and encouraging member feedback. Small groups also maximize leadership opportunities among the local population.

In time, as the credit groups acquire more experience and become aware of the potential economies of scale which might be realized through inter-group cooperation in input supply and crop marketing operations, the organization of second-level farmer organizations can be expected. Already the Puebla Project is planning the development of such structures, largely in response to initiatives emerging from the local groups, many of whom have had negative experience with obtaining appropriate inputs on time.

From 1970-73 the number of Plan Puebla participants (defined as those small farmers on credit lists) continued to grow.

Although impressive relative to the size of the project staff available to promote it, this growth was not fast enough to satisfy the expectations of the Plan. In 1970 the project's credit recipients increased by an impressive 2272 newcomers but then the pace dropped to only 407 in 1971; this caused Puebla staff considerable concern and led to extensive discussions about why the program was not expanding -- given relevant technology and credit availability -- at a faster rate. Renewed efforts to refine recommendations even further were undertaken, and a survey was launched to ascertain participant opinions about the program.[1] Partially as a result of these efforts the performance of the project improved, with 962 new participants in 1972 and 998 in 1973. Still the rate of expansion was insufficient to satisfy Puebla staff.

Project Strengths and Limitations

One of the greatest strengths of Plan Puebla is that, from its inception, it has encouraged conscious introspection and self-criticism. Above all else, Puebla staff see their pilot project as a learning experience and are remarkably undefensive about their accomplishments to date. This has enabled Plan Puebla to fulfill its functions as a truly experimental undertaking: a pilot project in the truest sense of the word. As a result, many lessons have been learned about the limiting factors which have impeded the growth of the project. Some of these obstacles are described below.

Even after developing 16 separate packages of recommended practices for specialized ecological micro-regions, the project found it had still not created sufficiently attractive technology to fulfill the rigorous demands of the local population. One reason was the fertilizer recommendations. At the project's inception local input suppliers were selling a mixed formula 10-8-4 for corn. But agronomic research by Puebla staff on small farms consistently demonstrated that the soils in four of the five project zones showed no response to the third element (potassium) of the formula; and in the fifth zone there was response only to the first element (nitrogen).

Puebla staff then tried to convince both the farmers and the input distributers to sell fertilizer elements separately. These efforts were partially successful in that from 1969 on,

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[1] Incidently, one subject curiously ignored in Puebla project evaluation efforts has been the whole question of whether small farmers really *need* credit to adopt the recommended technology. For the cost per hectare of the new technology on the average is only $18 more than the traditional technology.

12-8-0 and 10-10-0 formulas were made available. However, the demand for separate elements immediately ran up against supply constraints. At planting season farmers might be able to buy enough of one element but not of the other. This problem continues to plague the Puebla project today. Fertilizer is available, but not in a form which is sufficiently flexible to meet farmer requirements for maximizing the benefits of relevant Puebla-generated technology.

A second limiting factor constraining the attractiveness of the project to small farmers has been that Puebla agronomic researchers attempted to promote technology for corn only, and not -- as small farmers repeatedly suggested -- corn in association with beans. It was not until only recently that project staff finally agreed to conduct corn-bean trials. Much to their surprise they discovered that indeed, it was possible for a farmer to make more income with associated planting than with corn alone. This discovery has now opened a broad new horizon for further refinement of project-generated technology.

Other constraints of a cultural, institutional, or interpersonal nature have surfaced. Lack of coordination between Puebla staff of different program components -- for example, researchers with promoters, or evaluators with either -- has long been a problem endemic to project operations. Competition, friction and other problems of communication between the staff of the project and that of cooperating institutions have often escalated to the point where Plan Puebla's continuity could be jeopardized. Quality of service to project participants -- both by Puebla staff and other institutions -- has been paternalistic, careless or needlessly mired in bureaucratic procedures.

The performance of the agricultural insurance agency has long been a bone of contention between project participants and Puebla staff. The farmers complain ANAGSA premiums -- which are a requirement to receive credit -- constitute a rip-off because the agency seldom makes good on reimbursement of crop losses except when a total disaster occurs. Since farmers customarily operate holdings scattered in multiple plots physically removed one from another, they in effect are insuring *themselves* against total disaster. By 1974 rural dissatisfaction with crop insurance had already grown from a trickle to a flood; late in the year, the Valley of Puebla was severely ravaged by hailstorms that caused widespread damage to the harvests of project participants. At present ANAGSA is currently facing its worst baptism of fire. The very future of Plan Puebla may well hang in the balance, for many local credit groups -- verbally and in writing -- are threatening to withdraw from the program (i.e., refuse to request credit) if ANAGSA fails to make adequate indemnity for their losses or if the insurance requirement is not rescinded.

Evaluation Activities

In concluding this section on project dynamics, Puebla's evaluation capability should be mentioned. The crucial importance of evaluation activities was recognized in the initial design of the pilot project strategy. As a result, a benchmark study was implemented in 1967, followed by three-year evaluation in 1971. A third evaluation is planned for the end of 1975. Based on sample surveys of the region's project participants and non-participants, data from these studies have enabled Plan Puebla staff to develop highly reliable cost-benefit analyses, document many useful accomplishments and isolate deficiencies in project performance at the local and program levels.

Additionally, Puebla staff conduct sophisticated yet relatively cost-effective yield sampling studies among representative project participants during every year's corn harvest. An efficient methodology has been devised for estimating yields *prior to* harvest and without removing ears from the stalks for shelling and weighing. Length and circumference of ears are measured, the data being averaged for a sample of row segments and then correlated to a table of probable weights of shelled grain yield. This methodology offers high potential for replicability in other small farmer assistance programs.

V. PROJECT SUCCESS

The productivity and income achievements of the Puebla project have already been cited in the opening section of this write-up. With reference to these indicators it is appropriate to include here some of the specific data collected by Puebla evaluation staff which compares project outcomes measured in 1970 against the benchmark information gathered in 1967.

Productivity, Income and Employment Benefits

In 1967 total farm family income of the region's smallholders averaged $667. A general sample survey conducted in 1970 (including farmers on credit lists and those who were not) revealed that farm family income, adjusted to 1967 prices, had increased to $825, a change of 23.8 percent. In terms of value, crop earnings for the average family had grown from $202 to $293 per year, an increase of 45 percent. However, considering only those families on credit lists, income from crop production

averaged $400, a 98 percent increase. These figures suggest a substantial benefit flow accruing to project participants, but equally important, they would indicate that non-participants have also benefitted -- most likely by a slow diffusion and imitation of Puebla-generated technology between those farmers using credit and those who do not.

In this regard, it is important to clarify that Puebla technology is by no means so expensive that only credit users can afford it. For example, through refinement of technological recommendations the average cost per hectare of the average input package has fallen from US$62.89 in 1967 to $41.37 in 1973.[1] Using the traditional technology, most small farmers were already using in 1967 (and continue to do so today) *some* chemical fertilizer. The average fertilizer cost per hectare for traditiona use levels was estimated at $23.10 for the 1968-1973 period (or $9.24 per acre). Thus there is currently only about an $8 cost differential between the traditional and new technology on a per hectare basis ($3.24 on a per acre basis) which places self-financed adoption or partial adoption of the new technology well within the realm of possibility for the average small farmer of the region. For this reason, as noted earlier, the Puebla project claims to have generated during its first seven years about $2.6 million of indirect benefits in the Valley of Puebla.

A second area of project benefits involves rural employment. The traditional technology requires an average of 16.2 man-days of labor per acre (40.6 man-days per hectare); the new technology 21.1 (or 52.7 man-days per hectare) -- an increase of 30 percent. Considering that project participants in 1973 (7194) cultivated 20,604 hectares (50,892 acres) the increase in regional demand for labor (at 4.8 extra man-days per acre or 12.1 per hectare) was 246,888 man-days higher than in 1967. It is further estimated that an additional 12,450 hectares (30,752 acres) planted by non-participants also employed the Puebla technology, which would raise the increase in labor demand to 150,500 man-days. Distributed over the region's 43,000 farm families, the increase in labor demand represents 9.3 man-days per family.

Social Benefits

It is noteworthy that productivity and income gains generated by the Puebla project have been converted into significant improvement in the standard of living of the rural population.

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[1] Average cost per acre has fallen from US$25.46 to $16.37.

According to the 1971 mid-term evaluation, the proportion of farm families who ate fish every four to seven days increased from 3.2 percent to 11.3 percent between 1967 and 1970, while the proportion of families who said they ate fish at least once a month doubled. Similar improvement was registered in family consumption of cheese, poultry, eggs, fruit and to a lesser extent beef and pork.

With respect to home improvement, between 1967 and 1970 some 29 percent of the region's farm families made repairs, additions or other improvements on their homes. Local investments or activity to improve public services were also recorded during the first three years of the project. The number of farm homes with electricity increased by 14 percent; those with potable water by seven percent. In 1970 as many as two-thirds of all farm families believed they could afford to have their children complete primary school, and 21 percent believed their children could complete secondary school.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

If judged by the rigorous criteria and expectations of its planners and implementers, the Puebla project can only be considered a partial success: it has not grown fast enough. But as a carefully planned, comprehensively integrated, focused and self-critically implemented rural development pilot project, Plan Puebla has few equals anywhere in the world.

Perhaps the real importance of the undertaking is not measurable in terms of the benefits, however impressive, received by the project's participants and the local population in general; rather it lies in the wealth of lessons learned and experience gained in the course of Puebla's evolution as a pilot project. Most of these knowledge gains have been mentioned earlier and only merit brief summary at this time.

Puebla demonstrates that modern agricultural technology relevant to small farmers requires for its development both meticulous and ongoing adaptive research at the farm level, as well as the active participation of small farmers themselves in the research enterprise. The project shows that developing the technology is only the first step; subsequent investments in local communication, farmer group organization and a panoply of credit and other service institutions are absolutely essential for adoption of the technology to proceed rapidly. In the process, difficult problems of an institutional, cultural and interpersonal nature involving both project participants and outside change agents must be faced candidly and resolved

with commitment and resourcefulness, if the full potential of rural assistance activity is to be realized. At all times a project seeking to benefit small farmers must demonstrate an ability to listen to the opinions of the people it wishes to help; the project must encourage their active participation as change agents in expanding program coverage to other producers like themselves.

And finally, the Puebla experience demonstrates that the development and conscientious use of a methodology for ongoing project evaluation is indispensable to the success of small farmer assistance activities. At the very least, no objective assessment of project achievements is possible without such a formalized information system. At best, a periodic evaluation capability can provide highly effective tools for isolating program deficiencies, learning from mistakes, replicating successes and generally exploiting opportunities for improved program performance.

If the Puebla project teaches us anything, it is that developing suitable technology is merely one of many components of the success equation. In the last analysis, the crux of the rural development dilemma lies less with persuading small farmers to adopt new behavior recommended by outsiders than it does with persuading outsiders to change their behavior and attitudes toward small farmers. And chief among the changes required of outsiders is the realization of their own vulnerability: that they do not have all the answers, that they can not monopolize the process of rural development; that they cannot, in brief, help small farmers without the latter's assistance.

Information Sources

A. Field

The Puebla Project was visited on two occasions in July and October 1974. During both visits, of two days duration apiece, extensive conversations were held with the project coordinator and most of the professionals on his staff. Visits to groups of project participants were conducted and perhaps a dozen farmers interviewed, in the company of Puebla staff.

B. Reports

Aside from the project files, all data were taken from published sources. By far the most useful source consulted was Heliodoro Diaz-Cisnero's comprehensive doctoral thesis *An Institutional Analysis of a Rural Development Project: The Case of the Puebla Project in Mexico*, (University of Wisconsin. 1974). Based on most of the previous literature on Puebla and making unique contributions of its own, this study is the most complete and recent source of information that is presently available on Puebla.

Data Adequacy

Overall, the quality and reliability of the data presented in this write-up is high, since almost all data are taken from published sources based on project evaluation activities. The first draft of this write-up was reviewed and corrected by Heliodoro Diaz-Cisnero, Puebla Project Director.

PLAN MAIZE

I. PROJECT BACKGROUND

Sponsored by the State of Mexico with central headquarters in Toluca, Plan Maize was organized in 1971 to provide agricultural credit and technical assistance to small farmers. Its principal objective is to propagate a technology for dramatically increasing corn yields via heavy applications of chemical fertilizer financed by credit from public and private banks as well as farm input distributors and backed by a guarantee from the state government.[1] Prior to the project's inception, some 79 percent of the state's small farmers were already using fertilizer but at less than one-third the recommended use level, in part because only eight percent had ever dealt with an agricultural extension agent and only 14 percent had ever received a production loan.

In four years the project has grown from 5,239 to 31,620 small farmer participants, or about a quarter of all farm units in the state. During 1974, Plan Maize participants received input financing for 85,135 hectares of corn (210,283 acres) valued at US$5.6 million.[2]

The unique organizational structure of the project largely explains its rapid growth. The state has been divided into six zones, each with a zonal coordinator hand-picked for his knowledge of farming and his familiarity with the rural municipalities and local leadership within his area of jurisdiction by the state governor. Usually the zonal coordinator is assisted by one or two agricultural professionals and a small secretarial staff whose offices are located on a farm or at an extension agency, i.e. the location is rural not urban. The zonal program is called a *Plan Ranchero* (literally, "Rancher Plan") to advertise the fact that it is administered by and for people who live in the countryside. More significant still, each zone is subdivided into local jurisdictions or *planes rancheros*, each administered by a local farmer or rural leader and usually assisted by an agricultural technician.

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[1] Plan Maize is unique in that it is the only program in Mexico where the state government has guaranteed credit extended to farmers.

[2] In 1975, Plan Maize financed credit to be used on 100,000 hectares.

The local as well as the regional *plan ranchero* heads are paid a part-time salary and receive a monthly transportation allowance to cover field promotion expenses. Usually they make the rounds in their own vehicles, using the transportation allowance to buy the vehicles on a monthly installment plan. Their agricultural assistants often travel on motorbikes purchased in the same way.

In 1974, Plan Maize had a total of 58 local plan ranchero heads assisted by 73 technicians. Between them they managed to organize 6,324 groups of small farmers throughout the state. Each local group is free to determine its membership (typically, groups range from three to nine members), and several groups can be organized in the same rural district. Only by forming a group do small farmers qualify for credit, for although they receive individual production loans, they must sign a collective guarantee. Each group elects a leader to represent it in the preparation of loan documents and the procurement of financed inputs.

II. LOCAL ENVIRONMENT

The decentralized nature of Plan Maize is necessitated by the diversity of ecological and production settings within the State of Mexico. These range from tropical lowlands to high altitude plateaus, include subsistence as well as highly-commercialized farmers and contain primarily rainfed but also irrigated croplands. But the dominant crop is corn, some 60 percent of which is consumed for subsistence by the average farm family. Farm size is the classic *minifundio* pattern. Although the average holding is 2.7 hectares (6.7 acres), over 62 percent of all farms are less than two hectares (five acres), and an additional 22 percent less than four hectares (ten acres). Virtually all cultivable land is tilled each year. Some 45 percent of all rural holdings are held in collective *ejidos*, with an additional 43 percent as private property. Throughout most of the state only one crop cycle per year is possible. Crop losses due to hail and frost are frequent.

It should be noted that the project's effort to raise corn yields is strengthened by three notable advantages:

1. Mexico manufactures its own chemical fertilizer, which makes this input relatively cheaper than elsewhere in the Third World where it must be imported.

2. The corn price is fixed by the government

and a federal marketing agency purchases most small farm production through a system of storage facilities distributed fairly accessibly in the rural areas.

3. A private agricultural service infrastructure consisting of input distributors and banking facilities has been in place for many years, thereby providing a fairly experienced institutional base for channeling assistance to the small farm sector.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The idea for Plan Maize originated with the governor of the State of Mexico, elected to office in 1969. An ex-rural school teacher, the governor had long been concerned that per hectare corn yields on small farms were often one-third or less of those attained by progressive, commercial farmers.

In 1970, he asked the municipal president of a rural community to organize a pilot project to increase yields. The latter, a progressive farmer himself, personally hand-picked 75 small farmers in his district. With a staff of six rural extensionists and a guarantee from the governor's office to finance the purchase of all necessary inputs, the municipal president instructed these 75 farmers to use the very same methods he employed on his own farm. Strict compliance with technical package recommendations was achieved in a most novel way: the municipal president simply instituted a three-day jail sentence for any farmer who deviated from his instructions! The results of this pilot project were stunningly successful, for average corn yields of participants increased from 1.5 to four metric tons per hectare (.7 to 1.8 tons per acre).

The pilot project demonstrated that large yield increases were indeed possible on small farms. More importantly, however, it showed that small farmers are more likely to adopt new technology when taught by a knowledgeable local farmer than when taught by a non-local government employee such as an extension agent. Thus was born the central idea of the plan ranchero: progressive farmers hired part-time as change agents to assist less progressive farmers. In 1971, Plan Maize was launched in three regions of the State of Mexico under the supervision of eight local plan ranchero heads, with 12 technicians to assist them.

IV. DYNAMICS: PROJECT IMPLEMENTATION

To oversee the project's implementation, the governor instituted an entity known as DAGEM (Agricultural and Livestock Development Program of the State of Mexico), responsible directly to the governor and headquartered in Toluca. DAGEM essentially plays a planning and coordination function. Including staff whose responsibilities are shared between the central and the zonal offices, DAGEM employs 35 professionals including one General Coordinator, five Investigators, one Evaluator and 28 agronomists. It has a secretarial staff of 15, most of whom are employed by the zonal offices.

Once a month DAGEM staff and and the zonal plan ranchero heads meet with representatives of the private and public banking sector, input distributors, the federal crop insurance agency, the agricultural college of Chapingo, the State Department of Agriculture, the federal Marketing Agency and other institutions which cooperate with the project. As would be expected, "cooperation" does not quite capture the quality of institutional interaction in Plan Maize, for attempts at coordination have been hampered by frictions and rivalries aimed at keeping DAGEM -- and the political reputation of the governor who promoted and supports it -- from gaining too much recognition and credit in the countryside. As initially conceived, Plan Maize is only one of a package of rural assistance programs to be sponsored by DAGEM. Other programs, still relatively truncated, consist of cattle raising, crop diversification, rural processing industries, tourist promotion, domestic and external marketing of farm produce, etc.

At the local level, however, the major thrust remains that of increasing corn yields on small farms. The technical package is reasonably uncomplicated, consisting of recommendations for increased planting density and heavy fertilizer application, with a subcomponent stressing fumigation in those areas where insect blight is especially prevalent. Recommendations are locale-specific, based on experimental plots operated on the farms of representative participants. Some 146 such experiments were conducted in 1971, 270 in 1972, and 177 in 1973. Credit to finance modern input use only -- provided by input distributors and public and private banks -- is granted at 9.5 percent per annum interest and is repayable in 12 months.

As stated previously, small farmers may only qualify for input credit if they belong to a local group. Membership in the local group is determined by the small farmers themselves, who are simply asked to join with those individuals (be they relatives and/or neighbors) with whom they are

willing to share a collective repayment guarantee. Quite simply, the farmer must ask himself: Whom do I trust? Included in the credit package to each group member is health/life insurance for himself and family, plus obligatory crop insurance. Thus, the true cost of his crop loan -- including insurance premiums -- is roughly 13 or 14 percent. Completion of loan documents is conducted by local group leaders at the headquarters of the zonal plan ranchero, usually at least a month prior to the start of the crop cycle financed. Processing and approval of loan applications are done at the zonal plan ranchero level, where procedures have been so streamlined that up to 45 applications per hour can be processed.

Although loan collection was previously in the hands of the lending institutions, this function is now conducted by plan ranchero staff at the zonal and local levels. Loan recuperation in the absence of weather-induced crop losses has been near 100 percent. The overall repayment rate for all Plan Maize participants ranges between 71 percent and 80 percent. Virtually all outstanding loans overdue are collectable not from the farmers but from the Federal Crop Insurance Agency (ANAGSA).

The biggest problem currently facing Plan Maize is -- in the view of the farmers and DAGEM staff -- the poor performance of the federal crop insurance program. Employing a "catch-22" provision, ANAGSA only makes payment on crop losses if the value of the undamaged portion of the harvest does not cover the farmer's crop loan obligation. Other "catches" involving the failure of farmers to properly report the extent, time and cause of losses incurred effectively prevent the typical small farm client from receiving indemnity. Since crop insurance is obligatory if a farmer is to receive credit, the farmers justifiably feel they are victims of a rip-off, and an increasing number are threatening to eschew input loans altogether if ANAGSA's policies are not changed.

V. PROJECT SUCCESS

According to yield evaluations conducted by DAGEM staff, Plan Maize participants have increased their corn production on the average from 1735 pounds to 2512 pounds (from 647 to 937 kilos) per acre, or 45 percent. Assisted by increases in the government price support for corn, participants have found their net income gain per acre is now 37 percent above the preproject level (in constant 1974 prices). The average small farmer participant, with a holding of 3.1 hectares

(7.7 acres), now stands to earn US$357 in net income from his corn crop, as compared to US$221 before joining the project.

Multiplying this gain times Plan Maize's current 31,620 participants shows an income increase of almost US$4.3 million. This outcome was generated at a project administrative cost of only US$880,000 per year. These figures suggest that Plan Maize has demonstrated both replicability (its rapid expansion throughout the State of Mexico) and an ability to absorb and service rapid increases in project participants (approximately one-third of all small farmers in the State) at an extremely low cost (about US$28 per participant per annum). While the project does not charge participants for technical assistance services, it would appear that Plan Maize could be completely self-sufficient in covering its costs if a decision to make it so were necessary.

It should be noted that the supervisory role of the local plan ranchero head is made possible with a monthly salary cost of US$120-150. The logistical support of his activities costs -- in transportation allowance -- an additional US$120 but enables him to acquire his own vehicle. The salary and logistical support costs of each technical assistant for the local plan ranchero are an additional US$240 per month. Taken together, the cost reaches US$500 per month to maintain the services of a plan ranchero in support of some 241 small farmers or US$2 per participant per month.

Since an average farm family (five individuals) requires 1500 kilos (3300 pounds) of corn per year for subsistence -- corn tortillas being the principal staple -- the project has improved the small farmer's subsistence capability at the same time that it has increased his marketed surplus and cash income. Moreover, since his crop loan includes medical and life insurance, his family's well-being is further protected from those contingencies which might seriously decapitalize his farm operations.

About 15 percent of the project's participants have been directly benefited in another way. These are farmers who, in addition to corn, grow various kinds of vegetables which are largely sold in Mexico City. Thanks to the efforts of one of the zonal plan ranchero heads, a 25 square-meter plot in Mexico City's wholesale market has been reserved for Plan Maize participants. Upon investing two pesos (US$.17) in an identification card, the vegetable grower is exonerated from paying a sales tax of five pesos per *bulto* (an 80-to 100-pound sack or 36-45 kilos) of vegetables sold at the market. The average vegetable grower sells about 50 bultos per year, creating a savings of approximately US$20, in addition to increased earnings from direct sale of his produce to city consumers instead of intermediaries.

Aside from economic benefits the project has also generated substantial sociopolitical benefits. *First,* out of a population of 31,620 project participants, it has provided leadership experience (as local group representatives) for more than 6,300 farmers. *Second,* it has put significant change agent responsibilities on 58 progressive farmers. Paid between US$125-150 per month, each of these individuals, with their own vehicles, can support almost 550 farmers with technical assistance. These benefits, in turn, would appear to have guaranteed the continuity of the project well beyond the term of office of the present state governor (who is considered a strong candidate for the presidency). As one DAGEM official put it, "If Plan Maize was discontinued tomorrow, the government would have 31,000 angry peasants to contend with. You just can't ignore one-third of all the peasants in the state."

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

Plan Maize provides several very important lessons. *First,* the project demonstrates that progressive farmers can successfully serve as change agents; or conversely, that the change agent role need not be monopolized by "outside" agricultural professionals. *Second,* by sharing the job with local farm leaders, the project was able to assist considerably larger numbers of small farmers at a fraction of the cost required for using outsiders. *Third,* the foregoing points greatly enhance the project's potential for replicability and self-sufficiency. *Fourth,* credit repayment performance of small farmers seems to be enhanced when they are organized in *small* entities (say three to twelve members) because this enables group pressure to be applied more effectively than in much larger organizations. In other words, large groups may permit administrative economies of scale, but this advantage may be more than counterbalanced by diseconomies of scale arising out of the dilution of group pressure to assure reliable member performance.

Information Sources

A. Field

Data was collected on two separate visits to the program in July and October 1974. DAGEM's Central Coordinator, Aristeo Alvarez, was interviewed on both occasions. Two zonal *Plan Ranchero* Coordinators and one local *Plan Ranchero* head were interviewed. Visits were made by DAI staff to four rural municipalities to interview program beneficiaries, about two dozen small farmers in all. On these occasions group discussions were conducted with the participation of Plan Maize field staff.

B. Reports

DAGEM, *Estimación de Rendimientos de Maiz, 1973;* Obregon, Alvarez, Hinojosa, *El Plan Tenango del Valle (1973);* Cabrera, *Programa de Evaluación: Plan Maiz (1971);* also financial records at the zonal and central program offices were consulted.

Data Adequacy

Post-program yield and income data are based on written program documents. Pre-project figures are estimates based on data given in Cabrera (1971). The first draft of this write-up was reviewed by Aristeo Alvarez A. and Ives Cabrera García of the Plan Maize Project.

ANNEX K

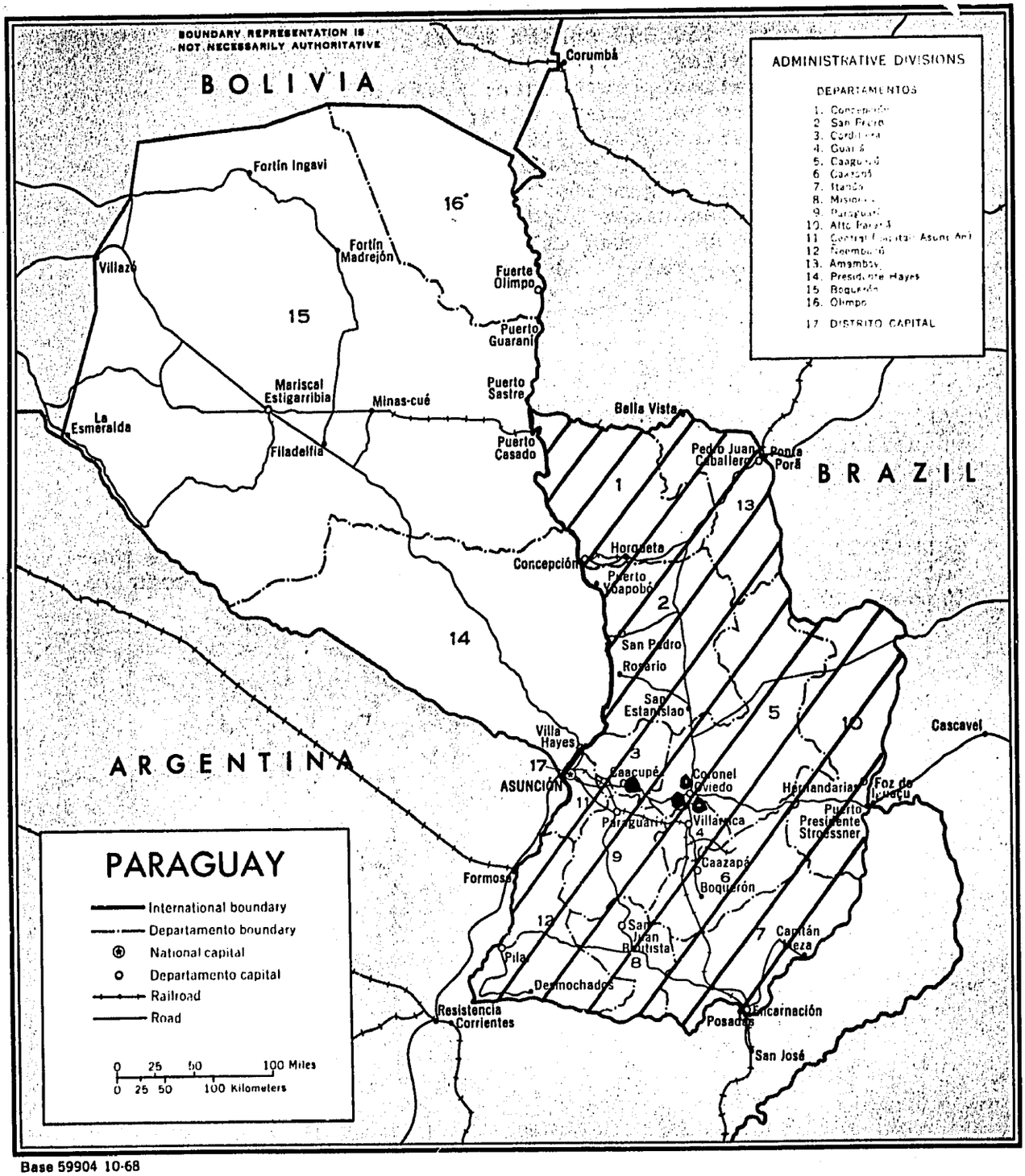
PARAGUAY

PARAGUAY

Area: 157,047 square miles
Population: 2,765,000
Population growth rate: 3.4%
Density per square mile: 17.6
GNP per capita: $280
GNP per capita growth rate: 1.3%
Capital: Asunción (387,676)
Major language: Spanish, Guaraní
Religion: Roman Catholic
Literacy rate: 70-80%

CAH Associations of Agricultural Credit Users - This project is nationwide. There are two subprojects outside of Coronel Oviedo (○).

CREDICOOP Directed Agricultural Production Credit - This project covers the shaded area ▨, with two subprojects at Coronel Oviedo and Itacurubí (●).



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C.A.H.
ASSOCIATIONS OF AGRICULTURAL CREDIT USERS

I. PROJECT BACKGROUND

The CAH (Crédito Agrícola de Habilitación) was organized in 1943 to provide supervised credit to small farmers. Currently funded exclusively with domestic capital via loans from the Central Bank of Paraguay, CAH is an autonomous agency of the Ministry of Agriculture. Like the much larger National Development Bank (BNF), the CAH specializes in agricultural lending, yet it is not a banking institution in the conventional sense, for it has its own extension/supervision arm and manages farm input supply operations in six regional offices around Paraguay. In addition to its managerial staff of 41 employees headquarters at the central office in Asunción, the CAH has 56 subprofessional farm-level supervisors who work out of the regional offices.

The CAH came into being through an agreement between the Paraguayan Ministry of Agriculture and a U.S. technical assistance mission in the agricultural sciences (STICA), with the latter agreeing to train the technical personnel required by the project and to jointly finance operating expenses. The first 15 years of CAH activity (1944-1959) were characterized by a wide variety of services. In addition to short-term crop loans, the CAH granted long-term credit for machinery and implements, livestock improvement and land purchase. It also managed pools of machinery for rental to small farm clients and was perhaps the largest agricultural supplies distributor in Paraguay. In its heyday in the early 1950's, the CAH reached some 7200 farmers and lent over US$500,000 per year. However, by 1959 -- when U.S. assistance was withdrawn -- CAH loan funds were almost completely dissipated. During the 1960's the CAH cut back all credit lines and devoted itself exclusively to advancing agricultural inputs to its clients. But even this form of credit could not be effectively recuperated, and CAH lending operations shrank progressively until a low of US$6500 was reached in 1967.

It was only in 1970, when the Central Bank of Paraguay exonerated the CAH of its entire outstanding obligations, that the institution acquired a new lease on life. In that year it decided to abandon its efforts to assist small farmers on an individual basis and turned to organizing them into groups knwon as AUCAs (associations of agricultural credit users). Essentially, the functions of an AUCA are to: 1) expedite the delivery of credit and technical assistance, and 2) provide an organizational base for compulsory group marketing, which in turn gives the CAH first lien on member harvest income and helps to forestall credit delinquency. Although AUCA members acquire a collective debt repayment obligation when given their individual loans, in practice this device has proven unnecessary as a credit collection tool.

Short-term crop loans are granted for cash crops only, typically cotton and tobacco, with additional two-to three-year loans for purchase of farm implements and draft animals. Credit is extended at 9.5 percent interest per annum, plus a two percent service charge on the loan principal. (This compares to interest rates of circa 14 percent from commercial banks.) Most loans are distributed in up to three installments and are made predominantly in the form of inputs rather than cash. Roughly 50-60 percent of a borrower's cash production costs are covered. In no case are loans made for more than one-third of a farmer's landholding. This is to encourage the borrower to leave an additional one-third to subsistence crops and the balance to fallow. Each year the respective thirds are rotated in a cash-to-subsistence-to-fallow strategy.

These restrictions, together with use of credit-financed inputs, are carefully supervised by CAH field staff, who make up to five or six visits to each AUCA member per crop cycle. These field workers are paratechnicians, some with only a primary education. Traveling on Honda motorbikes or on horseback, they are required to put in five out of six days per week in the countryside. Since the regional CAH offices are storage and distribution centers for agricultural inputs, they remain open seven mornings per week, and resident staff take turns covering Sundays and holidays.

Since its inception in 1970, the AUCA program has boasted credit repayment rates ranging from 91 to 100 percent. It is also very slowly recuperating -- in modest annual installments tacked on to crop loans -- portions of pre-1970 indebtedness of AUCA members. From 1970 through 1973, the number of AUCAs organized has increased from 17 to 124, representing about 3100 farmers and some 8596 hectares (21,232 acres) financed. This is equivalent to just over two percent of the small farm population of Paraguay.

II. LOCAL ENVIRONMENT

The CAH works with small farmers but by no means with the smallest or the poorest. This is primarily because AUCA membership is fundamentally determined by CAH field staff. In looking for potential members, the field staff looks first for ex-CAH borrowers with whom they have worked, in some cases for many years. And the typical AUCA of 25 members will probably have two-thirds who are ex-CAH clients.

Secondly, as a minimum requirement for membership, AUCA members should have title or secure rental tenure to no less than six hectares (15 acres), of which no more than a third can be financed for cash crops. This criterion effectively restricts about 50 percent of the small farm population of Paraguay from participation in the program. (Six hectares is the national average farm size.) It also explains why the activities of the CAH have been focused in areas of colonization, where six hectares (15 acres) represents the minimum "half-lot" that Paraguay's agrarian reform program (IBR) has specified as the smallest unit into which colonists may legally divide their government-granted holdings. Such limitations are predicated on the assumption that the role of the CAH is to promote commercial family farms, not subsistence agriculture; it is essentially a "springboard" program designed to upgrade the modern, productive capacity of small farmers within a period of about five years, after which they can "graduate" to other public or commercial sources of agricultural financing.

The CAH does not compile information on the socioeconomic characteristics of AUCA members (with the exception of landholdings), but through conversations with CAH field staff and the leaders of two AUCAs in the Coronel Oviedo area, the following profile was obtained. AUCA membership is exclusively restricted to male household heads. Perhaps six out of every ten members know how to read and write. The average member sells about 95 percent of his cash crop production and up to 50 percent of his subsistence crop production. Off-farm employment is minimal. Use of modern inputs such as fertilizer, improved seed, and insecticide was widely generalized up through 1973 but dropped off abruptly in 1974 due to the world energy crisis, which has caused prices for these products to increase drastically. For example, fertilizer has leaped from US$8.27 to US$23.64 per 50-kilo bag (110 pounds). Only a year ago AUCA members were required to apply fertilizer to cotton and tobacco crops; but during the 1974 crop cycle, CAH staff left fertilizer use up to the discretion of each individual AUCA member, and perhaps no more than two out of every ten requested credit for this commodity. Throughout Paraguay --

which must import its petroleum supplies -- gasoline prices average almost US$2 per gallon (3.8 liters), and this has caused a steep increase in the general cost of living which, in turn, has driven the cost of hired farm laborers from about US$1.50 to US$3 per day. Faced with doubled costs for outside labor at harvest time, only a small fraction of which are covered by CAH loans, the typical AUCA member must finance his harvesting expenses by selling up to half his production to local merchants. In exchange, he receives cash to meet the costs of harvesting the balance, which he then markets collectively under CAH supervision. In 1974 the amount of AUCA cotton marketed individually averaged 42 percent of total yields. Fortunately, with cotton prices up 220 percent over preproject levels, the value of an AUCA member's jointly-marketed production is more than sufficient to permit the CAH to recover the credit he has received.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

The idea for the AUCA program originated with CAH central office senior staff in Asunción and was imposed on the regional offices as a policy directive. Apparently, no consultation either with field staff or CAH farmer-clients took place. CAH field staff were visited by central office officials, were briefly trained in what an AUCA was -- its purposes, structure and membership -- and instructed to implement the program. The innovation did not entail any major departure from existing CAH operating procedures. Field staff were to continue to work with former CAH clients, preparing their production plans and supervising their farming operations via individual on-farm visits as had been done for years. The only significant changes derived from the requirement that clients be members of an AUCA and that they market their production collectively. It was also understood that CAH field staff would be responsible for determining who should comprise the membership of each AUCA, where it should hold its meetings (its official "headquarters") and which of its members should be "elected" for leadership positions: president, secretary and treasurer. This last expectation was not, of course, clarified explicitly, but its meaning is clear in Paraguay: to qualify for a leadership post one *should* be a member of the official government party -- i.e., a *Colorado*.[1]

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[1] Paraguay has a long history of one-man rule drawing support from a strong political party mechanism and the military. Virtually all government officials -- at all levels of government -- are members of the *Colorado* party. Most group undertakings at the local level -- like clubs, AUCAs or cooperatives -- appoint *Colorados* to leadership positions.

IV. DYNAMICS: PROJECT IMPLEMENTATION

The AUCA program is essentially designed to promote increased cash crop productivity through the use of modern inputs and the application of improved cultivation practices. The inputs are financed by credit, the improved practices instilled through periodic on-farm visits and supervision by CAH field staff. The latter involve the application of recommended planting densities, weeding and funigation schedules and land rotation procedures. The farmer is left with little room to exercise his own discretion. He must simply follow orders, and failure to do so automatically constitutes grounds for expulsion from the AUCA and subsequent loss of credit. In practice, the strategy is not as authoritarian as it might seem. Flexibility of implementation is determined by how rigorously each CAH field worker enforces program recommendations. The central program office is often unable to fill the field workers' requests for logistical support and is unsympathetic to the flexibility the workers feel is necessary. As subprofessionals -- and in some cases part-time small farmers themselves -- CAH field workers are only one or two steps above their clients in terms of experience, education and social status. Hence, they tend to be good listeners and seldom "go by the book." As mentioned previously, following recent input price increases, CAH field staff no longer enforce fertilization recommendations. They also allow clients to dispose of a portion of their harvest individually to meet harvest labor expenses not covered by their crop loans. In the absence of a CAH policy decision to increase the per hectare credit allowance to cover the full cash costs of the recommended technical package -- which have been more than doubled in the last year -- this kind of flexibility is necessary to keep the program going.

The principal strength of the AUCA program is that CAH field agents are intimately knowledgeable about their clients' productive potential and loan repayment capability. They know that if an insect blight appears in a client's subsistence corn crop, for example, he will probably allocate a portion of the insecticide he has received for cotton to corn fumigation.

To cover the insecticide deficit in cotton, CAH field staff will require the farmer to buy more chemical with the cash installment reserved in his crop loan for hired labor expenses, but permit him to cover this second deficit by marketing more cotton individually. Each is visited by CAH staff at planting time, at least twice during the period of preharvest cultivation tasks and usually twice during the harvest itself -- one visit to estimate yields and determine the maximum amount each farmer will be permitted to sell individually; a second to supervise his actual amount of harvest for group marketing. Following this last visit the CAH field worker arranges a marketing contract with a local or regional buyer and specifies a day when all jointly-marketed AUCA production must be delivered at a designated collection point. Upon pickup by the buyer, payment in cash or check is made directly to the CAH. If the buyer comes from Asunción, payment may be made by check at the central office; if he is a local buyer, a cash payment is made to the regional CAH office. After deducting all outstanding credit obligations, including any repayment installments for previous indebtedness, each AUCA member's account is cleared and his net balance, if any, paid in cash.

Aside from his on-farm and group marketing supervisory functions, the CAH field worker also interacts with each AUCA member individually in the preparation of his CAH loan request. This document is based on a farm plan worked out in dialogue between farmer and field worker -- usually at the farm rather than the office. With the exception of three "pilot" AUCAs where vegetable farming is being promoted, the CAH only finances cotton, tobacco and soybean crops. Rarely are AUCA members permitted to plant more than one-half hectare (1.2 acres) in tobacco, and maximum loan quotas per hectare are established for each of the three crops. But aside from these restrictions the AUCA member has some autonomy in deciding how much credit he will request and for what purposes. For example, some members have their own draft animals for plowing or have a larger supply of family labor than others, and this will influence the amount and use of the credit they request. The typical credit request is to finance 1.5 hectares (3.7 acres) of cotton and .5 hectares (1.2 acres) of tobacco given an average cultivable holding of six hectares (15 acres) of which four hectares (9.9 acres) must be reserved for subsistence crops and fallow.

Often a credit request will include the purchase of a farm implement or draft animal -- payable in two annual installments -- and will include an additional installment payment for previous indebtedness. Yield and income projections are also part of the production plan.

The responsibility of the CAH field agent and farmer-client is to come up with an overall production and credit proposal which both agree is feasible, and does not expose the latter to an obligation he can not reasonably meet -- even given a 20-33 percent margin of error with respect to anticipated productivity and income. Judging from AUCA credit repayment performance to date for the program as a whole, this planning process, with all its restrictions, appears to function exceedingly well.

V. PROJECT SUCCESS

Data on two AUCA's in the Coronel Oviedo area were collected to document program benefits at the local level. The first, AUCA No. 3, has 17 members: the largest with a holding of 23.9 hectares (59 acres) (of which only two hectares were financed in cash crops); the smallest with 5.7 hectares (14 acres) and the average having 6.5 hectares (16 acres). Although cotton and tobacco yields per hectare had increased from 900 to 1200 kilos and 1000 to 1400 kilos respectively[1] between 1970 and 1973, lack of fertilizer use in 1974 caused both to decline again, cotton falling to 1050 kilos (935 pounds) and tobacco back to its preproject level.

The second AUCA, No. 4, has 26 members. Their holdings range from 5.6 to 39.6 hectares (14 to 98 acres), the average being 12 hectares (30 acres); but again, even the largest members cultivated no more than four hectares (ten acres) with CAH financing. It is noteworthy that in 1973, the CAH field supervisor of this AUCA compelled its largest member to seek other sources of financing. This "graduate" reluctantly sought the services of the National Development Bank, was given a big "run-around" and never managed to get any credit. Pleading that CAH administrative procedures were more efficient and its staff gave better service, he persuaded his local supervisor to allow him back into the AUCA in 1974. This event suggests that the CAH will have difficulty implementing its "springboard" strategy. The five-year "in-up-and-out" rule is probably unenforaceable at this stage in the program's development.

The average farmer in both AUCAs planted two hectares (about five acres) with CAH financing, 75 percent in cotton and 25 percent in tobacco. Although he did not use fertilizer, his cotton yield was 17 percent above preproject levels, the

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[1] 801 to 1069 pounds and 891 to 1247 pounds per acre respectively.

increase due mainly to the use of improved seed and some insecticide. Measuring his production costs and net income in 1974 prices (both pre and post-project), the average AUCA member increased his net on-farm family income by $75.[1]

It deserves mentioning that when the CAH supervisor who assists both AUCAs was asked to describe how his clients had used their increase in net income, he cited the following modernizing investment. In AUCA No. 3, four of its 17 members opened up family-run *tiendas* (for limited sales of soft drinks, beer, cigarettes, candles, etc.); in AUCA No. 4, two members did the same. Three members in AUCA No. 3 and nine members in AUCA No. 4 made land purchases. Finally, one member of each group purchased a dairy cow.

In terms of other success measures, it would appear that the AUCA program has restricted its potential for broad coverage and replicability by choosing to work only with those small farmers who have land titles and operate holdings of six hectares or more -- not exactly an "elite" clientele, but by no means the most disadvantaged sector of the small farm population. Even granting that the program focuses primarily and justifiably on beneficiaries of colonization programs -- a population of about 61,000 small farmers in itself -- the CAH has yet to prove that it can reach even a tenth of these producers in the foreseeable future without 1) substantially increasing its field staff, or 2) creating an enforceable system for graduating its present clients to other sources of financing.

The AUCAs remain dependencies of the CAH which have no managerial capability and no system for self-capitalization, and are not recognized as legal institutions outside the program. They are neither cooperatives or pre-cooperatives; rather, they might best be described as "committees". This is not to say that an AUCA is not a useful institutional innovation for organizing farmers for purposes of expediting loan repayment in a directed credit program. But it does mean AUCAs are not the best way to promote self-sufficiency.

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[1] The price for cotton had risen 220 percent since preproject days, while the price for tobacco rose 133 percent.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The AUCA program provides several lessons for other programs of supervised agricultural credit. *First,* its credit operations are directly linked with a provision for compulsory group marketing. *Second,* unlike other programs where organization of clients in groups is primarily to economize on scarce technical assistance resources, the CAH continues to supervise AUCA members on an individual basis. *Third,* the relatively high intensity of field staff farm visits provides them with exceptional familiarity with local constraints and productivity, thereby allowing them to plan group marketing more efficiently as well as to build in important features of flexibility in program implementation. And *fourth,* this intensity of supervision is relatively cost-effective because it is conducted by subprofessionals. The average CAH field supervisor earns about US$96 per month. He covers some 80-90 small farmers. Thus the cost per farmer per year is on the order of US$12-13.

With respect to small farmer assistance programs in general, the AUCA represents a potentially useful prototype for organizing clients. It is hardly an organization at all: it functions only when some group activity is required -- like marketing -- and then, in effect, does nothing. It makes no capitalization or meeting attendance demands on members; as such, it is "easy" to belong to. Perhaps this type of organization would work well in other settings where either 1) more highly structured entities like cooperatives have failed, or 2) the introduction of institutions requiring relatively sophisticated managerial expertise is considered premature. The dismal history of agricultural cooperatives in the Third World suggests that such institutions are by no means a generalizable panacea for channeling assistance to small farmers. Minimum-structure entities like the AUCA may represent a more viable alternative in many settings.

Information Sources

A. Field

The AUCA program in Coronel Oviedo was visited on three occasions, once in February and twice in October 1974. Conversations with members of two AUCAs were conducted in February and one AUCA in October. CAH field supervisors accompanied DAI staff on all visits. Data on 1974 cotton and tobacco yields, prices and production costs are based on estimates by CAH field staff and subsequently amended from records available at the central program office of the CAH in Asunción.

B. Reports

Despite a concerted search for written documentation on the CAH program, all that was found was a one-paragraph reference in Joseph Pincus, *The Economy of Paraguay*, Praeger (New York:1968), pp. 100-1. Data on the lending history of the CAH since 1954 came from central office files.

Data Adequacy

Compared to that of other programs in the DAI survey, the documentation on the CAH program is extremely sketchy. Time constraints and the non-availability of central office staff for extensive interviews severely limited data collection on the program as a whole. However, field staff in the Coronel Oviedo area was most cooperative. Data on AUCAs No. 3 and 4 were based on a complete census of membership loan files, supplemented by field staff estimates and central office file records. The draft of this write-up was reviewed by Mr. Sanford White, Rural Development Officer, USAID/Paraguay.

CREDICOOP

DIRECTED AGRICULTURAL PRODUCTION CREDIT

I. PROJECT BACKGROUND

Organized in late 1973, CREDICOOP is a federation of Paraguayan savings and loan cooperatives. In addition to promoting and assisting the nation's credit co-op movement, CREDICOOP administers a program of directed agricultural production credit (DAPC) specifically designed to assist small farmers. The program was developed by CUNA International in 1969 and supported by some US$265,000 in grants from AID/Paraguay and US$100,000 in counterpart funds from the Government of Paraguay. The DAPC strategy is intended to channel production credit into the hands of small farmers who ordinarily cannot qualify for loans from public agricultural lending sources.

The program is essentially no different from the DAPC of FECOAC in Ecuador, from which it was copied. First, credit co-ops located in rural towns throughout Paraguay are encouraged to expand their membership to include small farmers. Once admitted to and launched upon a systematic savings program, the farmer-member can qualify for crop production and implement loans. These are not drawn from co-op capital, but rather from credit extended by Paraguay's Agricultural Development Bank (BNF). Each loan is based on a detailed farm plan prepared by co-op staff in consultation with the credit recipient. It is disbursed in both cash and input supplies, the use of which is supervised as closely as possible; hence the name "directed agricultural credit." BNF loans to the co-ops are granted at 9.5 percent interest per annum and reloaned to farmer-members at one percent per month plus a single service charge of two percent on the loan's principal. The interest spread and service charges permit the co-ops to cover most of the costs of rural credit administration and supervision.

Currently the DAPC program of CREDICOOP is assisting 16 rural credit co-ops, whose agricultural members total 2426. In 1973,the BNF extended a total of US$274,092 in crop and implement loans to 1240 DAPC beneficiaries, whose combined acreage financed was 3785 hectares (9346 acres); this amounted to an average of three hectares (a little less than 7.5 acres) per credit recipient.

It should be noted that the DAPC program is directed at small farmers only in a very limited sense. A farmer cultivating three hectares (7.5 acres) in cash crops certainly qualifies for the adjective "small." However, in Paraguay cultivated acreage coincides only in very rare cases with a farmer's total landholdings. For example, in two DAPC co-ops visited, farmer-member landholdings averaged eight hectares (20 acres) in the first and 12 hectares (30 acres) in the second. Thus, the average co-op farmer is "small" strictly with reference to how much of his land he devotes to cash cropping. The reasons why a relatively small portion of a farm family's total land is cultivated are not entirely clear, but most likely the scarcity of hired laborers and their high cost (US$2 or more per day) constitute major constraints. Scarcity of production credit is another. Land rotation to preserve soil fertility is a third.

CREDICOOP's DAPC responsibilities include: 1) coordination of loan requests between participating co-ops and the BNF; 2) training co-op leadership in DAPC management; and 3) promoting modern agricultural technology and other farm-level services in conjunction with the Farm Extension Service and other agricultural sector agencies or programs. Working from a single national office located in Asunción, CREDICOOP's personnel include an expatriate CUNA advisor, a managerial staff of three and a technical staff of nine that includes five agronomists on loan from the Ministry of Agriculture. Also three Peace Corps volunteers work with the program.

II. LOCAL ENVIRONMENT

While agricultural land in Paraguay is far from equitably distributed, this resource is still relatively abundant in comparison to its availability in most other Latin American countries. Out of the nation's approximately 150,000 farm units, about 98,300 represent holdings of less than ten hectares (25 acres). Of these, ten percent are less than one hectare (2.5 acres), 58 percent are between one to five hectares (2.5 to 12 acres), and 32 percent are between five to ten hectares (12-25 acres). But as previously noted, these figures refer to landholdings, not area cultivated. The typical Paraguayan small farmer probably cultivates only about three to four acres (1.2-1.6 hectares).

Although more than 50 percent of Paraguay's farmers do not have title to the land they farm, tenure security is considered very high for renters and squatters. The level of rural illiteracy is also around 50 percent, but it is difficult to find a small farm family that does not have at least

one of its school age children attending a public school. Few social services have reached the rural areas, and market access roads are relatively scarce.

Paraguay's small farmers produce a predominant share (circa 65 percent) of the country's agricultural exports. The principal export cash crops are cotton, tobacco and soybeans. Given the world market scarcity in cotton, for example, farm-level prices for this product have increased 113 percent since the DAPC program was launched in 1969. Up to 1973, DAPC recipients dedicated a major portion of their loans to the purchase of fertilizer; using improved seed and other inputs, they were able to register per hectare yield increases on the order of 500 kilos (1100 pounds), or about 50 percent, over pre-project levels, thereby generating quite spectacular gains in net income. Unfortunately, this combination of yields and high prices was rudely disrupted in late 1973 when the world energy crisis drove the price of fertilizer in Paraguay from US$8.27 to US$23.64 per 50-kilo (110-pound) sack. (Incidentally, gasoline prices in Asunción rose from about US$.80 to US$2 per gallon in October, 1973.) As a consequence, the DAPC co-ops no longer insist that their farmer-members use fertilizer, and most credit recipients have not elected to request loan amounts large enough to cover even reduced levels of fertilizer application. Thus, their cash crop yields have fallen back almost to pre-project levels. Nonethless, cash crop prices remain high -- high enough to give DAPC recipients a net income in excess of pre-project levels, even though their yields have practically been cut in half.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

In 1968, AID/Paraguay asked Percy Avrams, a U.S. contractor of CUNA who initiated South America's first DAPC program in Ecuador, to visit Paraguay and develop a project proposal for establishing a DAPC program there. Avrams suggested a pilot project to test the concept in a rural credit union. A second CUNA contractor -- also an American -- went to Paraguay to further flesh out the financial and staffing requirements of Avram's proposal in 1969, and by early 1970 AID/Paraguay completed the loan paper to finance the experiment.

One of Avram's lieutenants from Ecuador, Carlos Flores, arrived in Paraguay in March 1970 to become the CUNA contract advisor. He spent two months visiting credit co-ops in rural towns of eastern Paraguay until he finally selected one, Caraguatay, as the best candidate for starting the DAPC idea on a trial basis. The Caraguatay co-op had been organized by school teachers and local merchants in 1967, and its membership

included only a handful of farmers. Flores conducted a two-day course on the principles of DAPC for the co-op's leaders. Next, with their help, he identified some 20 progressive farmers from the area and gave a second course for them. These farmers were then organized to promote the DAPC idea among their rural neighbors, and over a subsequent five-week period a farmer membership drive was conducted in 20 rural districts. Flores also trained two urban members of the co-op to fill the posts of co-op manager and field supervisor. As new rural members joined the co-op they were all given eight hours of instruction in DAPC, in co-op principles and organization, in use of credit, etc. Once each new member had paid his membership fee and deposited his first savings quota, co-op leadership met with him to prepare a farm production and credit plan to justify his loan request. All requests were aggregated into a global loan request and presented to the BNF for financing. In July 1970 the Bank lent Caraguatay US$19,640 for member crop production, 57 percent of which was to finance tobacco, the remainder to finance cotton, wheat and other crops.

During the ensuing crop cycle, Caraguatay's DAPC recipients were given technical assistance on a group basis by a local agent of Paraguay's Farm Extension Service. Tobacco-growing members were trained in modern cultivation practices by representatives of PRONATA, the National Tobacco Promotion Agency, who also set up a demonstration plot on the land of one of the co-op members. At harvest time, all member production was marketed collectively under co-op auspices. By early 1971,the Caraguatay experiment was judged to be a success. Several Paraguayan professionals -- accountants, an agronomist, a sociologist -- were recruited by Flores to augment the staff of the CUNA mission, and the program was quickly extended to five new co-ops.

IV. DYNAMICS: PROJECT IMPLEMENTATION

The basic approach worked out in the Caraguatay pilot project has essentially remained the same up to the present. CUNA/CREDICOOP staff visit rural credit co-ops, conduct a one- to two-day seminar on DAPC, encourage their non-farmer members to contact progressive farmers, and with the latter's cooperation, help the leadership to launch a farmer membership drive in the rural districts. New members must receive a minimum of eight hours of training in DAPC and cooperativism prior to requesting or receiving production credit. CUNA/CREDICOOP staff also help rural co-ops to find candidates for managerial and field supervision posts. Once these individuals are trained, DAPC activities can be initiated. CREDICOOP provides participating

co-ops with standardized forms for farm production plans, member passbooks and institutional record-keeping in general. In most cases, CREDICOOP provides the participating co-ops with office equipment such as file cabinets and typewriters. These items are received as interest-free loans and must be repaid once the co-op is three to four years old and is able to finance its administrative costs from interest income on member lending. Several co-ops have also received motorbikes from CREDICOOP for use by their field supervisors in visiting member-farmers. The bikes are also provided as interest-free loans and must be repaid when the co-op is able to do so.

As with the Caraguatay pilot project, DAPC co-ops, with CREDICOOP assistance, attempt to procure the part-time cooperation of local agricultural extension agents to provide group training to farmer-members in crop cultivation techniques or in the establishment of demonstration plots on the farms of members. Moreover, most DAPC co-ops attempt to organize group marketing of member production, and the typical co-op usually has an input supply service as well. Indeed, during planting and harvest periods, the office of a DAPC co-op may be crowded to the rafters with agricultural supplies, bales of cotton, etc. At such times the institution physically resembles -- and in a real sense actually becomes -- a multiple-service agricultural cooperative, even though the majority of its members are non-farmers and the bulk of its capital is composed of savings contributed by school teachers, government employees, merchants and other urban residents.

This is precisely what makes the DAPC idea so fascinating. The philosophy which underlies the program is that of taking a co-op initially organized by and for non-farmers and exploiting their leadership resources to create an institution which serves as an intermediary for channeling credit and technical assistance to farmers. In most rural settings, farmers and non-farmers represent two utterly discrete and often antagonistic communities of interest. But in a DAPC co-op, the two elements are joined in a mutual undertaking which can be beneficial to both. Farmers are directly benefitted in two ways: *first,* because they gain access to agricultural credit, and *second,* because as co-op members they are entitled to request loans from co-op capital for non-agricultural purposes. Non-farmer members are benefitted because the savings contributed by their rural neighbors help to increase the total supply of co-op capital available for meeting their credit needs. Of course, this mutuality of interest between both groups of members only holds as long as farmers make less than their share of demands on the institution's credit resources, i.e., as long as farmers invest more savings than they demand in loans for non-agricultural use. In other words, for the DAPC idea to work, a credit co-op requires access to outside financing; otherwise, farmers and non-farmers would have to compete directly with each other

for a supply of loan capital far too limited to meet the credit demands of both.

This circumstance creates an interesting problem, for it means that a DAPC co-op can easily become a mechanism for syphoning off the savings of farm families into consumption expenditures by urban residents. The probability that this will happen is considerably increased when the co-op's decision-makers happen to be non-farmers, which is precisely the case with most DAPC co-ops in Paraguay. For example, two of the most successful co-ops in the program (to be described presently) do not have a single farmer serving on either of their boards of directors or credit committees. However, in all fairness to the co-ops in question, there exists no clear evidence that the dominant control of urban residents over credit allocation decisions has led to excessively preferential consideration of non-farmer credit requests at the expense of those by farmers. The point of all this is simply to indicate that a DAPC co-op's non-agricultural lending operations do require a delicate balancing act by the leadership to keep the interests of its rural and urban members in harmony.

Another delicate matter confronting DAPC co-ops is the problem of loan delinquency. As mentioned previously, the DAPC idea is only viable if access to outside capital is available. In Paraguay, the funds which co-ops need to finance agricultural loans to farmer-members come from the Agricultural Development Bank (BNF). And the BNF can refuse to lend to any DAPC co-op whose delinquency on all loan operations (agricultural and non-agricultural) exceeds ten percent. In some DAPC co-ops this limit has been reached or exceeded. Sometimes, due to crop disasters, market price drops or other uncontrollable constraints to which agriculture is particularly prone, the delinquency problem may lie principally with the farmer-members; in other cases, the problem is with non-farmers. It is worth emphasizing that loan repayment performance is not necessarily a function of ability to pay. Quite frequently, it is more directly influenced by the vigor with which sanctions against credit delinquency are enforced. CREDICOOP staff points out that the principal cause of credit delinquency in some co-ops is the fact that their leaders are the worst offenders! This type of situation establishes a negative precedent which permits farmer and non-farmer members to escape their obligations with impunity.

For the most part, delinquency involving only non-agricultural lending does not jeopardize a co-op's DAPC program; but if repayment problems with agricultural loans appear simultaneously, the situation of the co-ops, and hence DAPC, becomes most precarious. The BNF is not a charity institution, and the co-ops know their credit line can be terminated if they fail to repay their obligations in full. To forestall this contingency, co-ops which are reluctant to enforce credit

sanctions or delinquency controls usually attempt to hide their delinquency by cutting back on non-agricultural loans to release co-op capital for payment of external obligations. A co-op can decapitalize itself in a hurry this way. Two bad crop years back-to-back would probably drive many a DAPC co-op out of business.

V. PROJECT SUCCESS

Fortunately, there has not been a really bad crop year in Paraguay since the DAPC program began. The price trend for the principal cash crop financed by BNF credit, cotton, has been solidly positive.

Two DAPC co-ops were visited to ascertain program benefits at the local level. The first, Itacurubí, is located in the densely-populated *minifundio* region some 87 kilometers (54 miles) due east of Asunción. The second, Coronel Oviedo, is located in an old colonization area approximately mid-way between Asunción and the Brazilian border, about 50 kilometers (31 miles) to the east of Itacurubí. Neither co-op collects post-loan data on small farmer crop yields, production costs or net income. Thus, the figures which follow are based on estimates made by field supervisors of the respective co-ops for the 1974 crop cycle. Since very few farmer-members used fertilizer that year, estimates refer only to non-fertilized crops.

Itacurubí

In 1974, 91 crop and implement loans totaling US$15,039 were made. Out of 161 hectares (398 acres) financed, 105 (259 acres) were in cotton. Yields averaged 1200 kilos per hectare (1069 pounds per acre), or a 20 percent increase over preproject levels; the difference was then credited to use of improved seed and insecticides which the co-op distributes in kind as part of the loan package. Despite a 271 percent increase in production costs, the percent increase in net income to the farmer per hectare was 40 percent, and 96 percent of all agricultural loans were recuperated. Itacurubí is certainly one of the best managed DAPC co-ops in Paraguay. Farmers are visited by co-op staff four to five times per crop cycle, four demonstration plots have been established on the land of members, and a formal evaluation of co-op services to DAPC participants is conducted every year at the conclusion of the crop cycle. The co-op president, a woman, is also on CREDICOOP's Board of Directors.

Coronel Oviedo

In 1974, 173 crop loans totaling US$20,396 were made to finance 266 hectares (657 acres) of cash crops, of which 163 (403 acres) were in cotton and 87 hectares (215 acres) in tobacco. An additional 53 loans were made to finance the purchase of farm implements valued at US$3240. Cotton yields averaged 1100 kilos per hectare (980 pounds per acre) a 13 percent increase over preproject levels. Tobacco yields averaged 1300 kilos (1158 pounds), an eight percent increase. Although the increase in production costs for both crops was 263 percent and 256 respectively per hectare, net income to the farmer was 40 percent for cotton and 37 percent for tobacco. Agricultural loan recuperation was 87 percent. Coronel Oviedo's manager is a dynamic individual who vigorously pushes the co-op's field supervisors to maintain frequent farmer-member visitation schedules. He has launched an effort to reorganize DAPC participants in rural subcommittees to expedite the delivery of technical assistance services and the preparation of loan requests. Member crop production is joint-marketed through the co-op, and this has resulted, in the case of cotton and tobacco, in a US$.01 per kilo price increase over that offered by private merchants (a three percent differential).

CREDICOOP calculates that it takes a DAPC co-op three years to reach self-sufficiency in terms of covering its full administrative costs. In the interim, CREDICOOP covers its affiliates' operating deficits in the form of interest-free loans. The fact that the DAPC is a replicable idea is demonstrated by the gradual expansion of DAPC co-ops in Paraguay from five to 15 since 1972, and by the transfer of the program initially from Ecuador. CREDICOOP itself is not yet self-sufficient, but this goal is expected to be reached in the near future via the payment of member co-op dues (calculated in relation to each co-op's membership and social capital). With the organization of CREDICOOP, DAPC members have acquired a spokesman for their needs and interests at the national level. All in all, the program appears to be in fairly good shape, especially since CREDICOOP has assigned number one priority to finding a solution to the problem of credit delinquency. But the DAPC program's true "test of fire" probably lies in the future, when one day the cotton price may fall abruptly, or the weather turn uncooperative, or ... .

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The history of agricultural cooperatives in the Third World, especially those of the multiple service type, has been generally dismal. One obvious reason for the poor

performance of these institutions is that they are relatively sophisticated enterprises requiring sophisticated managerial expertise; this is precisely the one commodity which tends to be in shortest supply in developing societies, especially in predominantly agrarian societies. Small farmers who have little or no education, no experience with public or commercial credit, little exposure to group organization and no understanding of bookkeeping can hardly be considered suitable candidates for managing complicated business undertakings. Of course, they are rarely expected to do so. In most conventional co-op promotion programs, the problem of management talent scarcity is dealt with by entrusting the non-financial co-op functions to elected co-op leadership and the financial functions to "outsiders." The latter are usually government employees who neither reside in the local area nor share with the membership any of the risks to income or livelihood should "their" co-ops fail; they have no real vested interest in these institutions. Worse still, such outsiders often lack the necessary commitment to provide the kind of managerial guidance that co-ops require to become successful.

The DAPC program, as organized in Paraguay and other countries, represents a promising attempt to resolve, or at least simplify, this dilemma. It creates institutions which offer the same basic services of agricultural cooperatives *without* requiring that they serve only farmers. It takes credit unions located in rural towns (co-ops organized by and for urban residents) and "borrows" their management resources to administer the delivery of credit, marketing, and technical assistance services to small farmers. In return, urban residents "borrow" the savings of farmers to expand the supply of co-op funds available for lending for non-agricultural purposes. This partnership, however, is really only viable if the co-op can tap outside sources of agricultural production credit. To a lesser extent, the partnership's continuity also requires that farmer-members be content with investing more savings in the co-op than they take out in the form of loans for non-agricultural purposes. But given these restrictions, DAPC co-ops are proving they can fill the role of a full-fledged multiple service agricultural cooperative. Moreover, they are doing so with locally-available resources and do not depend on large doses of management subsidy from the outside.

Nonetheless, DAPC co-ops should not be thought of as permanent substitutes for conventional agricultural cooperatives because they are not, in the last analysis, institutions which encourage the participation of small farmers in the decision-making process. DAPC co-ops tend to be exclusively controlled by non-farmers, and in the long run, this is not in the best interest of farmers.

It is perhaps a safe prediction that as the farmer memberships of DAPC co-ops continues to grow, the utter volume

of operations involving agricultural credit and marketing services will create powerful incentives for establishing separate and specialized agricultural cooperatives. Then too, as farmers acquire greater experience as members of their present credit unions, they may be expected to learn many of the skills required to manage their own co-op undertakings. But until such time as these conditions begin to occur, DAPC co-ops offer a potentially effective vehicle for reaching small farmers with badly-needed services they might otherwise never receive.

Information Sources

A. Field

The subprojects of Itacurubí and Coronel Oviedo were visited on two separate occasions each, in July and October 1974. No program staff accompanied the writer on either trip, but a Paraguayan staff member of AID/Asunción was present during the first visit to each co-op. Interviews were conducted with co-op managers, field supervisors and other co-op leaders.

B. Reports

Capital Project Paper (PROP), *Credit Unions Development*, AID/256-234; *Memorias: Asamblea de Constitución, Central Cooperativa Nacional de Ahorro y Credito CREDICOOP: Encuesta Agropecuaria por Muestreo-1972* (Ministry of Agriculture).

Data Adequacy

Yield and income data on the subprojects were based on estimates by field supervisors and a review of loan application forms; they were subsequently modified (lowered) slightly in light of additional data on non-fertilized crop yields obtained from the AUCA program of the CAH, which works in the same areas where the CREDICOOP subprojects are located. Some data on landholdings of program beneficiaries were taken from survey research on co-op and non-co-op small farmers conducted by the Paraguayan Center of Sociological Studies (CPES) in 1974. The draft of this write-up was reviewed by Mr. Sanford White, Rural Development Officer, USAID/Paraguay.

ANNEX L

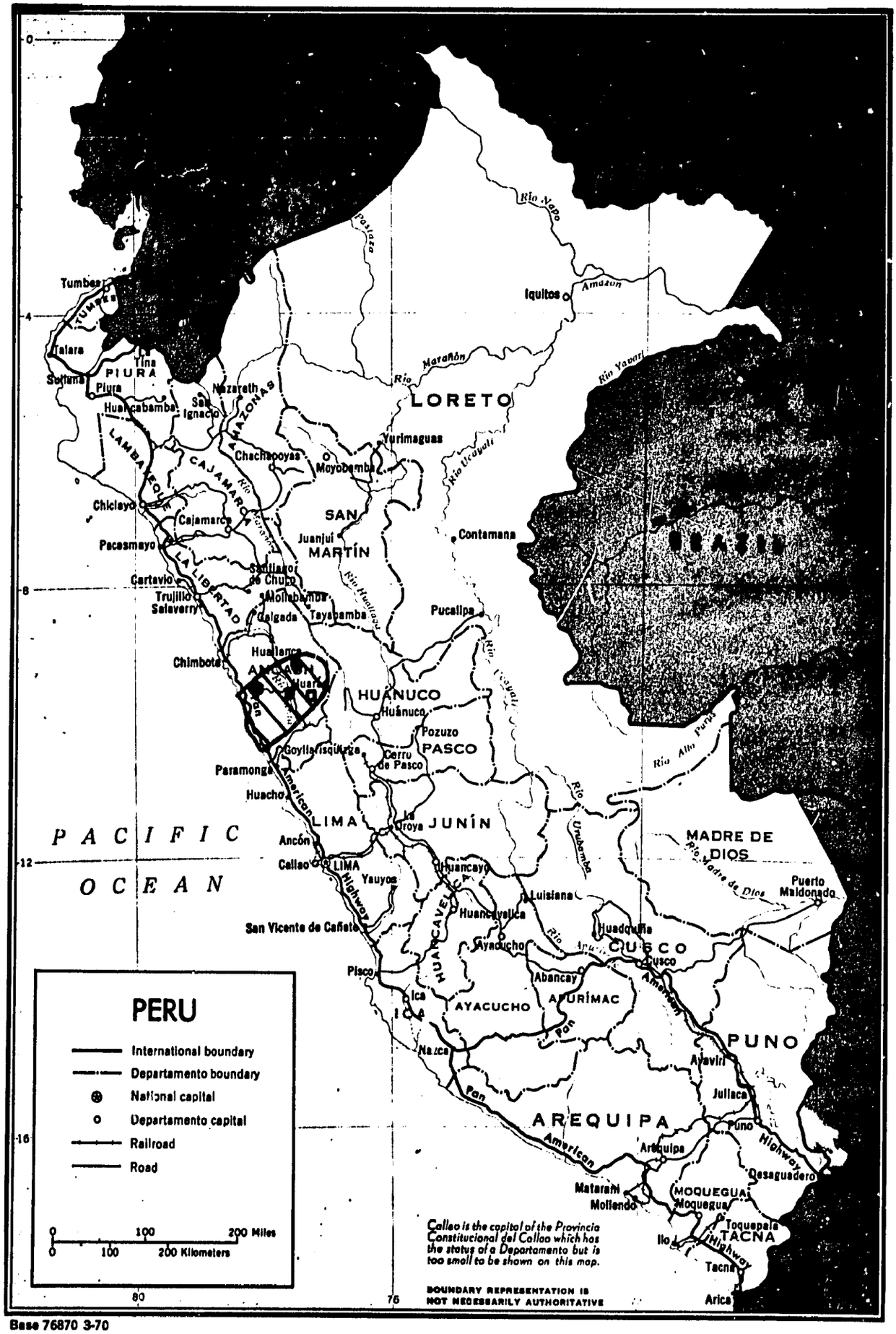
PERU

PERU

Area: 496,222 square miles
Population: 15,360,000
Population growth rate: 3.1%
Density per square mile: 31.0
GNP per capita: $480
GNP per capita growth rate: .5%
Capital: Lima (3,330,000)
Largest cities: Callao (335,400, Arequipa (194,700)
Major language: Spanish, Quéchua
Religion: Roman Catholic
Literacy rate: 70-80%

The Community of Vicos - This project covers the area of Vicos (□) in the Department of Ancash.

ORDEZA/RDD, Rural Enterprise Development - This project covers the shaded area ▨ in the Department of Ancash. Huaraz is the project headquarters (■) and subprojects are Pariacoto and Chavin (●).



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THE COMMUNITY OF VICOS

I. PROJECT BACKGROUND

In 1952 the Anthropology Department of Cornell University launched one of the first and most unique experiments of directed social change in the history of rural development. It signed a five-year contract to rent and manage a traditional highland hacienda in the Peruvian Andes whose resident labor force consisted of 380 Quechua-speaking Indian families. During the contract period, Cornell proposed to train these Indians in democratic self-government, abolish their obligatory labor tax, introduce modern agricultural practices, provide a variety of social services and generally prepare the indigenous community to manage or purchase the land on which they had heretofore worked as serfs.

The Cornell-Vicos project was heralded as a great success in the late 1950's and early 1960's. The community of Vicos *did* establish an institution of democratically elected leadership which continues to function today. Indian families mastered the use of fertilizer, insecticide and improved seed to quadruple yields on both communal land and individual family plots. Indeed, by the mid-1960's Vicos had become an exceedingly productive and progressive commercial enterprise, shipping tons of potatoes to regional and national markets on its own truck. Three Vicos leaders received training in the United States. A number of the community's young men and women -- some assisted with Cornell scholarships and others not -- have managed to complete high school to become professionals, an accomplishment considered impossible for a *Vicosino* before 1952. When the Cornell lease expired, the community of Vicos successfully rented the hacienda at a profit for another six years, made its first down payment to purchase the 1600-hectare (40,000-acre) property in 1962 and by 1965 had completely paid for the land.

Unfortunately, the success of the Vicos project was abruptly stifled in 1969 -- not by defects in its planning and implementation but by a set of circumstances which can be most appropriately considered as "acts of God." First, a potato blight in the central Andean region caused the government to declare a quarantine on all market sales of this crop;

since potatoes constituted virtually the entire source of the Vicos community's cash income, its commercial viability was practically destroyed overnight and has yet to be reconstructed on a new basis. Then, in 1970, the community suffered extensive damage to its social and productive infrastructure during the terrible earthquake which ravaged the region on May 31st of that year. This disaster left the community even further decapitalized and, in a real sense, its morale shattered. Finally, in a misguided attempt to restore Vicos to a commercial footing, the regional office of the Ministry of Agriculture persuaded Vicosinos to accept a dairy cattle loan to purchase 80 purebred cows and convert most of their production on community-farmed lands from subsistence food growing to cattle forage crops. The idea was attractive because Vicos had already purchased six pure brown swiss cows and was pleased with their production.

When the cattle turned out to be of utterly inferior quality (mixed breeds and old animals had been added to a few purebreds), the community returned the animals and reneged on its loan obligations, thereby ruining the dairy scheme; but in the process, Vicos also destroyed its credit rating, and even worse, lost an entire year's supply of subsistence food crops by growing forage which it no longer needed nor was able to sell. Today, the community of Vicos is a society beset with hostility, apathy and despair. It is wracked by internal dissension. Innumerable vestiges of its once progressive social services and productive capital have fallen into decay and disuse. Most incredible of all, Vicos has largely shut itself off from the outside world and has reverted back to an exclusively subsistence agrarian economy.

II. LOCAL ENVIRONMENT

Of its 16,000 hectares (40,000 acres) perhaps no more than 1400 hectares (3500 acres) of the hacienda of Vicos are cultivable. To own this immense estate is like owning the highest fifth of a 5000-meter mountain, for the property is replete with snow-capped peaks, a glacier, sub-artic tundra, precipitous valley walls and finally, some reasonably flat bottomland scattered at different altitudes and irrigated by a glacier-fed stream. Some 192 hectares (470 acres) of this bottomland are communally farmed. It is subdivided into ten districts of varying size, each cultivated by a proportionate segment of the community's labor force. An additional 1040 hectares (2560 acres) of poorer quality land is farmed as individual subsistence plots by the some 680 families who reside in Vicos. Family holdings range from .2 to two hectares (.5 to five acres) with the average about one hectare

(2.5 acres). Most residents raise sheep and a few head of cattle, which they graze on communal lands.

Aside from household tasks, the primary task of Vicos women is herding livestock. Few adult women in the community speak Spanish -- a clear sign they have received little schooling. Even today, more than 20 years after public education facilities were inaugurated in Vicos, boys outnumber girls ten to one in primary school enrollment. About 35 percent of the community's male adults are functionally literate, most of them having been educated since the Cornell project began.

A stranger visiting Vicos today for the first time would be impressed by two modern structures -- a school and a health clinic -- recently completed as part of the disaster relief program of the Peruvian government following the 1970 earthquake. But he would be hard pressed to explain how dozens of North American and Peruvian professionals could have managed to spend over a decade and perhaps a half million dollars in Vicos without leaving behind more durable evidence of their efforts and presence there. A community potable water system no longer functions; bathhouses and a laundry facility have crumbled and are not repaired. Light bulbs and wires can be found in most of the old hacienda buildings which surround the community plaza; and residents insist that their diesel generator works fine; but it is only turned on at Christmas and other holidays because nobody wants to pay for its fuel and maintenance.

A model 1010 John Deere tractor -- a gift of the National Farmers Union of the United States -- sits unused in a shed behind the hacienda house, its instrument panel showing only 208.3 hours of operation; meanwhile less than 200 yards away one can see residents plowing communal lands with oxen and wooden plows. An adjacent storage room is filled with abandoned hand sprayers and a brand-new garden tractor which has never been used because it was donated without wheelbolts and nobody has bothered to buy them. The school's carpentry shop has been abandoned and its tools "safely stored" because Vicos lost its manual arts teacher in 1970. Similarly, a community sewing workshop with at least six sewing machines has been locked up for years for want of an instructor. Last but not least is a door on the second story of the hacienda house above which had been printed years ago the words: "Alan R. Holmberg Library"; behind this door is a room filled -- ironically enough -- with straw.

The chain of disasters which led to the present plight of Vicos could not possibly have been anticipated at the outset of the Cornell project. In fact, its staff planned and implemented the project with commendable caution, insight and competence. It is therefore important to briefly detail

how the project was successful in accomplishing what it did, before describing how its efforts were subsequently undone.

III. DYNAMICS: IDEA EVOLUTION AND PROJECT DESIGN

Cornell became involved with Vicos almost accidentally. The hacienda was owned by a public charity society in the departmental capital, which rented the property and its indigenous labor force to any interested party for a minimum lease cf six years. In 1951 a family which had rented the hacienda for years found itself unable to meet its rental payment in the first year of a new lease period, and forfeited management rights to Cornell University which offered to complete the remaining five years of the lease. Cornell had been informed of this opportunity by one of its anthropologists, a Peruvian citizen, who had conducted field research in Vicos since 1949.

In conjunction with the Peruvian Institute of Indigenous Affairs, Cornell drew up a memorandum of Agreement to obtain government support for its proposal to conduct an experiment in directed social change in Vicos. The broad objectives of the project were:

- devolution of power to community residents;
- the production and broad sharing of wealth generated by the hacienda;
- the introduction and diffusion of modern skills;
- the promotion of health and well-being; and
- the enlargement of the status and role structure (essentially the creation of new leadership opportunities).

It is not clear whether Cornell had a clearly defined strategy for reaching these objectives prior to the inception of its management responsibilities; nor is there evidence to suggest that community residents were consulted in the design phase. But thanks to earlier survey research and residence in the community of Vicos by Dr. Mario Vásquez, Cornell began its work with a clear appreciation of the sociocultural obstacles involved and quite appropriately elected to advance its experiment slowly and cautiously.

IV. DYNAMICS: PROJECT IMPLEMENTATION

Aside from abolishing the institution of unpaid, obligatory labor services to the hacienda management (primarily involving female domestic servitude and the sale of Vicos labor gangs to outside contractors for short-term contracts), Cornell did not undertake drastic reforms in the authority structures of the hacienda. Previous strawbosses and foremen were retained; Vicosinos continued to take and obey orders and Cornell played the *patrón* (boss). Modern agricultural potato practices were applied to the hacienda lowlands. Essentially this involved the introduction of new seed, chemical fertilizer, insecticides and agricultural implements such as hand sprayers. Moreover, new methods of potato classification were established, along with the supplying of non-traditional markets as far away as Lima.

Once proven effective on hacienda lands, Cornell management made modern inputs available for use on family plots as well. But most important, the harvest income from production of the hacienda's lands was now for the first time shared equitably between the property's managers and the labor force which had produced it.

First, that portion of the harvest required to repay the costs of modern yield-increasing inputs was set aside for market sale. Next, a second portion was set aside to be divided among the hacienda workers as a labor payment in kind to help them meet their subsistence requirements. The determination of how the balance of the harvest was to be dispersed -- either cash sale or subsistence consumption (in kind labor payments) -- was worked out in a dialogue between Cornell staff and a general assembly of community residents. A savings account was opened in the name of the community to deposit community cash income.

These changes were supplemented by Cornell's promotion of social infrastructure -- a primary school, potable water system and electrification -- constructed with community labor. This was mobilized on both forced and voluntary bases. In the first instance, as hacienda manager, Cornell was free to decide how the obligatory three-day labor tax levied on each resident family was to be allocated: either in crop production tasks or in construction and other activities. Additionally, any labor in excess of the three-day obligation earned a wage payment and was covered (as a cost of production) out of Vicos cash sale income. Labor contributed on weekends and holidays was considered as free voluntary contributions by the community.

Thus, the self-respect and cohesiveness of Vicosinos was developed in preparation for the day when they would manage the hacienda themselves. By the time the Cornell lease expired in 1956, the community had acquired a new institution for local self-government -- an administrative counsel based on a system of district delegates. The Vicosinos signed a six-year rental lease in 1957, at which time Cornell retired to a supporting, facilitating role.

Some detail on the Vicos system of self-government is in order. Now as then, administrative council members -- president, vice president, secretary and treasurer -- are elected by popular vote of the assembly of community residents, all officers holding office for one year. The delegates are elected by the residents of their respective zones. In turn, those delegates who are illiterate are assisted by *escribanos* (scribes) -- usually young men or adolescents with the ability to read and write (*los letrados*); this is for the purpose of keeping production and labor records at the zonal level. It should be noted that the scribe system has enabled community youth to assume roles of importance in the decision-making structure of Vicos. Elected community leaders can be removed from office by the will of the general assembly, which meets several times a year whenever important decisions call for community ratification are required.[1] The administrative council meets every Tuesday.

From 1957 to 1962 the residents of Vicos demonstrated they could manage the hacienda as a commercial enterprise and turn a profit. Year by year their net income from potato crops on communally farmed land was diligently saved in anticipation of the opportunity to purchase the hacienda outright. This prospect was particularly threatening to local landlords who did not wish to see such a precedent established, and considerable pressures were brought to bear on the public charity society of Huaraz to refuse to sell the Vicos hacienda to its resident labor force. Only through the concerted persuasion of Cornell University with top government officials in Lima was it possible to force the owners to accept the Vicosinos' initial down payment on the property in 1962.

The Vicosinos finally won their freedom and their respectability just as the Alliance for Progress had come of age; and quickly they found themselves besieged with offers of

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[1] To give an idea of what can constitute an "important" decision requiring general assembly deliberation: In June 1974, four of the community's cows died because they accidentally ate rotten forage *(pasto soleado)*. The animals were butchered for their meat, and a community assembly was immediately called to determine what prices should be charged for sale of the meat to residents and outsiders.

assistance from a host of domestic and foreign "do-gooders" who wished to share the aura of the community's accomplishments and convert this still-backward society into a showplace of progress. Between 1962 and 1965, over a dozen Peace Corps volunteers (CD generalists, nurses, MBAs, etc.) worked in Vicos before the community -- by democratic vote -- elected to throw them out.[1] In 1963 a specialist from Lima helped Vicos to organize a credit cooperative, which proved a dismal failure once he left because nobody had been taught to manage it; once member savings had all been disbursed as loans, the money was never repaid. The National Farmers Union of the U.S. donated a tractor which was used only until it had a flat tire. The Institute of Indigenous Affairs donated sewing machines. The Ministry of Agriculture gave Vicos a preferential concession for guano fertilizer. The Forest Service convinced the community to plant over one million Eucalyptus saplings, by far the most productive idea the community received in the decade of the 1960's.

One is tempted to explain some of the apathy noticable in Vicos today by the fact that in the seven years preceeding its economic collapse in 1969, the community's self-reliance was almost totally undermined by outside paternalism. Cornell University did its job well. It changed serfs into land owners,free to manage their own destiny in a collective enterprise. Unfortunately, this was not enough to guarantee the continuity of the Vicos community's progress toward socioeconomic development.

As was briefly mentioned earlier, beginning in 1969, Vicos suffered no less than three major disasters in the short space of five years. The first came in 1969 when the Peruvian government, in response to a widespread potato blight in the north central Andes, decreed a quarantine on market sale of the region's potato crop. To this day the quarantine remains in effect. Obviously, since potatoes were the principal cash crop of Vicos, the community's market income base was destroyed, perhaps permanently. The following year the entire region was devastated in less than two minutes by an earthquake. Much of the ruined or abandoned appearance of the Vicos hacienda facilities can probably be credited to this disaster. Most Vicos families lost their homes, and some are still living in provisional shelters donated by international earthquake relief efforts.

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[1] The cause of their dismissal makes for a rather complicated story and need not be gone into here, except to say that the Peace Corps was accused by Vicos leaders of stealing community income in the operation of a small hotel, restaurant and hot springs bathing facility serving tourists and located on community property. The community agreed to drop its allegations in exchange for the opportune gift of a horse from the Peace Corps.

Deprived of a market for its principal crop and acutely decapitalized by earthquake damage to family and community assets, Vicosinos suffered the third and most crippling blow of all, when in 1973 they allowed the regional office of the Ministry of Agriculture to talk them into a dairy cattle scheme. Vicos signed a loan agreement for $69,700 to acquire some 80 purebred dairy cows and to finance the construction of a feedlot and a mammoth silage structure. But prior to the arrival of the cattle, Ministry personnel rezoned the hacienda's communal farm lands and instructed the residents to plant alfalfa and other forage crops. The rezoning and mandatory shift from subsistence to forage production created intense divisions among the community members, especially because certain districts of the hacienda were expected to produce more forage than others. The project was seen to be especially unwise by many residents because it required that one year's crop of forage had to be harvested and stored before the cows arrived.

The project literally began to collapse long before a single credit-financed cow reached Vicos. Built by an outside contractor, the community's cement silo cracked and fell apart, destroying a major portion of the community's recently harvested alfalfa crop. Nonetheless, the cattle were delivered anyway, and within a week practically all Vicosino women in Vicos -- all experienced judges of animals -- were reprimanding their menfolk for having been sold a worthless herd of old, mixed-breed cows. And they were right. The men of Vicos had the cattle inspected by a team of veterinarians sent from Lima and were told the animals fell far below the quality promised by the Ministry of Agriculture. Indeed, serveral cows apparently died of "old age" within the first two weeks of their arrival. The men of Vicos knew no peace until they officially lodged a complaint with the Ministry and refused both to accept the cows and to repay their loan obligation.

Pure and simple, Vicos was the victim of a colossal "rip-off." It is only small consolation that the regional Ministry official who planned the project was demoted and sent to a post in the Amazon basin. For the real tragedy was that the community lost an entire year's crop production, leaving it with an insufficient subistence food supply and forcing most of its labor force to seek outside employment to avoid starvation.

V. PROJECT SUCCESS

Understandably, the community has developed an instinctive dislike for outsiders -- gringos included. It is likely that visitors will be aggressively interrogated by community

officials before they agree to answer questions about the Cornell-Vicos project. To document the economic success of a project which officially terminated 17 years ago would be virtually impossible under the best of circumstances.

Nonetheless, from the bits and pieces of information that were volunteered by a variety of residents in response to outsiders' questions, it would appear that the Cornell-Vicos project did enjoy dramatic success in terms of increased community income and productivity, both during the period of the Cornell lease as well as the decade following Cornell's departure. Community residents invariably date the "end of the good years" between 1965 and 1969.

If success is defined in other terms, the project was never self-sufficient, and no attempt was ever made to make Vicos pay for the full costs of Cornell staff members and other sources of outside technical assistance. Conservatively estimated, the price tag probably reached $.5 million. Nor can the project be considered replicable. It was initiated in response to a unique opportunity, its efforts were focused on a single community and it was implemented by sensitive and competent anthropologists -- human resources seldom available for rural development projects. In sum, the usefulness of Vicos as a model for other projects is quite limited.

VI. LESSONS FOR DESIGN AND IMPLEMENTATION

The Cornell-Vicos project provides a number of important lessons. *First,* it demonstrated that possibly the most useful roles outsiders can play in rural development is that of catalysts or motivators who attempt to alter the rural poor's conviction of their helplessness and who confront them with opportunities to take control of their own destiny. From the beginning Cornell's primary objective was not strictly to raise community productivity and income through the introduction and adoption of a modern technological package, but rather to restore power to the local population. This power devolution was accomplished through the creation of a democratic institution of self-government based on a delegate system representing the resident population organized in ten different zones.

Second, whenever the project objective is to change human behavior and attitudes, it is prudent to implement a change strategy slowly. Cornell took five years to prepare Vicosinos for their independent, self-managed community enterprise. From the authoritarian structures established for

hundreds of years as exploitation mechanisms, Cornell gradually removed their most onerous features. But it maintained the symbolically useful and practical advantages of the traditional *patrón-peon* relationship for introducing by fiat a modernizing technology which might subsequently be copied voluntarily by Vicos residents. By sharing with community residents the net income benefits generated by this technology, Cornell established the precedent that an improved standard of living was possible and well within the reach of Vicosinos -- working collectively -- to attain on their own. After five years spent establishing new behavior patterns and a production model for the community to follow, Cornell withdrew to allow the Vicosinos to put into practice on their own responsibility the lessons they had learned.

But even five years was not enough to prevent the encroachment on community autonomy by outside "do-gooders" who sought to step up the timetable of community modernization. In retrospect, it is easy to argue that had Cornell left the community of Vicos to its own devices, sheltering it from the well-intentioned but paternalistic blandishments of free goods and services from other less sensitive outsiders, Vicosinos would undoubtedly be better equipped to confront the problems which face them today and possibly might have forestalled at least one of the disasters that befell them since 1969. In fairness to the community, it must be said that they were by no means entirely passive targets for outside paternalism. For on two occasions -- with the Peace Corps and the cattle fiasco -- Vicos residents reached democratic decisions to throw out or otherwise denounce the "do-gooders" whose performance displeased them.

Cornell recognized that its continued involvement as a *patrón* -- once its lease had expired -- would be antithetical to its ultimate objective of converting former serfs into self-governing free agents; and exposure of the community to the paternalistic meddling of domestic and foreign assistance agencies was a necessary part of the ongoing education of the Vicosinos.

In sum, they had to be left free to make their own mistakes or permit others to make mistakes on their behalf. In the long run -- and Vicos has yet to reach a point where it can be considered to have proved itself as a development enterprise -- the present "time of troubles" in Vicos may pay high dividends as a crucible in which the community's leadership will gain the necessary experience to engineer its economic rehabilitation.

Finally, the Vicos project offers an important lesson in the inherent vulnerability of a rural development undertaking based on a single cash crop. Obviously, Cornell planners can not be faulted for their failure to anticipate the potato

quarantine which has stifled the commercial viability of the Vicos community since 1969. But on the other hand, Cornell planners can be criticized for assuming a single-crop modernization strategy would be adequate to insure Vicosinos a reliable source of income into the the indefinite future. The lessons of agricultural development history contain innumerable examples which demonstrate that sustained growth in rural productivity and income is a dynamic process requiring continuing adaptation to environmental, technological and market opportunities. Just as a nation should strive to diversify its production for domestic consumption *and* export sale (provided, of course, this can be accomplished cost-effectively), so too with small farmers, whose primary imperative is not only feeding others but also themselves.

Information Sources

A. Field

One DAI staff member spent three days in Vicos over as many visits during trips to Peru in June and August 1974. On these occasions he had lengthy conversations with two community leaders and the Vicos-born medical technician who operates the community's health center. The most cooperative respondents were several high school students now studying outside the community and one zonal delegate. Conversations were held on an individual basis with an additional 10-12 residents. On the first visit to Vicos, the DAI staff member was accompanied by a Quechua-speaking Peruvian professional, Dr. Aquiles Lanao.

B. Reports

In view of the initial hostility expressed by community leaders toward the visitor, no request was made to inspect community records. While the literature on the Cornell project is enormous, most of it describes the 1952-1956 period and to a lesser extent the post-project period into the early 1960's. Evidently nothing has been published on Vicos in the last five years. Since DAI's intention was to primarily document the current condition of the community, it was necessary to rely on information communicated in personal conversations and visual observation. The principal published reference used was the March 1965 issue of *The American Behavioral Scientist*, Vol. VIII, No. 7, which is devoted exclusively to six articles on the Cornell-Vicos project.

Data Adequacy

Data on community literacy is based on monthly student attendance counts kept on one corner of the blackboards in the classrooms of the Vicos primary school. Information on the disuse of the community's productive capital was based on visual inspection of the Vicos hacienda facilities, storage rooms, etc. The description of the cattle fiasco was based on personal conversations with residents. Some data may be erroneous, but the description of the present condition of Vicos is in general fairly reliable.

ORDEZA/RDD
RURAL ENTERPRISE DEVELOPMENT

I. PROJECT BACKGROUND

On May 31, 1970, an area of about 83,000 square kilometers (32,000 square miles) in north-central Peru was devastated by one of the worst earthquakes ever to occur in the Western Hemisphere. Major cities and towns in both the mountain and coastal regions were leveled, along with hundreds of rural villages. Official estimates list 70,000 people killed, 100,000 injured and 500,000 left homeless.

By far the most appalling destruction was suffered by the Callejón de Huaylas, a beautiful mountain valley which had long been a mecca for tourists and alpinists. There the disaster reduced Huaraz, capital of the Department of Ancash, to an immense pile of rubble in which one-third or more of its some 50,000 inhabitants perished. Further up the valley, the quake shook loose a 25-50 million cubic meter (33-66 million cubic yard) mass of rock and ice from the north face of Mount Huascarán, which then rushed 15 kilometers (nine miles) to obliterate the towns of Yungay and Ranrahirca, burying in seconds some 20,000 victims.

The domestic and international disaster relief effort which was launched within hours of the catastrophe was eventually to enlist donations of money, medicines, clothing, building materials, provisional shelters, heavy equipment and technical assistance from 66 countries. To coordinate both immediate and continuing relief activities on behalf of the earthquake survivors, the government of Peru established a new agency in June 1970: the Commission for Rehabilitation and Reconstruction of the Affected Area (CRYRZA).

First headquartered in Lima and later transferred to Huaraz, the agency's authority transcended that of all other government entities in the disaster zone, and its Director General was assigned cabinet rank; but CRYRZA's mandate was that of overall supervision, not implementation, of relief activity.

This changed in 1971 when a loan agreement was signed late that year between AID/Peru and CRYRZA for the amount of $3 million to promote self-help housing construction and income-generating community enterprises in the rural areas of the Department of Ancash. Almost $2.1 million of this money was designated for subloans to communities to finance construction materials, equipment and skilled labor not locally available for project implementation. An additional $325,000 was provided to purchase dump trucks, bulldozers, cement mixers, staff vehicles and other equipment required by the program. The Peruvian Government put up $100,000 to finance personnel and other administrative costs.

While essentially remaining a coordinating agency, CRYRZA established a special Rural Development Division (RDD) to assume program execution responsibilities in May 1972 and began to assemble a well-paid staff of Peruvian professionals -- civil engineers, architects, sociologists, economists, agronomists -- and a phalanx of subprofessional technicians and skilled laborers.

As of October 1974, 19 subloans had been approved for 17 projects in 14 communities for a total value of $1.2 million. This sum is intended to benefit roughly 1700 families -- predominantly small farmers, although some non-farmers are included. Among the income-generating projects approved for financing were hog farms, turkey and chicken farms, service stations, restaurants and a marble mine. Slightly less than 50 percent of the funds were for housing construction.

Of the 17 projects under way, construction had been completed on about six by late 1974, only one of which has had a full 12 months of business operating experience. Some projects are being built or managed by cooperatives, others by indigenous communities and still others by "agrarian societies of social interest" (SAIS), new multi-community structures whose members are beneficiaries of Peru's agrarian reform program.

The project prefers to work with an organization that represents the entire community. This stems from the experience in one subproject area, Pariacoto, where the signing of an agreement with a co-op whose membership constituted less than 50 percent of community families lead to social friction.

Subloans for community housing construction are granted by CRYRZA -- now operating under the name of ORDEZA -- at three percent per annum; for income-generating community enterprises the interest rate is five percent. In both cases, 1.5 percent of the interest charge is deposited in the community's account to help cover administration costs, while an additional .5 percent goes into the project's reserve

fund. Hence, the loans are virtually interest-free and represent a substantial subsidy.

Moreover, other administrative costs of operating the community enterprises are absorbed by the RDD. For example, the program staff manages subproject accounting; it provides its own staff members as subproject administrators during the first 6-12 months of operation; it sometimes pays part or all of the wages for subproject laborers during the same period; it helps to market the production of community enterprises; and it provides occasional free transport services. Taken together, the level of subsidization of subprojects is extremely high, as is the per capita loan obligation of their membership.

II. LOCAL ENVIRONMENT

With these considerations in mind, it is hardly surprising that the ORDEZA/RDD program does not currently reach more than 1.5 percent of the 106,500 farm families in the Department of Ancash. Broad coverage is not its objective. Indeed, the program staff is quite explicit in contending that it does not seek to assist the typical rural community, but the atypical: those located on all-weather roads, with relatively easy market access and with sufficient water, mineral, agricultural and human resources to provide at least minimally advantageous conditions for the establishment of a commercial enterprise.

Consequently, the RDD wishes to promote subprojects in communities with high visibility. Its hope is to create decentralized "growth poles" in the countryside, scattered foci of income and employment opportunities which may serve as a stimulus to increased modernizing investment in the rural sector and as a check on the tide of rural-to-urban migration by peasant youth.

Viewed in isolation, the strategy seems a dubious one. But when considered as only one component of a much broader strategy of the Peruvian government in the agricultural sector -- the ambitious agrarian reform, programs of peasant organization, indoctrination and infrastructure construction by Peru's Social Mobilization Agency (SINAMOS) -- the work of the RDD is better understood.

Even while selecting the relatively most prosperous, most accessible, most literate and most organized rural communities in the region, the RDD still faces formidable challenges. Most assisted communities remain predominantly subsistence-oriented agrarian societies. Cultivated holdings of the average project participant are about one hectare,

often scattered among a number of small plots at different altitudes and sometimes located on hillsides so steep that one wonders how they could be possibly plowed and cultivated without harnessing farmer or draft animals with safety ropes.

Overall, the level of literacy of community members assisted by the program is probably in the range of 25 to 30 percent. Off-farm employment is high, and seasonal migration to find work on the sugarcane cooperatives in the coastal region siphons off large numbers of the adult male labor force throughout the Department of Ancash, which has been exporting unskilled laborers for over two centuries. It is probably fair to say that RDD-assisted communities display more similarities than differences compared to non-assisted communities, the only critical difference being that the former are located on major transportation arteries, and the latter are not.

III. PROJECT DYNAMICS: EVOLUTION AND DESIGN

It has already been explained how the RDD's rural enterprise development program was created as part of a disaster rehabilitation effort. The initiative for the program came from AID, which throughout the first year of disaster assistance had channeled considerable resources through the Community Promotion Agency (PROCOM) of the Ministry of Housing. In fact, the rural enterprise development loan was originally intended to expand PROCOM activities, and this agency had been designated first as the project executor. But when PROCOM was absorbed into SINAMOS in early 1972 and the latter, as reorganized, proved unable to undertake the project, its execution responsibility was transferred to CRYRZA. However, many RDD staff members were recruited from ex-PROCOM personnel.

The design of the program was conducted as a top-down enterprise, with no significant interaction with the rural poor. This plus the heavy subsidization of approved community enterprise projects might suggest that the RDD continues to follow a paternalistic, minimum-interaction model. This is not the case. For one of the most striking features of the program is the manner in which RDD professional staff -- during the subproject promotion and planning stage -- almost totally immerses itself in the community environment and often takes up prolonged residence in the community itself. It is relevant, then, to explain how community subprojects are selected, studied and approved.

Community Subprojects

RDD professionals are divided into what is known as "interdisciplinary micro-planning (or execution) teams" (EPMs). The EPM's first activity, subsequent to its assignment to a new area of the disaster zone, is to visit a number of different communities (between six and twelve) to select possible candidates for future program assistance. This task involves individual and group meetings in each community to establish a dialogue with local residents about their needs and problems and to get a feel for local community resource endowment and potentially viable subprojects.

Since each team member has a different professional specialization, each surveys community potential from his own trained perspective: the geologist checks into mineral resources, the agronomist into agricultural and livestock possibilities, the economist into employment and income characteristics, the sociologist into leadership potential and social cohesion, etc. Repeated visits and meetings between the EPM and the communities are frequent; completion of the process, which ends with the selection of one or several communities, may take a month or more. Selections are subject to approval by the RDD Director in Huaraz, who himself is likely to visit each community recommended for assistance.

Once a community is selected, the EPM locates a field office in or near the chosen locality and takes up residence there. A formal socioeconomic survey is taken of community residents, which may take 2-4 weeks. The local population has not, as yet, been made part of the data collection and analysis effort. Overlapping this activity is a project prefeasibility study, which involves team members in ongoing dialogue with local leaders and residents, as well as following up possible approaches which seem workable to various EPM members.

After one or several meetings with the local population to discuss different project options, one is finally selected for implementation. There are no clear procedures for deciding upon *the* income-generating subproject to be constructed in the community. It is a combination of EPM initiative and community interest. In both subprojects examined, the specific suggestions for the income-generating project came from the local community.[1]

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[1] Two projects were rejected after all feasibility studies had been completed, due in large part to the inapplicability of the project to the local community.

At this juncture the EPM initiates a rather voluminous and meticulously detailed project feasibility study on which it will base the chosen income-generating community enterprise. Project construction costs are calculated down to the last pound of nails, yard of pipe, bag of cement and adobe brick implied by the blueprint of the RDD architect. Administration costs, gross and net income and loan repayment obligations are projected for a ten-year period; break-even point, cost-benefit ratio and profitability calculations are made. To complete the project feasibility study can take months. A typical EPM on an average project can easily put in an entire man-year of effort, valued at $4500 to $5000, before a community enterprise may be approved by ORDEZA's Credit Committee for funding.[1]

In most cases, the housing project operations are more straightforward. A standard house plan costing about $700 in non-labor inputs has been developed.[2] It is usually up to the community organization to decide how many houses to build and where to locate them. Sometimes each house is constructed by its future owner only. Usually, however, community residents organize to build the housing units collectively, and then, once the houses have been constructed, the residents select their houses by a lottery drawing. This eliminates potential bickering among residents concerning the location of their houses.

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[1] There is no evidence to suggest that the socioeconomic studies influence the design of the subproject, nor have they been used for evaluation purposes. DAI has been working with ORDEZA/RDD to increase the usefulness of the baseline data collected by the EPM teams before the project gets underway. On the other hand, the feasibility studies are used both to develop the loan package for the subproject and to construct the subproject's facilities. However, to date, there has been no systematic matching of feasibility study costs and projections against the actual subproject results.

[2] In several subprojects the community was given the opportunity to make an input into house design. The result was the construction of houses varying from $500 to $1500 in value. Because of the additional design costs, the project now only builds a single housing unit. The only variation is whether they are made of brick or adobe, and this depends on what is available locally, as well as the stated preferences of the local families involved in the housing project.

IV. PROJECT DYNAMICS: IMPLEMENTATION

With planning completed and financing approved, the EPM may either be sent to a new community to repeat the process and/or continue to shepherd the project through the construction and initial administration phases. In any event, at the beginning of the construction phase, a "project execution team" (EPE) is formed. Its members consist of at least one professional supervisor, a project contractor recruited by ORDEZA and perhaps up to a dozen skilled laborers -- carpenters, brickmasons, welders, mechanics, etc. The latter two laborer categories are paid by ORDEZA and their wages covered under the community's loan. All unskilled labor required by the project must be supplied by local residents, who are usually organized in labor gangs for different days of the week so that the labor obligation per participating community family is fairly equitably distributed. Books are kept on the per family labor contribution.

Normally, organization of the local labor contribution is left to the discretion of community leaders; only when their ideas and authority do not result in an adequate mobilization of voluntary labor contributions to advance the construction on schedule -- and this has happened repeatedly -- does the RDD staff return to promotional activities intended to motivate community residents to meet the project's requirements. It should be emphasized, however, that some lapses in project construction momentum are due to seasonal labor shortages occurring at planting and harvesting points in the local crop cycle; other delays are the result of material shortages, non-availability of machinery, loan disbursement complications, bad weather and a host of other problems which are seldom fully anticipated by EPM planners, so that rarely has a project ever been completed on schedule.

Nonetheless, RDD's cumulative experience with such problems is gradually leading to improved efficiency of external resource deliveries in some areas. But as an increasing number of projects reach the administration phase, available program staff resources are becoming overburdened. A case in point is the RDD's accounting personnel, who by retaining subproject accounting functions do not have time to handle both construction-related *and* subproject administrative bookkeeping without one or the other (usually the latter) becoming dangerously neglected.

As mentioned above, once the construction of a project is completed, the RDD usually assigns a professional or subprofessional to serve as its administrator for an initial 6-12 month period. In theory this individual trains local leadership in management and administration of their project

and teaches other members to adequately perform the day-to-day technical functions of the new jobs created by the community enterprise; in practice only the latter training task has been effectively implemented. This comes as no surprise, for it is far easier to *do* than to *teach*. In addition, the personal incentive of the hired manager is to retain the job on the ORDEZA/RDD payroll. This eliminates any effective on-the-job training of local replacements for the ORDEZA-paid management.

But failure to teach management/accounting functions to local project participants -- or even to create formal administrative systems for RDD staff to follow -- has created a dilemma. On the one hand, the enterprises which have been placed in motion are not "community" undertakings at all, but rather ORDEZA-run businesses; on the other hand, in the absence of active attempts to train project participants in business management skills, there is no immediate prospect for altering the situation, nor sufficient program staff to sustain these businesses under ORDEZA administration.

In confronting its current dilemma, the program faces only three options: hiring more staff, conducting more training or a combination of both. The choice of options may turn on ORDEZA's view of possible outcomes it will tolerate in pursuit of its objective to create rural growth poles. First, the rural enterprises are likely to make more money and repay their loan obligations more quickly if they are administered by ORDEZA staff and continue to receive high levels of subsidization; but this model only assures short-run viability and postpones the question of how to transfer full responsibility to the communities. Second, if the transferability is achieved upfront, the community enterprises will probably make more short-run mistakes, earn less money and have more difficulty with loan repayment; but in the long-run they may prove more viable. In either case, the question is which option will yield greater "impact," more positive visibility and higher social as well as economic benefits.

V. PROJECT SUCCESS

Obviously, the ORDEZA/RDD program is still much too young to have demonstrated its success to any meaningful extent. However, a visit was made to two subprojects -- a cooperative hog farm in Pariacoto and a restaurant for tourists in Chavin -- to document project-community interaction at the local level and assess initial performance of these enterprises. Pariacoto was in the process of completing its second six-month production cycle, while Chavin was in its seventh month of operation.

Pariacoto Hog Farm: This is the program's "showcase" project. Financed by two ORDEZA loans totaling $58,363, it has 40 sows, three boars and a productive capacity of about 300 pigs of marketable weight every six months. The farm's pen, storage and administrative structures are modern and attractive. The enterprise employs six full-time laborers taken from the 66-member agricultural co-op which is responsible for the project.

Actually, the farm represents two projects in one, for it has a mill and motor for the processing of animal feeds, both for use by the project and for sale to other ORDEZA-sponsored hog or poultry farms. Since the Pariacoto area is a major corn producer, an abundant and secure supply of raw material for milling operations is assured. It seems most likely that the enterprise will earn far more income from feed sales than from pig production, once milling operations reach full capacity.

ORDEZA staff considers the Pariacoto project a great success, for with its income from first semester pig sales it paid *twice* the amount of its first loan amortization installment one year *ahead* of schedule. While this gesture was a political asset for ORDEZA, it was not an accurate measure of the farm's true income condition. Since Pariacoto's operating expenses had been heavily subsidized by RDD, the enterprise had earned far more net income than expected and was, in a real sense, simply returning the subsidy in the form of a premature loan amortization payment. Nonetheless, upon completion of a balance sheet and inventory of the project's assets dated as of October 15, 1974, the Pariacoto hog farm showed a net income on paper of $9667 for its first year's operations, which matched almost perfectly the income projection for the same period in the project's economic feasibility study.

It was discouraging to note that the president and secretary of the Pariacoto hog farm project -- both men with high school educations -- had not received any formal training from the program in business management and accounting. Indeed, the project's checkbook is kept by the central program office in Huaraz, and account withdrawals must have the approval of the RDD Director and Chief Accountant. This is the greatest weakness of Pariacoto: of all RDD projects it undoubtedly has the best-educated leadership available, yet no attempt had yet been made to train them in the business skills they require to assume responsibility for the enterprise which they have been elected to manage.

Chavin Restaurant: At the start, the 20-member Artisan Cooperative of Chavin (population circa 8000) requested and received RDD assistance because it was anxious to improve the production and sales of local handicrafts. Only when

an RDD micro-planning team studied the idea's possibilities and returned a negative verdict did the artisans suggest the idea for a restaurant, where they could sell meals *and* their crafts to wealthy tourists. The restaurant project was to have the added advantages of creating six jobs for co-op members and would offer remunerative prices for member farm products purchased for use in the restaurant. Eventually the co-op's 20 participants were to put in 1200 man-days of voluntary labor for the construction of the project. Financed with ORDEZA loans totaling $17,670, the completed facility was a source of pride both to the co-op and the community of Chavin in general. After its first seven months of operations the enterprise had gross sales of $13,474, with net income of $2932 -- which exceeded feasibility study projections.

But the following facts illustrate the reality of Chavin:

- Only two of the restaurant's employees are co-op members -- both waiters;
- a succession of three ORDEZA-hired administrators have not encouraged the idea of artisan sales on the premises of the restaurant, and no crafts are currently displayed or sold there;
- restaurant purchases of member farm produce are virtually nil; and
- in salaries paid to the restaurant's administrators and cook -- also brought in by ORDEZA from outside Chavin -- the program subsidy to the enterprise reaches $4232 -- which more than compensates for the project's net income cited above.

In other words, the outcome is completely different from the original expectations of its founders; worse still, were its present administrative costs not subsidized to some extent, even as an ORDEZA-managed enterprise, the business would be losing money.

One apparently profitable enterprise and one that is not; both managed by outsiders instead of their legal owners; neither having yet created income benefits which have made any difference in the life of the average project participant: these are not dramatic signs that the ORDEZA rural enterprise development program is destined for success. But neither do they provide sufficient evidence that it will fail.

What *is* clear, though, is that as a capital-intensive, highly subsidized and strictly controlled rural development

effort, the program has little chance of ever being self-sufficient at either the global or the subproject level. Nor does it offer much potential for broad coverage or replicability. In sum, while the program may prove an important component of Peru's overall rural development strategy, it hardly provides an attractive prototype for other Third World countries to follow, because in the last analysis, there are many more less expensive ways to reach the small farmer.

VII. LESSONS FOR DESIGN AND IMPLEMENTATION

On the positive side, the RDD micro-planning team approach to community selection, project identification and project design is an effective way to maximize interaction between program staff and the local population. The EPMs live in the country for months at a time. For professionals who have been raised and educated in cities, this experience is more than an ordeal; it is an education. By enlightening outsiders to the realities of peasant society, the field residence of the EPMs may prove -- in the long run -- the program's most valuable investment.

But the strategy is not without risks. It has broken the mental and physical health of several RDD professionals. It has proven extraordinarily difficult for married men. And it has contributed to a rapid turnover in program staff. Yet there are some who have remained with the program since its inception, and slowly they are being moved into senior staff positions. The lessons they have acquired the hard way -- from peasants instead of textbooks -- may contribute significantly to the future directions of the ORDEZA program or of other programs they may someday direct.

Less optimistically, the project's "growth center" approach (see II. LOCAL ENVIRONMENT) has not been proven. Unless there are significant demonstration or spread effects among the communities off the main road which are within the influence radius of the ORDEZA/RDD subproject, the heavily capital-and-skilled-labor-intensive project will not be a cost-effective method of promoting rural development.

Other lessons from the project include:

- effective interaction with the local population in the subproject design phase neither insures a profitable subproject nor any significant degree of community control over the operations of the subproject;

- extensive assembly of socioeconomic data, particularly when the collection is not standardized across communities, does not provide the basis for either improved project design or evaluation. A generalized requirement for "data" is not helpful to project management or to external assistance agencies (in this case, AID) who seek to measure the impact of their financial aid;

- very detailed feasibility studies, cost-benefit analysis, etc. are easily constructed by well-intended but over-optimistic project staff to show subproject success and are not in themselves useful guides to subproject selection. Some medium ground between "no" planning and "every nail" planning needs to be found which can be used as the basis for estimating the potential success of new subprojects. This rule-of-thumb might be possible to construct by examining the detailed feasibility studies against the actual costs of construction and operation to obtain "ball-park figures" which could be used in other similar cases; and

- the administration and management of subprojects by project staff or paid employees will continue to consume ever-increasing quantities of costly skilled manpower. These functions should be turned over to local participants through well-conceived and well-executed training programs and established schedules for local assumption of administrative and management responsibilities.

- entering into an area with a service that meets a clearly-felt need (for example, promoting construction of housing in an earthquake-devastated area) offers an opportunity to mobilize local labor and other resources for self-help undertakings as well as gain an "in" to the local area which can be exploited for other rural development project activity. However, the fact that the local population does contribute these resources does not guarantee that the project will be *theirs* in any meaningful sense. Nor does it guarantee the success of the undertakings for which these contributions are made.

Information Sources

A. Field

The ORDEZA/RDD project was visited four times, beginning in November 1973. Each visit included discussions with the director and staff. In conjunction with field support activities in the design of a program evaluation system, visits were made to the rural headquarters of two EPM teams and extensive dialogue conducted with their members. Visits to six community projects were made with senior staff during three separate visits in June, July and October 1974. Together with a Peruvian consultant, Dr. Aquiles Lanao, and RDD Chief Accountant Hector Namuche, balance sheets were completed on the Pariacoto and Chavin projects during the October visit.

B. Reports

USAID Capital Assistance Paper, *Peru-Rural Enterprise Development*, AID-DLC/P-2051; also, ORDEZA/RDD written reports and subproject feasibility studies.

Data Adequacy

Numerical data on the overall program are taken from written reports and documents; subproject data are taken from interviews with local leaders and from the accounting records of both co-ops, as verified by the RDD Chief Accountant. The draft of this write-up was reviewed by Edward Butler, Director of Community and Urban Development, USAID/Lima.