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TAKING STOCK:

A CASE STUDY
OF A
CATTLE PROJECT IN
RURAL EL SALVADOR



BY
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TECHNOSERVE, INC.



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TABLE OF CONVERSION

1 colon (¢1.00)	=	.4 dollars (\$0.40)
1 dollar (\$1.00)	=	2.5 colones (¢2.50)
1 manzana	=	0.70 hectares
1 acre	=	0.40 hectares
1 kilometer	=	0.62 miles
1 meter	=	3.28 feet
1 kilogram	=	2.204 pounds
1 quintal	=	100 pounds
1 bottle	=	750 ml. or 27 ounces
1 lb. hard cheese	=	5 bottles milk
1 lb. soft cheese	=	3 bottles milk
1 quart	=	.94 litres

Preface

Technoserve is a private non-profit corporation which has assisted more than 100 enterprises in over a dozen African and Latin American countries. These enterprises include ranches and farms, processing and marketing cooperatives and companies, savings and credit cooperatives and technical and business service companies. Its program focuses on the development of enterprises which help low-income people improve their standard of living and increase their self reliance.

To maximize the effectiveness of its operations, Technoserve has established country programs with resident national and expatriate staffs. The majority of this 80-member staff are citizens of the countries in which they work. Most have advanced degrees in development-related disciplines, including management and finance, agronomy, animal husbandry, engineering, economics and public administration.

This study is the first in-depth evaluation examining the impact of one of Technoserve's projects. As such, it was a learning experience which involved much trial and error. The conceptual framework for this study slowly evolved from discussions with a number of experts in the evaluation field. A multi-disciplinary approach was chosen to provide a more comprehensive view of the project.

This study could not have come into being without the efforts of several people who generously donated their time. Invaluable creative inputs and critical advice was given by George Metcalfe, former Senior Vice President of Technoserve. His vision and enthusiasm propelled this research forward; his budget paid the bills.

The cooperative's history was written with major inputs from Technoserve's El Salvador staff. Roger Anderson, Jaime Chacon and Jorge Araujo examined their memories, Technoserve files and the co-op management's reminiscences to describe the process of building this institution.

The methodology used in the Survey Section evolved after discussions with Dr. Samuel Daines, a leading designer of larger, more comprehensive efforts. His expertise in questionnaire design and statistical analysis were generously shared with Technoserve staff. But it was the dedication and persistence of the Santa Maria interviewers which made this section possible. Ing. Francisco Lino Osegueda Jimenez, one of El Salvador's foremost cattle experts and Technoserve's Country Program Director since November 1, 1979, also helped to analyze these results from a technical point of view and made valuable recommendations.

Jorge Araujo, Technoserve's project advisor to the co-op since mid-1979, conducted most of the interviews and provided much background information included within the family profiles. The anthropological work by Dr. Isabel Nieves also supplied many important insights.

Useful suggestions on an earlier draft were supplied by Francisco Lino Osegueda, John Beardsley, Jeffrey Ashe, Jay Rosengard and Judith Gilmore. Responsibility for the final content, of course, rests with the author.

Final thanks go to Betsy Scotto, whose immaculate typing from barely legible scrawls and cow posters have been a constant source of inspiration.

All names, including that of the community, have been changed to insure confidentiality.

I. Executive Summary

A. Project Description

In 1979-1980, Technoserve worked with members and staff of the Santa Maria Agricultural Production Cooperative to establish a feed concentrate mill. This project's main objective was to raise the standard of living of low-income farmers by improving the maintenance and milk production of their cows through feed concentrate use.

B. Evaluation Purpose

This evaluation used methodologies employed by historians, economists and anthropologists to examine (1) the role, effect, strengths and weaknesses of Technoserve's assistance upon this rural enterprise and (2) that enterprise's impact upon the surrounding community. It also aimed to test whether Technoserve could evaluate its projects in an objective cost-effective manner.

C. Technoserve's Impact Upon the Santa Maria Cooperative Enterprise

Technoserve's services to the cooperative included the:

- introduction of the concept of establishing a feed concentrate mill enterprise;
- preparation of a prefeasibility and feasibility analysis to determine the enterprise's socio-economic viability
- assistance to complete documents to obtain a bank loan and a USAID/El Salvador grant;
- design, selection and installation of the co-op building and feed mill equipment;
- formulation of a properly balanced feed concentrate;
- selection and acquisition of raw materials;
- analysis of the economic feasibility of installing electricity;

- training of the co-op manager, accountant and plant operators;
- development of a procedures manual;
- provision of livestock extension services.

Technoserve's assistance has contributed to:

- an increase in the co-op's visibility, membership and staff capability;
- an improvement of the cooperative's financial viability;
- the initiation of additional cooperative economic activities;
 e.g., a small-scale cattle feed lot;
- some additional awareness about proper cattle management practices.

D. The Santa Maria Cooperative Enterprise's Impact Upon the Community

Benefits to the community include:

- a mechanism to organize previously isolated farmers;
- easier access to agricultural inputs;
- an increase of net income to local suppliers of agricultural by-products
- the organization of fiestas by the co-op's Women's Committee;
- the construction of a basketball court by the Education Committee;
- the provision of electricity to residents living near the co-op building.

Services to only members are:

- the provision of credit to purchase livestock and agricultural inputs;
- livestock and agricultural extension services;
- a small discount on the price of feed concentrate and other feeds.

Survey results indicate that:

- feed concentrate did not prevent milk production levels from dropping
 during the dry season;
- nevertheless, cows feeding concentrate produced on average more milk
 than those not feeding concentrate;

- cows feeding more than 5 lbs. of concentrate accounted for this difference in milk production levels;
- little difference in milk production levels exists between cows consuming less than 5 lbs. of concentrate daily and control group cows;
- almost all farmers fed their cows an improper balance of feeds;
- using feed concentrate was, on average, a profitable investment;
- proper cattle management and feeding practices are necessary to increase further the profitability of using feed concentrate.

E. Lessons Learned

- feed concentrate is only one of many inputs needed to improve the standard of living of small-scale cattlemen;
- livestock extension activities should be included as an integral component of this feed mill enterprise;
- opportunities to use the cooperative as a mechanism to aid poorer farmers should be actively explored. It may be inaccurate to assume that poorer farmers will automatically benefit from such an enterprise;
- local initiative is a major factor towards project success;
- a contractual agreement between the sponsor group and the external assistance agency helps delineate the responsibilities of both parties and may promote an atmosphere of mutual dependence;
- to integrate the skills and assets of higher income community members with the needs of lower-income residents, representatives of both groups should be included in the co-op's original membership;
- numerous external factors could easily threaten the cooperative's economic viability;

-- this evaluation did encourage more attention being devoted to livestock extension and "social outreach" activities. It cost 2.4% of Technoserve's total assistance costs to feed mill projects in El Salvador incurred until March 1980.

II. Introduction

Development is not just a function of increased availability of goods and services; it is a process by which people become aware of their capability to improve their immediate environment. This awareness exposes them to new options and additional risks. Independence and isolation are confronted with increased exposure to external ideas and resources.

If properly introduced and appropriately applied, this injection of ideas and resources can have beneficial effects. It may create momentum for further innovations which buttress economic gains and encourage more people to benefit from the process. The history of such development efforts, however, is replete with disasters in which the poor become even more impoverished and powerless than before. In either case, once broken, this pattern of isolation shall never be re-established.

This study is about social change and economic development in a rural community in El Salvador. A steadily deteriorating physical environment prompted a small group of farmers in the town of Santa Maria to seek a new form of social organization. They established a cooperative to provide outside resources -- credit, agricultural inputs and technical assistance -- to members. Technoserve helped them establish the town's first industry which produces a cattle feed concentrate. Following Technoserve's involvement in the project, co-op membership grew steadily and sales of agricultural inputs, feed concentrate and other cattle feeds thrived and demand for credit increased. The co-op began to provide additional services to members and plan community functions. In May, 1980, Technoserve withdrew its ongoing management and livestock extension services -- less than two years after project implementation began.

Technoserve decided to conduct this study because of internal and external needs. Its first decade involved organizational growth, trial and error and

learning, with few resources available to conduct in-depth evaluations. After ten years of assisting enterprises in Central America and Africa, Technoserve believed it was time to pause and examine the effectiveness and impact of its activities in a more systematic way

Technoserve's development hypothesis, that self-help enterprises are an effective means to improve the economic and social well-being of low-income people, seemed to be substantiated by many projects but had not been analyzed in a rigorous manner. Thus, one of Technoserve's 1979 corporate objectives was to assess the effectiveness of its program and methodology. This included fostering the further improvement of that methodology to maximize benefits to low-income people.

Technoserve donors wish to know more about whether Technoserve projects improve the lives of the poor. It will become more difficult for any development agency to continue raising funds to continue its work without such proof. Billions of dollars of developmental aid has been spent during the past thirty years, with little evidence provided as to what impact these funds have had. Macro-economic statistics revealing that the overall condition of the poor is deteriorating cause new grand strategies to come into vogue every few years. Often, more hope than knowledge stimulates such policy changes. Thus, this study was undertaken in an attempt to clarify the dynamics and impact of self-help enterprise development to assist policy makers in the development community make informed decisions.

Specifically, this study's purpose was to examine and evaluate: (a) the role, effect, strengths and weaknesses of Technoserve's assistance upon one rural Salvadoran enterprise and (b) that enterprise's impact upon the surrounding community. This assistance, derived from Technoserve's standard operating procedures, is described in a more realistic fashion than a flow-chart. (See Appendix A for Technoserve Procedures flowchart). The advisory process is never as smooth as the directional arrows indicate. It is expected that this study's findings and recommendations will be relevant for other Technoserve projects and the development community.

The study itself was an experiment to test the degree to which private voluntary agencies like Technoserve can empirically evaluate their projects in an objective, cost-effective manner. We chose to study a Salvadoran feed concentrate enterprise because Technoserve was assisting several projects of this type and planned to initiate similar activities in the near future. Map #1 shows the location and status of feed mill projects assisted by Technoserve in January 1980. This study's costs are justified, given the small scale of each feed concentrate enterprise, since specific results can be applied to strengthen the positive impact of replication efforts. Findings discovered during the research period have led to a stronger emphasis upon providing livestock extension services to feed concentrate enterprises. Technoserve project managers now include these and other "social outreach" activities on a regular basis.

An interdisciplinary approach was used to provide a more comprehensive analysis of this project and its impact. An historical approach was used to examine the process by which a rural institution was established. This section provides some insight into the key ingredients leading to successful

project implementation and a narrative discussion of some of the spin-off activities which have emerged. However, this description of the institution building process and financial data substantiating Technoserve's impact on this institution tells us little about how well it has achieved its corporate goal. Technoserve does not merely assist enterprises to become economically viable; successful enterprises must be used as means to improve the lives of low-income people. This institution does increase residents' access to resources. However, if improperly used, outside resources such as credit, fertilizer and concentrate can, with the unwitting participation of development agencies, further worsen the poor's condition.

Thus, a survey was designed to assess empirically the impact of one of the cooperative's products upon users. Although feed concentrate can improve the overall condition of cows, Technoserve was most interested in its effect upon milk production, since small-scale cattlemen depend heavily upon milk and its by-products for their families' nutrition and income. The survey's scope was, therefore, limited to examining this variable and providing some socio-economic information on project participants.

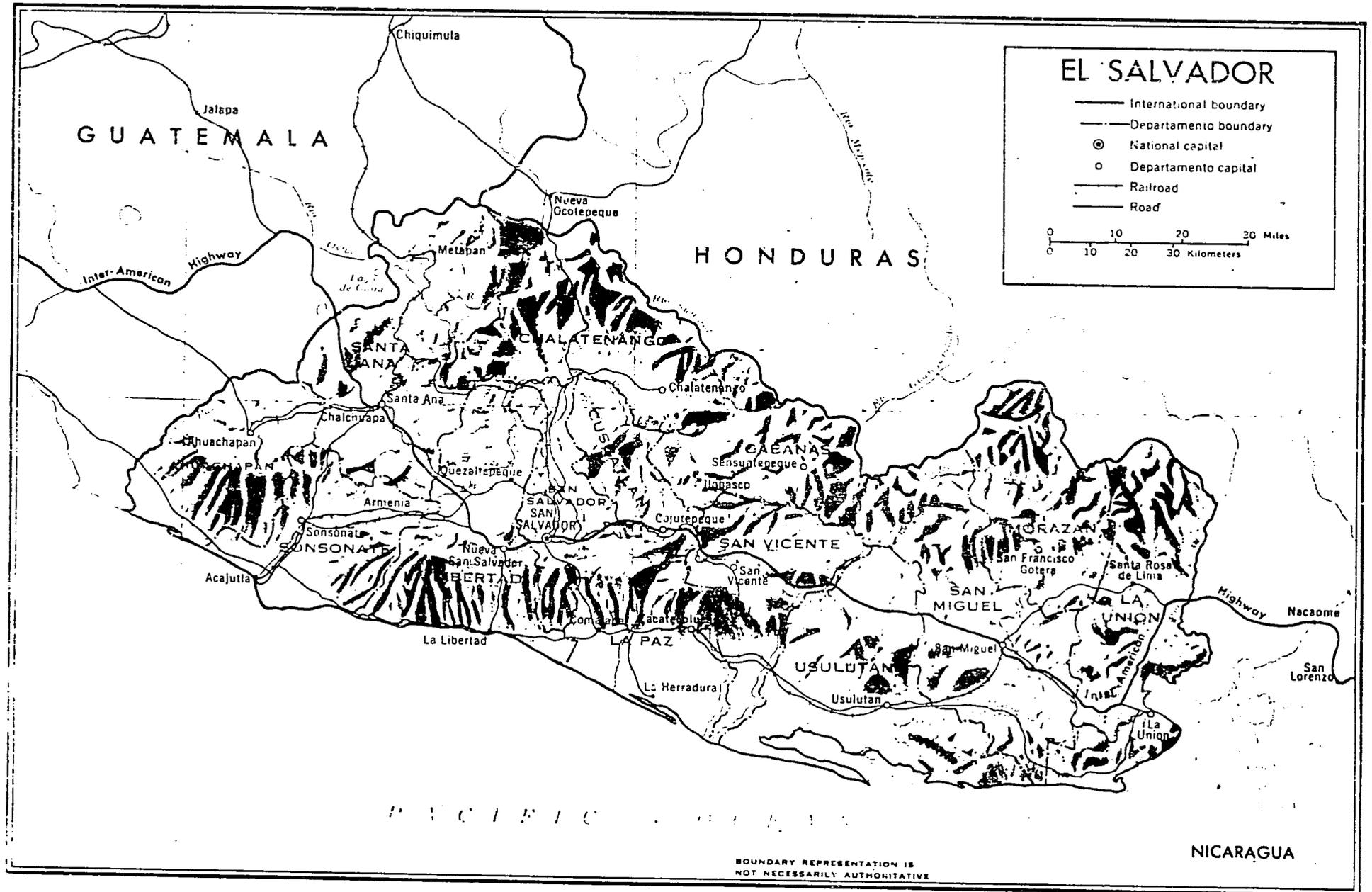
After completing these two sections, Technoserve still knew little about the people whose lives development efforts were attempting to improve. Information on how they viewed themselves, their hopes and ability to take advantage of new options could not be derived through answers to a carefully structured 45-minute questionnaire. During such surveys, the respondent is a passive object, only providing specific information which has been requested.

We wanted some project participants to have an opportunity to play a more active role in the evaluation of the project. For the success of the project must be judged according to how well it meets their goals, not Technoserve's. The final section of this study, therefore, is composed of profiles of a few project participants. These profiles are based upon extensive interviews

conducted during May - July, 1979. We believe they add greater meaning to the findings of previous sections.

Many complex issues must be addressed to break the cycle of poverty; the cooperative feed concentrate enterprise does meet some of these people's most fundamental needs. Many have greater aspirations, however, which will require further exposure, participation and development activities other than the feed enterprise.

MAP 2



III. Background

El Salvador is in a period of crisis. The established order which has stood for one hundred years is being challenged. A severely skewed distribution of wealth has provoked a conflict which has become increasingly violent in recent months. Progressive rural development efforts such as the establishment of the Santa Maria cooperative are caught in the middle of this struggle.

The breach between El Salvador's disparate political forces is a reflection of its economic inequalities. In 1974, an estimated 5% of the population received 38% of total income, while 40% received less than 8%.¹ Until the recent land redistribution program, 66% of total acreage was owned by about 7% of landholders.² Much of the best quality land was concentrated in the hands of a few landlords.³

Spiraling population growth rates coupled with shortage of arable land has worsened the status of the rural poor. Three-fourths of El Salvador is mountainous and about one-fourth is unsuitable for agricultural use. (See maps 2 & 3).⁴ Evergreen forests and deciduous vegetation once covered 90% of the country, but now have dwindled to only 15%.⁵ From 1950-71, 100,000 hectares of pasture and woodland areas were shifted into temporary crop use,

¹ IBRD Report #17, "Effectiveness of Cooperatives as Instruments of Social Change and Definition of Action Alternatives for the Community Enterprises Program", Vol. II p. 2.

² Ibid

³ In 1977 almost 13% of all land was under the control of 29 powerful landowners, Ibid

⁴ AID Country Development Strategy Statement FY 1981, El Salvador, January '79, p.8

⁵ Ibid. Statistics released by the Agricultural Ministry of El Salvador show only 40,000 hectares of forested land in a total land area of 2,080,000 hectares, or only 2% of the total.

thereby accelerating erosion rates. By 1978, the cultivation of temporary crops exceeded the recommended level by over 200,000 hectares.⁶ Thus, yields of basic food crops have stagnated since 1976. Rapid soil erosion due to overuse and climate will continue to take its toll on the land until strict conservation programs are launched.

About 60% of El Salvador's population depends upon agriculture for its livelihood. Coffee, cotton and sugar sales provide 65% of foreign exchange earnings which have helped develop the industrial sector. The rural poor's economic position has become even more tenuous during past decades. To yield greater profits, large plantations have been replacing tenant farmers, who had some land security, with landless laborers.⁷ Poor crop and livestock productivity is pushing thousands of small-scale landed farmers into this pool of landless labor.⁸ But lack of alternative full-time employment possibilities has caused 32% of the economically active population to remain unemployed.⁹ Underemployment in El Salvador's agricultural sector is the highest in Latin America.¹⁰

⁶ AID, op cit, p. 10.

⁷ According to IBRD op cit, p. 16, "In 1961, some 39.2% of families with less than one acre were tenant farmers. By 1971, the area of land farmed under the tenant farmer system fell by 77% and the number of holdings employing that system declined by 70%.

⁸ By the 1961 census, 11.8% of rural families were landless but by 1971 that proportion had increased to 29.1%. An IBRD report estimates that 40.9% were landless in 1975. IBRD, op cit, p. 17.

⁹ ILO estimate, cited in AID op cit, p. 14; During 1961-71, open unemployment increased from 5.1% to 10.2%.

¹⁰ AID, op cit, p. 1, labor underutilization is estimated to be 47%.

EL SALVADOR

Economic Activity

- National capital
- Department capital
- Demarcated international boundary
- Indefinite international boundary

COMMERCIAL AGRICULTURE (Primary Production Areas)

- Coffee
- Cotton
- Sugarcane

GUATEMALA

METALLIC MINING DISTRICTS



Note: exact production figures for individual mines are not available, national production figures are given in the *Minerals Yearbook*. Gold and silver are the only metallic minerals currently being commercially exploited.

1. Metapán: lead, silver, zinc, copper, gold and iron; only lead and silver have been mined; activity is limited and intermittent.
2. Santa Rosa de Lima: gold, silver, and mercury; inactive.
3. Jocaro: gold, silver; limited, intermittent production; inactive since 1955.
4. Yamabal-El Hormiguero: gold, silver, copper; inactive since 1948.
5. Chapeltique-Sesori: gold, silver; inactive since 1952.
6. Sanantepeque: gold, silver; some commercial production.
7. Chalatenango: gold, silver, copper; limited intermittent production.
8. El Paissal: gold, silver, copper; never exploited commercially.
9. San Cristóbal: gold, silver, mercury; gold and silver currently being produced for export in significant quantities.

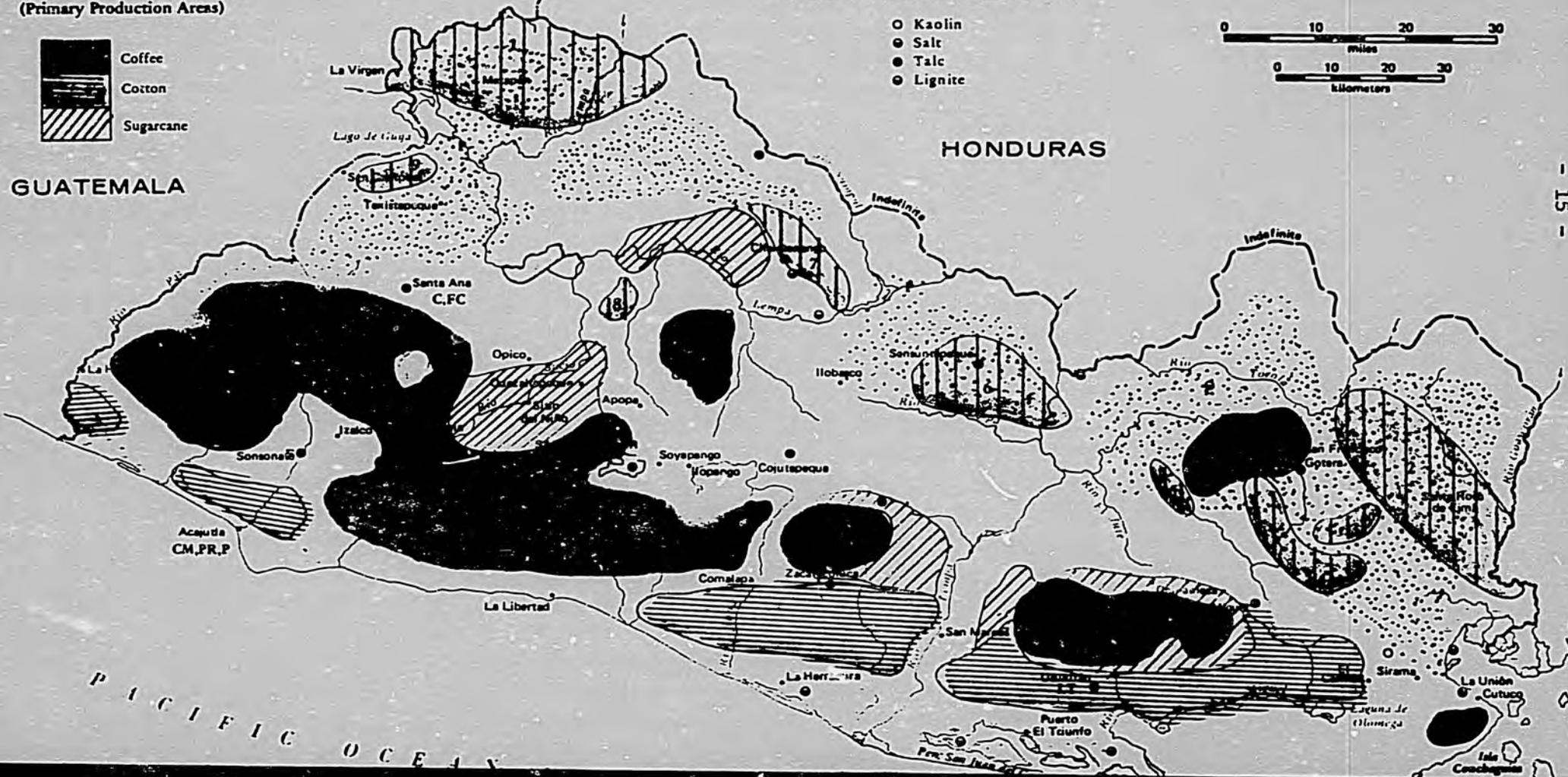
GOES cattle development regions

NONMETALLIC MINING (Areas of Current Production, 1974)

- Kaolin
- Salt
- Talc
- Lignite

INDUSTRY

- F Food processing
- V Vegetable oils processing
- S Sugar refining
- C Coffee processing
- FC Footwear and clothing production
- T Textile production
- LT Leather goods, tanning
- CM Cement
- PR Petroleum refining
- P Powerplant



High unemployment levels and low productivity of small and medium-sized farms contribute to El Salvador's distinction as one of the lowest-income nations in the Western Hemisphere. The average per capita income of \$528 (skewed upwards by enormous elite group incomes) can be rendered into harrowing statistics on malnutrition, illiteracy, infant mortality and housing. The greatest concentration of poverty is in the northeast.¹¹ This is where the town of Santa Maria is located.

The land's poor condition (see Land Use Map of El Salvador, Map #3) and the unsatisfied internal demand for cattle products caused the Government of El Salvador to designate its northern tier as livestock development zones (see Map #4). Its aim is to increase the productivity of cattle belonging to small (under 50 head) and medium scale (50-199 head) farmers without expanding grazing lands. Thus, existing resources must be more carefully managed and more efficient methods introduced.¹²

But it is one thing to mandate a policy and quite another to implement it. Good intentions are never enough. Ultimately, success depends upon farmers accepting the desirability of such changes before it is too late. And, unless programs are implemented to reverse the present trends, time is running out for the small-scale cattlemen in El Salvador.

This is the story of the beginnings of such change among farmers in one of the most impoverished regions of a troubled land.

¹¹ According to the AID Country Development Strategy Statement FY 1981, "the incidence of poverty increases dramatically as one moves toward the north and east....the poor represent 40% to 50% of the rural population in the West Region, but 80% to 85% of the rural population in the East Region. The worst poverty is to be found in the northern tier, a non-coffee growing area of the country." p.3.

¹² "Diagnostica de la Ganaderia Bovina en El Salvador", PROGAN, 1975.



Eroded hills in the Santa Maria area



Santa Maria's main street

IV. HISTORY OF THE SANTA MARIA CO-OP

A. Enterprise Environment

During the rainy season from May to October, only 4-wheel drive vehicles are able to plow through the muddy roads to reach Santa Maria. Even they cannot pass after heavy rains have left streams swollen. Founded in 1892, Santa Maria was only officially incorporated in 1956. Marginal agricultural land has made this one of the least densely populated and poorest regions (see map #5 on population density) in El Salvador. The area surrounding the town is interspersed by sharp hills and pocket-sized valleys, traversed by numerous rivers as yet unspanned by vehicle or foot bridges. Roads are single lane, a mixture of dirt and gravel, and in several places follow the courses of shallower rivers.

Lack of good roads has kept Santa Maria relatively isolated from the more developed towns in El Salvador. Commercial activity is limited to a few general stores and pharmacies. Public services include an elementary school through the 9th grade, a public health center, a police outpost, a local tribunal and a public telephone building. Some of the homes in one section of town have electricity. An old bus travels daily to some of the larger cities in the area.

According to the 1971 census, the Santa Maria zone contained about 8,000 people, one-seventh of whom lived in town. Most families depend upon agriculture for their income. But the quality of the land, according to farmers profiled in this study, is deteriorating. Erosion - a major problem throughout El Salvador - is especially severe in this region. The soil's poor permeability and steep inclines allow heavy tropical rains to wash topsoil down to the valleys. With careful management, however, some land may be used to grow

seasonal crops. Fertilizer - once a luxury and now a necessity - is frequently swept away with the rains, due to poor agricultural techniques. This contributes to low crop yields. In 1971, less than one-third of the 8,000-hectare zone was used to grow seasonal crops.¹

Sixty-two percent of the land was used for pasture by 300 farms.² Most of this land is unfit to cultivate food grains. (See Soil Map #6). These farms - one-fifth of all Santa Maria farms - had an average size of 16.5 hectares and thirty head of cattle. The average size of all Santa Maria farms was less than 6 hectares. However, farm size is not an accurate indication of relative income levels in this zone. Well-cultivated small areas of agricultural land can generate more income than poorly managed much larger farms.³

In 1971, three-quarters of El Salvador's farms with cattle had less than 50 head. The Government of El Salvador has categorized this group as "small scale" and belonging to its target population. Income levels within this group vary according to how efficiently they manage their resources. Survey results indicate that Santa Maria cattlemen have little knowledge of how to maximize their resources.

1 Tercer Censo Nacional Agropecuaria 1971, October 1974, Vol. 1.

2 Ibid

3 An AID report confirms this is true throughout the country: "Farm size is not a very good proxy for income on a national basis; in the West a 2.5 hectare farm (1.75 manzanas) on the average would support its extended family at income levels above the target group limit and an 8-hectare farm (5.6 acres) in the East would not." From Daines, Samuel, El Salvador: Analysis of Small Farms and Rural Poverty in El Salvador, AID, June 1977, p. 35.

MAP #6 SOILS MAP OF SANTA MARIA AREA



KEY:



slightly rolling plains



rolling plains



rocky and hilly



rocky and mountainous



rocky, high terrain

Some farmers are nostalgic about the days when their cattle could wander freely through plentiful pasture.¹⁶ But as cattle herds grew, the ability of the land to support them diminished. Yet, in 1971, only 30% of pastureland was planted with grasses which permit the land to attain a greater carrying capacity. Santa Maria cattlemen are now in a transition period. To survive, small-scale cattlemen must increase the productivity of their cattle by adopting new feeds and management technologies; natural pasture no longer suffices during the dry season.

Other potential feeds -- cotton seed meal, sorghum, cornhusks -- are often unavailable or very expensive in this isolated region during the dry season. These feeds do not, in any case, provide the nutrition requirements for healthy cattle unless properly mixed with additional elements. Thus, each year the general health, weight and milk production of Santa Maria cattle seriously decline during the dry months of January through May. Fertility rates are low and, until recently, one-fifth of calves born in this area did not survive their first months.¹⁷

Since many of this area's inhabitants depend primarily upon cattle products for their livelihood and sustenance, both income and nutritional levels suffer during the dry season. Milk production is far below its potential, even during the wet season, because only low quality natural pasture is used to nourish cows. According to the 1971 census, only 4.16 bottles of milk (750 cc/bottle) was produced by the average Santa Maria cow in late August -- the peak of milk production.¹⁸ In comparison, prime Holstein cows in Salvadoran research conditions are currently producing 40 bottles per day. Salvadoran dairy cows on efficiently managed large farms produce a daily average of 16 to 20 bottles.

¹⁶ See Francisco Gomez profile.

¹⁷ From discussion with FAO livestock expert working in the Dept. of San Miguel.

¹⁸ This study's survey reveals that milk production levels have changed little since then. See page 65.



Traditional way of feeding cattle

B. Beginnings of the Santa Maria Co-Op

For most of their lives, the people living in the Santa Maria region had never considered anything but individual and family efforts to improve their lives. Enrique Fernandez, profiled later in this study, was one of them. A primary school teacher, he is one of the most educated people in town and owns 3 milking cows. The first roots of a locally based organization, as described by Don Enrique, took hold as follows:

"In early 1975, eight of us with a few animals got together to discuss some of our problems. We talked about the large number of animals that died each year, the real difficulty we had obtaining fertilizer, seeds and other agricultural supplies, and their high prices. Above all, we were not organized to help each other out."

"During those days, an agronomist arrived in town, the first, I think, to have worked in Santa Maria. Our group decided to visit him and explain our problems. After several group meetings and conversations with the agronomist, the idea of forming a cooperative emerged. By then, about 18 farmers were interested in this idea; soon it began being supported by other farmers in Santa Maria."

Because three of the founders had been schoolteachers, they personally knew many Santa Maria farmers. They traveled to backwood farms throughout the zone to explain the concept of a cooperative. Although many were receptive to the idea, founding the cooperative was not a smooth process.

Prospective members disagreed about the cooperative's objectives, how to meet legal requirements and the institutions with which they would work. Farmers were not accustomed to collaborating; all tenaciously clung to their vision of

how things should be done. Compromises were only achieved after several months of intensive discussions.

Problems came from all directions. Keeping an appointment with INSAFACOP, the government cooperative institute, was often difficult. Swollen rivers in the rainy season often prevented the founders from attending important scheduled meetings. The farmers entered an unfamiliar world of complex bureaucratic procedures -- legal statutes, accounting controls and administrative structures -- which are needed to legally incorporate a co-op in El Salvador.

These difficulties were overcome eventually because the co-op was initiated by local people and was based on their needs and interests. It was not imposed by an external promoter upon whom the group might thereafter be dependent. Other organizations were consulted only after residents had committed themselves to the co-op. Intense pride motivated these farmers to donate their time and resources; some refer to it as their child which they guided into maturity.⁷

The Agricultural Production Cooperative of Santa Maria was legally constituted in February, 1976. Conforming to Salvadoran law, co-op statutes prohibit any limitation on the number of people who could join the co-op. Although this law is intended to prevent co-ops from becoming exclusionary clubs, high initiation fees, not controlled by the government, can have the same effect. Founders of other co-ops have insisted upon high membership fees to discourage new members, but a share of the Santa Maria co-op cost only \$4.00 -- approximately equivalent to four days' wages for a landless agricultural worker at the time the co-op was founded.

Each cooperative member has one vote, irrespective of how many shares that member has bought. To help ensure that no member has undue influence on co-op

7

See Enrique Fernández family profile.

activities, Salvadoran law prohibits any members from contributing more than 10% of subscribed capital. To meet this requirement, the Santa Maria co-op forbade any member from owning more than 500 shares.

In general, co-op profits are distributed to members according to the amount of equity contributed. However, the objective of the Santa Maria co-op is not to distribute net earnings, but rather to re-invest them to expand services to the community.

The administration of the Santa Maria co-op was also carefully delineated in the co-op's statutes to ensure the participation of members. The General Assembly, comprised of all members, is the co-op's supreme authority. At the General Assembly meeting, held at least once each year, Santa Maria members elect the nine-member Administrative Council, as well as the Supervisory, Supplies and Marketing, Credit & Education committee members to 1-3 year terms. The Supervisory Committee reviews the co-op's fiscal activities and the Education Committee is in charge of promoting the co-op among members and in the community.

The founding 34 members purchased 130 shares for a total initial capital of \$520. They included 24 farmers, 3 teachers, 3 merchants, 3 housewives and a druggist, all of whom grew crops and/or owned cattle.

After its incorporation, members believed the co-op would quickly thrive. But this was not the case. "It's one thing to establish the group, and another to run the business", a cooperative member and past manager recently stated.

The first year of cooperative operations was limited to buying and selling fertilizer. It was a financial disaster. Because the cooperative did not have sufficient accounting controls to analyze what had gone wrong, members grew suspicious.

They demanded to know what had happened to their individual equity contributions and why the cooperative had not made money. In addition, a few of the large land-holders in the Santa Maria area publicly stated that the cooperative would be a

complete failure. According to the co-op manager, one said, "The cooperative cannot possibly be successful, because members know nothing about business operations and do not know how to buy and sell agricultural inputs. Private enterprise is superior to cooperativism." These alienating statements served to increase the co-op members' sense of resolve. Critics underestimated their capacity to admit that they needed outside assistance to overcome many problems. After the first year of poor economic performance, members decided to request technical assistance.

They first consulted a representative from the Livestock Division of the government's Agricultural Ministry. He discussed their problems and concluded that the co-op needed some form of integrated technical assistance. He suggested that the co-op contact Technoserve's office in San Salvador, which had been providing this assistance to similar co-ops for two years. In mid-1977, the Livestock Division of the Agricultural Ministry contacted Technoserve and described the cooperative's situation.

In August 1977, Technoserve's Program Director and a Technoserve agricultural advisor traveled to Santa Maria. They listened to the members describe the co-op's problems and discussed what they wished to accomplish by using outside technical assistance.

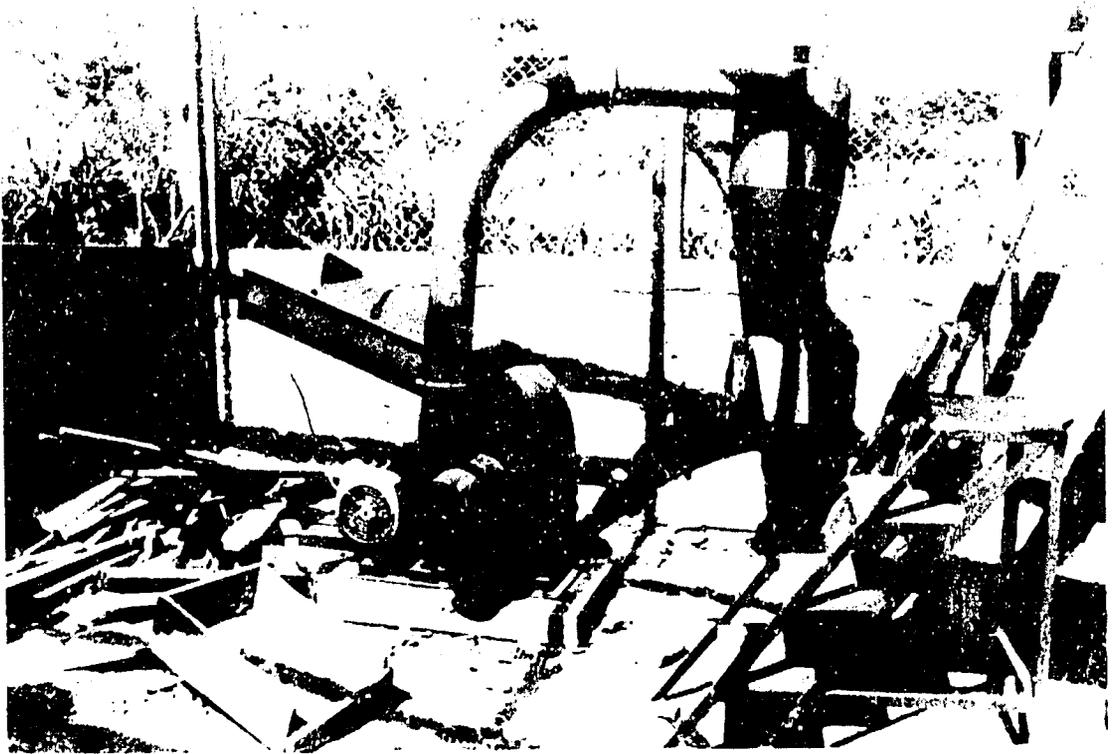
During a later meeting, another Technoserve agronomist mentioned that he was working with another co-op composed of cattlemen facing similar problems. The San Antonio co-op, approximately three hours from Santa Maria, had decided to establish a feed concentrate mill. Cattlemen were pleased with the concentrate's results and the co-op had prospered.

Several of the Santa Maria co-op members decided to try this concentrate and were impressed with its results. Because it was difficult to transport feed across the

river separating San Antonio from Santa Maria, these members asked Technoserve about the possibility of establishing a similar feed mill for their co-op. In addition, they requested Technoserve help design and implement an accounting system for the co-op.

Technoserve's policies and procedures regarding the provision of technical assistance were then explained to the group in a series of meetings. Members were asked a number of questions to determine if this group fit the standard criteria used by Technoserve in selecting organizations to assist. Did the resources and incomes of the majority of members indicate that they were among the poorer segments of the Salvadoran population? Did the co-op members work together to achieve common goals? Were their goals compatible with the group's capability and environment? Would a co-op feed mill have a significant positive socio-economic impact on the members and the Santa Maria community?

After discussing these issues, members were asked to request Technoserve's services in writing. Technoserve staff agreed to study the feasibility of installing a feed mill, but added that even if the analysis were positive, the enterprise could not begin operations for more than a year. Since the primary demand for feed concentrate is during the dry season, operations should begin in December to maximize the mill's business viability. However, it was too late to complete all the analyses required to construct this facility in time for the 1977-78 dry season. Thus, Technoserve suggested that, if feasible, the plant could begin operations in late 1978. The cooperative members agreed with this timetable.



*The hammermill grinds agricultural by-products
and other feed inputs into edible form*

C. Analysis of the Feed Mill Enterprise

A small-scale production plant was planned to mill and mix various feed ingredients for cattle, then package and sell this feed concentrate to farmers in the zone. The purchase of milling and chopping machines necessary to produce concentrate could also be used to process farmers' crop harvests. If successful, this activity would heighten the co-op's visibility and attract new members. But an unsuccessful business venture could destroy the co-op and postpone further community development activities indefinitely. The people of Santa Maria would pay the heavy price of a lost vision and a wasted opportunity to better themselves if the project failed.

Cognizant of the fragility of this nascent cooperative, Technoserve agronomists and business analysts carefully analyzed the economic and social viability of the new venture. A preliminary feasibility analysis examined the co-op members' commitment to both the organization and the project, their capability to implement this idea and whether the enterprise could survive financially.

Technoserve advisors evaluated member participation by attending co-op meetings. A well attended Annual General Assembly meeting and regular Administrative Council, Credit, Supplies and Marketing and Education Committee meetings demonstrated great interest in the co-op. Co-op membership had more than doubled in two years, indicating that many community members believed that the co-op was a valuable organization in Santa Maria.

Co-op members and Technoserve advisors held a series of meetings with local residents to discuss the feed mill concept. The technology involved was not complex and had proven to be within the capability of San Antonio co-op members and

staff. A survey questionnaire was administered by Santa Maria residents trained and assisted by Technoserve advisors. Livestock numbers, feed intake levels, land owned or rented, crops cultivated, crop and animal management patterns, family size, resources and income levels and interest in the proposed enterprise were all examined.⁸

This questionnaire's results and continuous contact with the project group caused Technoserve's El Salvador staff to recommend a more in-depth analysis of the project. They also advised the home office that a provisional assistance document should be signed with the co-op. This "Letter of Understanding" would outline the work process during the coming months, explain Technoserve's policies in greater detail and negotiate Technoserve's and the co-op members' responsibilities during this study period. This document indicated that Technoserve was seriously interested in the proposed enterprise and asked the co-op to commit itself firmly in writing.

In May 1978, this pre-feasibility analysis was approved by Technoserve headquarters and the letter of understanding was signed. The agreement authorized Technoserve to complete a more comprehensive feasibility study on the feed mill enterprise. The cooperative members agreed to collect the equity capital necessary to support the investment required for the feed mill.

During this period Santa Maria co-op, with Technoserve's assistance, had contacted the U.S. Agency for International Development/El Salvador Mission. Co-op members learned of the Small Development Assistance Program whereby USAID makes partial grants towards the purchase of equipment and/or construction materials for rural-based projects benefiting low-income Salvadorans. The co-op members completed the necessary paperwork to apply for a \$5,000 grant from AID. The data extracted from Technoserve's pre-feasibility analysis

⁸ Although this survey provided some general information on project participants, unfortunately, it is not a good source of reliable statistical data. The questionnaire's design makes it difficult to assess the reliability of data collected; because it was administered to 22 non-randomly chosen project participants, its results cannot, in any case, be extrapolated to represent the entire group.

improved the co-op's chances of receiving these funds. When it was received, this timely donation reduced the external financing requirements for the feed mill enterprise.

The project study analyzed the economic feasibility of the feed mill enterprise in more precise terms. The demand for feed concentrate, product distribution plans, methods, logistics, costs and the probable response by competitive distributors of inferior quality cattle feed in the area were the main elements of the marketing investigation. Analysis of raw material requirements, costs and availability, as well as the production, infrastructure, processes and manpower/energy needs were part of the production supply and operation investigation. All of these analyses were combined in a 5-year financial projection of enterprise revenues, raw material and other production costs, sales, administrative and financial expenses and the projected net income resulting from the operation.

The project study results showed that a positive net income could be anticipated from the feed mill and other service operations, but that this net surplus would be small, due to the service nature of the co-op's operation. The co-op's aim was not only to maximize profits, but to develop a successful enterprise which would reach poor cattlemen who most needed to receive concentrate.

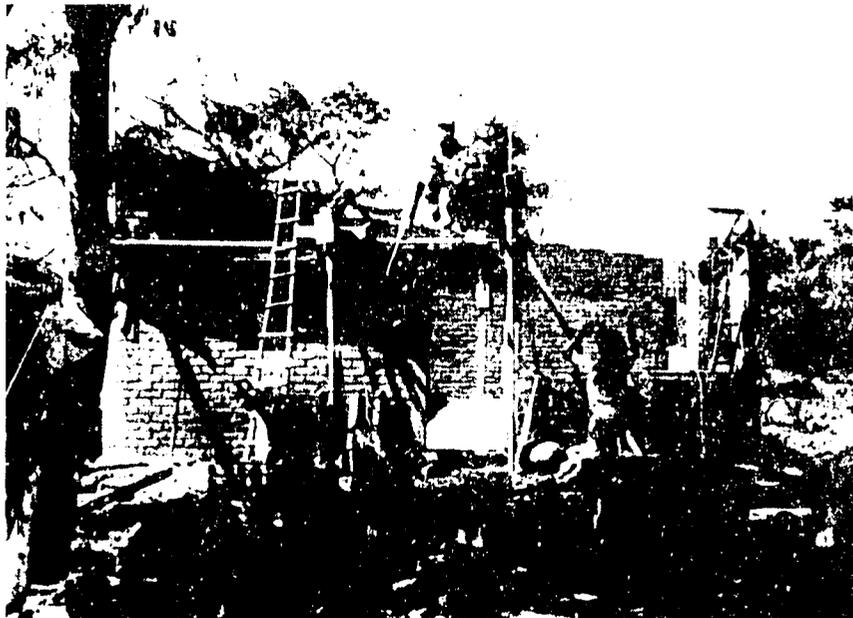
After determining that this feed mill activity was economically feasible, the next step was to obtain debt financing. The only national financing entity willing to consider this high risk rural agricultural enterprise was the Banco de Fomento Agropecuario. This national development bank had a specific set of credit and guarantee norms which required that the co-op finance about one-third of the total investment from their own resources. Since many members had little, if any, experience that would lead them to save and invest in something

they could not yet see in concrete form, the task of getting them to set aside what little cash they had for this project was a monumental one. Technoserve staff often accompanied co-op leaders on visits to individual members and held joint meetings to explain the benefits of the feed mill enterprise and its related service activities.

These efforts were unsuccessful until a few of the better-off members became convinced of the project's viability. Once they pledged their funds, it became somewhat easier to obtain share capital from a larger segment of the membership. In addition, the co-op members voted to allocate an existing \$3,480 in cooperative equity to the feed mill enterprise. In all, the co-op was able to collect a total of \$5,426 towards the total investment requirement of \$30,480. The AID donation reduced the external financing requirement by another \$5,000, leaving a debt capital requirement of about \$20,000 in debt capital from the Banco de Fomento. With this grant and equity capital in hand, as well as a Project Study to support its request for a loan, the cooperative was now ready to enter the implementation stage.



Breaking ground



Constructing the co-op building

D. Implementation of the Feed Mill

Two steps remained before the feed mill operations could begin. First, a bank loan had to be obtained and, second, the fixed assets and materials needed for production had to be installed.

The financing operation presented new problems. Neither co-op members nor Technoserve staff had had previous experience with the Banco de Fomento Agropecuario (BFA). They talked with bank representatives in the regional office, inquiring about credit norms, procedures, guarantees, etc., and believed they had the information necessary to process the loan application successfully.

However, after the loan application had passed through the mandatory technical and administrative bank approval processes, the bank's contract lawyer detected two missing legal documents needed to support the pending contract: a paper legally ratifying the cooperative's exemption from taxes and a tributary card which shows that the cooperative was officially registered as a legal entity in El Salvador. Since the loan had already been approved, the BFA decided to approve the disbursement of half the requested loan amount. The remainder was held until the co-op received the necessary government approval for the two missing documents. This approval was finally granted in November.

The next step towards project implementation was to purchase land upon which the co-op building and feed concentrate plant would be constructed. The purchase of a suitable parcel of 2,764 sq. meters had been already negotiated when engineers informed the cooperative that their land might be intersected by a future road. Only after several troubled meetings with the engineers was it determined that the route would bypass the co-op's land.

Next came plans for the plant construction and installations. A cooperative commission was named to determine a suitable plant contractor and electrician. Technoserve engineers designed a 216 sq. meter plant building which included space for machine processing and packing of the feed concentrate, a warehouse, storage facilities for agricultural inputs and the forage chopper machine and a small space for a cooperative office and meeting room. This task was facilitated since Technoserve engineers had designed similar buildings for other feed concentrate projects. All plans were discussed and approved by the cooperative's Board of Directors.

In September 1978, the co-op and Technoserve contracted for the assembly of machinery and equipment necessary for the co-op's activities. This equipment included a hammermill to grind up agricultural by-products such as corncobs, a horizontal mixer to combine all the feed concentrate ingredients, and a forage chopper to mill members' fodder.

The equipment contracting and assembly went smoothly but the construction process was delayed several times. The co-op could not afford to hire a city-based full time contractor to do the job. The co-op Board and Technoserve's advisor drew up a list of contractor requisites, but no one suitable in Santa Maria could be found. Finally, co-op members hired a contractor from a nearby town who in turn employed two bricklayers and three laborers.

Construction started, but after a few weeks it became evident that something was wrong. Progress was slow, the workers were disorganized. The contractor was often away from the site. Construction had to be completed by December to prepare for the next dry season. Confronted by the co-op, the contractor explained that he had to harvest his bean and corn crop. If he waited, his crops would be lost. But, he assured the co-op, only one week more of harvesting was required. To

resolve this dilemma, the co-op asked the Technoserve advisor to supervise the project until the contractor could finish his harvest. This additional assistance was provided.

Lack of water during the construction period was another problem. The nearest water pipes were 100 meters away from the construction site and yielded only a trickle of the 150 gallons needed daily for construction. If this water were fully used, the town of Santa Maria would be left dry! Various solutions were proposed ranging from purchasing an expensive pump and hose connection to forming a bucket brigade to haul water from the nearest river. Finally it was decided to hire someone who would fill up a wagon-load of barrels in the evening and haul them to the construction site for the next day's use.

Lack of electricity in the co-op building construction site was the next problem. This building is located on the edge of town, surrounded by the poorest households in Santa Maria. Since June, the co-op and Technoserve had requested the regional electric light company to extend nearby primary lines without charge and install a transformer which would increase the kilowatt output and obtain three phase electricity. Four months had passed without any resolution in sight. The expense to the company, officials explained, was too great to be offset by the increased electrical consumption of the feed mill. The cooperative also could not afford this additional investment.

While these negotiations were hopelessly stalled, several dozen residents living near the co-op building asked the co-op leaders and Technoserve help them obtain electricity for their own homes. This had not been a part of the original social impact justification for the feed mill enterprise, but the intercession of the local residents could not have been more timely. Technoserve advisors and the co-op Board presented a new feasibility analysis of the electrical installations, including

the 40 homes surrounding the feed mill, to the electric light company. Officials were convinced by this analysis and agreed to install the primary lines and transformer without charge. Fees for the electricity used now justified the electricity company's initial installation costs.

In early October, the co-op and Technoserve negotiated and signed a service contract. Technoserve agreed to provide continuous technical assistance to the feed mill enterprise throughout 1979 with an extension possible through early 1980. This included assistance in accounting, marketing, production and general administration.

By mid-November, plant construction was far advanced and the on-site electrical installations were completed. Hundreds of people lined the roads when trucks delivered the new cooperative machinery. As the installation progressed, members' interest in trying out the feed concentrate heightened. The Technoserve project advisor arranged to have some feed concentrate produced by the San Antonio cooperative delivered to Santa Maria.

Lessons learned by this other Technoserve-assisted co-op served to reinforce the Santa Maria operation. Santa Maria's feed mill operator went to this feed mill to receive three days of intensive training in machine operation and care. He also learned about San Antonio's production control systems, appropriate use and care of raw materials and other techniques necessary for successful feed mill operation.

While the plant equipment was being installed, a Technoserve financial advisor established accounting controls for the project. The work was slow since past documentation of co-op activities was only partially complete. However, these documents did serve as a basis for the normalization of an accounting system. Eventually, up-to-date accounting statements were prepared and an accountant was hired by the co-op to prepare the financial statements under Technoserve's tutelage. In November, a full-time general manager was employed and began training.

By mid-December 1978 the plant was finished, machinery installed, personnel employed and raw materials supplied. The only step left prior to beginning operations was the installation of electricity. Finally, on December 28th, after persistent complaints, the electrical crew arrived, installed the transformer and extended primary lines to the concentrate plant's line. On December 29, 1978 the first animal feed concentrate rolled off the production line and quickly sold out. A new "industrial era" had begun in the town of Santa Maria.

COMPARATIVE PROFIT AND LOSS STATEMENT
 SANTA MARTA AGRICULTURAL PRODUCTION COOPERATIVE
 (Thousands of colones; ¢1.00 = US\$0.40)

	<u>Year Ending</u> <u>March 1979</u>	<u>Year Ending</u> <u>March 1980</u>
Sales Revenue:		
Concentrate Sales	20.9	73.6
Cottonseed Meal Sales	5.5	23.6
Agricultural Supply Sales	<u>73.0</u>	<u>110.5</u>
<u>Total Sales Revenue</u>	99.4	207.7
Gross Margin	14.5	32.8
as a % of		
Sales Revenue	15%	16%
Total Expenses	14.4	52.8
as a % of		
Sales Revenue	14%	25%
Other Income	9.1	33.2
As a % of		
Sales Revenue	<u>9%</u>	<u>16%</u>
<u>Net Surplus (loss)</u>	9.2	13.1
as a % of		
Sales Revenue	9%	6%

E. 1979-80 Operating Efforts and Financial Results

The opening of the first industry in Santa Maria attracted a great deal of interest in its products. Sales of concentrate for the fiscal year ending March 31, 1980 generated revenues of \$29,440 for the co-op (see Chart 1). Overall sales doubled over the previous year (from \$39,760 to \$83,080); other income increased four-fold, and gross sales margin increased 16%. For 1979-80, the co-op had a net surplus of \$5,240, or 6% of total sales revenue. The net surplus figure reflects co-op policy of maintaining low prices for its members while operating as a successful business enterprise.

Charts 2 and 3 indicate the cyclical nature of the co-op enterprise's financial performance. Chart 2 shows that sales revenues were highest in May, 1979, the planting season, because of agricultural input sales, and January, due to record concentrate and high cotton seed meal sales.⁹ Losses were suffered in April and June-September 1979 (see Chart 3) when concentrate sales dropped due to increased use of natural pasture and prior to strong agricultural input sales and throughout the rainy season when concentrate, cotton seed meal and agricultural input sales were low.

Member patronage caused cooperative asset values to almost double from \$34,960 to \$63,160 (see Comparative Balance Sheet, Chart 4). Outstanding credit increased five times over the previous year's total. Approximately 90% of co-op members received co-op credit to purchase agricultural input supplies and/or cattle. Thirty new members joined the cooperative in 1979-80, adding an average of \$36 each to the capital account. Total owner equity increased by \$6,160 during 1979-80 (see Chart 4) to maintain an adequate owner contribution base as the cooperative asset holdings expanded. Incremental fixed and working capital investment has increased \$67,862 since this project idea began to be analyzed in mid-1978. Over \$74,000 of raw

⁹ Sales revenues were considerably lower in May 1980, due to a delay in receiving credit for the co-op to purchase agricultural inputs.

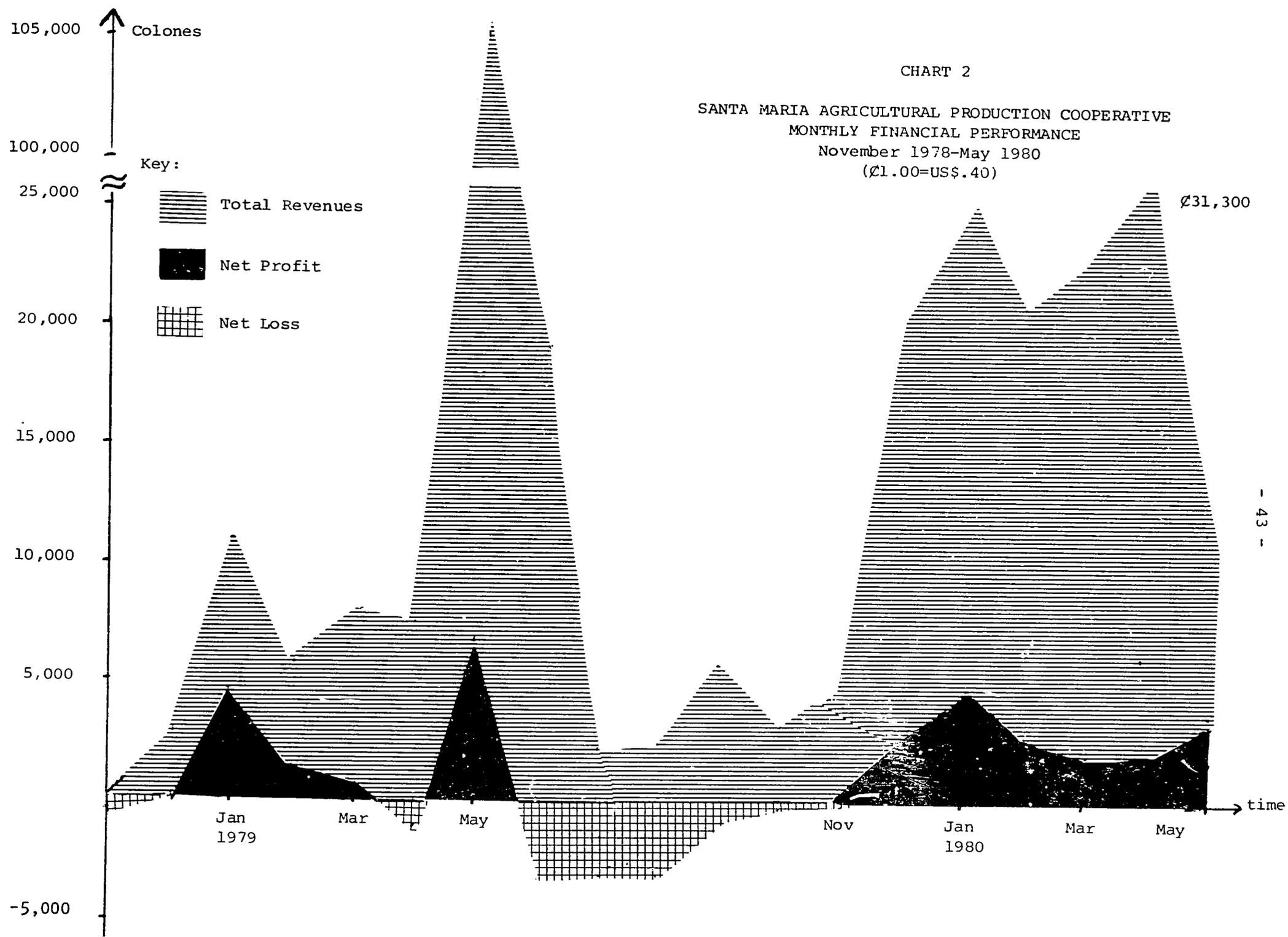


Chart 3

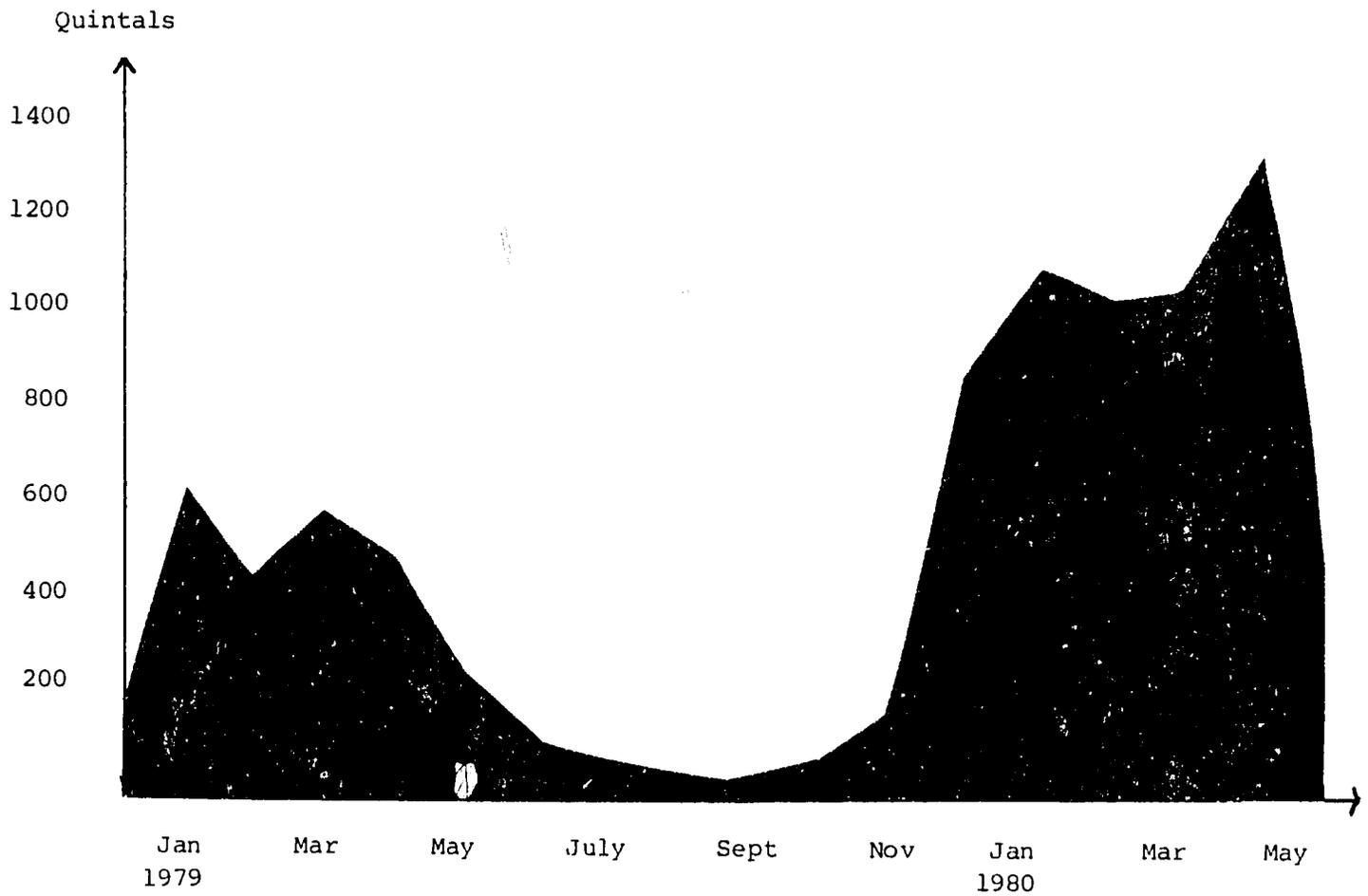
SALES OF FEED CONCENTRATE PRODUCED

BY THE

SANTA MARIA COOPERATIVE

December 1978-May 1980

(1 quintal = 100 lbs.)

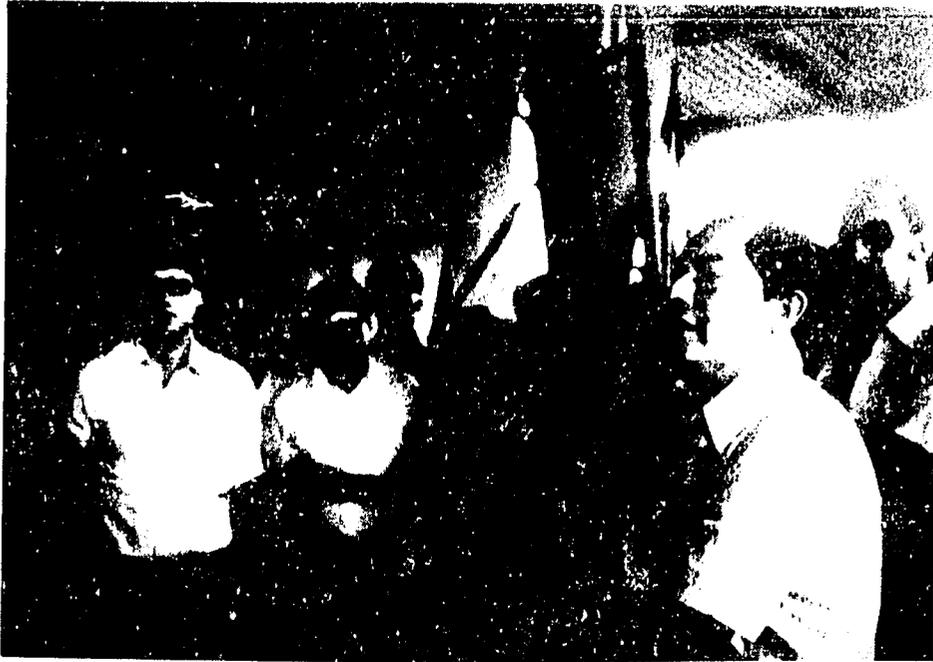


COMPARATIVE BALANCE SHEET
 SANTA MARIA AGRICULTURAL PRODUCTION COOPERATIVE
 (Thousands of colones; ¢1.00 = \$0.40)

	<u>March 1979</u>	<u>March 1980</u>
Current Assets:		
Cash	36.1	104.9
Accounts & Loans Receivable	24.9	17.1
Inventory	2.9	68.9
	8.3	18.9
Fixed Assets:	47.3	47.7
Other Assets	<u>4.0</u>	<u>5.3</u>
Total Assets	87.4	157.9
Current Liabilities:	11.5	21.0
Current Loans Payable	11.2	14.6
Other Current Liabilities	0.3	6.4
Long-Term Liabilities:	<u>38.8</u>	<u>84.4</u>
Total Liabilities	50.3	105.4
Owner Equity:	37.1	52.5
Share Capital	15.0	27.4
Current Year's Profit	7.5	13.1
Previous Year's Profits (losses)	(0.4)	(1)
Other Equity	<u>15.0</u>	<u>12.0</u>
Total Liabilities & Owner Equity	87.4	157.9

(1) Capitalized as share capital

materials and inputs were purchased from national suppliers during the year; several co-op members supplied raw materials for concentrate production during peak production periods. Co-op employees received \$5,100 in wages and benefits during the fiscal year.



A Technoserve advisor explaining mill operations to government officials



Testing the feed concentrate mixer

F. The Assistance Process

The cooperative agreed in the Service Contract to pay Technoserve 100 dollars per month during 1979. For the 1980-1982 period, the co-op agreed to pay Technoserve between 800 and 1,600 dollars per year. All of these payments were contingent upon the feed operation yielding a profit during each of these years.

The service contract assured the co-op of Technoserve's presence while the feed mill enterprise was being established. It also reinforced the principle that this was the co-op's project and not Technoserve's; the co-op had hired Technoserve to provide a service. It could also fire Technoserve if members were not satisfied with the services provided. Technoserve required that the co-op pay it for services, although these payments covered less than 2% of Technoserve's true cost, to avoid a lingering dependency relationship. The payments were to increase over time so that the co-op would have more incentive to become entirely self sufficient.

Technoserve's costs in terms of staff time from April 1, 1978-May 1980 were about \$68,000.¹⁰ This project's costs are higher than those of those other Technoserve-assisted projects because of heavy vehicle wear and logistical constraints. The average one-way trip to Santa Maria from Technoserve's office in San Salvador, approximately 180 kilometers away, requires five hours. Technoserve's assistance -- the transfer of capability from skilled technicians to local community residents -- is by its nature a labor-intensive, long-term process. Management and accounting skills cannot be learned in a cheap, quick two-week intensive course. Building good management judgment necessary to ensure the enterprise's survival and growth requires more thorough exposure to problems encountered in a changing, often unpredictable environment.

¹⁰ When Salvador program administration and Technoserve corporate administration costs are included, this project's total cost is raised to \$109,000.

Employee turnover, a particularly serious problem among projects located in isolated regions, increases project costs. After acquiring marketable skills through Technoserve training, some co-op personnel find higher paid jobs in urban areas. During the second quarter of 1979, the cooperative manager and accountant quit. Thus, all the training they had received was lost to the co-op -- and gained by another employer.

The new co-op manager and accountant, both co-op members, were judged capable of assuming full management responsibilities by May 1980. Technoserve withdrew its intensive advisory assistance services and signed an ad hoc monitoring agreement with the co-op. This provides for monthly visits by a Technoserve agronomist and accountant until November 1980. These services, for which Technoserve receives \$40 monthly, may be extended for an additional six months. If co-op staff leave, however, it may be necessary for Technoserve to expand its level of assistance. A combination of income incentives based on employee performance and project output and increased community activities was introduced to reduce this possibility. Much will depend upon El Salvador's political environment as well.

Cognizant of the future turnover of elected co-op board members and employees, Technoserve staff prepared some simple, easy to follow procedures manuals. They describe the various functions of the administration, accounting, production and maintenance personnel. In this way, it is hoped that the skills learned will be transferred without the on-site presence of a technical assistance agency.

Until May 1980, the Technoserve project manager and accountant spent one to two days per week in Santa Maria; monthly visits have continued despite numerous obstacles. The trip is arduous and sometimes dangerous. Vehicles have been stopped and questions asked. Much of the road goes through unpopulated areas not frequently travelled by other vehicles.

The Technoserve accountant's work consisted mainly of designing an appropriate accounting system for the co-op's operations, training an accountant to follow this system and then reviewing financial statements with the co-op accountant. The project manager met with the co-op Board when requested, attended general assembly meetings and helped to resolve the dozens of problems which constantly occur.

The project manager also worked with members to consolidate their relationship with institutions and marketing agents. Most of the members did not know how to negotiate loans with financial institutions, fill out necessary forms and ensure that the money would be repaid. Many were intimidated by such procedures and the unfamiliar city people with whom they had to deal. One of the project manager's most important functions has been to build up the groups's capability to deal with outsiders, as well as to handle daily management responsibilities.

Santa Maria's project manager also held occasional meetings to explain the proper use of feed concentrate and discuss problems encountered by members. Approximately forth co-op members attend each meeting, usually held every month. As staff grew more capable of handling co-op operations, the Technoserve advisor, a trained agronomist, began visiting co-op members' farms to advise on the proper care of crops and cattle. Approximately ten farmers were visited each month.

A demonstration test of the effect of feed concentrate on cows was conducted shortly after sales began. It attempted to compare differences in milk production between cows using concentrate with those fed traditional mixtures. Two farmers were asked to record how much they fed their cows and daily milk production levels. Five cows belonging to each farmer

were fed five pounds of feed concentrate apiece and five cows were each fed a traditional mixture of twenty pounds dry grass, five pounds molasses diluted with water and one pound of cotton seed meal. The ten cows belonging to each farmer were selected so that they were of similar age, milk production levels, milk gestation period and were located in the same pasture.

Regrettably, this evaluation attempt failed. Although both farmers promised faithfully to keep records, one neglected the responsibility entirely and the other did not keep a daily record on each cow, as instructed. This example illustrated the difficulty of having farmers keep their own records to determine the impact of feed concentrate. This study's survey, therefore, did not employ this methodology.



Installing electricity at a home behind the co-op building



*A co-op worker draining molasses to make feed concentrate.
The enterprise provides a new market for locally produced agricultural goods.*

G. Spinoff Activities

The feed mill has increased the co-op's visibility in the community. It is now a stronger mechanism by which members of different economic strata collaborate to exert pressure on outside institutions for resources. Towards the end of the dry season, co-op members met to discuss purchasing new cows and heifers for fattening. Working with the Technoserve and Banco de Fomento Agropecuaria representatives, a number of members were judged credit worthy. A total of \$30,560 was approved to be channeled through the co-op to individual members: \$18,240 in long-term credits for milking cows and \$12,320 in one-year loans for fattening heifers.¹¹ An estimated 38 milking cows and 182 heifers were purchased with this credit.

In January 1980, the co-op began an experimental steer fattening operation. This activity's main purpose is to demonstrate the potential use of feed concentrate and provide meat to the area. Enclosed feed lots, a "second generation" activity of several other Technoserve-assisted feed mills, are a mechanism to increase meat production in these zones without increasing the burden upon pasture.

The co-op purchased 17 steers at the beginning of the dry season when low prices prevail and confined them outside the co-op building. Each head was fed for 75 days with twenty pounds of feed concentrate. They were sold to community residents for slaughter during the height of the dry season when meat prices are highest; the small scale of this activity caused no profits to be derived; larger numbers of steers are expected to be fattened in future years.

Successful economic activities enable the co-op to serve as a mechanism to organize community residents for non-economic goals. It can provide a forum for

¹¹ How one loan recipient used this credit is mentioned in the Fernandez family profile. See pages 120-128.

farmers to discuss problems and, eventually, reduce their isolation and lack of power. Participation in co-op activities has been surprisingly high, given the distance and terrain that most must travel to reach the co-op building. For example, 65% of the members were present at the March 1980 Annual General Assembly meeting.¹² They voted a new president and vice-president of the Board of Directors and another president of the Supervisory Committee into office.

Co-op membership has almost quadrupled since it was founded; 34 farmers joined in 1979, bringing total membership to 127. Many farmers say they became members to receive credit for agricultural inputs.¹³ Other advantages of co-op membership -- discounts on feed concentrate,¹⁴ the possibility of receiving dividends and chopper services to make silage¹⁵ -- are less compelling incentives to join. The initial membership fee has been raised to \$16 (plus \$2.50 for paperwork); an additional \$64 must be paid over a period of sixteen months. Although members may withdraw this contribution upon leaving the co-op, the fee seemed high to one small-scale farmer profiled in this study and made him worry about joining.

Non-member residents benefit from the co-op's presence by having easier access to agricultural inputs and cattle feeds. In addition, some sell feed concentrate inputs -- including agricultural by-products with no other commercial value -- to

¹² At that meeting, members voted to reinvest the 1978/79 net surplus of about \$3,000 in ongoing activities, rather than distribute it to members.

¹³ Conversations with Santa Maria farmers and reported by the Technoserve project advisor

¹⁴ Co-op members pay \$.20 less per hundredweight per bag of concentrate.

¹⁵ The co-op rented a chopper during October 1979-January 1980 for members to make silage. Approximately 20 members used this service.

the co-op. The co-op's Women's Auxiliary Committee helped collect equity contributions from new members, has organized numerous community fiestas, and started a new library. The Education Committee collected funds to construct a basketball court and the co-op building obtained telephone service.¹⁶

One of the most visible benefits to non-members was unexpected. Thirty-one families, many of whom seek seasonal employment on coffee plantations, now have electricity in their homes. The co-op prompted 120 of these barrio residents to organize and sign a petition to improve their living standards. Their success sets an important precedent in the Santa Maria community.

¹⁶ Community activities such as these have diminished during the current political crisis.



*Lack of inputs and loss of co-op staff
could endanger the enterprise's viability*

H. Prospects

Despite encouraging financial performance, no guarantee exists that the co-op will continue as a viable economic entity. Shortages of fertilizer, credit and feed inputs are not inconceivable if El Salvador's current political crisis deepens. Numerous events outside the co-op's control could destroy it.

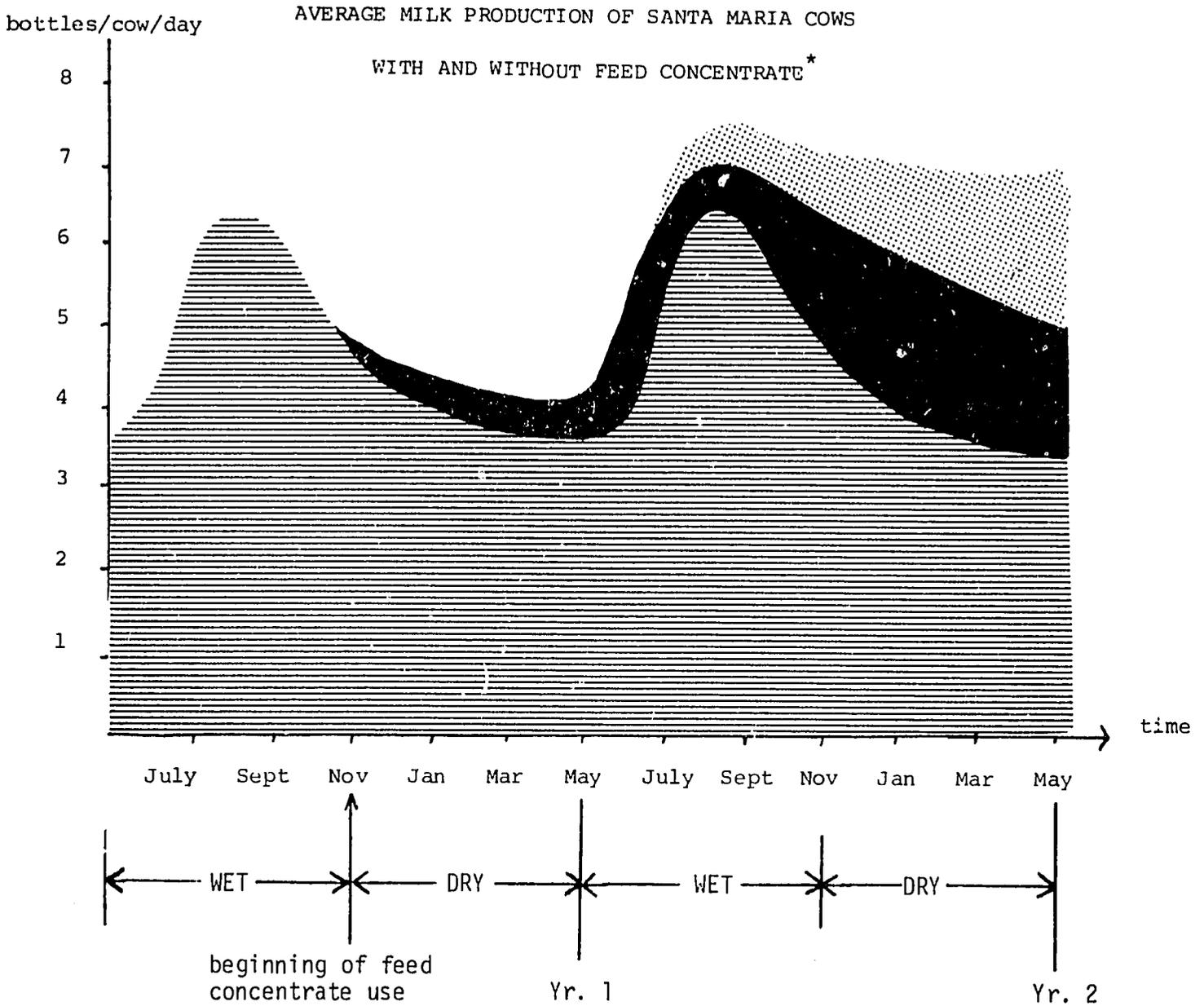
Internal difficulties could also endanger its viability. Technoserve withdrew its services in May 1980. The co-op must now fully rely upon its four staff members -- the manager, accountant and two millers. An abrupt departure of the manager and accountant would have serious consequences. Few Santa Maria residents possess the rudimentary high school skills to replace them. Feed concentrate must have strict quality controls, the millers' and manager's responsibility, if it is to benefit the community and maintain current sales levels.¹⁷

Feed concentrate sales will remain low during the rainy season unless extension services continue after Technoserve's withdrawal. Currently, the co-op has no plans to provide these services. Concentrate sales have been better than expected during the dry season. But it is not enough that farmers buy feed concentrate. This new technology's ultimate success depends upon the degree to which it is being used efficiently.

The following section examines the use of feed concentrate and its impact upon project participants.

¹⁷ Impurities have been found during spot checks of feed concentrate.

CHART 5



Key:

-  Milk production of cows without feed concentrate
-  Milk production of cows feeding concentrate only in the dry season
-  Milk production of cows feeding concentrate in the dry and wet seasons

* Based on Case Study Survey Data and projections

V. Statistical Survey Section

A. Survey Purpose

Technoserve's primary project objective is to raise the standard of living of low-income farmers by (1) increasing milk production and (2) improving the maintenance of milk and beef cattle. Charts 5 and 6 illustrate the cyclical nature of milk production and weight levels among Santa Maria cows. They reach their peak production during the rainy season and suffer a great decline during the dry season. Cows gain weight only to lose it again. According to theory and some test results, feed concentrate can alleviate these problems. But what impact has it had in Santa Maria?

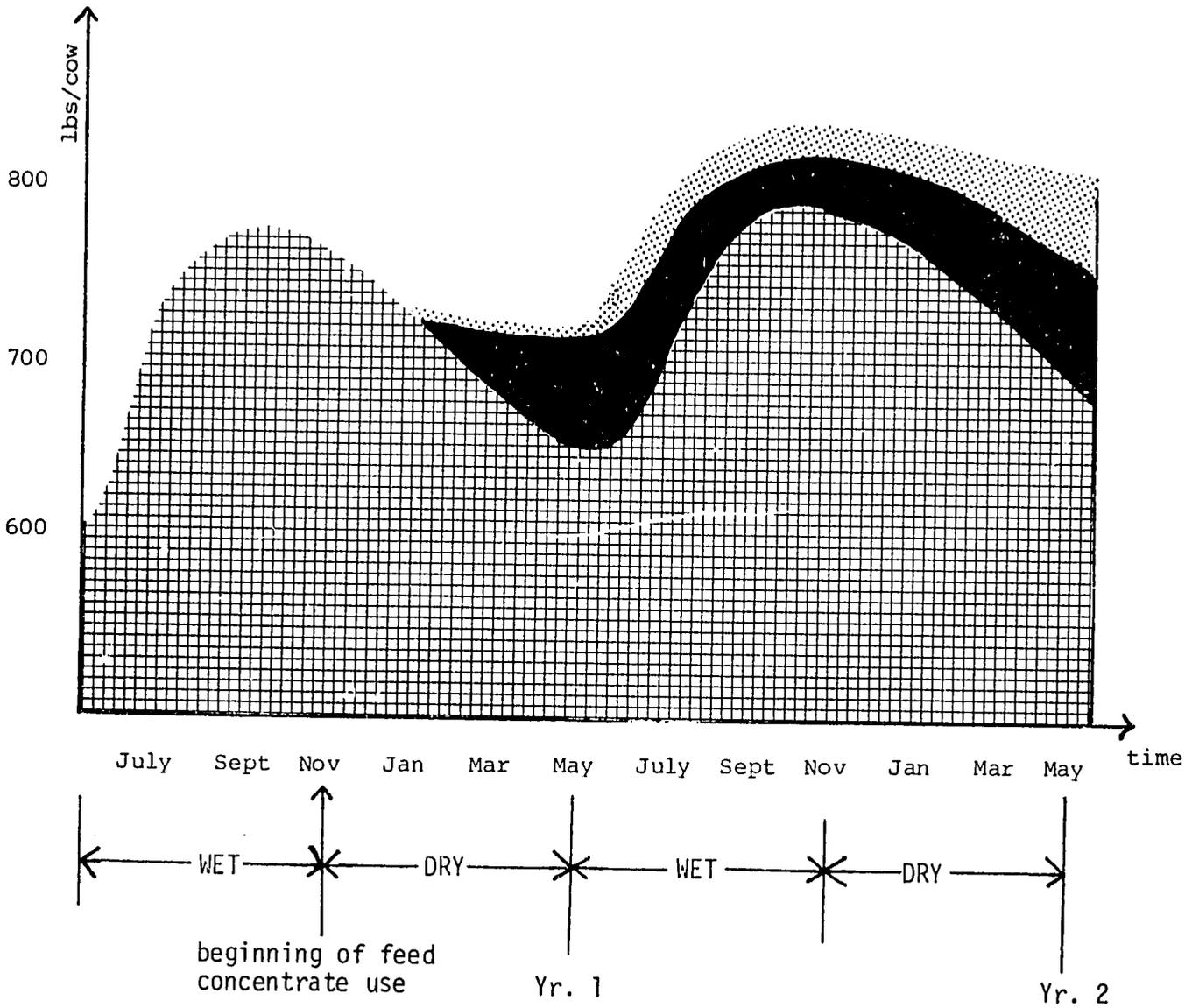
One simple method to ascertain potential project impact is to extrapolate from business indicators. If we assume that each cow receives the prescribed amount of concentrate and we know, through scientific tests, that this amount yields a certain amount of additional milk, then sales figures can be used to hypothesize how much net income has been generated.¹ Unfortunately, this method depends heavily upon assumptions which may bear little resemblance to reality. We learn nothing about what has actually occurred, just what should have occurred had this technology been used appropriately. Given the prevailing low level of proper cattle management in Santa Maria, these assumptions are especially tenuous.

Thus, a survey was designed to examine what effect feed concentrate actually has had upon milk production. (see Appendix B for Questionnaire). Indicators on housing, availability of potable water and electricity were also included to assess the relative standard of

¹ For example, in 1979 the Santa Maria co-op sold 373,900 lbs. of concentrate, 97% of which was for milking cows. If we assume that each cow received 4 lbs. of concentrate over a nine-month period, then approximately 335 cows were fed concentrate. Scientific tests indicate that 4 lbs. of concentrate result in an average increase of two bottles of milk per day. Since the average price for a bottle of milk is ¢.45, gross annual income resulting from concentrate use would be ¢81,604 (336 cows X 2 bottles X 270 X ¢.45). The cost of this feed concentrate to farmers is approximately ¢56,085; net income is thus ¢25,519. Assuming that 102 farmers purchased concentrate, each one earned a gross income of ¢800 and a net income of ¢250.

CHART 6

AVERAGE WEIGHT OF COWS
WITH AND WITHOUT FEED CONCENTRATE *



Key:



Weight of cows without feed concentrate



Weight of cows feeding concentrate only in the dry season



Weight of cows feeding concentrate in the dry and wet seasons

* Based on experts' estimates

living of those surveyed. It was not enough that concentrate sales were high: Technoserve wanted to know more about who was buying it. Were low and medium income farmers taking advantage of this product or were larger farmers its major consumers?

Another survey objective was to derive information that could aid co-op marketing and extension efforts. For example, non-concentrate users were asked why they had chosen not to buy feed concentrate. Their reasons for not using concentrate enabled Technoserve advisors to take prescriptive actions.



Survey interviewers

B. Survey Design

This survey was conducted in May 1979, four months after feed concentrate sales began.² At that time, only 34 farmers living within 10 kilometers of Santa Maria used the co-op feed concentrate.³ Each of these families using concentrate⁴ were matched with a family which did not use co-op feed concentrate. After finishing an interview with a feed concentrate user, the interviewer was instructed to find a non-concentrate user with approximately the same (plus or minus 50%)⁵ amount of land and head of cattle. This matching procedure was used to control for differences in the amount of pasture available to each group's cattle and the level of technology used in production. Because those using feed concentrate "test" the hypothesis that feed concentrate increases milk production and improves cow maintenance, they are referred to as the "test group". The aim was to derive a control group similar to the test group in all ways but one: only the latter used feed concentrate.⁶

² This time was chosen since it was the beginning of the rainy season when farmers would still be using concentrate and yet remember milk production levels prior to concentrate use.

³ Approximately 50 farmers bought concentrate directly from the co-op in previous dryer months. Another 50 farmers -- some living outside the zone -- formerly bought this concentrate from traveling distributors.

⁴ Demonstration tests have shown that milk production levels change after ten days of concentrate use. Thus, to be classified as a concentrate user, the farmer had to have fed concentrate for at least one month prior to the interview.

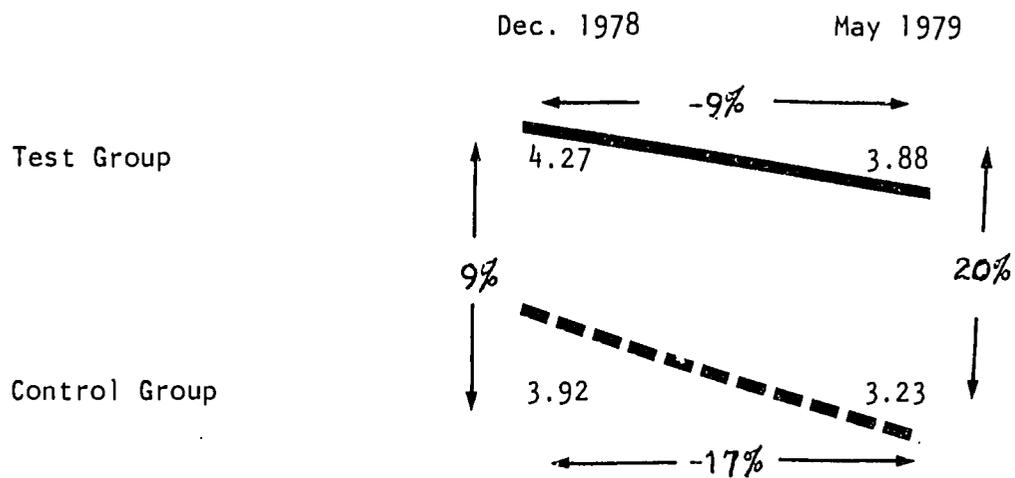
⁵ One concentrate user which grazed cattle on communal land was matched with another who used the same system and had approximately the same number of cattle.

⁶ See Methodology Section for an in-depth discussion of the survey's design.

SAN GERARDO SURVEY RESULTS

Table 1

Average Milk Production per Cow
(in 750 ml bottles)



C. Survey Results⁷

a. *Cows feeding concentrate produced more milk than control group cows*

Survey results, presented in Table 1, show that milk production for both test and control group cows declined between December and May. Feed concentrate did not completely replace the pasture used by the average test group cow in December. However, control group households suffered a 17% decrease in milk production, while test group households' milk production per cow declined by only 9%.

In May, test group cows produced an average of 20% more milk than control group cows. Since these cows produced more milk even before feed was being used in December, not all of this difference can be attributed to the feed concentrate. The 9% difference in milk production between test and control group cows in December informs us that these cows were not exactly alike before feed was used. Test group cows were not, therefore, perfectly matched with control group cows. Thus, cows feeding concentrate produced an average of 11% more milk than control group cows, after adjusting for this 9% matching error.⁸

Eighty-two percent of test group participants (28 households) said they believed that feed concentrate was increasing their cows' milk production. Survey results indicate that, when compared to their non-concentrate-using neighbors, they were right.

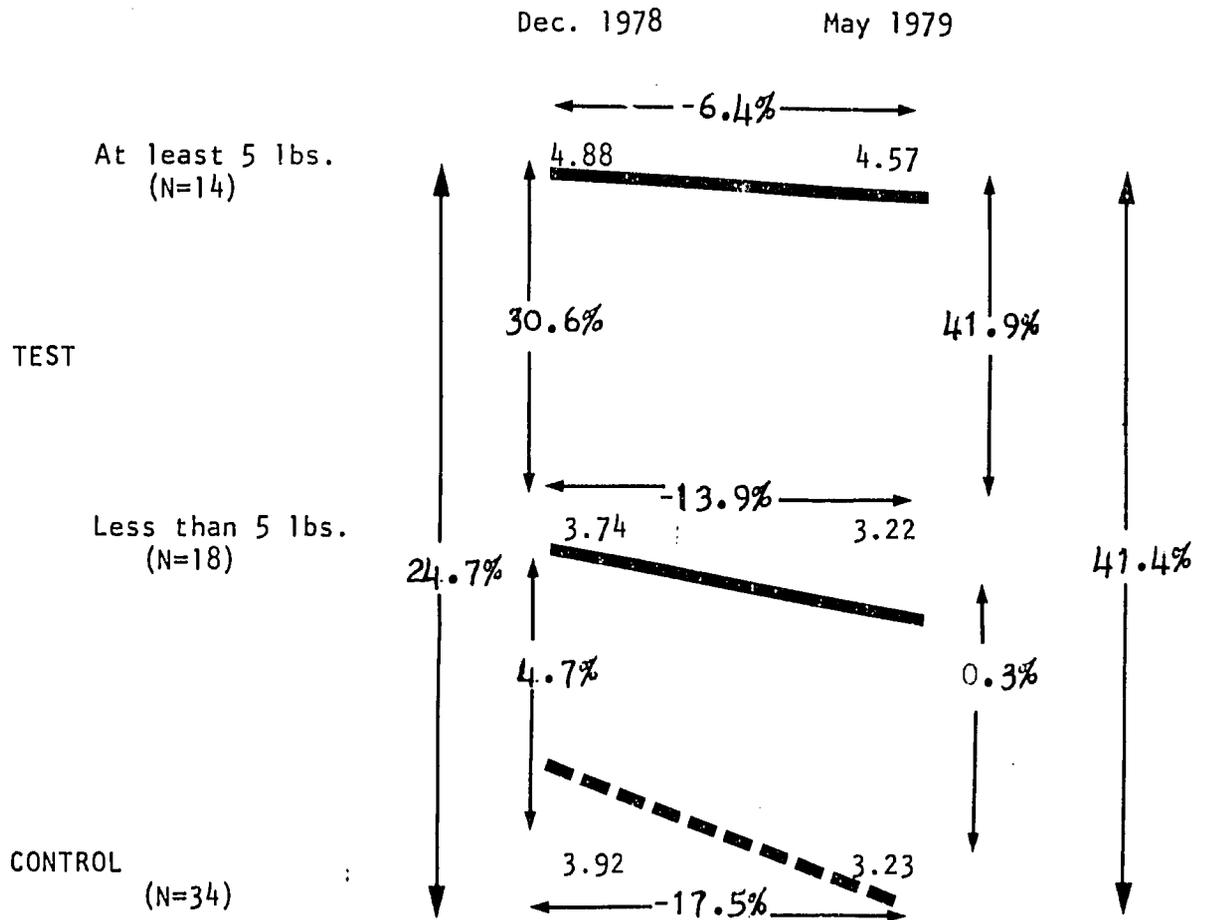
⁷ The results of this survey only pertain to concentrate users interviewed in the Santa Maria region. They may not reflect the situation of previous feed users nor of those in other parts of El Salvador.

⁸ A key assumption is that the 9% difference in December's milk production levels remains constant. It is possible that the underlying factors which caused a matching error of 9% in December also created a 20% gap in May. Further collection of substantial data is necessary to resolve this issue.

SAN GERARDO SURVEY RESULTS
Table 2

Milk Production According to Amount of Feed Used per Cow
in April 1979

(in 750 ml. bottles)



- b. *Little difference in milk production levels exists between cows consuming less than 5 lbs. of concentrate each day and control group cows. Cows feeding more than 5 lbs. produced 17% more milk than control group cows.*

The survey indicates that an average of 4.42 lbs. of concentrate are being fed to cows in the test group. However, livestock experts seem to agree that San Gerardan cows should eat at least 5 lbs. of concentrate plus adequate amounts of roughage to increase their production of milk during the dry season. Cows eating less than this amount will use the protein content in the feed for maintenance rather than milk production purposes. Survey results confirm this belief.

Test group cows were divided into those fed at least 5 lbs. daily (high feed users) vs. those fed less (low feed users).⁹ Milk production results classified by amount of feed concentrate used are found in Table 2.

In December and May, there is little difference in the milk production levels of cows feeding less than 5 lbs. of concentrate daily and those not using any concentrate. Cows which received at least 5 lbs. of feed concentrate produced, after adjusting for matching error, 17% more milk than control group cows. They produced 11% more milk than cows receiving less than 5 lbs. of concentrate each day.¹⁰

⁹ To control for differences between households, average milk production per cow (total bottles of milk produced + total number of milking cows) was first computed for each household. These averages were then summed and divided by the number of households owning milking cows.

¹⁰ Since 35% of high-feed users were nursing calves under 2 months of age while only 27% of low-feed users were nursing, the actual milk production of the latter group has been overstated. About 38% of control group cows were also nursing.

Also, high-feed users ate lesser amounts of alternative feeds compared to control group cows. Feed concentrate, therefore, and not other feeds, would account for the difference in milk production.

High feed users also suffered a smaller drop in milk production levels between December and May. As Table 2 indicates, the milk production levels of control group and low feed users dropped by 18% and 14% respectively; high feed users' milk production decreased by only 6%.¹¹

These results suggest that a minimum critical level of feed concentrate use must be reached before it can yield maximum benefits in terms of milk production. Interviews with farmers revealed that some had tried feeding 2 lbs. of feed concentrate to each cow. Only if the concentrate improved milk production, they reasoned, would they feed greater quantities. When milk production did not increase, they decided to stop using concentrate completely. They took the right decision, in terms of their immediate need for income, but for the wrong reason. Low feed users, by increasing the amount of feed given to each cow by one to two pounds, might achieve significant increases in milk production. Or, low feed users should complement feed concentrate with other protein and nutrient-rich feeds.¹²

11 Because high-feed user cows produced more milk than other cows even before feed was introduced, it is possible that factors other than feed concentrate alone may account for their relatively stable milk production levels during the dry season. High feed use may be evidence that these cows were better taken care of in the dry season than other cows. Improved cattle management practices would increase the positive impact of feed concentrate.

12 According to cattle experts, an 800-lb. milking cow needs 20 lbs. of air dry matter, 1.03-1.58 lbs. of digestible protein and 9.67-15.17 lbs. of total digestible nutrients. One pound of the San Gerardo feed concentrate mixture provides .097 lbs. digestible protein and .563 lbs. of total digestible nutrients. Thus, for example, 4 lbs. of concentrate should be balanced with 16 lbs. of grass or 43 lbs. of sorghum silage. If other feeds are not used, then more concentrate is necessary.

It was surprising to find that almost all -- 97% -- of these high-feed user cows were cruzadas. Only 58% of low-feed users and 76% of control group cows were of this type.¹³ This caused us to examine whether milk production varied by breed.

c. *Cruzada milking cows feeding concentrate produced more milk than control group cruzadas; the average milk production of test and control group criolla cows is very similar.*

Cruzada cows, which are a mixture of local and European dairy breeds, when properly cared for, produce more milk than criollas. They are also more delicate than Criollas and suffer more if they must stand in the sun or graze in poor pasture. Cruzadas, which are a mixture of local breeds and Brahin bulls, produce more milk under poor conditions. Their longer legs allow them to walk through uncleared grazing land with less injury and they are more resistant to ticks, mosquitos and the sun. Eight times as many cruzadas were owned by test and control group households as criollas.

When milk production was calculated for each household according to breed, it was found while test group cruzadas produced slightly more milk than test group criollas, the situation was reversed for control group cows. In May, there is a very small difference between the milk production of test versus control

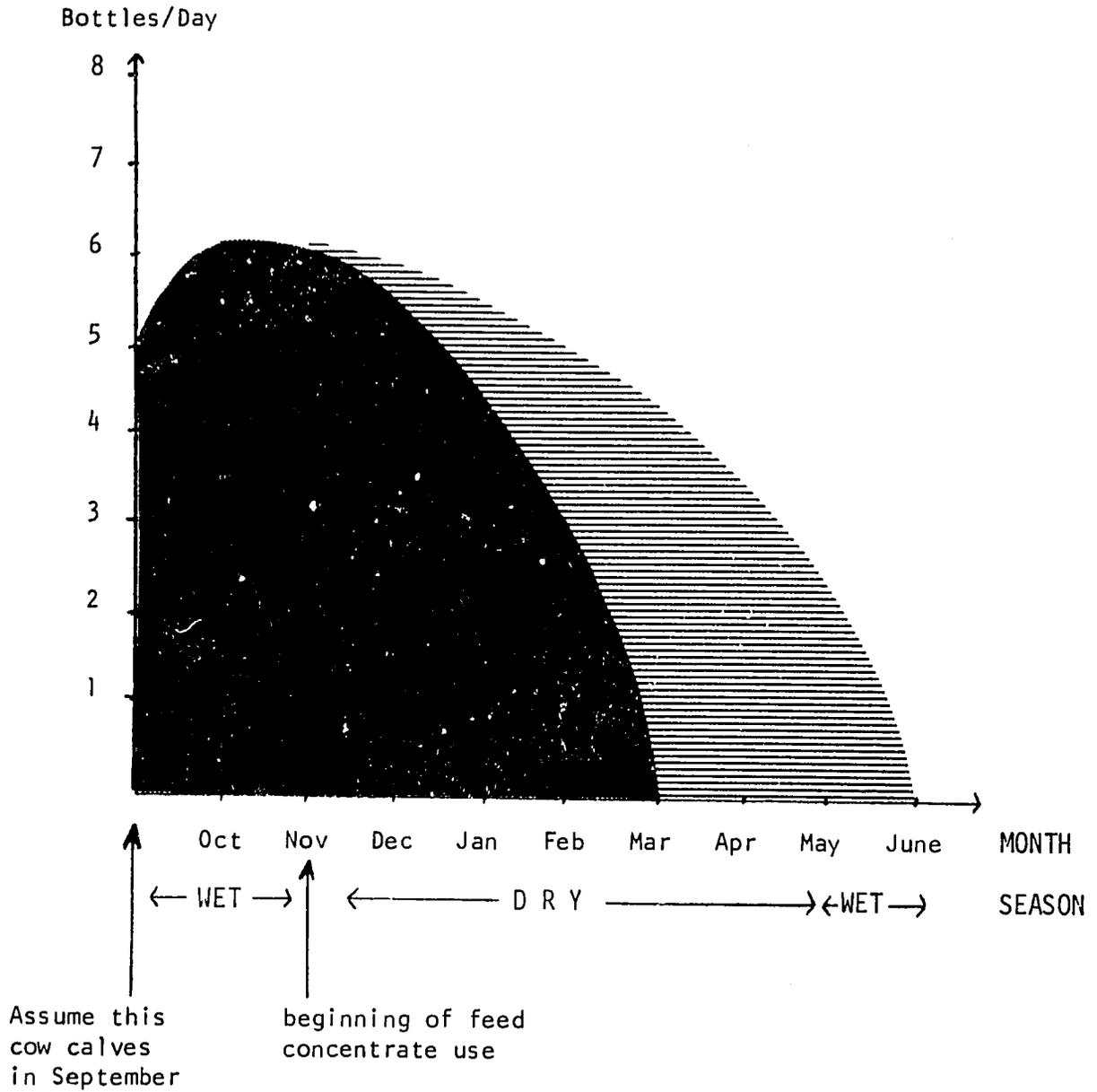
¹³ Inconclusive, somewhat contradictory results were found when groups were further stratified by breed into high feed, low feed and control group cows:

<u>Milk Production</u>		
	<u>Criollas</u>	<u>Cruzadas</u>
TEST		
High feed users	4.6 (5 households)	3.909 (13 households)
Low feed users	3.284 (11 households)	5.215 (15 households)
CONTROL GROUP	3.625	3.317

This is probably due to the low number of observations in some of these categories.

CHART 7

HYPOTHETICAL CASE OF THE POTENTIAL EFFECT
OF FEED CONCENTRATE ON ONE COW*



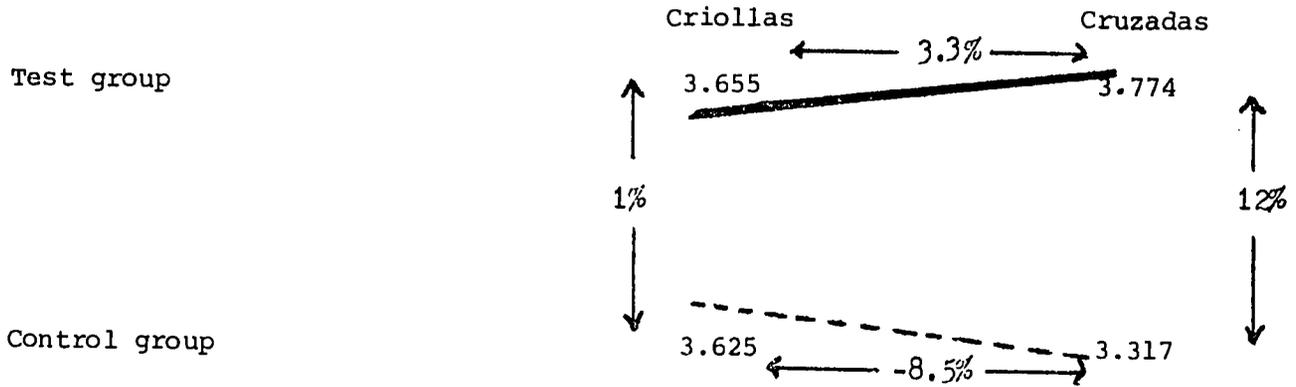
milk production of cow without feed concentrate

milk production of cow with feed concentrate

*According to cattle experts' best estimates

group criollas; test group cruzadas produced 12% more milk than their control group counterparts. Table 3 presents milk production data by breed:

Table 3
Average Milk Production of Criollas and
Cruzada Milking Cows in May 1979
(in 750 ml. bottles)



Because information on December's milk production according to breed was not collected, it is not possible to compare each breed's May milk production with pre-concentrate levels. Without this information, we cannot know the extent to which differences in milk production between the breeds in May is due to matching error. We also cannot know conclusively whether each breed responded differently to the feed. However, during interviews, some farmers complained that their criollas "did not like" the concentrate. Thus, further tests on this matter need to be conducted.

d. *Households using feed concentrate had a higher percentage of milking cows to total cows than their control group counterparts.*

Numerous factors influence whether a cow will produce milk or be dry. Among these are the general health of the cow, amount and quality of feed consumed, access to water, fertility and pregnancy. Cattle experts believe that, aside from the natural fertility cycle, Santa Maria cows go dry during the dry season because lack of feed causes their health to deteriorate. If properly fed, these cows could increase their present 6-month lactation period by an additional 1-3 months. The hypothetical effect of feed concentrate is shown in Chart 7.

Table 4

NUMBER OF MILKING COWS

•
—
•

TOTAL NUMBER OF COWS OWNED

BY EACH HOUSEHOLD IN DECEMBER 1978 AND MAY 1979

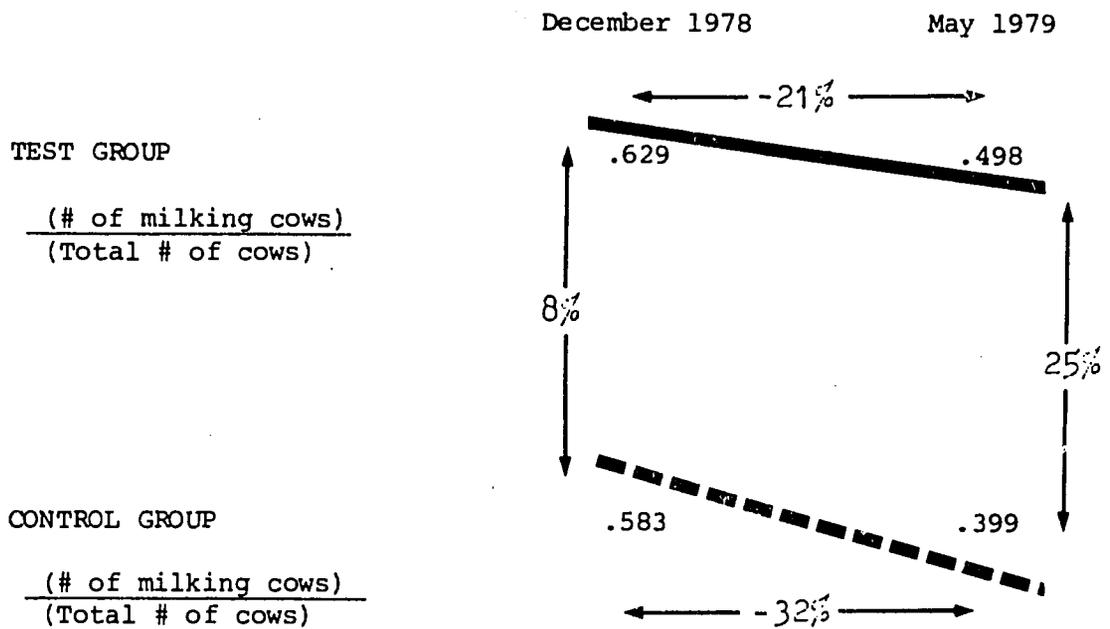


Table 4 shows a comparison of $\frac{\text{number of milking cows}}{\text{total number of cows}}$ before and after feed concentrate was introduced. There is a 17% real difference between the groups in May, after adjustments are made for an 8% matching error. Thus, on average, (1) the test group had a higher percentage of milking cows to total cows in May and (2) each milking cow produced more milk than its control group counterpart.

e. *Almost all farmers interviewed fed their cows an improper balance of feeds*¹⁴

A close examination of Tables 5 and 6 indicates that most farmers did not feed their cows a nutritionally balanced ration. Some provide more feed and nutrients than necessary, thus increasing the costs of cattle maintenance without gaining any benefits in the form of increased weight or milk production. Excessive use of cotton seed meal provides too much digestible protein which may actually harm animals. Most cows, however, received much less bulk matter, nutrients and protein than required.

The highest level of milk production -- 8 bottles per cow/day -- was achieved by a farmer who fed only 2 lbs. of concentrate to each cow. However, he supplemented it with the correct amounts of other feeds -- 2 lbs. cotton seed meal, some molasses and 17 lbs. of silage. This farmer, it was later discovered, was the only group member to have received FAO livestock extension services.

In areas with poor pastureland and no cattle management, each head of cattle should have 2 manzanas in which to graze. (.5 head per manzana). The average Santa Maria cow has only 1.2 manzanas (.8 head/manzana) of grazing land. With pasture rotation, this area should be able to support 1.6 to 2 head of cattle per manzana.

f. *Using feed concentrate was, on average, a profitable investment*

Survey results indicate that feed concentrate does increase milk production. However, test group farmers' incomes will only be augmented if the value of this increased milk compensates for the extra costs they incur by using concentrate. Approximately 79% of test group participants believed that feed concentrate was increasing their profits. Our calculations, based upon early May 1979 prices, show that feed concentrate was, on average, a profitable investment.¹⁵

¹⁴ This conclusion is drawn from conversations with Francisco Lino Osegueda, livestock management expert and Technoserve's Country Program Director.

¹⁵ These survey results should, in general, be used as a basis of comparison and not as absolutes by which to calculate profitability. Due to lack of alternative information, however, these calculations were made but should be regarded as mere estimates.

TABLE 5

AVERAGE AMOUNT OF FEED EATEN PER TEST GROUP MILKING COW AND MILK PRODUCTION PER COW ON A TYPICAL DAY IN EARLY MAY 1979 (CALCULATED FOR EACH HOUSEHOLD)

Test Group Household #:	Lbs. of San Gerardo Feed Concentrate Used per Milking Cow:	Lbs. of Cottonseed Meal Used per Milking Cow:	Lbs. of Corn Cobs Used per Milking Cow:	Lbs. of Sorghum Used per Milking Cow:	Lbs. of Long Grass Used per Milking Cow:	No. of 750ml Bottles of Molasses Used per Milking Cow:	Lbs. of Bran Used per Milking Cow:	Lbs. of Corn Husk Used per Milking Cow:
001	5	10						
003	6.666							
005	4	3.333						
007	3.125			0.833	6.666			8.33
009	2.857				9.375			9.375
011	6.666	3.333						
013	5							1.666
015	6				30			
017	5	2	5					
019	3	1		2		2		
021	3							
023	3.571							
025	2	2						16.666
027	4	4				0.033		
029	6.666							7.143
031	5.4	3						
033	--							
035	5.6							
037	10							
039	4	5				0.6		20
041	6							5
043	4				10			10
045	2							
047	3.846	2.307						
049	3							
051	2	2.5						
053	1.131					0.133		
055	3							5.555
057	7.536							25
059	--	1						
061	7.031							
063	2.5							
065	5	5	6.25		6.25			6.25
067	3			1		2		
TOTAL	141.575	44.467	11.25	3.833	62.291	4.766	0	12.5
Number of Observations	32	34	34	34	34	34	0	127.48
MEAN	4.424	1.308	.331	.113	1.832	.140	0	3.749

TABLE 3 (CONT. D)

AVERAGE AMOUNT OF FEED EATEN PER TEST GROUP MILKING COW AND MILK PRODUCTION PER COW ON A TYPICAL DAY IN EARLY MAY 1979 (CALCULATED FOR EACH HOUSEHOLD)								
(Continued)								
Lbs. of Silage Used per Milking Cow:	Lbs. of Cotton Hulls Used per Milking Cow:	Lbs. of Bagasse Used per Milking Cow:	Lbs. of Molasses Used per Milking Cow:	Lbs. of Forrage Used per Milking Cow:	Lbs. of Mineral Salts Used per Milking Cow:	Number of Grazing Cattle Number of Manzanas of Pasture Land	Number of Bottles of Milk Produced per Farm Number of Milking Cows per Farm:	
						.655	7	001
						.75	3	003
						.433	3.66	005
						.358	3.75	007
						.529	2.914	009
						1.12	5	011
						1.316	4	013
						1.9	2.33	015
						1.038	6.4	017
						.802	2.666	019
						.244	3.16	021
						.3	1.66	023
16.666						.688	8	025
						.686	2.142	027
						.978	6.6	029
						1.8	3.6	031
						1.167	6	033
						.770	4.2	035
						.378	5	037
						.75	2	039
						1.3	5	041
						.571	2.5	043
						.495	2.5	045
						.742	3	047
						.846	1	049
						.381	5.66	051
						Communal Grazing Land	2.77	053
						1.167	5	055
					.5	.696	3.076	057
						.659	4	059
						.726	3.75	061
						1	2.5	063
						1.375	5	065
						.25	3	067
16.666	0	0	0	0	.5	26.87	131.932	TOTAL
34					34	33	34	Number of Observations
.490	0	0	0	0	.0147	.814	3.88	MEAN

*Each calf = .5 head of cattle

TABLE 6

AVERAGE AMOUNT OF FEED EATEN PER CONTROL GROUP MILKING COW AND MILK PRODUCTION PER COW ON A TYPICAL DAY IN EARLY MAY 1979 (CALCULATED FOR EACH HOUSEHOLD)								
Control Group Household #	Lbs. of San Gerardo Feed Concentrate Used Per Milking Cow:	Lbs. of Cottonseed Meal Used Per Milking Cow:	Lbs. of Corn Cobs Used Per Milking Cow:	Lbs. of Sorghum Used Per Milking Cow:	Lbs. of Long Grass Used Per Milking Cow:	No. of 750 ml. Bottles of Molasses Used Per Cow:	Lbs. of Bran Used Per Milking Cow:	Lbs. of Corn Meal Used Per Milking Cow:
002		3.125				1		
004		6.5				1		
006								4
008								
010		2						
012								
014		5						
016								
018								
020		2				0.5		33.333
022								2
024					20			7.2
026		4.348				0.23		20
028		3	5			1		4.168
030		2.166				0.833	16.666	10
032								
034					25			25
036		3	5			0.333		
038								
040		3						
042								1
044					10			25
046		5.714				1.071		21.429
048		3.333						
050								7.5
052								12.5
054		4						
056								25
058		6.897						
060			6					
062		4						
064		4.571						5.714
066			12.5	2		4		
068		3					1	12.5
TOTAL	0	91.659	28.5	2	55	9.967	2.666	216
Number of Observations		34	34	34	34	34	34	34
MEAN	0	2.696	838	.059	1.618	.293	.490	6.3683

AVERAGE AMOUNT OF FEED EATEN PER CONTROL GROUP MILKING COW AND MILK PRODUCTION PER COW ON A TYPICAL DAY IN EARLY MAY 1979 (CALCULATED FOR EACH HOUSEHOLD)
(continued)

Lbs. of Silage Used Per Milking Cow:	Lbs. of Cotton Hulls Used Per Milking Cow:	Lbs. of Bagasse Used Per Milking Cow:	Lbs. of Molasses Used Per Milking Cow:	Lbs. of Forrage Used Per Milking Cow:	Lbs. of Mineral Salts Used Per Milking Cow:	No. of Manzanos of Pastureland No. of Grazing Cattle	No. of Bottles of Milk Produced No. of Milking Cows:	Control Group Household #
3.75	2.5					.91	6	002
		6.25				.448	3.9	004
						.25	2	006
						.771	0.714	008
						.537	3.2	010
	5					.63	3.333	012
			10			.931	2	014
						2.2	5	016
						.85	2.5	018
						1.13	3.833	020
						.867	.25	022
						.425	2.4	024
						.273	3.478	026
						.554	2.4	028
						.663	3.333	030
						.577	6.5	032
	2			2		.884	.25	034
						1.013	2.083	036
			8			.75	3.75	038
						.75	5	040
						1.5	2.666	042
						1.125	1	044
						.448	2.857	046
						.963	2	048
						.667	3	050
						.675	1.875	052
						Communal Grazing Land	2.083	054
						1.2	4	056
						.88	6	058
						.558	7	060
						.724	6	062
						.719	3.571	064
						.556	2.5	066
.524						.469	3.5	068
	9.5	6.25	18	2	0	.898	109.976	TOTAL
34	34	34	34	34		33	34	Number of
.110	.279	.184	.279	.059		.7847	3.235	Observations
								WEAR

Potential Revenue Generated by Using Feed Concentrate:

The average test group cow produced 3.88 bottles of milk on a typical day in early May. After adjustments due to match distortion were made, the average control group cow produced 3.528 bottles/day. We will assume that all of this milk was converted into hard cheese (5 bottles = 1 lb. hard cheese) and either sold or consumed. In early May, the price received by farmers for hard cheese was ø3.8/lb. Thus, the value of the additional cheese produced by an average test group cow was:

$$\frac{3.88 - 3.528}{5} \quad 3.8 = \text{ø}27$$

Costs Incurred by Test and Control Group Members

Tables 5 and 6 show the amounts of different feeds consumed per cow for each household interviewed. These figures were used to calculate that a test group farmer spent ø.22 more on each cow than a control group farmer.¹⁸

18

<u>Type of Feed</u>	<u>Test Group lbs/cow</u>	<u>Control Group lbs/cow</u>	<u>¢ Price/lb.</u>	<u>Test Group Costs</u>	<u>Control Group Costs</u>
Feed Concentrate	4.424	0	.125	.553	0
Cotton Seed Meal	1.308	2.696	.135	.17658	.36396
Corn Cobs	.331	.838	.026	.008606	.021788
Sorghum	.113	.059	.17	.01921	.01003
Long Grass	1.832	1.618	.026	.047632	.042068
Molasses	.14	.293(bottles)	.09(price/ bottle)	.0126	.02637
Bran	0	.490	.125	0	.06125
Corn Husk	3.749	6.3683	.026	.097474	.16557718
Silage	.490	.110	.01	.0049	.0011
Cotton Hulls	0	.279	.05	0	.01395
Bagasse	0	.184	.01	0	.00184
Morro	0	.279	not sold	0	--
Forrage	0	.059	.09	0	.00531
Mineral Salts	.0147/qt.	0	.7/qt.	.01029	
Total				.930292	.69857

The true cost to test group farmers was their May costs with feed minus what they would have been spending without feed (control group costs):

Feed Users' Costs: = .930292 - .69857 = .231722

Return to Investment

The return to investment, $\frac{\text{revenue}}{\text{cost}}$, of using feed concentrate is $\frac{.27}{.23}$ or 1.17. This means that the average test group family with 12 milking cows could earn an additional Q2.04 (\$.82) on a typical day in late April - early May.

This figure is of most concern to poorer, present-minded farmers who need a quick return on their investment. Wealthier farmers can afford to wait for the longer range benefits of using feed concentrate.

However, the price of cheese must be above Q3.26 per lb. to make the use of feed concentrate profitable for the average test group member. The market price for cheese ranges between Q3.4 - Q3.8 in the dry season; in the wet season an increased supply of cheese causes this price to drop to Q2/lb. Farmers profiled in this study said they had little incentive to invest in feed concentrate during the wet season.¹⁹

Cattle experts agree that short-run analyses cannot do justice to the merits involved in using concentrate. Its true value may only surface in the long run. These projected long-run benefits include:

1. Higher milk production levels in the rainy season. Even if farmers stop using concentrate in the wet season, cows will not have to recoup as much lost weight as in previous years. This should cause milk production levels to increase quickly as pastureland becomes available.

¹⁹ Two events may increase the attractiveness of using feed concentrate. The Government of El Salvador recently passed a law requiring that hard cheese be part of every landless laborer's meal supplied by the landowner. If compliance with this law is great, the price of cheese should rise even in Santa Maria. Another development is that the GOES has begun to sell cotton seed meal on the world market, thereby causing its domestic price to increase by 30% to Q17.50 in October 1979. Since cotton seed meal is a major feed competitor, more farmers may switch to the cheaper balanced feed ration.

2. Healthier, stronger cows which produce better quality milk. About 76% of test group and 68% of control group farmers believed some of their cattle were healthier than they had been the previous year. Three-quarters of both groups believed their feeds were making the difference.

3. Longer lactation periods. Survey results indicate this may have already occurred.

4. Increased calving rates. Currently a typical Santa Maria cow calves every 14 months instead of every 12 months. An increased cattle population would have to be complemented with additional feeds and better cattle management.

5. Healthier calves.

Another more comprehensive survey would be required in the future to test whether these longer-run objectives have been achieved.

g. Extrapolations from business indicators should not be used to determine the benefits of this project to concentrate users.

Survey results indicate that feed concentrate has, on average, increased milk production less than anticipated. Extrapolations based upon the impact of concentrate under more ideal conditions (e.g. 4 lbs. of concentrate/cow = 2 additional bottles of milk/cow/day) would overestimate the concentrate's actual effect on Santa Maria farmer incomes. Thus, such calculations (as described in footnote #1, p. 60) should be avoided, if possible.

Farmers require more cattle management extension services before this project achieves its desired impact. Improvement in farmers' net income due to increased calving rates, milk and beef production might be investigated at a later date. Other benefits, such as net income to farmers selling inputs to the enterprise and net jobs created are extremely difficult to calculate in a cost-effective, yet accurate, manner. And, because the most important benefits of this project cannot be quantified into monetary terms, a traditional benefit/cost calculation is not appropriate at this time.

PHYSICAL ASSETS OF FEED CONCENTRATE USER HOUSEHOLDS
TABLE 7

Type of Physical Asset:	Unit Ranges of Physical Assets:	0 - 10	11 - 20	21 - 30	31 - 40	41 - 50	51 - 60	61 - 70	71 - 80	81 - 90	91 - 100	101-110	111-120	131-140	141-150	151-200	201-250	251-300	Communal	Total
		Manzanas Worked	% of total households (No. of Households)	23.5% (8)	5.9% (2)	14.7% (5)	8.9% (3)	5.9% (2)	8.9% (3)	2.9% (1)	8.9% (3)		5.9% (2)					2.9% (1)	2.9% (1)	2.9% (1)
Cattle Owned:	% of Total Households (No. of Households)	26.5% (9)	17.6% (6)	11.8% (4)	11.8% (4)	2.9% (1)	5.9% (2)			5.9% (2)	5.9% (2)					5.9% (2)	2.9% (1)			100% 34
Cows Owned:	% of total households (No. of Households)	47.1% (16)	20.6% (7)	8.9% (3)	5.9% (2)	2.9% (1)	5.9% (2)	5.9% (2)												100.1% 34
Milking Cows Owned:	% of Total Households (No. of Households)	61.8% (21)	20.6% (7)	11.8% (4)	2.9% (1)			2.9% (1)												100% 34
Beef Cattle Owned:	% of Total Households (No. of Households)	94.2% (32)		2.9% (1)		2.9% (1)														100% 34
Bulls Owned:	% of Total Households (No. of Households)	100% (34)																		100% 34
Calves Owned:	% of Total Households (No. of Households)	47.1% (16)	29.4% (10)	11.8% (4)	2.9% (1)			2.9% (1)			2.9% (1)									99.9% 34

D. Socio-Economic Characteristics of the Test Group

Another survey objective was to derive some sense of the socio-economic characteristics of those using feed concentrate. Were lower income farmers with fewer assets taking advantage of this new technology, or were more prosperous farmers its primary market?

The Government of El Salvador has categorized those owning less than 50 head of cattle as "small scale" and belonging to its target population. Over 70% of feed concentrate users surveyed were members of this group.

It has been estimated by Technoserve advisors and confirmed by Santa Maria residents that the average seven-member family requires the income and food generated by twenty head of cattle to meet poverty level needs. These families, assuming that cattle provided a major, if not sole, source of income, would fall below USAID/El Salvador's \$335 per capita income poverty level definition. *About 44% of test group participants fall into the poverty level category.* One quarter of the test group owned less than ten head of cattle (See Table 7 for distribution of the test group's land and cattle).¹⁶

The Vargas family profile in the following section describes the lives of those with such assets.

About 26% of test group farmers owned between 21 and 50 head of cattle. Many of these larger-scale cattlemen would, due to mismanagement of their resources, also be part of the lower income target population. Francisco Gomez, the owner of 45 head of cattle, provides an example of one of the more enterprising members within this economic strata.

Thirty percent of the test group owned between 51 and 250 head of cattle. These assets placed them within the wealthiest segment of Santa Maria's population. A short description of someone in the lower half of this group can be found in the next section.

¹⁶ Since the main focus of this study was on milk production, respondents were not asked whether they owned or rented this land. Most Santa Maria residents own some pasture for their cows; many must rent land fit for cultivation.

Were the socio-economic characteristics of test group members fairly representative of the Santa Maria population? To answer this question, the test group was compared with the 1971 Santa Maria census statistics.

In 1971, 22% of Santa Maria farms had cattle. The distribution of cattle ownership according to the 1971 census and feed concentrate users in May 1979 is shown in Table 8:

Table 8
Distribution of Cattle Ownership in Santa Maria

No. of Head	1-9	10-19	20-49	50-99	100-199	200-499	Over 500
1971 Census N=303	47%	20.5%	18.2%	6.6%	6.3%	.9%	.3%
May 1979 Test Group N=34	23.5%	14.7%	32.4%	17.6%	5.8%	5.9%	--

It is difficult to compare these distributions since they stem from different time periods. Average herd size may well have increased since 1971. If this has occurred then the test group may bear a striking resemblance to the composition of cattlemen in Santa Maria. If herd sizes have remained the same or decreased, then test group members have an underrepresentation of smaller cattlemen in their midst.

Most of the test group participants lived in adobe (44%) or mud and wood (38%) structures. The remainder had wood (9%), brick (6%) or straw (3%) walls. All families had tile roofs and almost half had dirt floors. The other half had either cement (29%) or clay (21%) tiled floors. Over ninety percent of Santa Maria homes in 1971 had dirt floors.

The average family had seven members. And yet, 58% of homes had only two or less rooms. Almost one quarter of the homes had three rooms; the remaining 18% ranged from four to seven rooms. In 1971, 67% of homes in Santa Maria had four or more inhabitants per room.

About one quarter of feed concentrate users had electricity, and only 35% had potable running water in their homes. The twenty-two families without water must walk an average of 250 meters to their source of running water.

E. Survey Participants' Attitudes on Feed Concentrate Use

Test group participants seemed favorably impressed with the concentrate. No one said they would buy less during the next dry season and 71% said they planned to buy larger quantities in the future. One quarter planned to use the same amount and 3% were undecided. Yet, over 67% of test group participants said they planned to buy less feed concentrate during the wet season; 18% said they would continue to buy the same amount and 6% planned to buy more; 9 were undecided.

All control group members had clear reasons why they had not bought feed concentrate. About one-third of control group members said they did not use feed concentrate because they preferred cotton seed meal. Many believed that cotton seed meal caused cows to produce more milk than concentrate. However, if properly used, feed concentrate is more cost effective than cotton seed meal. The efficiency and comparative cost of using feed concentrate versus cotton seed meal has been examined by Technoserve livestock experts.¹⁷

Eighteen percent of the control group said they could not afford to buy concentrate and fifteen percent did not believe it would improve milk production. Nine percent

¹⁷ See "Análisis de la Encuesta a Socios de ACOPALIM" by Ing. Francisco Lino Osegueda and Adrian Chacon, Technoserve, Inc., September 1979

mistakenly believed that only co-op members were allowed to buy concentrate. The rest used other feeds, complained that their cows gave so little milk that concentrate would not be worthwhile or said that they lacked any means of transporting the 100-lb. sacks to their farms.

These statistics sketch, in very abstract terms, the constraints faced by Santa Maria cattlemen. But what does it mean to say that income generated from twenty head of cattle can meet the basic needs of a seven-member family, that most families had dirt floors and lacked potable running water? The nature of poverty cannot be understood through these numbers. They have no meaning unless accompanied by a closer examination of the lives they represent. The following profiles seek to describe the daily lives of a few Santa Maria families to reveal more about their hopes and the obstacles they face.



VI. Family Profiles

A. Overview

A better understanding of the lives affected by this project gives it a meaning that cannot be conveyed by examining the growth of a local institution or its quantifiable impact. We believed that a cold, analytical discussion of farmers' problems was not enough; we wanted people of differing economic means to be given an opportunity to tell their own stories. We hoped they would teach us more about how they perceived reality and their hopes for the future.¹ For it is the Gomez, Sanchez and Vargas families who will finally determine the course of development in this small community. Outside agencies may act as catalysts for change, but only if such people seek to participate in their own development. Although generalizations based on these profiles should not be made, the families did share some common characteristics:

- All farmers interviewed believe in saving and re-investing their profits in productive assets such as land and cattle.
- None of the families were composed of more than two generations or has a strong extended family system.
- All families reinforced the notion that this is a child-oriented society. Family planning has been rejected by these couples because they do not view children as extra mouths to feed, but rather as sources of pride.
- The basic diet of tortillas, beans and cheese does not vary greatly between these families, despite their economic status. Wealthier farmers, however, may be able to afford more bananas, meat and vegetables.
- All have heard stories about the United States through friends and relatives, most of whom are illegal aliens. Ownership of radios and even televisions are not adequate proxies for wealth, since these items are often gifts from relatives returning home on visits.
- Education is highly valued by all these families. Some, like Francisco Gomez, view it as a ticket to a better life in the cities for his children. Others, who hope their children will stay in Santa Maria, say they have great respect for knowledge.
- Although all families are dependent upon their cattle for most of their disposable income, they know little about cattle management. Because they do not rotate their use of pasture, they cannot make full use of its potential.

¹ These families are not necessarily representative of other Salvadoran or even other Santa Maria residents. A discussion of the methodology used to select families and conduct interviews on page 146 should alert readers to biases they may encounter.

The greatest difference between these families is their income. The per capita income of the four rural families ranges from approximately \$160 to \$700. It was not possible to determine the per capita income of the richest, urban-based family. Income figures included within this section are estimates based on information on the value of family-consumed food, revenues received from crop and cheese sales and their accompanying costs. Surprisingly, this income distribution has not been translated into a marked disparity in these rural families' standard of living -- housing, sanitation, food and education are very similar.

Why some children leave Santa Maria to seek their fortune elsewhere, also seems to be less a function of their economic status than the expectations of their parents. Some have encouraged their children to leave. The families' economic situation has had a direct bearing on how far their children can afford to go. The Gomez' have helped to finance two sons' journeys to the United States; the cost of this high-risk venture prevents the poorer children from following this example. However, San Salvador may only be the first stop in their flight from Santa Maria.



Francisco Comez pointing to his pasture.

B. Francisco Gomez Family

Don Francisco has twice lost everything he owns. On the first occasion he believes modern medicine was to blame. "My cattle died", he says confidently, "because I vaccinated them." His wife adds, "After giving birth, the cows couldn't stand; their legs would bend and green liquid flowed from their mouths. They died quickly."

"After the cattle died", says Don Francisco, "The bank still came to me, demanding that I pay back the loans they had given me to buy the cattle. I lost my land... and everything."

On the second occasion, there was a drought and all his cows starved to death. "In those terrible years, there wasn't enough pasture, even in the rainy season."

Santa Maria is not an hospitable area for cattle. Until six years ago, 20 percent of this region's cattle died annually, according to an FAO livestock expert. Lack of feed and water during the dry season, compounded by rough terrain and year-round infestation of parasites has made survival of even the hearty Brahmin breed difficult. Vaccines, if not properly stored, will produce not prevent disease.

When Don Francisco moved to San Sebastian twenty years ago, it was a cluster of mud and wood houses near Santa Maria. Today it remains virtually unchanged. Because he could read and write and "had a little knowledge", he became the teacher of a nearby rural school.

He saved his wages and bought land. At that time, land was very cheap -- \$80 per manzana. Land today costs five times that amount.

Over the years he began to raise cattle and buy more land. Don Francisco is nostalgic about the past. The cows were not fatter, but "they were not restricted, they could wander freely". When he was a child, fertilizer was not needed for the

cornfields. Now, he says, "if you do not fertilize, you do not eat". But still he complains the soil grows worse each year.

Don Francisco has invested both time and money in the community. Believing that San Sebastian should have its own school, he donated some land upon which a school has been built. Thinking that cattlemen working together might better survive the increasingly hostile natural elements, he was one of the initial founders of the Santa Maria co-op.

He lived for some time with a young woman from the neighborhood. A travelling priest passed by their house one day and they were married. They both speak enthusiastically and frequently interrupt each other.

Although the Senora has attended several family planning sessions, she has had seven children. Her husband says he cannot even listen to family planning propaganda on the radio. "Before when someone spoke about this, it was considered an insult", Don Francisco says vehemently, "Now it is even heard in ads with music."

"Even before these ads came out, I read in the Bible that at the end of the world women were to stop having babies. Not because God forbids it, nor because women cannot have them, but because men want it that way. Since I was curious, I asked the priest about this. He answered that it has not come true yet, but that these things that are said in the Bible will come true."

"In the countryside women have to have more children to help us build and produce more. In the large cities it is different. Why is there so much to eat in the houses in San Salvador? Why is there so much money in the bank? And yet, we are in this bad situation. The government does not help people in the campo."

Dona Rosa disagrees with her husband: "If a family is poor, it should use family planning, otherwise the children will demand food that cannot be provided." She does not practice family planning, but because she is in her mid-40's, they do not expect to have more children.

The Gomez family has prospered during the past few years. Annual family income -- not subtracting the cost of family labor -- is approximately \$5,000. Their per capita income is three times the national average for the rural sector. And yet, their standard of living still is far below most of the poorest North Americans.

Although they own 37 manzanas of land -- more than four times the average size of farms in the area -- 80% of this soil can barely support his grazing cattle. Corn is grown on seven manzanas and is used to make tortillas for the family, fed to the cattle or sold.

Their fifteen milking cows produce an average of 50 bottles of milk each day which is converted into cheese. If entirely sold, this cheese would produce a net income of about \$2,500 each year. A profit of \$1,600 was gained from last year's corn harvest. In addition, the family owns 15 dry cows and heifers and 15 calves. About 85 percent of Santa Maria's cattlemen in 1971 also owned fewer than 49 head of cattle.

When he is not attending his crops or cattle, Don Francisco is a paramedic. Although he has never received any training, he sells medicines and gives injections to local clientele -- "I practiced on the cows first", said Don Francisco. He earns a monthly average of \$40 from this activity.

Dona Rosa spends the day doing the laundry, preparing food and taking care of the small store located in their house. She invests the profits of this enterprise -- \$1.00 per day -- to buy food.

The family's two-room home is large for the region. Its walls are constructed of mud and wood and the roof is tiled. The main room is a store selling soaps, aspirin and candy. This room also serves as a living room and is where cheese is made and stored. A few old wooden chairs, hammocks and a table are the only furniture. A partition divides the store from the bedroom where the parents and younger children sleep. It is about 10 X 20 feet wide and overlooks the pigpen. Another small room is used as a bedroom for the older children.

The main room is usually filled with animals -- chickens are fed off the dirt floor where younger children play. Several cats and dogs wander through and sniff at open sacks of feed concentrate.

A hand pump brings water from a nearby well to a covered area outside the house. Here clothes are washed and family members bathe.

The house has no electricity. They have a battery-operated record player and an old radio. Don Francisco listens to the radio each morning during breakfast, after the cows have been milked. He says, "I'd rather miss breakfast than the news about the world." Most Santa Maria residents profess little interest in outside events or politics.

But Don Francisco says:

....."We were going to have a fiesta today, but it was cancelled because the authorities are here. Where the guardia is, there's fighting immediately. Look at Santa Maria; it's very nice. There are never guardia around. The people of Santa Maria can take care of themselves. This military rule is no good for the town, because there's no democracy. Look at Costa Rica. People there abide by the law. Some pilots arrived from another country, and they were thrown out because they were foreigners. The assembly voted on it. "

"Here everyone orders everyone else around. If the guerillas say, "do this", it is done -- and if the government says something else, it is also done. They are never in agreement. The government should be the leader. "

"In the past, during the rule of President Molino, the government said that the price of beans was going to be $\text{¢}0.25$ per pound and not $\text{¢}0.60$, because prices should be lower for workers. But a woman in Santa Ana hoarded 1,000 qq. Imagine that? And then she went to have a conversation with Molino. He told her to sell it for whatever she could get. How about that! Things are not right, and the people can't stand it any more.

Today the government says that yes, the laws are going to be respected. I've heard that a minimum wage is going to be $\text{¢}5.20$ per day and those that resist will be fined. I've heard that some merchants in Santa Ana were speculating with prices and weights. Now they will be fined. This is good. This is democracy. This is law. "

Don Francisco hopes that all his children will obtain high school degrees so that they will be able to move to the city. He knows that life in Salvadoran cities can be difficult; "The only ones who live well are the rich or those who have a good job." He hopes his sons would follow the example of the eldest who works at a San Salvador bank. He earns a steady salary and shoulders none of the risks involved in farming. Don Francisco believes this is an easier life than he has had.

Unlike their father, his four younger sons do not believe their future lies in El Salvador. They have heard stories about the riches which lie waiting to be tapped in the United States. All that is needed, they say eagerly, is hard work. As much as \$100 can be earned in a week -- almost half of rural El Salvador's annual per capita disposable income! ²

Three years ago Alberto, the second eldest son, worked as a busboy in a hotel near San Salvador. There he met a Cuban-born import/export entrepreneur who was a Texas resident. After spending some time with the boy and meeting his family, Oscar Campos offered to sponsor the seventeen year old's entry into the U.S.

Alberto could live with the family and attend a Texan high school; in exchange he would work on their ranch. After a few months, Alberto received a letter from his new friend. It was written in English so he and his family could not know its significance. His mother kept it hidden in a wooden box with other valuables. She says she was somewhat afraid of what it might contain and cautioned her son against the promises of strangers.

Years later these yellowed, carefully hoarded papers were finally translated. Neighbors gathered around and listened. It was a notarized affidavit of support addressed to the American Consulate. A registration form to a San Antonian high school was also enclosed. Oscar Campos had kept his word after all. With these documents, Alberto could probably have obtained a legal visa to the United States.

² In 1976, average per capita disposable income was \$210 for rural families and \$537 for urban families. AID, Country Development Strategy Statement FY 1981 El Salvador, January 1979, p. 2.

But it was too late. While the letter was being translated in Santa Maria, Alberto was in a Texan jail. He had decided to enter the United States illegally through a "coyote". This agent charges each aspiring immigrant the hefty sum of \$1,000 for three chances to go to North America. The customers are guaranteed delivery within the U.S. border; if deported within a few weeks, they may try again free of charge.

Alberto was twice deported and left on his final attempt in July 1979 -- one week after he was deported. "I won't give him one centavo more", his mother vowed, "If he doesn't make it this time he will have to stay here." He has not been heard from since.

Jose, now 17, also asked his father if he might try to go to America. Don Francisco says, "While they are here, my children all work in the house or fields without pay. If they need money for some reason, I must give it to them with pleasure because they helped make it." Thus, he sold some animals and used all their savings to buy both sons their "tickets".

Two years ago Jose went to the United States. His bus, filled with illegal immigrants, was picked up soon after crossing the border. He shows his passport stamped "illegal alien" with obvious pride as proof of his adventure. His three weeks in jail were not bad at all:

Everyone spoke Spanish and we were treated well. The cell was clean and we had three good meals - even meat - each day. There was a television on the wall which I could control from a small box.

I watched all the soap operas.

He is eager to try his luck again. When told that the regular air fare from San Salvador to New York is half what he must pay, he responds with a laugh, "But that is if you enter legally. I must enter illegally. Of course that costs more!"

Given the present productivity of the land in Santa Maria today -- and the population pressures -- Don Francisco and his wife expect their children to leave for the cities, if not North America. Both parents, of course, say they would like to see their children employed in Santa Maria. But employment opportunities outside the family farm are virtually non-existent.

The continued investment by Don Francisco of his time and limited resources in co-op activities is not going to prevent his sons from seeking employment outside Santa Maria. But he says that the collective efforts that have begun to permeate the community as a result of the co-op's existence -- and in particular the local production of feed concentrate -- have enhanced the security of the small family farm. For the first time since he walked among Santa Maria's ramshackle mud and wood huts 20 years ago, Don Francisco is more optimistic that his material gains will not be taken from him by the mere vagaries of the weather. Co-op fertilizer helps his land, its concentrate protects his cattle and its credit has enabled him to buy more livestock.

As a co-op officer, he plans to improve its services even further. He wishes to expand credit services to members and market the feed concentrate more aggressively, since it has helped maintain his cattle during the past dry season. He hopes the co-op will soon advise members how to plant improved grasses so that milk production will increase during the rainy season. He believes the co-op could encourage farmers to introduce better cattle breeds into their herds. Don Francisco has always been a visionary among his neighbors.



The senora at work



JUAN SANCHEZ FAMILY

Juan Sanchez' poultry are dying. His 50 hens, chickens, chicks and baby turkeys have begun coughing and sneezing -- symptoms of the deadly Newcastle disease. Their bodies will soon become distorted so that they can no longer walk or eat. Eventually they will die of starvation. No vaccination program against the virus exists in the area, so there is little hope for recovery.

One of his three calves has a swollen throat which inhibits its ability to eat properly. The animals' skin is tautly stretched across protruding ribs as evidence of severe malnutrition. This may be due to a calcium deficiency. Because there is no local veterinarian, Don Juan has bought medicines recommended by local cattlemen. He does not know what he will do if this medicine is unsuccessful.

The poultry and six head of cattle are his sole assets. He does not own any pasture of his own, and so must graze his cattle upon his father's land. His house is also built upon land owned by his father. It is a small mud and wood structure with a dirt floor. Instead of plaster walls, newspaper sealed to wooden sticks is used for insulation. Smoke rising from the indoor kitchen protects the house against termites and mosquitos. One large trunk is used as a granary for shelled corn; another locked box stores good clothes, important papers, pictures and other valuable items. These boxes divide the one room house into the areas where adults and children sleep.

An old, manually operated sewing machine rests on a table near the window. The senora uses the small sum she earns sewing clothes to buy cloth for family use, but Don Juan attests, "My son and I need only two changes of clothing".

Three children died at birth. Five of their six children live at home. The second eldest son, 21 years old, moved to San Salvador six months ago. "He is trying to get used to city life", the senora says. "He visits us every three months. He has come twice but each time he returns to the city. I think we have lost him; he does not like the field anymore".

The other family members say they are not interested in going to the city. The senora says, "I cannot sleep in town; there are too many mosquitos and I do not feel good being away from my home". Family members say they are happy living peacefully and do not wish to complicate their lives with knowledge of outside events.

Don Juan has raised cattle and cultivated corn his entire life. His eldest son helps him just as he used to help his father. They grow corn on three manzanas of rented land and hope to earn a profit of \$480. Beans are sown between rows of cornstalks and are solely consumed by the family.

Don Juan buys all his agricultural inputs on credit from the co-op. As a co-op member, he does not have to complete many forms to receive a loan. When he needs credit, he informs the credit committee, which then takes care of the paperwork. This useful service was the motivation behind Don Juan's decision to join the co-op.

Don Juan says he is pleased with the feed concentrate because

meals. When they were younger, the boys helped with chores around the house. But, like many Salvadoran families, a strict division of labor according to sex occurred at puberty. The boys followed their father to the fields, while the girls remained at home.

Don Juan expects the older girls to leave his home and live with or marry men from the area. Don Juan and the senora have never been legally married. There is no social stigma attached to couples living together (called "acompaniarse") - many couples wish to avoid the expense of a wedding. The illegitimate children of such unions suffer no scorn; they are the norm, rather than the exception.

Don Juan says he has taught his children not to carry guns because this is "bad education". "I only carry a machete to cut the branches, fallen trees or to peel fruits. I never carry a gun because I don't consider it necessary. If someone wants to hurt me, he can ambush me easily at any time."

This philosophical attitude is unusual; most farmers in this zone carry both guns and machetes when travelling. Guns are not only worn as symbols of power, they also provide some protection in what local observers have described as a violence-ridden society. But in Santa Maria violent crimes are comparatively infrequent.

Politically motivated violence has not yet reached this region. However, political graffiti scrawled on the walls of a nearby town indicates that Santa Maria's relative isolation from such conflict may be coming to an end.



Young members of the Vargas family



Grinding corn for tortillas

D. Jose Vargas Family

Jose Vargas and his wife say they used to be poor. Ten years ago they had hardly any possessions of their own and mere survival was precarious. The family lived in a small boarding room in Santa Maria. He cultivated corn on a patch of rented land and she traded chickens and pigs.

Six years ago they used their lifetime savings to buy two manzanas of land in the countryside. They constructed their own home and began to raise cattle because the soil could support nothing but grass. Now they own four milking cows and eight calves and heifers. They rent an additional five manzanas for the cattle. Don Jose is proud of what he has achieved and feels rather fortunate. Poverty is clearly relative -- this family's annual per capita income is about \$160.

Don Jose also rents one manzana of arable land on which he grows corn. While many farmers in this region own some pastureland for their cattle, most are forced to rent land fit for cultivation. Because he rents a different plot each year, Don Jose has little incentive to make permanent improvements on the land. The soil's fertility grows worse each year.

Don Jose must pay the land's owner for the right to plant two crops. He is worried that this rent will climb to \$72 next year. "I wish I could buy one manzana of land. Each year it is more difficult to rent land to sow".⁴

⁴ The government, installed in October 1979, announced a freeze on land rents. However, this law, like the minimum wage law, may be difficult to enforce in isolated regions like Santa Maria.

milk production is now maintained at the same level all year long. When his cows are healthy, they each produce six bottles -- one of the highest production levels in the region during the dry season. Three bottles are consumed by the family and the remaining fifteen bottles are converted into cheese and sold. The family's annual income from this activity is approximately \$800. Their per capita income not subtracting their own labor costs, is about \$190.

Like most of his neighbors, Don Juan sees little incentive to use concentrate during the wet season. Even if concentrate increases milk production, the price of cheese is too low for it to be profitable. Muddy and sometimes impassable roads make it difficult to transport concentrate to the field or market cheese. Traders sometimes come to the house to buy cheese, but often payment is only received three to four weeks later when these merchants have returned from the town.

All the children have attended school. The four daughters walk one hour to reach Santa Maria's school. To save time, they travel on narrow paths through the bushes rather than the main road. Don Juan hopes all his children will finish ninth grade. Like most rural families, they cannot afford the expense of sending their children to larger urban schools for additional studies. Less than 1% of rural Salvadorans have completed nine grades.³

When they are at home, the females sweep, mend clothes and go to a nearby ravine to wash dishes and clothing. The males never cook or serve

³ In 1975 .4% of the rural populace completed ninth grade and only 12% completed sixth grade. By comparison, 4.5% of urban residents had finished ninth grade and 44% had received a sixth-grade education. Education is highly prized among these rural families, but in 1973, only 32% of rural schools offered all primary grades. AID, CDSS, op cit, p. 5.

"Planting corn is not a business", he adds. "My profits are the twenty quintals of 'mulquite' corn which we keep to feed ourselves. This is good corn -- with it we make tortillas. We feed the cows with corn husks, cobs and stalks. But after all the costs are calculated, my labor receives no compensation."

The cost of agricultural inputs such as fertilizers and pest control keep rising, but the wage paid to daily laborers has remained stagnant. Don Jose employs three men for thirty days each year to help him plow, harvest and shell the corn. He pays them \$1.40 for each day of their labor.

Don Jose hopes to produce 60 quintals of corn per harvest -- an extremely optimistic projection. If he attains this goal and the price of corn remains approximately \$ 6 per quintal, he should receive an annual net profit of \$400 for his labor. But since his family consumes part of the harvest, about \$170 of disposable income will actually be received from this activity.

Immediately after the harvest he tries to repay his debts to a local businessman. But this moneylender -- one of two in Santa Maria -- charges 10% interest per month. The cooperative, in contrast, charges 15% annual interest on its one-year loans. But, although Don Jose buys concentrate from the cooperative, he is not a member and therefore cannot receive its credit.

Recently he has been wondering about joining the cooperative. He is both attracted by and afraid of the credit he might receive to buy cattle and agricultural inputs. Don Jose is a cautious man and has not been convinced of the advantages of cooperative membership. He says he will only adopt changes after he is completely sure they will benefit his family. The initial investment of \$18.50 to become a co-op member increases his sense of prudence.⁵

Like many El Salvadoran farmers, Don Jose says he wishes to maintain his independence as much as possible. They believe it is better to go their own way -- neither asking for nor receiving any outside help. This makes it more difficult to establish community organizations like the Santa Maria cooperative.

Don Jose's main source of pride is the well he constructed entirely by himself. Clean water is now available outside the house. His daughters previously had to walk one kilometer to the closest source of potable water. Neighboring women are also invited to draw their water from this well during the dry season. The senora says she likes having more visitors.

Although Don Jose prefers to be free of outside entanglements, he realizes they are necessary for his survival. His main source of income depends upon the milk produced by his four milking cows. When milk production began to decline as the dry season progressed, he

⁵ Jose Vargas decided to join the cooperative a few months after this family profile was written.

decided he would experiment with the concentrate. He fed each milking cow five pounds of concentrate, along with some cotton seed meal, corn cobs and molasses.⁶ He continued buying concentrate only because he saw a definite increase in milk production. This experience has made him a bit less suspicious of new products.

But Don Jose will stop buying concentrate in the rainy season. Experts have told him that concentrate is most effective when complemented with fresh green pasture. Nevertheless, small-scale cattlemen like Don Jose are not swayed by assertions that concentrate would improve milk production even more.

Years of experience have taught farmers that as cheese production increases in the wet season, its price drops to 80¢/lb. This is half of what they receive in the dry season when supply is low. Thus, small farmers regard feed concentrate as a luxury they can ill afford in the wet season.

Most farmers have no means of transporting their cheese to urban centers where prices are higher. They have no facilities where larger quantities of cheese might be stored until prices rise. They need cash to meet daily expenses.

So Don Jose must sell his cheese to one of the local middlemen who controls the market. He must accept the low price that is offered. The "coyote" reaps a profit by storing the cheese and reselling it during the dry season. Don Jose sees no other choice: "What am I

⁶ Don Jose like most farmers surveyed, is feeding his cows an improper balance of feeds. It is not necessary to feed each cow five pounds of concentrate and cotton seed meal. Thus, his costs are higher than warranted.

going to do? There is nothing I can do but sell it cheap. At least that way I can keep my cows."

Despite these problems, Don Jose and his wife are glad they moved two kilometers away from Santa Maria. "We would rather sacrifice the advantages of the city to be able to live quietly in the field", says the Senora. "Nothing in the world could make us go back to the city. Here it is bettercalmer", Don Jose adds. "The city has many good things but they are not necessities. It is not necessary to eat cookies or ice cream".

The Vargas family lives without what most in developed countries take for granted as necessities. Don Jose's mud and wood house consists of one 5 x 6 meter room. A paper screen cordons off a sleeping area for the seven family members. They sleep next to each other on hard wooden beds.

Animals are fed in a muddy corridor beside the house. Occasionally, the calves wander through the room, enticed by the odor of feed concentrate sacks.

The kitchen is outside the house. It is a small structure -- a tiled roof resting on four wooden beams -- designed to meet the family's needs. The women must bend to cook on a low wood-burning hearth. All food is either boiled or fried in lard.

There are no toilet facilities. Only a few of the wealthier families in Santa Maria can boast of this luxury. Don Jose's well, however, is used for washing and drinking.

Family members have never visited a doctor. Dona Maria has borne seven children, of which five have survived. One son died at birth and the other died four years ago at the age of five. This is not unusual. Ten percent of rural infants do not survive their early years.⁷

They do not know why their children died. When members of the family become ill, the senora tries to cure them with either traditional or modern medicines. Medicinal herbs such as hepazote, chamomile, anise, buffalograss and coriander are used to alleviate body aches, influenza and mild fevers. Alcohol and aspirin are also commonly used.

Don Jose's children have never attended school. He thinks it would be too dangerous for his three daughters to walk two kilometers to the nearest school. They would have to cross many rivers during the rainy season. Instead, a neighbor teaches his daughters and six-year-old son how to read and write. She charges a monthly rate of two or three colones for each student. There are twenty children in each four-hour session.

Every month he pays \$4.30 so that his children may receive lessons. "I think that's very expensive", says Don Jose. "My children cannot go to school, but I like people with education and culture to visit us.

7

AID, CDSS, op cit, page 4.

This way we can have a conversation and learn something. For example, I would like to know why the earth is round and what there is to see on the other side of the ocean".

Don Jose and his wife regard family planning as irrelevant to their lives. "Let it be God's will", they agree. "We will have all the children God wants us to have".

The four older children help with chores around the house. As their strength increases, the tasks become correspondingly more demanding. Everyone knows what to do. Those who finish first help family members who are behind in their work.

The family's daily routine varies little throughout the year. Typically, Don Jose, Dona Maria and the two eldest girls -- Juana (age 16) and Rosa (age 14) rise at 5 o'clock in the morning. He milks the cows behind the house while the females grind corn to make tortillas. In the dry season, the latter is an easy task, but Rosa says, "During the rainy season it is really hard. I blow and blow the fire and nothing happens. The firewood is too wet"

After the fire is finally set, tortillas and eggs are cooked. Breakfast is ready when Don Jose returns with the milk. While they are eating, Dona Maria places two bottles of milk on the fire. According to local custom, the milk must be brought to a boil three

times before it can be drunk. The normal breakfast for each consists of an egg, one portion of refried beans, 3 tortillas, a small piece of cheese and one cup of milk. Dona Maria says, "we always leave a few cups of milk aside for visitors".

After breakfast, the women continue to do the housework. The table is not wiped after each meal. Instead, a parrot is set on the table to eat any remaining crumbs. Food is never wasted.

The younger children do the easiest work. They carry firewood, sweep and collect eggs. The Vargas' have twelve hens which produce an average of 8 eggs per day. When one of their chickens begins to produce eggs, it is substituted for an older hen which is then slaughtered.

The older children draw water from the well, collect firewood and feed the chickens, pigs and dogs. Around 9 A.M., nixtamal - corn for tortillas - is placed on the fire. Lime and ashes are used to extract the husks from the corn grains. This makes the tortillas soft and filled with calcium. Tortillas made out of flour have another flavor which is not very appetizing. Don Jose says, "There is nothing like the tortillas made in the grindstone at home. The tortillas made in the city are not good.....they do not fill you up".

A rennet pill is added to the eighteen bottles of milk and within three hours it is transformed into curd. Three bottles of milk form one pound of curd.

While his wife and children work around the house, Don Jose takes the cattle to pasture. He talks to each cow by name and carefully examines them for any signs of illness. They are his main source of income and he tends to their needs to the best of his ability. But Don Jose is not a cattleman; neither by experience nor training. He knows little about cows, has never met any livestock extension agents and, if serious diseases developed, would not know how to cure his animals.

Don Jose usually remains with the cows all morning. During planting or harvest time, he rides the family horse to his rented land located five kilometers from the house.

At noon the family reunites for lunch. They usually each consume a portion of rice, a small piece of meat, three tortillas and some soup. The soup occasionally contains some vegetables they have begun to grow near the well. They talk about the day's activities during lunch and then take a siesta until 2 o'clock.

After waking, the girls place a sheet around the well and bathe before attending their daily four-hour reading and writing lesson.

At 3 o'clock, the senora starts grinding the Nixtamal to make tortillas for dinner. She removes the soft cheese from the curd and puts some aside for family use. The rest is placed on a press to be transformed into hard cheese. About five bottles of milk yield one pound of hard cheese.

Between 4 and 5, Don Jose returns with the cattle from the grazing land and leaves them near the house. He feeds them, gives them water and again checks to see that they are not hurt or sick.

After returning from their lessons, the girls help their mother cook the evening meal. The dinner menu is the same as lunch except that the meat is replaced with a large cup of coffee made of burnt, ground corn kernels. Leftovers are returned to the cooking pots.

The family's spartan routine is interrupted by one luxury. After all the chores are done, the Vargas family walks half a kilometer to a neighbor who owns a television set. Because there is no lock on the door, either the senora or her husband remains at home to guard their belongings. The rest go to watch the soap operas imported from various parts of Latin America. Walking down Santa Maria's streets in the evening, one can peer through open doors to see as many as twenty people sitting around a black and white TV screen.

Almost all of Santa Maria's 50 television sets are tuned to the same channel. Villagers enter the glamorous lives of politicians and movie stars living in homes they will never experience. They never question this -- it is another world which has nothing in common with their own lives.

The more precocious children chant along with the commercial jingles advertising girdles, toilet bowl cleaners and cigarettes. Marlboro commercials, banned on U.S. television years ago, have found a new home. The children love to watch the Texan cowboy. They, too, ride horses.

During last year's "state of siege" a new commercial appeared on the screens. Quick cuts of smiling youngsters were interspersed with mangled dead bodies. It's message was: "Say NO to Terrorism".

Don Jose says there have been no terrorist activities in the area and that they are not affected by those problems in the large cities. He can only live peacefully if he does not listen to the news. Most Santa Maria residents, like Don Jose, were not aware of the state of siege. The television commercial against terrorism was viewed like everything else on the screen -- alien to their experience.

Those with televisions also own refrigerators. The implicit admission fee for this entertainment is the purchase of "charamuscas" -- flavored ices -- for the children. Adults sometimes buy liquor or beer.

Later in the evening -- 9 P.M. -- North American movies and familiar television series appear on the screen. But by this time most residents of Santa Maria have already fallen asleep. Before going to bed, the women wash the dirty clothes so that they may be worn the following day. They own few changes of clothing.

On Sundays the family members wear their finest apparel and walk to Santa Maria's church. Once they even visited Esquipulas -- a famous pilgrimage site in Guatemala. After finishing his well, Don Jose called a priest to come and bless it. This, he believes, will protect the well from evil.

Don Jose wants to improve his standard of living but is careful not to endanger what he has by taking additional risks. He does not plan more than one year in advance. He does not dream of what he might do if his income suddenly increased significantly. It never has. He believes this is a slow, long-term process. If he is very lucky, he says, he might be able to afford another pig next year.



A maid washing dishes at Dona Julia Christina's home



Sonia Fernandez

E. THE SOTO AND FERNANDEZ FAMILIES

Julia Cristina Hernandez de Soto is a member of one of the most influential families in the Santa Maria region. Her house is one of the grandest in town -- adobe brick and cement walls with a tiled floor. It is located near the church and town square, the best section of town. Electricity and running potable water are conveniences which distinguish this family from most rural families. Their wealth also is reflected in the family's ample living space; the house has five bedrooms, two bathrooms and an indoor kitchen. A propane gas range, refrigerator, television, multi-band radio, electric iron and fan are among the more noticeable luxury items.

Dona Julia's husband died three years ago, bequeathing his 120 manzanas to her sole care. She rents 19 manzanas to others -- 8 manzanas for corn and 11 manzanas of pasture -- and cultivates one manzana of cereals for personal use. Thirty manzanas of poor quality land are used by some of her children. Her 80 head of cattle graze on the remaining land.

Because she says she is old and ill, she takes no interest in her cattle. The feed concentrate's purpose or composition is unknown to her. When she fed each of her 30 milking cows 5 pounds of concentrate, they produced 82 bottles of milk total. But someone advised her to use less concentrate, so now each one receives only one pound and milk production has declined to 60 bottles.

Many farmers still regard large numbers of cattle to be more desirable than a smaller quantity but higher quality herd. Three well-managed dairy cows could easily produce as much milk as Dona Julia's thirty cows. This does not bother her; she says she is not concerned about improving her cattle or grazing land. One worker is in charge of milking and tending the cows. He, also, has no incentive to improve their production.

Although Dona Julia was one of the first co-op members, she never attends any meetings. Unlike most members, she does not require co-op loans to purchase agricultural inputs or cattle. Her primary motivation for joining was the convenience of being able to buy molasses and cotton seed meal from the nearby co-op building. And, perhaps, some of her children convinced her to join.

Only one of Dona Julia's children live at home these days. One of the more educated men in town, this son works as the co-op accountant. Three sons are farmers -- the one still living in the Santa Maria area is also a co-op member. Two daughters married and moved to San Salvador, the two youngest daughters attend a San Miguel high school. Only one daughter, Elena, remains in Santa Maria; her living situation is markedly different from her mother's.

Twenty-four years ago when Elena was in her early twenties, she fell in love with the new schoolteacher in town. The older villagers like to recount a romantic tale of how this stranger married one of the most eligible and beautiful girls in the area. But the years have treated her harshly.

Her drawn, heavily wrinkled face and her slow, cautious style of walking give the impression that she is much more than 45 years old. Nine years ago she suffered an attack of hepatitis from which she has never quite recovered. Since then, stomach pains frequently bother her. Usually she drinks potions made of "chichilquate" to alleviate the pain. Sometimes she visits Santa Maria's pharmacist, who is from the area and trusted. The clinic, in contrast, has been staffed by young doctors who must spend a year in the countryside before returning to more comfortable and lucrative urban practices. These doctors -- who sometimes charge more than their clients can possibly afford to pay -- are avoided by many Santa Maria residents.

Elena's husband, Enrique Fernandez, is still a schoolteacher. He works a double shift to earn extra money for the family. The first shift from 7 o'clock to noon is for children from the outlying areas so that they may travel during daylight hours. The second shift, 1 - 6 o'clock, is for town children. Don Enrique leaves his house at 6 AM and returns thirteen hours later. Including his overtime wages, he earns about \$200 each month.

Unlike small-scale farming, teaching provides a relatively steady and secure source of income. However, in El Salvador, it is scarcely risk-free. When the Salvadoran government faces a budget crunch, teachers are often the last to be paid. Last year teachers' wages were delayed for several months.

Because Don Enrique has little spare time, his wife and younger daughters must do all the housework and tend the animals. They own nine head of cattle - three milking cows, three heifers and three calves - about ten chickens and nine turkeys. Their milking cows produce a total of ten bottles of milk each day. Elena feeds each cow five pounds of feed concentrate during the dry season. She alone takes care of the cattle. She converts their milk into cheese which is either consumed or used to supplement their income.

Until her father's death, Elena believed her parents owned only fifty-five manzanas. Her father hid the truth from the family so that his children would not quarrel over the land. They only learned of the extent of their wealth at his deathbed. After his death, the children decided to leave the title in their mother's name since it would have cost a "pile of money" to make any legal changes. Plus, she says, "If we had divided the land among us, each one would have received very little. Our mother still pays to send my younger sisters to school. She can use the money."

So could Dona Elena.

The Fernandez home shows signs of neglect. The clay tile roof and 4 by 6 meter mud-and-wood structure are deteriorating and need repair. But neither Don Enrique nor his wife have the physical energy to fix up the house. There is little furniture and only a dirt floor. A thin wooden panel divides two bedrooms from the dining room and indoor kitchen. Firewood is used to cook food; they rarely eat fruits and vegetables.

There is no electricity but running water is available. Gravity pulls the water through 300 meters of pipes from the more elevated regions of Dona Julia Cristina's property to the house. A sink and toilet - consisting of a 4-meter hole with a cement bowl - are located in the back patio area.

During the dry season, neighbors frequently draw their water from the Fernandez home. Dona Elena encourages these visits for she loves to have company. Usually she is alone with her three young daughters.

One of these daughters is mentally retarded; because the family cannot afford special teachers for her, Maria attends the local school. But she makes little progress. Dona Elena worries what will become of Maria after her death.

Like many Salvadoran families, the Fernandez⁷ do not benefit from a strong, extended family system. Limited obligations of mutual aid between relatives and friends cause the Salvadoran poor to live more precarious lives than other third world poor.

If the crops fail or cows die, the nuclear family must cope as best they can without relying upon assistance from other family members. In many other less developed countries, however, a strong link of mutual responsibilities among even distant relatives cushions these shocks. In contrast, Dona Elena does not even think of asking her comparatively wealthy mother to help pay for necessities such as special teachers for her daughter. Her mother lives in a comfortable five-bedroom house while Elena's nine-member family has lived in a small one-room hut. Assistance was neither demanded nor given.

Most of the seven Fernandez children have already moved away from home. Even though the two eldest daughters graduated from a business high school, they now work as machine operators in a San Salvador factory. "For three years, I've been telling the girls they should finish high school and get jobs," Dona Elena remarked. "They should help their father so that he doesn't have to work so hard because he's ill. But the girls work only for themselves. They don't make enough money to help us. Perhaps in the future, our friends will help us find better jobs for them."

The eldest son recently finished high school and was an interviewer for this case study. This was the first time he had ever earned a daily wage. He needs to earn money to fulfill his ambition of continuing his agricultural studies. For months, he looked for job opportunities in the area, but failed to find anything that would use his skills. So he, too, has since left for San Salvador to look for work. He lives with his sisters and a younger brother who attends high school in the city. Santa Maria's school only holds classes through the ninth grade, so all who wish to obtain a high school degree must leave the town.

Elena has received many invitations to attend family planning meetings in Santa Maria, but she has never accepted them. "Since I've had the youngest child, I have been ill" she says. "Perhaps God does not want me to have more children."

"You should see how happy we are when the children visit home. The more children, the happier we are. During the Holy Week they all return. I'm so glad then, I don't even notice the day going by..."

"It's good to have many children in the countryside. In San Salvador, it's different. The big cities are more crowded. It's hard to have children because the father and mother work and no one is at home. Kids are left alone."

"For example, look how our children live in San Salvador -- four people live in each small room. Only these four are allowed to bathe; if I or one of my daughters come to visit, we must find a wash place somewhere else. Can you imagine two adults and seven children trying to live in such a small room? How could I live like that! Yes, family planning is useful in the cities."

"But I would still like to go to San Salvador because I get bored all by myself in this isolated area," Dona Elena continues. The senora dislikes Santa Maria -- it is not "nice and clean" like other towns. She dreams of moving to Izalco, San Salvador or Ereguayquin where there are lots of people to meet.

"Why don't you go?, my husband asks me. "But", she says with a voice tinged with bitterness, "I would not have enough money to buy a house in any of these places. Enrique says he wouldn't even like to live in the town of Santa Maria, because you can't have poultry and other farm animals there. But in the large cities you can find other work in the market to help when your salary is not enough to cover everything."

"But look, he told me, "I am tired of living in a meson (boarding house) where it is always crowded; the water stops at 9 in the morning, the electricity is cut at 10 at night." Don Enrique grew up in a small rented room in the large town of Izalco. This meson was where the poorest people in the town lived. He never knew his father; his mother and her children earned a little money doing odd jobs. They always were afraid of not having enough to eat.

As a boy, Don Enrique won a scholarship so he could continue past the sixth grade. After completing five additional years, he became a schoolteacher. Thirty years ago, this was one of the few ways a poor boy could rise in El Salvador's social structure.

Now, despite his still modest economic means, Don Enrique is one of the most influential leaders in the community. As a schoolteacher, he almost automatically is accorded great prestige. He knows all the children, rich and poor -- and gets to cross social strata by meeting their parents.

These contacts formed a useful basis upon which to build the fledgling cooperative. Don Enrique was one of the cooperative's founders and largely responsible for guiding it through the early years. He speaks protectively about the cooperative as if it were his child. At first, he argued against allowing those rich farmers, who had originally tried to destroy the cooperative, to buy feed concentrate. Others convinced him that it would be against the cooperative's best interests to discriminate against the rich.

Reminded of his childhood, Don Enrique is haunted by the fear of returning to a state of abject poverty. Many in Santa Maria share these fears. Don Enrique built upon these concerns and argued that each individual's risks might be minimized if everyone banded together. Instead of concentrating his efforts on his own assets, Don Enrique preferred to work on building a community organization.

This action was not taken without any selfish motive. The cooperative is a vehicle which has increased his prestige and power within the community. Don Enrique used to lose touch with many families after their youngest children finished school. The cooperative has allowed him to regain these contacts. As the elected co-op secretary, he may call meetings and make decisions which affect the entire community. He also likes working with highly educated people from the Ministry of Planning, the Banco de Fomento Agropecuario and Technoserve.

Don Enrique is aware that he has been a poor man his entire life. He cannot give his wife and children the things they want. Building the cooperative has increased his sense of self esteem and pride. That may ultimately be the co-op's most important function for many of its members.

CHART 8

<u>Problems</u>	<u>Solutions</u>
Farmers not organized	Formation of co-op
Lack of credit	Co-op credit provided for agricultural inputs, e.g., fertilizer, pesticides
Scarcity of feed supplements during the dry season	Co-op sells cotton seed meal, molasses, feed concentrate, et
High cattle/pasture ratio	Provision of feed concentrate, extension services to plant improved grasses,* feeding in confinement*
Inadequate use of agricultural by-products as cattle feed	Co-op ham mill available to grind agricultural by-products into edible form
Limited knowledge of optimal use of agricultural resources	
-- improper feeding practices	Premixed concentrate available
-- low fertility of cattle	Availability of technical advi services (TNS) until May 1980
-- high mortality and morbidity rate of cattle	Establishment of ongoing techn services*
-- low crop yields	Co-op cattle fattening demon- stration
	Farm demonstrations of proper feed concentrate use to increa milk production
Lack of improved breeds	Loans to purchase cattle made available through co-op
	Introduction of improved breeding bulls*
Low prices for cattle products in wet season	Formation of service company to purchase, store and market cheese*

* Under consideration

II. Findings and Recommendations

These profiles suggest that improvement in the standard of living among small-scale cattlemen in this region will require more time than originally projected in Technoserve's feasibility studies. Such change is a complex process -- of which supplying feed concentrate is only one component. Farmers' overall management of cattle and the land must change substantially to maximize their economic returns. Even then, the most talented and ambitious sons and daughters will continue to seek their fortune among the bright lights of the cities. Their dreams cannot be nourished by this broken land.

The cooperative has helped those who remain in Santa Maria. The addition of the feed concentrate mill to previous co-op activities has heightened its visibility and strengthened its linkages to the poor. Concentrate sales, based on the first year's financial returns, have increased the co-op's economic viability. The improved accounting system, designed by Technoserve, generates information which enables management to make informed decisions to help preserve the cooperative's viability.

Technoserve's training has empowered co-op staff to garner outside resources for the institution and the community. Previously, ignorance of what was available beyond Santa Maria's borders and apprehension of the complex procedures required to secure such resources reinforced the area's physical isolation. That seclusion has been broken; the co-op has been a forum for community residents to discuss problems and draw in outside resources. The precedent of creating mechanisms to address these problems successfully should provide momentum for continued initiatives.

That Technoserve responded to local initiative is a major factor in this project's successful implementation. This was always Santa Maria's project, not Technoserve's.

Farmers' desire for change had begun prior to Technoserve's involvement. Technoserve advisors only helped to channel this energy into an economically productive activity within the group's managerial capability. Thus, Technoserve staff did not need to motivate members to overcome problems, just to suggest how they should be solved.

The partnership between Technoserve and co-op members was reinforced by the legal contract signed prior to project implementation. This document reaffirmed that the co-op had hired Technoserve to provide a service; it also reassured Technoserve staff that their recommendations would be seriously considered. Requiring the co-op to pay a token sum for Technoserve's services created an atmosphere of mutual dependence rather than solely one-way assistance.

The crucial ingredient enabling this cooperative to serve as an effective community organization is the socio-economic composition of members. More educated and relatively more affluent community members like Enrique Fernandez were needed to establish the feed mill enterprise; very low-income members did not risk contributing any equity until wealthier farmers first provided an example. Thus, in the beginning, a co-op business may have a relatively high proportion of more affluent members. The presence of low-income members helped prevent the co-op from becoming an exclusionary club by discouraging the membership of other poor farmers. If cooperatives wish to integrate the skills and assets of higher income community members with the needs of lower income people, then both must be included in the original co-op membership.

The co-op will remain vulnerable after Technoserve's withdrawal. If the current staff leaves, co-op members may be forced to seek outside assistance or hire unqualified

staff. Extension activities undertaken during the latter half of 1979 and early 1980 have significantly expanded concentrate sales. Many farmers still, however, require additional services. If extension services do not continue, the co-op's economic viability eventually may be endangered.

Farmers who inappropriately use feed concentrate may decide to stop buying it when anticipated results are not achieved. Some members of the control group mentioned that they had tried to minimize their risk by feeding only two pounds of concentrate to each milking cow. Only if milk production increased would they have fed greater quantities. When milk production levels did not increase, they stopped using feed concentrate completely. Many members of the test group used too much of other feeds, thereby causing their costs to be higher than necessary for the additional milk derived.

Survey results show that during the dry seasons some farmers rely principally upon feed concentrate while others use less concentrate or none at all. This suggests that two different feed concentrates could be formulated -- farmers in the former category may require a higher quality, more expensive concentrate than those supplementing concentrate with other feeds. This possibility, suggested by cattle experts, may be worthy of further consideration.

Farmers profiled in this study are willing to listen to extension agents and can be expected to adopt improved livestock practices after they are convinced that they will be profitable. Use of feed concentrate may indicate a profound attitudinal change among cattlemen; traditionally, any extra income was used to purchase more cattle rather than investing to increase the productivity of the current herd.

Thus, extension services should become an indigenous part of the co-op's activities. Since the co-op cannot afford to hire its own full-time extension agent, efforts should be made to secure government livestock experts or to collaborate with other similar co-ops to contract a part-time agent. The difficulties of

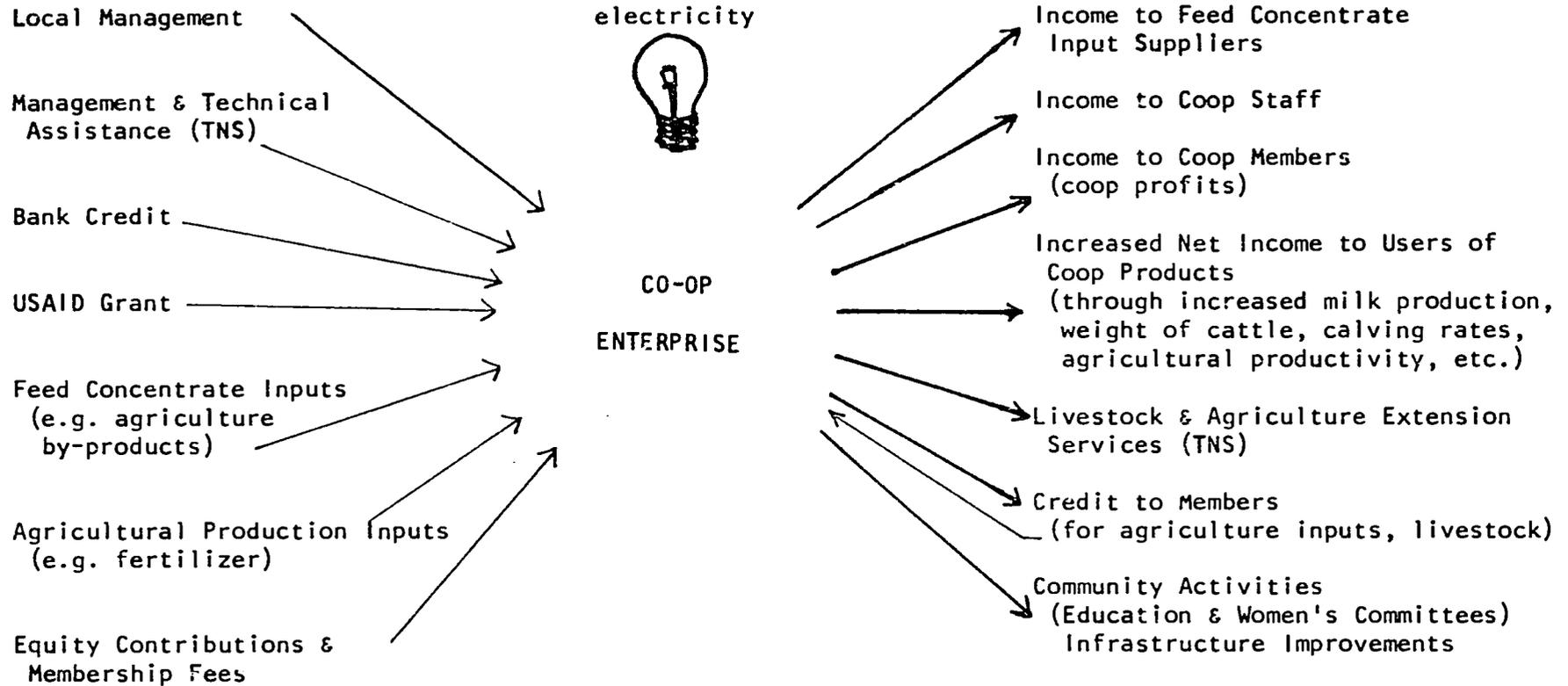
providing adequate extension services to isolated Santa Maria farmers, however, should not be minimized. Although on-site visits seem most effective, a three-hour horseback ride is required to arrive at several members' farms. Central meetings, a much less expensive means of reaching larger numbers of farmers, often include a disproportionate share of those enterprising farmers living in the vicinity. Eventually a core group of such members will have to provide these services to their neighbors.

The feasibility of forming a company to provide extension, marketing and managerial services to co-ops like Santa Maria was investigated in May 1979. Although economically unviable at the time, this type of service company may become more attractive as additional co-op organizations with similar needs emerge. Technoserve-assisted co-ops' need for extension services and back-up managerial support may soon become crucial.

If Technoserve-trained management leaves, the Santa Maria cooperative's financial viability may be jeopardized. Although Technoserve will provide ad hoc assistance for specified periods, this small co-op business' long-term viability may require a service company to help cushion against future shocks.

Another future co-op activity might be cheese storage and marketing. Low cheese prices during the rainy season cause most Santa Maria farmers to stop using any supplemental feeds. Small-scale farmers must sell their cheese to travelling merchants who store it until prices rise. Technoserve investigated this possibility for similar co-ops and found this activity to be riddled with seemingly insurmountable problems. High transport costs, varying qualities of cheese and powerful ties between cheese middlemen and small farmers are among the complex factors involved.

CHART 9
 MODEL OF SANTA MARIA ENTERPRISE LINKAGES



Perhaps the most fundamental lesson learned is that the sponsor group must have both the desire and the capability to implement a project if it is ever to be self-sustaining. In Santa Maria, willingness to participate in the feed concentrate project was backed by individuals' equity contributions. It is the outside agencies' responsibility to ensure that the group has the potential skills necessary to implement this project.

Overambitious donors who seek to impose solutions before their time and beyond the group's capability court disaster. And groups who, overconfident from an initial success, enthusiastically rush into a multiplicity of new activities may strain their resources and doom all efforts to failure. In the latter case, the outside agency has a duty to restrain such overambitious attempts. Although there is a need to secure higher cheese prices during the rainy season, the co-op cannot, in the short term, address this need. It can now provide some solutions to problems faced by local farmers, as indicated in chart 8 & 9, but not all. Greater strength, maturity and financial resources are required before the cooperative should tackle such complex problems.

Technoserve's procedures were used successfully to analyze the project's short-term business viability and to implement it in an organized, efficient manner. These procedures have been streamlined for feed concentrate projects assisted since Santa Maria and have resulted in lower Technoserve project costs. However, the pre-project feasibility study could be further improved by developing a simple, but statistically sound, survey methodology. More data could be collected at minimal cost and could help Technoserve determine the extent

to which it should subsidize its activities to other groups. Baseline data should be part of a comprehensive evaluation system. Certain key variables should be re-examined during and after project implementation to determine whether the project was achieving its stated objectives. Such evaluation efforts should be part of the ongoing management of projects.

This evaluation did contribute to management decision making. Increased emphasis has been placed upon providing livestock extension activities and other "social outreach" services as well as management assistance to the enterprise. The involvement of Technoserve's project advisor to the Santa Maria co-op in this evaluation enabled him to learn more about farmers' needs and capabilities. This evaluation's cost is about 2.4% of Technoserve's assistance costs to Salvadoran feed mills through March 1980.¹

A final recommendation is to re-evaluate this project several years after Technoserve's withdrawal. It is too early to make definitive statements about this project's impact. It may not survive the challenges presented by El Salvador's current socio-economic instability. However, even if the co-op fails, a precedent has been set. Farmers have established a tradition of organizing to better their standard of living. That, in itself, is an important beginning.

¹ Evaluation costs include supporting service overheads; project costs include those plus program management overheads.

VIII. Methodology

A flexible combination of both qualitative and quantitative procedures was used to yield a depth of perception that neither method alone can provide.¹ We wished to know more about the process of development by examining the growth of the cooperative and understand what this meant from a few community members' own frame of reference. Qualitative procedures, adapted from the fields of social anthropology and oral history, helped to explain why changes had occurred. Quantitative methods were needed to provide "hard data" on how well the cooperative business was functioning and the impact of feed concentrate upon milk production. Photographs were taken during the evaluation to epitomize the problems confronted by the community and to promote a deeper understanding of those influenced by the project. Time and cost constraints dictated, however, that this evaluation be a relatively modest venture. Thus, traditional quantitative and qualitative research methods were modified to fit a relatively small budget.

Historical Section

Technoserve's management information system provided a major source of information for this section. Files both at Technoserve headquarters in Norwalk and those contained in the San Salvador office were carefully examined. This included documents such as the letter of understanding, prefeasibility analysis, project study, internal quarterly reports and reports to donors and the cooperative's financial statements.

Examination of these files -- and a realization of information that was still lacking -- was used to design a semi-annual report form which was first introduced to the El Salvador program in July 1979. The semi-annual report yielded additional

¹ For further discussion of this approach, see Cook, Thomas & Reichardt, Charles, "Beyond Qualitative Versus Quantitative Methods" in Cook, Thomas & Reichardt, Charles, (ed) Qualitative and Quantitative Methods in Evaluation Research, Sage Publications, Beverly Hills, 1979.

information, through interviews with Technoserve project staff, on Technoserve's plans versus accomplishments, changes in co-op membership and participation and other co-op activities.

However, information on the numerous difficulties encountered by the co-op and Technoserve's project staff in the early years of this project was still missing. Thus, Jaime Chacon, the Technoserve project advisor to Santa Maria until March 1979 and Roger Anderson, Technoserve's Associate Program Director, prepared some comprehensive written materials detailing the frustrations and joys of project development. Technoserve's El Salvador Country Program Director until September 1979, Enrique Cristi, also elaborated upon Technoserve's experience with this and similar projects. Further discussions were held with co-op staff and members to find out their attitudes toward the co-op. Visits were made to homes which had received electricity due to co-op efforts and documentation accompanying these residents' petition to the electric company was reviewed.

Statistics were also derived from El Salvador's 1971 census and various GOES livestock-related publications.

Survey

A questionnaire was first designed in the United States, redrafted with the assistance of Technoserve advisors familiar with the Santa Maria area and livestock issues and then revised with interviewers' suggestions and after a pre-test. A copy of the final questionnaire can be found in Appendix B.

Five interviewers, three males and two females, were chosen from among a dozen applicants in the village. They were 18-30 years old; one had a seventh grade, another a ninth grade education, the others had recently graduated from high school. All had family members who were in some way affiliated with the co-op. This was the

first wage any had ever received. They worked enthusiastically during the three-day training and five-day survey periods. This survey would have been impossible without their dedication and sense of direction. Only residents very familiar with the region could have found most of the test group participants.

The most recently compiled co-op list of feed concentrate buyers was used to identify some test group participants. Since many on this list had stopped using feed during the month prior to the survey, we contacted local distributors and members of the community for information on other concentrate buyers. Thus, the 34 Santa Maria feed concentrate users in the test group include non-co-op as well as co-op members. They were matched with non-feed concentrate users \pm 50% the amount of land and cattle held by concentrate users.

The same questionnaire was administered to test and control group members. Each respondent was asked to recall what the total milk production of all milking cows had been on a normal day in December -- prior to concentrate sales when pasture was still available -- and on the day prior to the interview.²

² Since interviewers were not present when each survey participant milked his cows, we must rely upon the farmer's ability to recall milk production levels in both May and December. For many, milk production is their most important, if not sole, source of income. Farmers name each cow and carefully watch for even minute changes in milk production. None had any problems remembering what their milk production had been the day before the interview. However, as time passes, memory of even important events fades. Recall information of milk production in December may, therefore, be less accurate than that of the more recent past. However, cattle experts working in the area confirm that small and medium sized cattlemen remember their milk production levels for at least a six-month period.

Use of this classical design allowed us to control for most non-project influences.³ Since both test and control groups were subject to the same over-time, non-project-related changes, we can isolate the degree of milk production change due to the project versus that which would have occurred without the project.

But even though the design and analysis of this survey has tried to take into consideration most factors which would call these results into question, a cow is a complex organism. It is difficult to state causality with complete certainty by using this questionnaire approach. However, the results of a scientific experiment are equally unsatisfactory. Demonstration farms often do not approximate conditions of the target group population, but rather the ideal situation.

The factors which influence the reliability of these results may be divided into (a) those dealing with the accuracy of the data derived and (b) those affecting whether the feed concentrate was responsible for the observed changes in milk production. Farmers may not remember milk production levels or might intentionally mislead the interviewer.⁴

³ Data collected from both the test and control groups on the key variable to be studied before and after an outside influence has been introduced (feed concentrate) constitutes a classical design. For the purposes of this evaluation, this design was seen as superior to either a longitudinal study (collecting before and after information on only the test group) or a cross-sectional study (collecting information only on milk production in May from the test and control groups).

If we had only interviewed the 34 farmers using feed and received information on their milk production levels in December and May, then we would not have known the extent to which external factors had also influenced production. The decline in the quality of pastureland between these months causes milk production to drop significantly. Without a basis for comparison, we cannot know the extent to which the feed concentrate offset this deterioration of the pasture.

If we had only compared milk production levels in May between a test and control group, then there might have been a doubt that milk production was actually different because these households had not been adequately matched. Test group cows might always have had higher levels of milk production than their control group counterparts. Since it is impossible to match each feed user with another farmer who is similar in all ways except for lack of feed concentrate, this is a legitimate concern.

⁴ For the former problem see footnote #2.

Interviewers explained that they wanted to ask farmers some information about their cattle so that the cooperative could improve its services to the community. Since interviewers were drawn from the Santa Maria region, they spoke the local dialect and knew the area well. We found no cause to believe that farmers were not frank with these young members of their own community.

There is also a possibility that some farmers may wish to either exaggerate or understate their milk production yields or assets. The questionnaire was designed to detect any inconsistencies by deriving the same information in different ways throughout the interview. Interviewers returned to requestion farmers about inconsistent answers. But although these problems of inaccurate data were anticipated, they did not actually pose much difficulty. Even so, it must be remembered that the recall data collected for both groups was used primarily as a basis for comparison. Unless members of one group consistently bias their results upwards or downwards, the comparison remains valid despite any small errors in response. ⁵

5 It is important to feel confident that the members of one group do not consistently bias their results upwards or downwards. If wealthier farmers of both groups exaggerate milk production results, the comparison between the two groups remains the same. However, if only wealthy test group members exaggerate their results, then the true comparison between the groups has been distorted. The same type of distortion would exist if members of one group consistently presented more accurate data than the other. It is reasonable to assume that the relative accuracy of this recall information is approximately the same for both groups overall. However, the small number of test and control group participants increases the disturbing effect that one inaccurate response can have upon the average.

The reliability of attributing any changes in milk production between the test and control groups to the feed concentrate basically depends upon how well the two groups are matched. Ideally, milking cows in these two groups should be identical in every way except that one group eats feed concentrate. Because of the costs involved in increasing the number of characteristics to be matched,⁶ farmers were only matched on the basis of the amount of land they used and the number of cattle they owned. Various factors which might also affect milk production levels -- breed, numbers of cows nursing calves, quality of pasture, other feeds eaten by milking cows, distance to water, parasites and cattle management practices -- were not controlled for in the survey's design. However, a careful comparison of test and control group participants indicates that they are very similar in these respects.⁷

⁶ Interviewers talked to an average of three farmers before locating a match.

⁷ Breed: There are only two name designations for cows in the Santa Maria region -- criollas and cruzadas. Criollas are a local breed while cruzadas also contain Brahmin or European blood. Test and control group households own very similar proportions of each type. On average by household, 24% of test group milking cows were criollas; 25% of control group milking cows were criollas. Thus, breed should not influence the reliability of milk production averages for the two groups. It does become a factor when comparing sub-sections of each group (e.g. high feed users vs. low feed users).

Numbers of Cows Nursing Calves: The true milk production of cows nursing calves will be underestimated in any livestock survey. If we assume that nursing cows of both groups lose about the same amount of milk to calves (4-5 bottles), then the relative proportions of nursing cows in each group is what is important. About 38% of control group milking cows but only 31% of test group milking cows are nursing calves under two months old. However, the greatest net difference in milk production is between cows consuming 5 or more pounds of feed concentrate ("high feeders") and control group cows. Since over 35% of "high feed" users also nursed calves, this factor should not be a significant source of distortion. Unlike more developed areas, only 80% of Santa Maria cows calve each year.

(footnote continued next page)

Quality of Pasture: Pastureland in the Santa Maria area is of poor to medium quality. Many farmers cultivate crops -- usually sorghum -- on some of their land and allow cattle to graze on what remains after harvest. By April - May almost all of these agricultural by-products have been eaten. But since this is a factor that might influence milk production levels in December, the relative percentage of land cultivated to total land used for grazing was computed. An average of 23.6% of the test groups' total grazing land was cultivated. The corresponding figure for the control group is very similar -- 21.8%. Thus, this factor should not affect the reliability of comparing average milk production results between the two groups.

Other Feeds Eaten by Milking Cows: Most farmers in the region, including those using feed concentrate, also feed a variety of other agricultural products to their milking cows. This study does not, therefore, compare those who use feed concentrate and pasture with others who feed only on pastureland. Few cows could subsist only on the pasture available in the dry season. The milk production of cows eating concentrate plus a small amount of other feeds is being compared to that of cows eating all feeds except concentrate.

Tables 5 and 6 show how many average pounds of other feeds were eaten per cow. An average test group cow ate 51% less cottonseed meal, 61% less corncobs and 56% less cornhusks than her control group counterpart. Some control but no test group cows ate cotton hulls, bagasse, sorro and forage. Test group cows, on average, ate more sorghum, slightly more long grass and one household fed silage.

Because test group cows ate less of the most prevalent alternative feeds in the area, we may be confident that the feed concentrate and not other feeds accounted for the difference in milk production between these two groups.

Distance to water: Cows who walk long distances to water may be at a disadvantage when compared to those who have water nearby. But unlike other regions of El Salvador, water is relatively abundant in the Santa Maria area. Only four test group and seven control group households said their cattle did not graze near water. Of these, most walked their cattle less than 500 meters to a source of water.

Parasites: Only two test group and four control group households complained that their cows had ticks. Ten test group and nine control group households vaccinated their milking cows against parasites. Given these comparisons, the degree of parasite infestation seems the same for both groups.

Cattle Management: If vaccinations and control of ticks are viewed as proxies for the overall care of cattle, then little difference exists between the groups. But these probably are not adequate proxies for this characteristic.

It seems logical that those who would use new methods of feed might also take better care of their cattle in other ways -- e.g., protect them from the sun, rotate the pasture used, etc. The classical design used by this survey allows us to control for these possible discrepancies. The difference in milk production levels between test and control group cows before concentrate is used may be attributed to one group's superior cattle management practices. This factor can then be controlled for when analyzing the difference in milk production in May.

There is no way to know with certainty whether test group households took comparatively even better care of cattle during the dry season than the wet season. Although cattle maintenance practices in Santa Maria do not differ greatly between farms in the dry season, according to cattle experts familiar with the area, this factor may be an uncontrollable source of error. However, we believe that most of the distortion caused by differences in cattle management can be controlled for in this analysis.

Data gathered from this questionnaire was coded in Santa Maria and analyzed in San Salvador and the United States.

Family Profiles

The works of Oscar Lewis served as inspiration for this section. Unfortunately, such in-depth family studies require more time and resources than any private voluntary organization could afford. Thus, these portraits are more journalistic than anthropological in nature.

The five interviewed families were drawn from the 34 feed concentrate users comprising the survey test group. This list was reduced to 17 families who seemed most willing or had time to talk to outsiders. Jorge Araujo, Technoserve's project advisor since April 1979 to Santa Maria, visited each of these 17 families. Two families were in mourning; impassable roads prevented access to many others. Four families were finally chosen because they came from different areas of the Santa Maria district and were of different economic means.

These families are not necessarily representative of other Salvadoran or even other Santa Marians. The primary criteria for their selection -- that they purchase feed concentrate -- sets them apart from most cattlemen in the zone. That all own or have secure rights to grazing land also differentiates them from most Salvadorans.

Each family was visited at least once by the author and five times by Jorge Araujo during May - July 1979. These sessions lasted between 2-4 hours each. Jorge Araujo explained that he was working with the cooperative and wanted to know how the feed concentrate was working out. Farmers asked him about problems affecting their cattle and crops. Discussions about family health, the children, their production, problems, education and other subjects naturally ensued.

The "interviewer" merely acted as a guide to orient conversations so that family members would evaluate their own situations. Information on the participants' attitude towards the co-op was also desired. But only two participants, co-op founders, wished to talk at any length about the co-op or the feed concentrate. After some degree of trust had been established, a few of the conversations were taped and later transcribed.

These family profiles were the most difficult, costly, but useful part of the inquiry. A lesson derived from this endeavor is the importance of the subject chosen to conduct such interviews. This work requires someone with extreme sensitivity to complex social problems and an ability to establish rapport with those from different socio-economic backgrounds. Much time is necessary for confidence between the outsider and those profiled to grow. Only after that confidence has been established should a tape recorder be introduced. Because of time and logistical constraints, very few of these conversations were recorded; such recordings, however, are required so that written materials reflect people telling their history in their own way, on their own terms.

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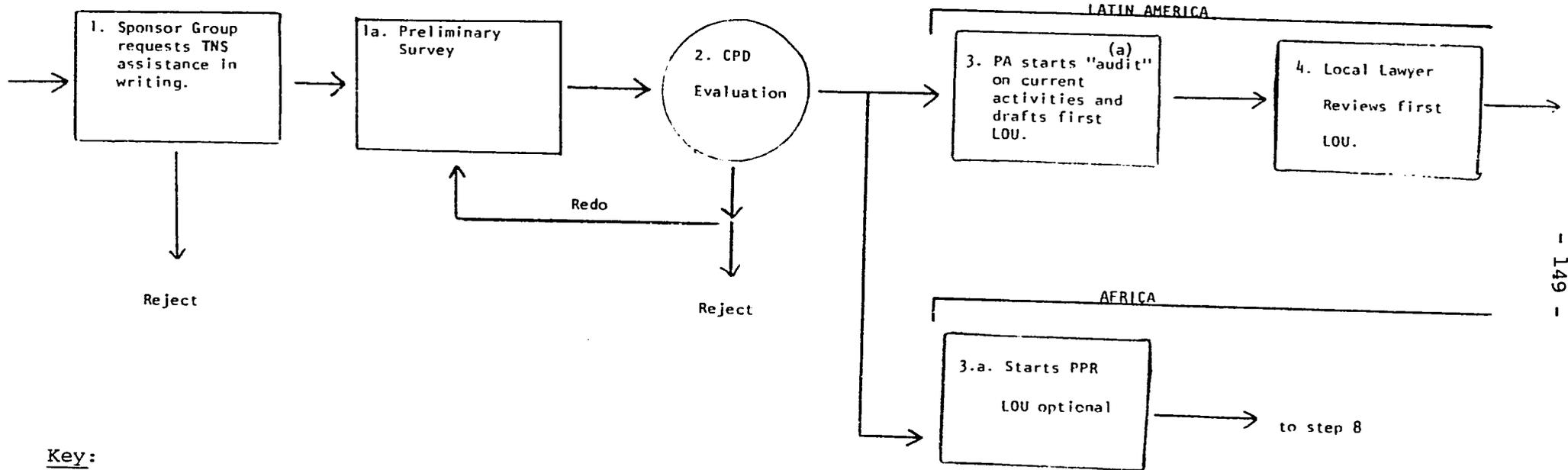
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TECHNOSERVE: PROJECT DEVELOPMENT PROCEDURE FLOW CHART

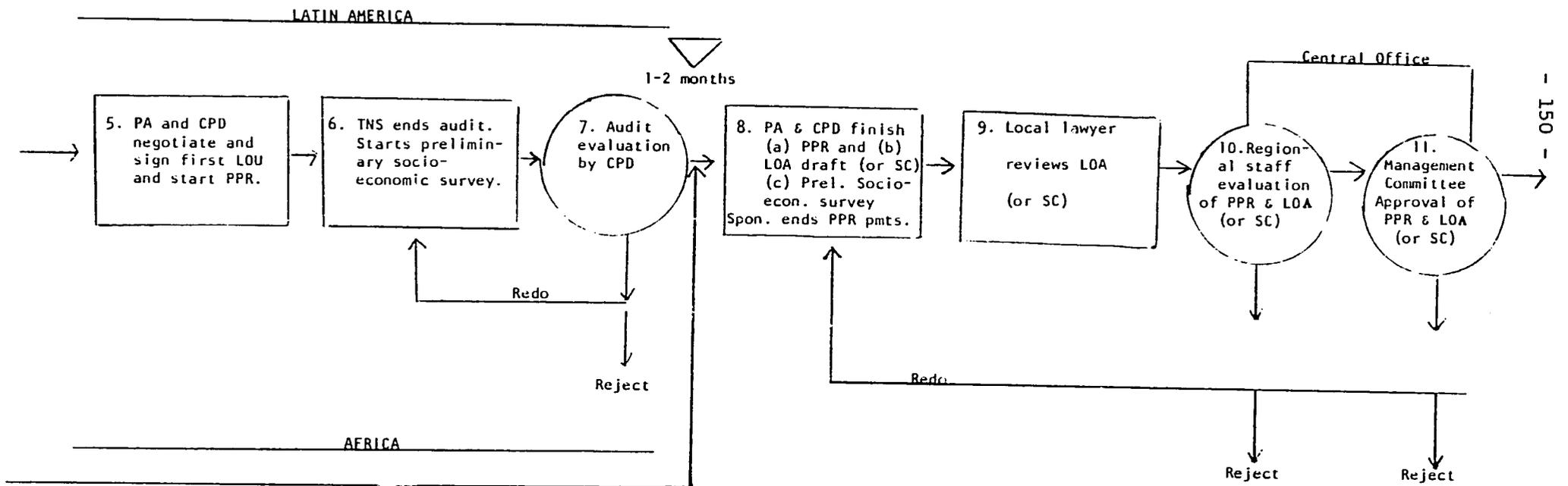
I. PPR



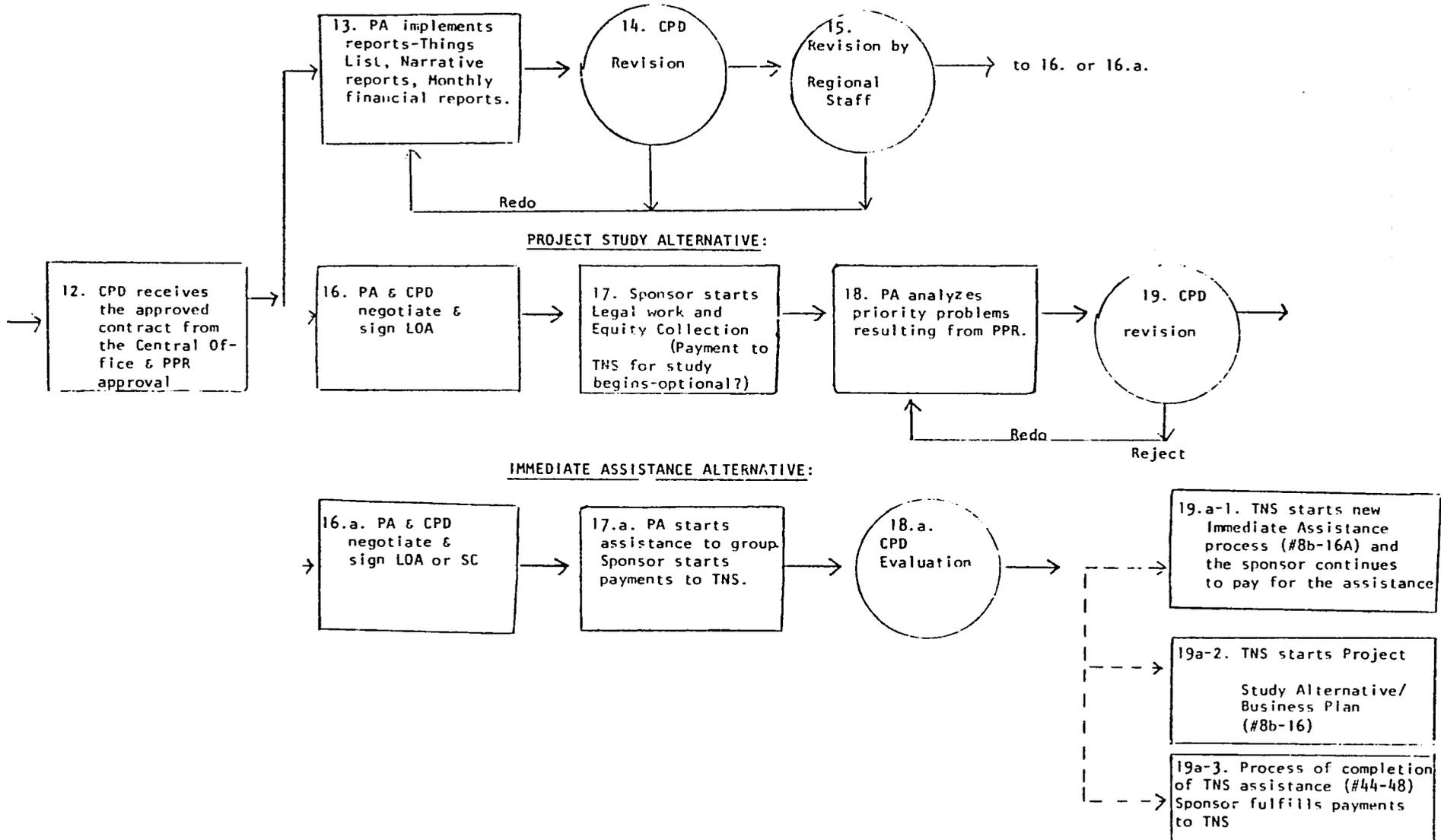
Key:

- PA: Project Advisor
- CPD: Country Program Director
- SC: Service Contract or Technical Assistance Contract
- PPR: Preliminary Project Report
- LOU: Letter of Understanding
- LOA: Letter of Agreement

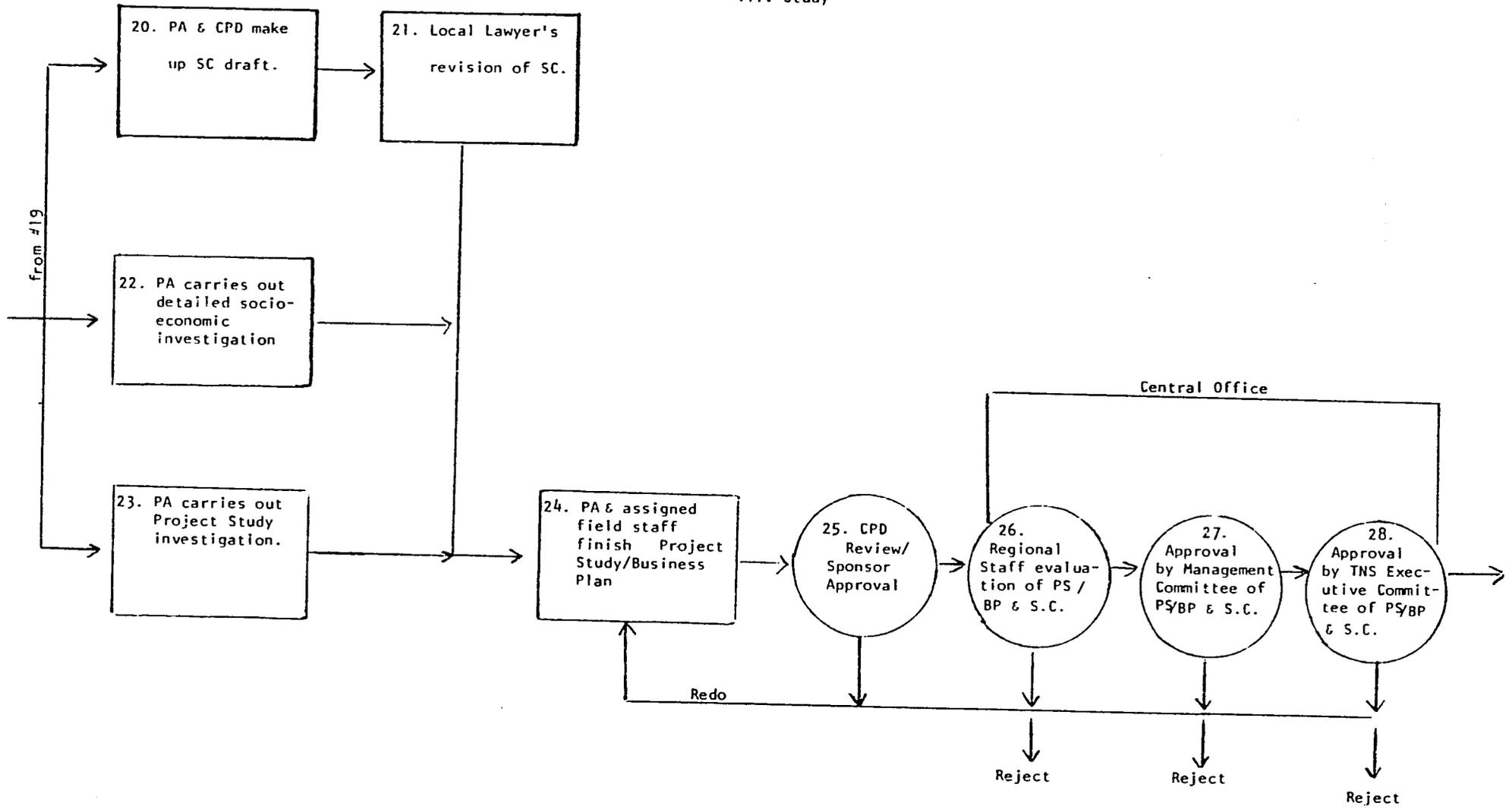
1. PPR



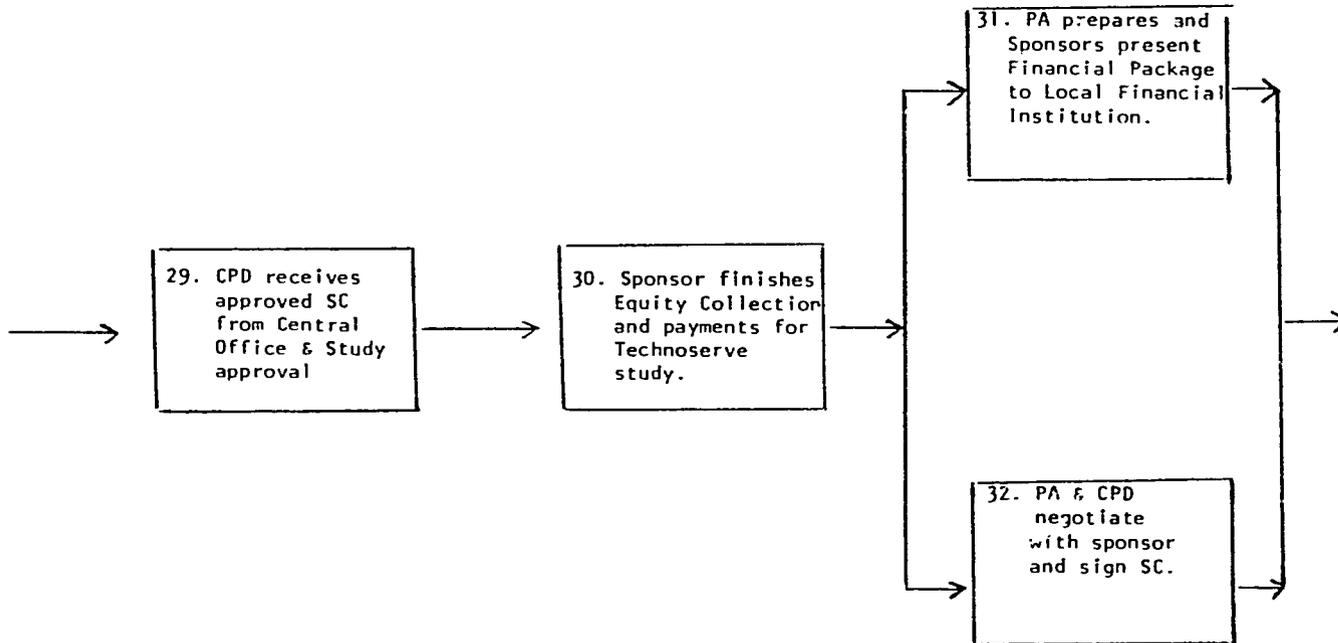
II. NEGOTIATION



III. Study

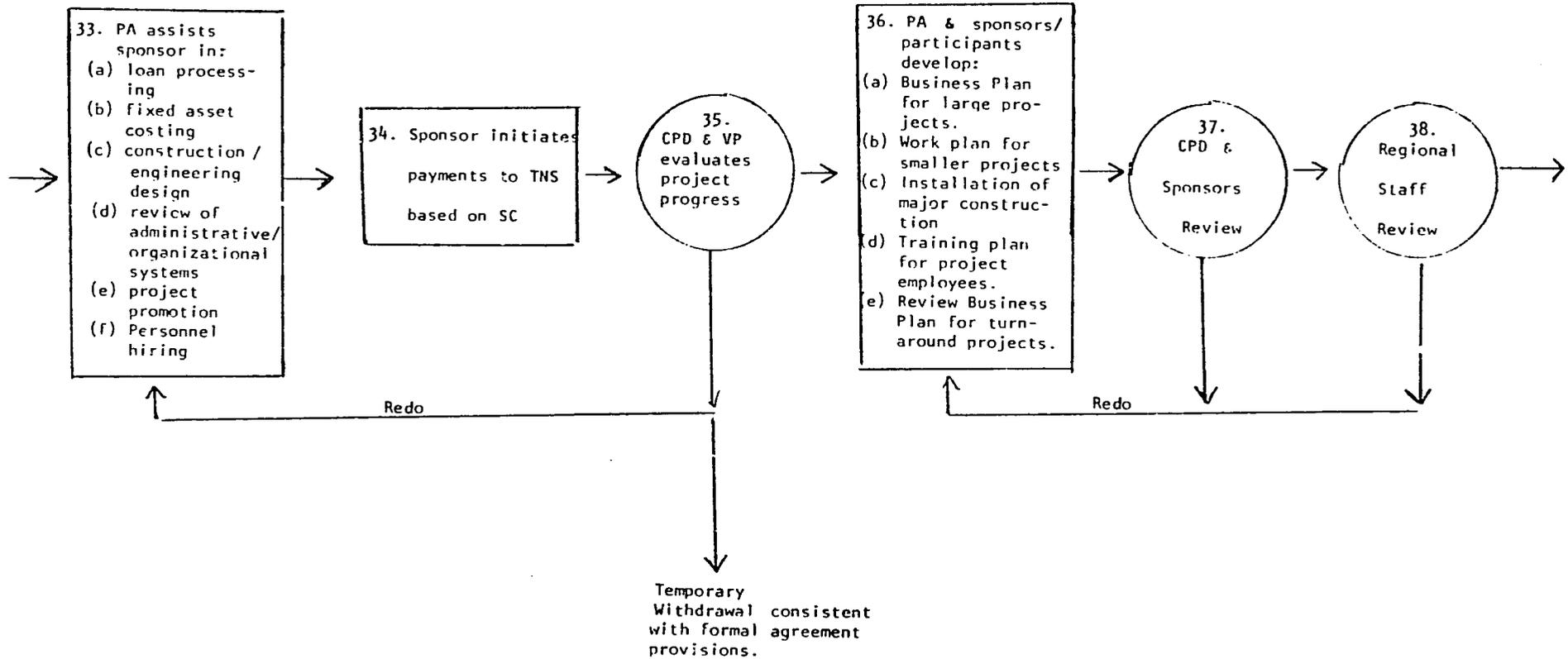


IV. IMPLEMENTATION

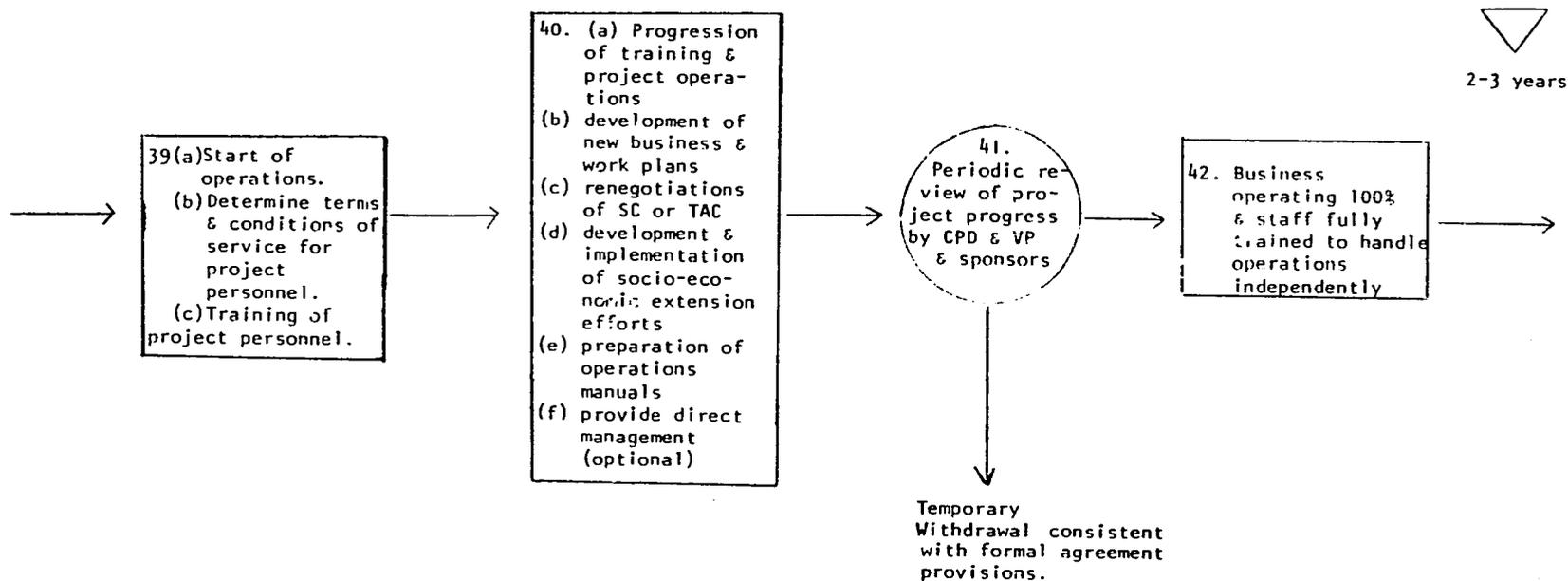


IV. IMPLEMENTATION (continued)

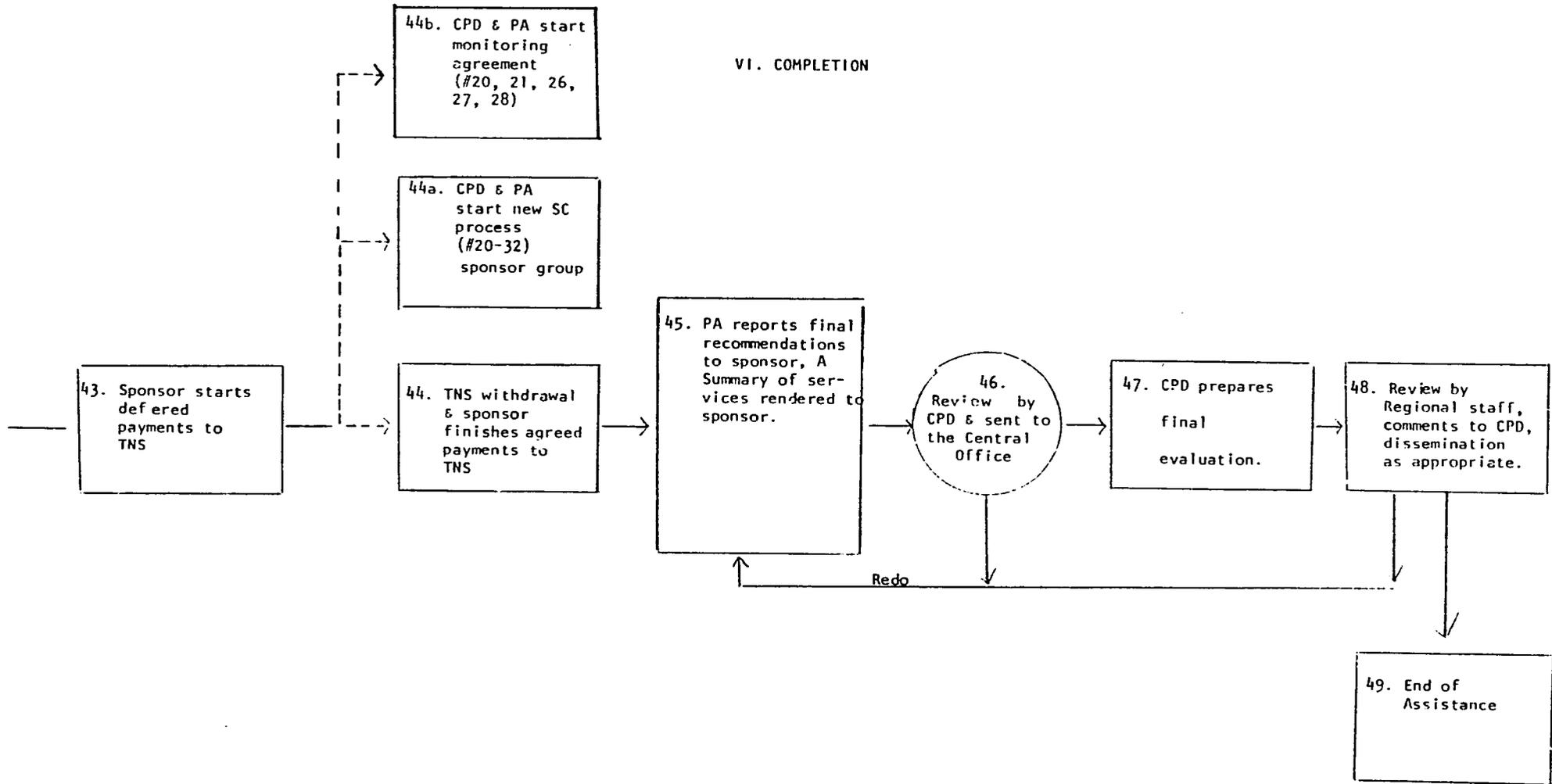
9-12 months



V. OPERATION



VI. COMPLETION



Fecha: _____

Nombre del Entrevistador: _____

Identificación
del Entrevistado: _____

a) Número: _____

b) Sub-Zona: _____

L. Alimento Ud. a su ganado con concentrado durante los últimos 30 días?

1 SI 2 NO

001

2. ¿Provenía ese concentrado de la Cooperativa de San Gerardo?

1 SI 2 NO

002

3. ¿Cuánto tiempo, durante los últimos 30 días alimentó Ud. a sus vacas lecheras con concentrado? *de la cooperativa*

003

4. ¿Cuántas Mz. tiene Ud. para pasto todo el año?

004

5. ¿Cuántas Mz. tiene Ud. para pasto en verano y siembras en invierno?

005

6. ¿Cuántas Mz. de tierra tiene en uso para pastar el ganado? *En total*

006

DETERMINE EL NUMERO DE ANIMALES ALIMENTADOS POR ESTE PROPIETARIO DURANTE LA MAYORIA DEL ULTIMO MES

7. ¿A cuánto asciende el número de ganado que Ud. alimenta? *En total*

007

8. ¿Cuántas vacas tenía Ud. ayer?	008
9. ¿Cuántas vacas fueron ordeñadas ayer?	009
10. ¿Cuántas de sus vacas están amamantando?	010
11. Cuántas vacas horras habían ayer?	011
12. ¿Cuántas de sus vacas tienen ternero?	012
13. ¿Cuántas reses está Ud. engordando para carne?	013
14. ¿Cuántos toros rejeros (o de semental) tiene Ud.	014
15. ¿Cuántos bueyes tiene Ud.?	015
16. ¿Cuántos terneros tiene Ud.?	016
<hr/>	
QUE OTROS ANIMALES USAN TERRENO?	
17. ¿Cuántas cabras?	017
18. ¿Cuántos muías?	018
19. ¿Cuántos caballos?	019
20. ¿Cuántos burros	020
21. ¿Cuántos cerdos?	021
22. ¿Cuál fué el total de animales que pastaron ayer?	022
<hr/>	
SI EL ENTREVISTADO OCUPÓ CONCENTRADO, HAGALE LAS SIGUIENTES PREGUNTAS:	
23. ¿Cuántas lbs. de concentrado comió ayer el ganado en total?	023

24. A cuantas de sus vacas lecheras alimento con concentrado ayer? 024
25. Cuantas de sus vacas lecheras no alimento con concentrado ayer? 025
26. Cuántas lbs. de concentrado comieron sus vacas lecheras ayer en total? 026
27. ¿Es esta la cantidad aproximada con la cual alimenta Ud. a sus vacas lecheras en un día normal? 027
28. ¿Si nó, que cantidad de lbs. de alimento da a sus vacas lecheras normalmente? 028
29. Alimentó Ud. con esta misma clase de concentrado a: 029
1. Mulas 4. Gallinas
2. Cerdos 5. Caballos
3. Cabras
1. Sí _____ 2. No _____
30. ¿Por cuántos días se alimentaron sus vacas (que dieron leche ayer) únicamente con este concentrado de la Cooperativa? 030
31. ¿Por cuantos días sus vacas lecheras comieron pasto y concentrado durante el mes pasado? 031
- de la Cooperativa*
- ¿Conqué otra cosa alimentó a sus vacas lecheras ayer?
- ¿Harina de semilla de algodón?
32. ¿Cantidad de lbs. que se les dió ayer? 032

Olotes

33. ¿Cantidad de lbs. que se les dió ayer?

033

Maicillo

34. ¿Cantidad de lbs. que se les dió ayer?

034

Maiz

35. ¿Cantidad de lbs. que les dió ayer?

035

Melaza

36. ¿Cantidad de litros que se les dió ayer?

036

Afrecho

37. ¿Cantidad de lbs. que les dió ayer?

037

Otros

38. Cantidad de lbs. que se les dió ayer?

038

39. ¿Cuántas de sus vacas lecheras son criolla pura?

039

40. Cuántas botellas de leche dieron las criollas ayer?

040

41. ¿Es esa una producción normal?

041

1. Si 2.No

42.	¿Si nó lo es, cual ha sido lo normal por día durante el último mes?	042
43.	¿Cuántas vacas lecheras son cruzadas?	043
44.	¿Cuántas botellas dieron las cruzadas ayer?	044
45.	¿Es esa una producción normal? 1.Si <input type="checkbox"/> 2.No <input type="checkbox"/>	045
46.	¿Si no lo es, cuál ha sido lo normal durante el último mes?	046
47.	¿Cuántas botellas en total dieron sus vacas lecheras ayer?	047
48.	¿Fué ayer un día normal de producción de leche? 1.Si <input type="checkbox"/> 2. No <input type="checkbox"/>	048
49.	¿Si nó, cuál es la cantidad promedio que se produce en un día durante los últimos 30?	049
50.	¿Hay disponibilidad de agua en el mismo lugar donde pastaron sus vacas ayer? 1.Si <input type="checkbox"/> 2. No <input type="checkbox"/>	050
SI LA RESPUESTA PARA LA PREGUNTA N° 50 fué "NO", ENTONCES PREGUNTE:		
51.	¿Aproximadamente, cuántos minutos se tardó Ud. en la ida al lugar en donde su ganado bebió agua ayer?	051
52.	¿Aproximadamente, cuántos kms. hay hasta el lugar en donde está el agua?	052

53. De las vacas que dieron leche ayer,
¿Cuántas vacas lecheras fueron vacunadas
durante los últimos 6 meses?

053

54. ¿Cuántas vacas lecheras tienen garrapatas?

054

TRATE DE AVERIGUAR CUAL ERA LA PRODUCCION
DE LECHE EN DICIEMBRE.

55. ¿Cuántas vacas tenía Ud. en
Diciembre?

055

56. ¿Cuántas de estas vacas producían leche
en Diciembre?

056

57. ¿Aproximadamente, cuántas botellas de
leche por día dieron todas estas vacas
en Diciembre?

057

TRATE DE AVERIGUAR COMO EMPLEARON LA LECHE
QUE ORDEÑARON AYER.

58. ¿Cuántas botellas de leche se vendieron ayer?

058

59. ¿Cuántas botellas de leche tomaron en su
casa ayer?

059

60. Aproximadamente, ¿Cuántas botellas de leche
ordeñada ayer se ocupó para elaborar queso?

060

61. ¿Cuántas lbs. de ese queso dejaron para vender?	061
62. ¿Cuántas libras de ese queso se consumieron?	062
63. ¿Se compró leche ayer?	063
64. Si así fué, ¿Cuántas botellas de leche se compraron ayer?	064
65. Compraba Ud. esta cantidad de leche diariamente durante los últimos 30 días?	065
66. Si no fué así, ¿Cuántas botellas de leche ha comprado Ud. en un día normal durante los últimos 30 días?	066
SI LA FAMILIA CONSUME LECHE, AVERIGUE QUE CANTIDAD DE LECHE ORDEÑADA EN CASA O COMPRADA APARTE CONSUMIERON LOS NIÑOS DE 6 AÑOS O MENOS	
67. ¿Cuántas personas comieron en casa ayer?	067
68. ¿Cuántos niños de 6 años o menos comieron en casa ayer?	068

	1	2	3	4	5	6	Total
Primer Nombre							
69. Cuántas tazas de leche de las producidas por sus vacas tomó c/u?							069
70. Cuántas tazas de leche comprada tomó c/u?							070
71. Cuántas tazas en total se tomó c/u?							071
72. Cuántas tajadas de queso producido comió ayer c/u?							072
73. Cuántas tajadas de queso comprado comió ayer c/u?							073
74. Cuántas tajadas en total?							074

AVERIGUE CUAL FUE EL CONSUMO DE LECHE

EN DICIEMBRE

75. ¿Cuántas personas comieron en la casa durante un día normal en Diciembre?	075
76. ¿Cuántos niños de 6 años o menos consumieron leche durante un día normal en Diciembre?	076

77. Aproximadamente, ¿Cuántas tazas de leche en total consumieron en su casa en un día normal en Diciembre?

077

78. Cuantas tajadas de queso comieron sus niños de 6 años o menos en un día normal de Diciembre?

078

DETERMINE LA ACTITUD DEL ENTREVISTADO POR MEDIO DE LAS SIGUIENTES PREGUNTAS:

79. Cuántas de sus vacas están más sanas de lo que estuvieron en Mayo del año pasado?

079

80. Con el ganado que está sano: ¿Cuál piensa Ud. que es la razón principal por la cual sus vacas lecheras están más sanas este año?

080

NO LEA ESTA LISTA DE RESPUESTAS

1. _____
2. _____
3. _____
4. _____

81. Con el ganado que no está sano, ¿Cuál cree Ud. que es la razón principal por la cual sus vacas lecheras no están más sanas que hace un año?

081

1. _____
2. _____
3. _____
4. _____

AVERIGUE CUALES OTROS PROYECTOS ADICIONALES SON DE MUCHO INTERES PARA EL ENTREVISTADO. NO LEA LAS POSIBLES RESPUESTAS, UNICAMENTE INDIQUE CUAL DE TODOS LOS PROYECTOS SON DE PRIMERA Y SEGUNDA IMPORTANCIA PARA EL.

1. Trabajo de Extensión Agrícola
2. Más o mejores carreteras (caminos)
3. Más o mejores facilidades de salud
4. Aumento de credito
5. Proyectos para crear más oportunidades de empleo.
6. Mejoras para agua potable
7. Trabajos de Extensión Ganadera
8. Otros

82. ¿Que clase de proyecto preferiría para esta Zona (Area)	082
-------------------------------------------------------------	-----

83. ¿Cuál cree Ud. que es el segundo proyecto de más importancia para esta comunidad?	083
---------------------------------------------------------------------------------------	-----

OBSERVE LO SIGUIENTE EN LA CASA DE ESTA FAMILIA:

84. ¿De qué están hechas las paredes?	084
1) Paja	
2) Baharaque	
3) Adobe	
4) Ladrillo	
5) Madera	

85. ¿De qué está hecho el techo?	085
1) Paja	
2) Teja	
3) Lámina	
86. ¿De qué están hechos los pisos?	086
1) Tierra	
2) Ladrillo de barro	
3) Ladrillo de cemento;	
4) Cemento	
87. ¿Cuántos cuartos tiene la casa?	087
88. ¿Tiene electricidad? 1.Si <input type="checkbox"/> 2.No <input type="checkbox"/>	088
89. ¿Tiene agua potable la casa?	089
90. Si la respuesta para la pregunta N° 89 es "No": ¿Cuántos minutos hay hacia la fuente de agua potable más cercana en la estación de verano?	090
91. Cuántos kms. hay hacia la fuente de agua potable más cercana durante el verano?	091
PARA LOS QUE NO COMPRAN ALIMENTO DE CONCENTRADO	
92. ¿Cuál es la razón principal por la que Ud. no utiliza concentrado de la Cooperativa de San Gerardo?	092

PARA LOS QUE UTILIZAN CONCENTRADO DE LA COOPERATIVA:

93. ¿Cree Ud. que el concentrado incrementa sus ganancias?

093

94. ¿Piensa Ud. que este concentrado incrementa la producción de leche de sus vacas?

094

95. ¿Piensa Ud. comprar más
 menos
 la misma ctdad
de concentrado durante la estación de invierno?

095

96. ¿Planea Ud. comprar más
 menos
 la misma ctdad
de concentrado para la próxima estación de verano?

096

PARA TODOS :

97. ¿Tiene Ud. problemas en vender la leche?

Sí _____ No _____

097

98. Tiene Ud. problemas en vender el queso?

Sí _____ No _____

098

99. ¿Cree que en el futuro será más difícil
vender la leche?

099

1. sí _____ 2. No _____

100. ¿Cree que en el futuro será más difícil
vender el queso?

100

1. sí _____ 2. No _____

OBSERVACIONES:
