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PRELIMINARY ASSESSMENT
OF
NICARAGUAN LIVESTOCK SECTOR

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LIST OF ACRONYMS

UFANIC	Union de Productores Agropecuarios de Nicaragua
FAGANIC	Federacion de Asociaciones Ganaderos de Nicaragua
BC	Banco Central
CNC	Corporacion Nacional de Carnes
CARNIC	Carnes de Nicaragua
FONDLAC	Fondo de Desarrollo de La Industria Lechera
PMA	Programa Mundial de Alimentos
USAID/N	A.I.D. Mission to Nicaragua
MAG	Ministerio de Agricultura y Ganaderia
IRENA	Instituto De Recursos Naturales
FONDO GANADERO	Livestock Producers Fund
BANCO GANADERO	Livestock Producers Bank
GON	Government of Nicaragua
PNDL	Programa Nacional de Desarrollo Lechero
FNI	Fondo Nacional de Inversiones
RUTA II	Regional Unit for Technical Assistance
IICA	Instituto Interamericano de Ciencias Agricolas
USDA	United States Department of Agriculture
FSIS	Food Safety Inspection Service
UNAG	Union Nacional de Agricultores y Ganaderos

INTRODUCTION

This report is one of a series of agriculture sector studies to develop background information, identify alternative courses of action, and provide an analysis of feasible options to USAID and GON officials to adopt development strategies.

The production, transportation, trading, processing, packaging and marketing of cattle industry products provides significant employment opportunities in the rural and urban sectors of the economy. At the end of the 1978/79 agricultural cycle, Nicaragua had an impressive per capita consumption of 13.3 kgs red meat and the industry was an important earner of foreign exchange (US\$ 58,114,000 in 1977 and peak sales of US\$ 93,257,000 in 1979). However, by 1989, per capita consumption of red meat was reduced to only 6 kg and exports from the livestock industry to just over \$37,000,000.

The agrarian reform measures of the Sandinista Government, the severe deterioration of security in the rural areas, the Contra War, runaway inflation, and the economic blockade of the Sandinista Government created chaotic conditions in the livestock industry and caused severe loss of production, capital, and markets.

The present Government of Nicaragua has established a Stabilization and Structural Adjustment Program for the period 1990-1993. This should present an opportunity to re-activate the livestock industry at least to the level it held in 1978.

SCOPE OF WORK

This study and report seeks to gather, summarize, and analyze information that is needed to provide a comprehensive overview of the livestock industry. It will attempt to identify the principal constraints to reactivation of the livestock and suggest a strategy to relieve these constraints through USG support.

The specific objectives of this assignment are:

- to make a general assessment of the status of the cattle industry in Nicaragua
- to evaluate the Ministry of Agriculture's program for re-activation of the livestock industry
- to evaluate cattle industry development proposals, such as the "Proyecto de Rehabilitacion Ganadera y Agro-Forestal", which was prepared by the technical unit of the World Bank, United Nations, IICA, and Unidad Nacional.

METHODOLOGY

Winrock International provided the services of James Bleidner and Raul Hinojosa for a period of approximately one month to conduct the studies and to prepare a report of their findings. Contacts were made with the "Federación de Asociaciones Ganaderos de Nicaragua", FAGANIC. With their assistance, the team was provided with access to farms, ranches, owners, laborers, milk processing plants, slaughterhouses, and the directors of the various "Asociaciones Ganaderos" of Nicaragua. Through these contacts, extensive visits were made to the production areas. Interviews with the Minister of Agriculture and his staff provided the public sector perspective. Observations of the class and condition of cattle, the availability of feed, marketing channels and the expressed opinions of persons interviewed were made by the study team. These observations were subjected to the experience of the team in other countries of South and Central America and the Caribbean Islands.

The most reliable, up-to-date, and complete series of statistics available to the team were contained in the annexes to the project proposal, "Proyecto de Rehabilitacion Ganadera y Proteccion Agro-Forestal". Some of these statistical tables are reproduced in the Annexes to this report.

EXECUTIVE SUMMARY

The livestock sector, both dairy and beef production, is constrained by a diminished production and a weak marketing system. The reduction in production and productivity is due to:

- decreased size of the national herd from three million to approximately 1.9 million.
- reduced inputs to the sector in the form of: animal nutrition, (i.e. forage, concentrates, minerals, and vitamins); vaccination for the prevention of respiratory problems, mastitis control, etc.; and reduced pasture management. All of these have had a direct negative effect on overall production and productivity.
- reduced export markets and purchasing power in the domestic market.

Political stability and incentives to producers are essential elements to create the necessary environment to make investments, increase production, and sustain growth. Political stability within the country is gradually improving. The incentives to increase production come in two forms:

- availability of working capital to improve productivity,
- existence of a marketing system which will absorb the increased production and, more importantly, pay for the production in a timely manner.

The national cattle population is at a low point in its evolution. Even so, the herd is large enough and the natural resource base is good enough that it is possible not only to increase the production of meat and milk, but also to increase the size of the national herd. Requirements for increasing production and the national herd is not so much the investment of large amounts of money, as it is the application of basic, inexpensive, animal husbandry techniques and practices in order to improve the calving rate of the cow herd, and the survival and growth rate of the calves.

USAID/N Mission strategy includes assistance to the CON to achieve broad-based, sustainable economic growth. The cattle industry extends to about one-third of the population, distributed throughout the rural and urban areas. Persons directly involved in the cattle industry range from poor rural inhabitants to "blue and white collar" workers in the processing, marketing, and transportation areas, to wealthy persons who have considerable political, social, and economic influence. Briefly stated, the cattle industry meets the criteria of a sub-sector of the economy which has a good potential to earn increased income on a sustainable basis for a large section of the Nicaraguan population.

Specific Strategy Suggestions

The Government of Nicaragua is engaged in a political and economic stabilization program to create a stable environment which will encourage people to make investments, create jobs, improve productivity, and increase production. The Government of the United States should continue to support this effort. A continuing dialog with the GON to encourage continuation of the privatization of

State owned enterprises should continue to be an important element of this program strategy.

The USAID/N assistance to the Ministry of Agriculture to obtain and install the equipment necessary to establish a meat inspection laboratory which will meet the requirements of the USDA and the FSIS is a necessary and timely project. Access to the USA market, with its favorable price structure, is important to the expansion and diversification of beef exports from Nicaragua.

The Private Sector Assistance Project, (525-0315), designed to strengthen the Livestock Producers Association, is the correct level of assistance, to the proper organizations at this time. The Project will provide the basis for continuing dialog, representing the opinions of the sub-sector with the GON. The Project will also provide an excellent means by which USAID/N can promote the idea of the livestock producers' establishment of a FONDO GANADERO and a BANCO GANADERO so they can develop a sector-owned source of credit and other financial assistance for livestock producers.

Establishment of a "Prompt Payment Trust Fund" to enable the export slaughterhouses and the milk processing plants to make prompt payment for animals and milk delivered would provide cash flow to producers. Improved cash flow could be used to finance improved animal husbandry practices and greatly reduce the need for expensive, onerous credit. A better solution would be for the slaughterhouses and dairies to establish a line of credit, collateralized by product in storage, which would permit them to make prompt payment. One wonders, however, whether or not the processors would find it sufficiently important to make prompt payment to accept the cost of a line of credit for this purpose.

The team believes that the Program Strategy actions suggested above are timely, helpful interventions. The expansion of credit via a large, highly structured Project Loan as described in the "Proyecto de Rehabilitacion Ganadera y Proteccion Agroforestal" is NOT considered to be advisable in the near future. The reason for this suggestion is that it will take time to put in place the political and economic stability and the market expansion which are needed for the expansion of credit for production purposes.

GENERAL ASSESSMENT OF CURRENT SITUATION

CATTLE POPULATION, HERD COMPOSITION, PRODUCTIVITY INDICATORS

No reliable census of the cattle population has been done for many years. The "Proyecto de Rehabilitacion Ganadera y Proteccion Agroforestal", dated September 1990, contains a well-reasoned analysis of the available information. The inter-institutional team included persons from the "Fondo Nicaraguense de Inversiones", the "Ministerio de Agricultura y Ganaderia", the "Unidad Tecnica de Asistencia Regional" of the World Bank, and the "Instituto Interamericano de Ciencias Agricolas". The best estimate, taking the facts which affected the cattle population over the past decade into account, is a total herd of 1.9 million head in the first quarter of 1991. In an exit interview, the Minister of Agriculture stated that he believes, "because there was heavy slaughter of steers in the past couple of years, the herd is likely to be at the 1.4 million level".

The study team's observations on farms and ranches and conversations with ranchers and leaders of the livestock industry lead us to believe that the productivity indicators early in 1991 are as follows:

Weaned calf crop	40% of eligible females
Mortality of cattle 1-3 years old	3%
Mortality of cattle over 3 years old	2%
Age of heifers at first calf	4 years
Age to slaughter	4 years
Average productive life of cows and bulls	7 years

Given these conditions, about 46% of the total herd would be cows or heifers in the first gestation period. It is reasonable to assume that there are 874,000 eligible females in the national herd. Using the Minister of Agriculture's cattle population estimate, there would be 644,000 females in the national herd.

The extraction rates of the past decade far exceed the possible herd replacements under these productivity indices. It is clear that the cattle herd is at a low point in its evolution. It is obvious that the productivity indicators must improve, especially the weaned calf crop, in order to meet the domestic demand, to earn foreign exchange, and to build up the cattle populations to former levels.

Annex 1 includes a series of tables, which illustrate the effect over a four-year period of animal husbandry at the productivity levels indicated above. Note particularly that the herd increases in size only 6% over a four-year period while the extraction rate is 13% of the herd at the beginning of the year. The combination of extraction rate and herd increase is called the "productivity rate", which is 13.6%.

Annex 2 is a series of tables, which illustrate the difference if modest gains in the percentage of weaned calf crop can be obtained over the four-year period. The herd increase is 19.3% over the four year period, the extraction rate remains at about 13% and the productivity rate in the fourth year increases to 20%. The increase in

the weaned calf crop can be attained by low cost management practices such as: the establishment of a controlled breeding season so that calves are born in the most favorable time of the year, use of at least one bull for every twenty cows, examination of cows for pregnancy at the end of the breeding season to eliminate non-breeders, vaccination of calves to avoid loss from disease, and adequate protection against internal and external parasites.

AVAILABILITY AND QUALITY OF FACTORS PRODUCTION

Land

The best estimate is that 2.8 million hectares of pastures are on farms, of this, 1.9 million hectares are improved grass or forage and .9 million are native grasses.

The team observed severe soil erosion and deforestation in the areas visited. There were cattle on steep slopes with rocky soils. There was little, if anything, for the cattle to graze upon. Such areas should be candidates for forestation. The presence of small bundles of firewood on the roadside of travelled routes seemed to be more a reflection of poor, unemployed rural people trying to eke out a meager living than it was an effort by ranchers to increase the area of pastures at the expense of the trees. The team visited established livestock production areas where there was no sign of ranchers trying to expand pasture areas by cutting down trees.

There may be some land clearing on the "agricultural frontier", not for the specific purpose of creating pastures, but to create employment by harvesting the forest land. When the forest clearing is completed, the land will eventually return to grass, which will be used by cattle. Clearing of forest land is generally not an activity of ranchers. The only major area of mechanized land clearing observed was on the Eastern shore of Lake Nicaragua. This was the removal of weedy brush to prepare the land for irrigated rice and pasture.

The Agro-Forestry component of the project proposal of Ruta II proposes to tie watershed protection via reforestation of areas subject to erosion to the loans made for infra-structure, pasture improvement and cattle. It would force the farmer to carry out reforestation on 10% of their land area. This would be financed by a long-term, low interest sub-loan. While this might yield a desirable result from the standpoint of soil conservation and forestry protection, it increases the cost of production loans to the point where it could be difficult to disburse the development funds if the project is eventually approved.

The Project Proposal contains few details related to the "Proteccion AgroForestal" component. It does not suggest the varieties of the trees to be planted, whether the planting will be done by seed, cuttings, or seedlings. If plantings are to be done by seedlings, are there plants available in tree nurseries? How are the new seedlings to be protected against mice, rabbits, and cattle?

The team suggests the following ten-year goal: expand the cattle herd from 1.9 million head to 2.7 million head on no more than 3 million hectares of pastures. The average carrying capacity, using supplemental forage during the dry season should

be about one animal unit per hectare. It is not considered to be necessary to expand the "agricultural frontier" to any significant degree, if the producers will provide for the dry-season shortage of pasture grass by planting and storage of forage crops, by irrigation, or by choosing cattle production enterprises which permit moving the cattle out of dry areas into areas where feed is available.

Labor Availability

In the discussion of labor, it is necessary to distinguish between farm labor that works with hand tools, other farm labor that drive tractors and milk cattle by hand or machine, and workers in slaughterhouses and dairy processing plants.

There did not seem to be a shortage of hand labor on any of the farms visited. Daily wages for these workers was reported to be about five cordobas (US\$ 1) plus food. The work day starts at sunrise and is completed by 11 am. It is necessary to keep in mind that the productivity of a person with hand tools is considerably less than the productivity of persons whose labor is multiplied by machines. As low as the wage may seem to be, it is probably in line with the productivity of this type of labor and the ample availability of persons who otherwise would be unemployed.

Those persons who handle the cattle, feed them, milk them, perform irrigation chores, and drive tractors or trucks are usually full-time employees whose home is on the farm or ranch. They are trusted, trained employees and earn correspondingly higher wages.

Persons who work in the agri-business of slaughterhouses and dairies run the full gamut of accountants, secretaries, electrical and steam engineers, shipping clerks, drivers, and those who work on the killing floor, in the deboning rooms and the refrigerated storage. Our impression was that they knew their jobs and were performing them reasonably well. There are probably some excess workers, but it must be kept in mind that we observed them during the season of low supplies. Such trained personnel must be kept on the job so they will be available when the processing plants operate at their full capacity.

Capital

The universal response to questions related to the availability of investment and working capital was, "We need more bank credit, at long-term and low interest rates to improve our productivity". This is not surprising, given the rate of inflation during the past 12 years, the flight of capital to safe havens in the USA and Europe, and the continuing uncertainty of the political and economic climate in Nicaragua. There seems to be a continuing reluctance to invest "owned capital". The preference is to use "borrowed capital", especially since default on loans is not severely punished.

There is an obvious need and opportunity to make capital investments which will increase production and improve productivity. The conditions of rural security, protection of property, and favorable market demand are apparently not yet good enough to induce investors to take the risk of investment in livestock production enterprises which have a relatively low return on a long-term investment. This is

not the right time to expand credit and soften the terms of loans. Increased capital investment must begin to come from the producers. "Project" loans from international credit are not the answer. The livestock producers need to establish their own continuing source of financial resources.

Banking

The Central Bank controls and coordinates the National Financial system. The re-organization in 1980 was the first step towards the unification of banking services. It coordinates monetary policy, issues currency, and establishes exchange and interest rates. Finance companies, commercial banks, and savings and loan institutions were brought into the financial system under control of the Central Bank. The "Banco Nacional de Desarrollo", the "Banco Nicaragüense de Industria y Comercio", the "Banco Inmobiliario", and the "Banco Popular" are the major banks of the system. The entire banking system has been nationalized since 26 July 1979.

In addition, the insurance companies are national entities. There are also "Companias Generales de Deposit" (bonded warehouses) which have the function to sell, store, guard and conserve merchandise, both domestic and foreign. Foreign banks are not permitted to receive deposits from the public.

The Central Bank controls the emission of money, regulates bank credit, and maintains the value of Nicaraguan currency inside and outside the Country.

The credit policy of the "Banco Nacional de Desarrollo" is designed to:

- support the stabilization and adjustment plan of the Government.
- promote increased agricultural production.
- make possible the re-orientation of credit under criteria of assignation strictly according to banking principles.
- optimize the utilization of scarce financial resources.

The specific objectives are to give priority to exportation of agricultural commodities, to promote the cultivation of non-traditional exports, to improve production efficiency, and to improve the rate of recuperation of loans.

Credit for cattle in the fattening stage is not more than C\$ 1,030.33 per head for up to 12 months at 18% interest, plus the loan contains a "maintenance of value" clause so the borrower has the exchange rate and inflation risk.

Credit for cattle in the growing stage is not more than C\$ 744.30 per head for up to 18 months at 18% interest, plus the "maintenance of value" clause.

Credit can be used for: working capital, purchase of production inputs, minor repairs, purchase of machinery and equipment, and fixed investment.

The watchword for bank policy is, "Lend only to persons who can pay and who generate profits for the Bank". These are tough lending criteria by any measure.

Marketing

World production of beef increased gradually in the 1983-87 period, roughly corresponding to the increase in world cattle populations. About 95% of the world production of meat is consumed in the country of production. In Central America, the largest per capita consumption has been in Costa Rica, Nicaragua, Honduras, and El Salvador, in that order. Per capita consumption of beef in Nicaragua in 1991 is down to a low of 6 kilograms.

The major importing countries in the 1983-85 period were the USA, the European Economic Community (especially Italy), Japan, Canada, and the Soviet Union. Major exporting countries were the European Economic Community, Australia, New Zealand, Brazil, Uruguay, Argentina, and the USA.

International prices are regulated by the industrialized nations where the "Yellow Sheet" of the Chicago Mercantile Exchange is used as a point of reference to arrive at the definite market price for the various forms in which beef and sub-products are sold.

World Bank projections of prices for the next decade indicate improving international prices, due primarily to the cyclical build-up of breeding females in the USA, and increasing demand from Japan, Korea, and the European Economic Community. Brazil has reduced its exportations.

Nicaragua, like other Central American countries, has the distinctive marketing advantage that it is an "aftosa-free" country. It has access to North American markets and is relatively free from restrictions in Europe and Asia.

Major export earnings for Nicaragua are produced by cotton, coffee, sugar and beef. Until 1985, the principal buyers of Nicaraguan beef were the USA, Canada, and Puerto Rico. From 1986-88, Canada was the principal buyer. Then came Sweden, Cuba, USSR, and El Salvador. From 1989 on, the market diversified further to include Canada, Mexico, Japan, and Germany. The economic embargo of Nicaragua by the USA, recently lifted, caused the loss of a major, favorable export market. It is now necessary to re-establish all the certifications required by the USDA to allow the entry of Nicaraguan beef once again into the USA market.

The Nicaraguan Domestic Market

The natural market forces which select good quality steers for export leave sufficient numbers of cull cows, cull heifers, bulls, and oxen to supply adequately the effective demand for beef in domestic markets. It is neither necessary nor desirable to establish quotas for exportation and internal consumption. In addition to cattle sacrificed in the 41 Municipal slaughterhouses, the export slaughterhouses, for one reason or another, direct a part of their production to the domestic market. The present level of domestic consumption per capita is calculated at 6 kilograms. The goal needs to be to increase production and productivity so 10 kilograms per person, per year is attained.

Prices

The price of beef dropped from US\$ 1.34 per pound F.O.B. in 1980 to US\$.92 per pound F.O.B. in 1988. Present prices in 1991 are: US\$1.04 to 1.08 per lb. C.I.F. Canada. The price for meat exported to Mexico ranges from \$1.25 per lb. vacuum packed, chilled to \$1.19 per lb. frozen boneless beef. The gross income to the producer is reduced by the following factors:

- **Transportation from ranch to plant C\$60**
- **Tax Stamps 1%**
- **I. R. withholding tax 2%**
- **Fondo Agropecuario 2%**
- **FAGANIC 1%**
- **Municipality 2%**

Payment to producers is based on warm carcass yield of animals slaughtered after 12 hours in the corral. The team considers this to be a fair way to pay for cattle. It is the first step towards payment for the weight and quality of cattle.

The Corporacion Nacional de Carnes (CNC) has sales agents on its own staff located in Canada and Mexico. The CNC sales agents negotiate prices, delivery terms, and payment conditions with buyers in these two foreign markets. The CNC agents transfer foreign exchange to the Central Bank, which converts the foreign exchange into cordobas. These cordobas funds are then deposited to the CNC accounts in the Banco Nacional de Desarrollo and its branches. The slaughterhouse can then issue checks to the producer.

The total installed capacity of the six slaughterhouses under the authority of the CNC is 1500-1600 animals per day for 288 days of the year.

At the present time, de-boned, frozen beef in 60 pound cartons is being exported to Mexico and Canada. Buyers in Mexico pay F.O.B. while the Canadian buyers insist on C.I.F. Some Mexican buyers want chilled beef, vacuum packed, for which they will pay a premium. Nicaragua does not have access to the USA market at this time because the testing laboratory is incomplete. The Minister of Agriculture is taking extraordinary steps to acquire the missing machinery and train the personnel. The Minister considers it essential to open the market in the USA to obtain better prices and to create both the reality and the perception of expanding markets. This is an incentive needed for ranchers to adopt better management practices.

The cost of processing one head of cattle in the CARNIC slaughterhouse was stated to have been 83 Cordobas just a few months ago. By early May 1991, that figure had improved to 60 Cordobas. Competitors in neighboring Central American countries are reported to have costs in the 30-33 Cordoba range. Whether or not privatization of the State slaughterhouses will result in decreased costs per head remains to be seen.

With respect to milk and milk products, many of the persons visited told us that they do not deliver their production to the dairies. The primary reason for this is that transportation costs and varying percentages for income tax withholding and

other charges are deducted from the payments. These discounts, or costs of marketing are not incurred when the milk is separated into cream on the farm, made into cheese, and sold without pasteurization or sanitation controls. Details of these discounts are presented elsewhere in this document. Ministry of Health sanitation and hygiene regulations are not widely or forcefully enforced.

The export of "beef" is a highly generic term. Beef is sold in many different forms or packages. There are several different ways to cut carcasses into quarters to suit the demands of specific markets. It is sold as chilled or frozen beef. Various sizes of packages or specific cuts of beef are ordered. Much of the beef presently exported is in the form of frozen, boneless beef, but there is a small market for chilled, vacuum packed meat in Mexico.

As an example of a non-traditional export, which could be assisted by APENN, consider the possibility to fill a heavy aluminum foil container, the right size to fit into a steam table of a cafeteria with cooked beef, sliced, packed in gravy, then frozen for transport and sale. The food manager of a cafeteria would then only have to defrost, put the pan in his steam table and serve hot roast beef sandwiches at a good price, with minimum effort.

For continuing success, those persons who are in charge of marketing beef and its sub-products will have to develop a variety of products and packages to be offered to a diverse clientele. By spreading the risk out over various markets, market stability at acceptable prices can be achieved.

There is little doubt that Nicaragua can have a significant export of livestock industry products and by-products. The slaughterhouses are in place and there is ample experience in serving export markets in various countries.

It is necessary for the slaughterhouses to become more efficient in the conversion of animals into marketable product. The slaughterhouse must be equipped to dry blood, render tallow, treat hides, and make bone and meat meal. This has the added advantage that it protects the environment against contamination from waste products. There must also be efficient handling of tongue, liver, kidneys, gallstones, thyroids, and similar sub-products. It would probably be economical to establish a division of industrialization in each slaughterhouse. The ability to use cheek meat, shanks, and scraps from de-boning for production of frankfurters, salami, bologna, and similar high-value products could add a profit center to a slaughterhouse. It would also diversify income to reduce market risk.

DESCRIPTION OF THE LIVESTOCK SUB-SECTOR

The livestock sector, both dairy and beef production, is constrained by diminished production and a weak marketing system. The reduction in productivity is due to:

- decreased size of the national herd from 3 million to approximately 1.9 million.
- reduced inputs to the sector in the form of: animal nutrition, i.e. forage, concentrates, minerals and vitamins; animal health, i.e. control of external and internal parasites, vaccination for the prevention of respiratory problems, mastitis control, etc.
- reduced pasture management, all of which have a direct negative effect on overall productivity and on individual animal production.
- a reduction in export markets and reduced purchasing power in the domestic market.

This total reduction of production and productivity has created a wider spread between the cost of production and the price received per unit of production, i.e. price paid per pound of live animal or liter of milk produced. While the producer has little control over the price paid for his production, he certainly has a direct effect on adjusting his production costs through efficient management practices. However, management inputs and technical assistance have been replaced by uncertainty of ownership of the business operation. Technical assistance is virtually nonexistent.

During the reconstruction period of the livestock sector, the technical assistance required to improve the quality of urgently needed technology must not be overlooked.

POLITICAL STABILITY

Political stability and incentives to producers are essential elements to create the necessary environment to make investments, increase production and sustain growth. The political stability, judged only through casual observation in the field, varies by region with the more questionable in the Northern region of the country. There are almost daily accounts of cattle rustling in the newspapers. However, the will to activate production on the part of the farm/ranching community of the region exists. The same holds true for the rest of the country. The status of political stability is gradually improving. However, the incentives to increase production come in two forms:

- in the capital investment needed to start and
- on a marketing system that will absorb the production, and, more important, pay for production in a timely manner. Because at present payments are delayed in some cases up to 90 days, improvement in payment could provide the financial capital needed to increase production. The producer, who is the source of essential basic food stuffs, receives the least support and in turn finances without interest the entire, weak marketing system. This process, which provokes dissatisfaction and in turn creates instability, should be promptly addressed.

NATURAL RESOURCE BASE

It seems that little attention has been given to the problems of natural resource degradation in the last decade. Natural resources have been abused, but in all fairness not by a decreasing livestock population which in itself was abused. Casual observation in the field would seem to indicate this abuse seems to be the result of three unchecked practices:

- heavy, indiscriminate harvesting of commercial timber without a program of replanting
- the continuous and steady harvesting of fire wood by needy people both for family use as well as for commercial purposes to generate income, e.g. numerous fire wood bundles are constantly seen by the side of the road waiting to be shipped to the city
- unprogrammed, unexplained, and uncontrolled grass and brush fires. The latter tends to be blamed on the livestock sector as a means of pasture maintenance and/or improvement. While the sector does use fire as a weed control practice, the ranchers are aware that the practice is detrimental and, if used, should only be in a controlled manner on grassland every four or five years. The sector cannot carry the entire blame when their pastures are set on fire by unknown and/or uncontrolled saboteurs.

A massive promotion campaign could be launched via radio, television, and news media to inform the general public of the damage caused by this practice. In addition, a reforestation program should be implemented that would generate jobs and at the same time plant trees. It has been observed in the field that some ranchers have initiated their own reforestation program by establishing tree nurseries and plantings within their own and/or neighbor's operations. The specific type of trees to use will vary from region to region. However, some of the tree species that are most frequently mentioned are pine, eucalyptus, and jicaro.

PASTURE

Pasture, which is the basis and foundation of the livestock sector, has been abandoned and left dormant during the last decade. Many pasture areas have reverted to natural grass and weed stands when before they were pure stands of a cultivated, highly productive grass, e.g. African Star Grass.

Pasture production goes through several stages of development, including establishment, management, and utilization in that order. In spite of the scarcity of grass seed, many of the ranchers visited have already prepared the land to plant the grass seed that they have been able to obtain. Four major grasses are becoming popular in the country in accordance with their availability. They are:

TAIWAN GRASS, which is used mainly as green chop crop under a cut and carry system and is planted in a predetermined size and location of land that in many cases can be fertilized and irrigated. These areas are called **ZACATERAS**.

ANGLETON GRASS is an improved variety of the Coastal Bermuda grass family. It is available in limited quantities and is increasing in importance. This grass is used mostly for direct grazing.

GAMBA GRASS (*Andropogon gayanus*) is an introduced, improved grass from Colombia. It is a bunch grass that grows up to 6 feet tall and can be grazed directly. It grows in areas receiving 24 to 48 inches of rainfall. Seed availability within the country is moderate.

JARAGUA GRASS (*Hyparrhenia rufa*) is a popular, well established grass within the country. It is used for direct grazing and seed availability is moderate.

Pasture development is indeed a science. However the climate and rainfall, in general terms, is abundant and favorable throughout most of the country during the winter months (May through December) for the grasses to become established and grow. Accomplishing the latter is only one third of the equation. The remaining two thirds rests with proper management and utilization in order to harvest the grass at its optimum stage of development to capture its maximum nutritional value. Adequate management and use would include, the following: fencing, to reduce pasture size and allow pasture rotation in order to both harvest at the proper stage of growth and allow recovery time; if feasible, irrigation, weed control, and fertilization; and, harvest to store excess forage in the winter for use during the dry summer months (January through April). Stored forage could be accomplished by either making silage or hay from the excess forage. These practices are not entirely unknown to the sector. The major problem is one of economics, and as a result the general practice is to over-stock in the winter and continue to overload the pastures in summer when grass is in short supply. This scenario should help us identify the two critical components of livestock production. They are:

- forage and water availability throughout the year
- an adequate profitable market.

These are two inseparable components of the livestock industry that must not be ignored. The remaining husbandry practices which in their own right are essential to livestock production are contingent upon the balance achieved in these components.

EXISTING MARKETING CHANNELS FOR LIVESTOCK BEEF

At the present time, there are only two major marketing outlets for commercial cattle that are sold and/or traded on a liveweight basis. They are the Subasta Nacional de Ganado and the meat processing plants.

SUBASTA NACIONAL DE GANADO

This method of selling livestock is identical to the typical livestock auction markets that are in use today in the USA. The subasta is privately owned and managed in a very efficient and highly professional, business-like manner. It operates three times per week (Mondays-Wednesdays-Fridays) throughout the year with an average flow

of 250 head of cattle per sale day or 750 head per week. The major portion of the animals sold at La Subasta are purchased by local meat processors ("empresarios"), who process the meat at the local municipal slaughterhouse for direct sale to the general public or for sell of full or half carcasses to smaller meat market establishments. The animals that are not sold for this purpose, mostly unfinished steers (steers that have not yet reached the desired slaughter market liveweight of 400 kilos) are traded and returned to pasture. This does not imply that all animals sold for local slaughter weigh 400 kilos.

The subasta charges a commission for its services, an insurance fee, and regular taxes. These include:

- 4% for La Subasta commission charges
- 2% for insurance
- 1% for municipal tax stamp)
- 2% for income tax charge.

A total of 9% is deducted from the gross sale receipt. La Subasta system (the only one of its kind in Central America) renders a service to the livestock sector in general, to the general public by being a sure source of animals for slaughter, and to the individual producer who has a few animals for sale on a given day and who at the same time gets paid in a timely manner, usually within five work days.

MEAT PROCESSING PLANTS

These are mostly oriented for volume processing for export and to a small degree for the internal market. They have the capacity to receive large volumes of animals at a time and an average processing capability of 200 head per day. There are eight meat processing plants in the country at the present time.

<u>PLANT</u>	<u>LOCATION</u>	<u>STATUS</u>
IFAGAN	MANAGUA	Closed but with refrigeration in use
CARNIC	MANAGUA	Operating for export
CONDEGA	ESTELI	Closed for servicing
NANDALME	GRANADA	Closed but with refrigeration in use
AMERRISQUE	CHONTALES	Operating for export
IGOSA	RIVAS	Closed but with refrigeration in use
RAMA	RAMA	Closed & inoperable
LAS BRISAS	MANAGUA	Operating for local processing of hogs

Of these eight meat processing plants only two, CARNIC and AMERRISQUE, are operating on a full time basis but not necessarily to their maximum capacity. Of the remaining six, three (CONDEGA, NANDAIME, and IGOSA) are approved for export and can become operable at any time. The processing plant IFAGAN is the oldest, dating back to 1958, with full operation capabilities and the only one that has the equipment for the preparation of industrial meats. It is believed that it will become operable in the near future to slaughter animals for internal consumption. This plant has lost its exporting certification and is in the process of renewing it. The refrigeration units that are operating within plants that are closed are being used to store excess meat that is processed at the plants that are operating. This leaves the RAMA plant, which is closed and inoperable and LAS BRISAS which processes horses and hogs for internal consumption.

Three major reasons why the plants approved for export do not operate on a "full time" basis are:

- not privately owned at the present time. They are government owned and operated. Efforts are being made to privatize them.
- an irregular export market demand, irregular transport availability, and irregular cash flow, which is the main reason for delayed payments to producers.
- an irregular supply of cattle ready for market throughout the year (see Figure 1).

RECOMMENDATIONS

As a means of alleviating this situation the following suggestions should be considered:

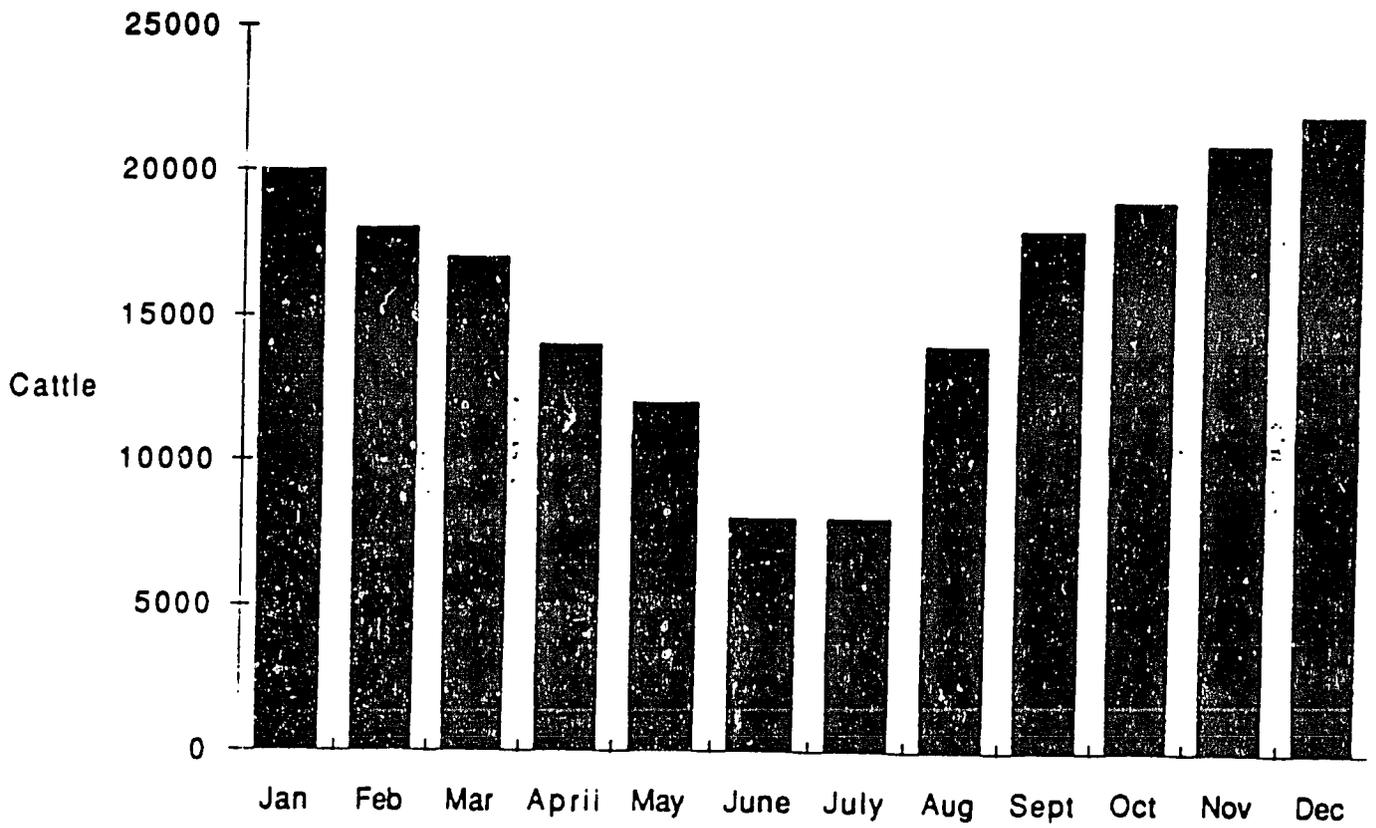
- Expanded export markets. Expand the export markets beyond the existing ones, which at present are Canada and Mexico. The U.S. market is being sought and the requirements are gradually being met. However, this process requires time. A reasonable time frame would be a year from May 1991.
- Market diversification. The present export markets are purchasing only deboned meat for industrial purposes. This in itself is limiting because the price of deboned meat is rather constant, e.g. Canada will buy all the frozen deboned meat, without classification, i.e. steer, bull, oxen, and cow meat, for US\$1.04 to US\$1.08 per pound C.I.F. Canada.

Mexico is more selective in their demands and, while willing to pay better prices, they demand only steer meat that meets the following criteria:

- meat must be from young steers (24 to 36 months old).
- meat must have fat that is white in color and well distributed throughout the carcass.
- meat must be of a bright red color.

FIGURE 1.

Number of cattle slaughtered per month.



Carcasses that satisfy these criteria are purchased in two forms and for different prices:

- Vacuum packed. This is deboned meat that is packed in a vacuum pack and is only refrigerated. This comes closest to representing "fresh" meat and for this reason the price improves to US\$1.25 per pound FOB Managua.
- Frozen deboned. This deboned meat is packed in 60 pound boxes and frozen. The price for this meat drops to US\$1.19 per pound FOB Managua.

It is speculated that if the US market is opened, this alone would improve the price per pound by US\$0.10 to 0.20. However, the demand requirement and classification criteria to obtain this price increase is not clear at this time.

Classification. Meat classification is a "must" so that meats can be differentiated for quality, therefore, warranting a better price. It is clear that a simple classification to emphasize younger age, bright red color, proper distribution of white fat through out the carcass, and tenderness will improve the price. Without this there is no incentive to improve the management, nutrition, health, and genetics of the live animal. The classification criteria that will be applied to the carcass will filter down to a judgemental, visual classification of the live animal, i.e conformation, size, length of body, and age that will in turn yield the desired carcass.

Packaging. The method in which the meat is packaged to satisfy a particular market demand will have an added value to a determined cut of meat or the same cut but packed differently, e.g. vacuum packed vs. frozen. This is an entirely new area towards a diversification marketing strategy of industrialized meats to other countries.

The livestock industry in general, but specifically the cow/calf producer, cannot make major advances without a price incentive. This incentive may or may not be "fully" expressed back to the farm gate, where it counts, when the market is restricted to unclassified and deboned meat.

PRODUCTION LEVELS

Production of cattle for beef in Nicaragua has an untapped potential that is not being fully explored. This potential exists without expanding the ranching operations to new frontiers. It simply rests on the premise of appropriate and more efficiency utilization of the lands that are presently being used for cattle production. However, this efficiency can only be stimulated through hope of better returns for the producer's time, effort and investments.

The present cow/calf operations, which are the foundation and source for the whole chain of events that follow in the cattle industry, are now at a low national production average of 40%. This means that for every 100 cows exposed to a breeding regime only 40 calves make it to weaning age. This low productivity does not stand alone on the shoulders of the cattle industry but also on the events of the last decade.

The effects of low production levels are manifested on the overall perunit cost of a kilogram of liveweight of calf weaned. A graphic illustration of this process is found in Table 1. The lack of actual cost production data requires that assumptions be made as to the cost of maintaining a mature cow per year. Therefore, this exercise has set what was considered a reasonable cost of 375 Cordobas per cow per year in a herd size of 100 cows. This figure is matched against production levels, i.e. percent of cows producing a weaned calf per year and a liveweight scale in kilos of the calves weaned. These figures are revealing. A calf weaning of 40% and a weaning weight of 200 kilos or 150 kilos will give us a cost per calf weaned of C\$938 or a cost per kilo of calf weaned of C\$4.68 and C\$6.25, respectively (Table 1). How does this compare to the actual prices for live animals? The following prices were taken from actual gross meat plant prices, subasta (auction sale), and individual cattle traders.

- 400 kilo steer (3 to 4 yrs. old) with a 52% warm carcass yield (top of the line) sells for a gross price of C\$4.00 per kilo liveweight.
- 300 kilo steer (2 to 3 yrs. old) sold for grass fattening purposes (known as a stocker steer) sells on the average for C\$2.50 to 2.75 per kilo liveweight.
- 200 kilo weaned calf (1 yr. old) if not kept on ranch for grass fattening to 300 kilos may sell for C\$2.00 to 2.25 per kilo liveweight.

This is a classic example why one needs to improve production efficiency and expand and diversify the marketing system.

DAIRY SECTOR

The dairy sector is in much the same predicament as the beef industry and faces many of the same production constraints. It is also worth noting that the dairy industry is composed of very few "true", specialized dairy cows. The bulk of the milk is produced by dual- purpose cows, which most ranchers tend to raise. The dairy breeds that make up the sector consist of Brown Swiss, Holstein, Jersey, and Guernsey, in that order. The predominant dual-purpose cow is a cross between the tropically adapted Brahman breed (beef type) and a Brown Swiss or Holstein (dairy breed). However, the cross breeding has not been defined to a specific percentage of either of the two breeds involved. The cross breeding has been conducted at random and without a specific goal, producing a conglomerate of animals without a distinct blood lineage. The individual animal may have a phenotypic appearance favoring either the Brahman breed or one of the dairy breeds. In addition, too many generations have passed without the introduction of new blood lines of either beef or dairy breeds, forcing the sector towards in-breeding. In general such a program will be reflected in reduced productivity. A specific cross-breeding goal towards a definite concentration of breed levels has to be defined and stabilized, e.g. 1/2 Brahman 1/2 Dairy; 1/4 Brahman 3/4 Dairy; 3/4 Dairy 1/4 Brahman; 3/8 Brahman 5/8 Dairy; or in the case of beef cattle 3/8 Brahman 5/8 European beef breed. Throughout the ranch visits only three ranches have come close or are about to reach a desired level of cross-breeding percentage. There were two in dairy and one in beef. It is strongly recommended that a determined percentage level be reached and then initiate a selection program based on milk or beef production. The illustrated cross-breeding chart (Table 3) can be used as a guide to reach the specific goal desired.

DUAL PURPOSE VS PURE BREED

With few exceptions, it has long been recognized that pure breeds, European beef or dairy, have difficulty adjusting to tropical environments. This is further reflected in reduced productivity and/or entire loss of the animal.

This situation has been alleviated with the use of native "criollo" cattle, which have just about become extinct or with the introduction of the Brahman breed. Both breeds provide the resistance necessary to survive and produce in tropical environments.

Therefore, the strategy to increase production would be to use a cross-breeding program where by the resistant breeds (Brahman or Criollo) blood level would be maintained at no less than 1/4 but preferably at the 1/2 to 3/8 total blood level composition of the animal's make up.

This rationale is part of the logic for the dual purpose dairy animal. The other is an attempt to solve an economic problem. The production of milk in the rural areas is viewed first as a means of daily cash flow, secondly as a basic nutritional staple and thirdly if there is not a market or a need for one or the other, the calf is allowed to consume all the milk.

DAIRY ECONOMICS

It has been observed through field visits and interviews with ranchers/dairymen that, conservatively, at least half of the cattle population is of a dual purpose type and is milked. Producers, through trial and error have come to the conclusion that raising animals for beef purposes alone was not producing the necessary cash flow. Therefore, diversification was a practical solution. Practical because production and marketing efficiency has not been achieved. Efficiency, therefore, is contingent upon three basic elements including: management, nutrition, and marketing.

Since productivity is a major problem, the economics of the sector at the cow/calf-milk production level becomes a critical issue. Using as a guide the 40% calf production index discussed earlier, the producer has realized that by selling the milk, while at the expense of the calf, he will "get by" economically. On the average a dual-purpose cow under the present management system will produce four liters of milk per day in one milking letting the calf consume whatever is left over. The average milking cycle in days for such a cow is 200 days or 6.6 months. This translates into 800 liters of milk (4 liters X 200 days) per cow per milking cycle (expressed as milking cycle rather than per year because many cows do not calf every year). This milk has at least three marketing destinations:

- milk processing plant.
- direct sale of non-pasteurized milk, cream or cheese by the producer to local consumers.
- local cheese manufacturer (cottage level industry).

If the producer chooses to sell directly to the consumer, he will receive a better price per liter of milk, usually \$2.00 Cordobas/liter or C\$8.00 per gallon, than by choosing either of the other options. This represents a yearly income from milk alone per cow of C\$1600 plus a "salvage" value of approximately C\$150 for a 150 kilos, under-nourished calf at 12 months of age. This disadvantaged calf will eventually (4 to 5 years) become the fattened steer for the meat industry (an extremely inefficient process). If, however, the calf is allowed to convert the same amount of milk into liveweight gain, the calf could possibly reach 200 kilos by 12 months of age. This calf could now be valued at C\$400 (200 kg. X C\$2.00). The economic advantage of the daily milk production system over the other is obvious.

DUAL PURPOSE--MILKED		DUAL PURPOSE--NOT MILKED	
a) Milk	C\$1600	a) Weaned calf	C\$400
b) Salvage Weaned Calf	\$150		
TOTAL	<u>C\$1750</u>		<u>C\$400</u>

There is a gross C\$1350 advantage in favor of the dual purpose milking. However, the cost of production (which usually the producer does not take into consideration) has not yet been discounted. A cost of production table for a milking system, Table 1., has been prepared for this exercise using realistic, reasonable assumption figures of C\$500 per cow per year (beef production costs were figured at C\$375 per cow per year). The difference between the two is the labor intensity required for milking.

By subjecting the above income figure of C\$1750 and C\$400, respectively, against the data of Tables 1 & 2 at the prescribed levels of efficiency, 40% calf crop (number of weaned calves per 100 cows) and 800 liters of milk/cow, the results are as follow:

DUAL-PURPOSE--MILKED		DUAL-PURPOSE--NOT MILKED	
GROSS	C\$1750		C\$400
LESS (800 lts X C\$1.56)	\$1248		\$938
	-----		-----
NET INCOME	C\$ 502	(LOSS OF)	C\$538

The economic situation at this stage of livestock raising (from birth to weaning) is at best critical. This scenario has a turn for the worst for the dual purpose milking when the milk is sold to the milking processing plant and/or to the local cheese maker.

The prices paid by the milk plant and the local cheese maker are as follows:

MILK PLANT	LOCAL CHEESE MAKER
Grade A-Refrigerated C\$5.00 less *0.27 = 4.73/gal or 1.18/lt	All Milk **C\$5.00/gal or 1.25/lt
Grade A -Without Refrigeration C\$4.63 less 0.27 = 4.36/gal or 1.09/lt	
Grade B C\$4.09 less 0.25 = 3.84/gal or 0.96/lt	
Grade C C\$3.76 less 0.24 = 3.52/gal or 0.88/lt	
*this deduction is for transportaion at C\$0.17/gal. plus 2% I.R. TAX.	**the cheese maker pays one price without deductions.

If the prices paid by the milk plant or local cheese maker are subjected to the same cost of production figures from Table 1, the results would be:

CATEGORY A		CATEGORY C	
Best price per lt.	C\$1.18	Best price per lt.	C\$1.25
Less cost of pro.	1.56	Less cost of pro.	1.56
LOSS PER LT.	- 0.38	LOSS PER LT.	- 0.31

This scenario vividly illustrates that while the milk plants would produce a "better" milk product for the general public, it is definitely not the best business for the producer. In the mean time the milk plants continue to operate at 1/3 or less of their capacity while the country produces 42 million gallons of milk per year and only 6 million gallons go through the plants.

COMMENTS

While the general outlook of the sector looks bleak, the sector continues to survive on a "half in -- half out" basis and from all indications are going to continue. In the meantime, the population continues to grow at a rate of 3.4% per year and the need and demand for protein will increase. The per capita income on a national basis was

calculated by Ruta II in May 1990 at US\$ 338. This demand will continue to be met through basic grains, milk and meat in that order. Of the three basic staples, meat tends to be in adequate supply not because it is plentiful but because the purchasing power of the general public is weak. That leaves basic grains and milk to fill in the nutritional gap. Of these last two, milk is the one staple that is constantly in short supply. The perpetual question remains, where do we go from here? There are few alternatives:

- The "do nothing" syndrome, but the problem remains.
- Massive importations of basic foods, but this leaves the country in a forever dependent society with potential resources both human and natural under-utilized.
- Develop production efficient strategies whereby all three sectors will benefit, i.e.:
 - promote efficient production at the cow calf producers level by creating incentives, e.g. buy their milk on a regular basis and pay them on time.
 - promote and support strategies that will allow the plant to purchase as much of the producer's milk as possible. This would help the plants work to their capacity.
 - promote the importance of quality and healthy milk through pasteurization and the role it plays in improving the nutritional needs of the general public.

RECOMMENDATION

The dairy, like the beef, sector is constrained by marketing problems which affect the plants "full" processing capabilities and the lack of incentives for the producer to produce more efficiently.

MARKETING

An immediate constraint is encountered with the regulation of milk prices to the general public based on the premise that basic staples ("canasta basica") should be made accessible. The following prices of milk are known to be in effect at the present time.

- Grade A whole milk with 3.2% fat sells for C\$2.25/liter
- Grade A low fat milk 1% fat sells for C\$1.25/liter

Increasing the price per liter of milk both to consumer and producer is not the overall solution. The first step would be to improve the overall efficiency of the plants through processing more fluid milk. The plants have to operate as close to their "full" capacity as possible. This would mean that a plant with a capacity of 28,000 gallons per day should be processing at least 22,400 gallons per day. This would spread the operating costs over more volume of milk and milk by-products, reducing the per unit cost. This would allow the plant to have a more positive cash flow which could translate into better services to producers, such as:

- Purchase more milk through more and better distribution of refrigerated collection centers. This would create a "sure" market for the producers.
- Provide a timely schedule of payment to the producer. This will generate a sure cash flow with which to improve his overall status.
- Provide essential services to the producer, such as animal health products, minerals, vitamins, concentrate feed, equipment, etc. Many of these services are already being provided, but the producers lack increased milk production per cow in order to take advantage of the price paid by the plant, have a sure market throughout the year, and increase their cash flow.

In order for the plants to initiate a strategy to increase operating capacity, they may require financial assistance. This could come in two forms:

- Loans--preferably these should be long term, minimum 5 years with modest interest rates. The loan or financial support should address the following problems:
 - improve essential equipment within the plant to handle more volume and improve efficiency.
 - purchase refrigerated collection tanks to increase the milk supply intake.
 - transportation equipment to collect and distribute milk.
 - operating capital to provide timely payments to producers.
 - expand the market
 - by diversifying both milk products and methods of merchandizing.
 - establish direct delivery routes within the city to consumers.
- Efficient Utilization of Non Fat Dry Milk (NFDM). This product has become an issue of strong debate because it is perceived, and with certain justification, as direct competition to fresh milk production. Usually NFDM is provided at low cost or is donated for the purpose of:
 - improving the nutrition of specific population sectors.
 - to generate a source of revenue to be used for development work in favor of the dairy sector. This is accomplished by selling the NFDM to the milk processing plants at a price that should not compete with the fresh milk supply.

The logic behind the strategy is reasonable except that it tends not to accomplish the objectives. A suggestion to consider towards achieving these same objectives could be:

- let the plant or plants process a determined amount of NFDM into reconstituted milk that could be returned processed to the owner, the government, so that it in turn can distribute the milk to the intended sector of the population.
- the plant will be paid for the reconstitution, bagging, distribution, etc. either in kind, NFDM equivalent, to cover the operating costs of reconstituting or be paid in cash for the service. If paid in kind, there would be no money exchange. The Government would then distribute the milk to the needy public free of charge, or at a charge enough to reimburse the cost of transportation. Thus, providing improved nutrition to the public

at little or no cost. At the same time, it demonstrates the need and importance of milk and milk products to a sector of the population which cannot afford to purchase milk (an indirect promotion campaign). The plant could then take the NFDM payment in kind to augment its production (aiming towards improved efficiency), spread out the cost of production over volume, increase their sales, improve the cash flow, which would allow them to purchase more fresh milk and improve their payment schedule to producer. This method may be more of a development effort than the present system pretends to accomplish.

GENERAL RECOMMENDATIONS FOR BEEF AND DAIRY SECTORS

Explore and expand the marketing capabilities through quality products and establish an open trade system of commerce.

Place stronger emphasis on improving nutritional levels of livestock via improved forage, supplemental feeding of protein, minerals, vitamins, concentrate energy feeds, and basic animal husbandry practices.

Introduce new blood lines of both dairy and beef breeds via frozen semen and under special conditions young (12 to 14 months old) bulls of the Brahman breed. The dairy and European breeds of cattle would be better served through frozen semen and an artificial insemination program.

Most of the team's contacts with the livestock industry were arranged by FAGANIC. There is, however, a significant sector of the industry in State owned and operated livestock enterprises under the CORNAP Corporations known as HATONIC. The HATONIC cattle and land are in the process of privatization. One element of HATONIC is the large dairy farm known as "Chiltepe". Located close to Managua, about 3,200 cows are milked twice daily to produce about 40,000 liters of milk. The milk is sold to the two processing plants in Managua. About one third goes to La Selecta, the remaining two-thirds is sold to La Perfecta. La Perfecta is reported to be in the process of reversion to the original owner.

Another significant force in the cattle industry is the Union Nacional de Agricultores y Ganaderos (UNAG). This conglomerate of cooperatives is powerfully led by the charismatic union leader, Daniel Nunez. During the Sandinista government, he was able to obtain very significant support and donations from governments friendly to the Sandinistas. Daniel Nunez is a strong bidder in the privatization of the CARNIC slaughterhouse and has plans to re-activate the RAMA slaughterhouse to export meat down the river to Bluefields for access to the Caribbean Islands. The team believes that, within the UNAG organization, a great deal of capital may be available. Daniel Nunez is presently a supporter of the "concertacion" effort to create political stability in Nicaragua. However, he is insisting that the GON take proper recognition of the "campesinos" participation in the benefits of a growing, improved economy.

TABLE 1. COST OF MILK PRODUCTION PER COW AND PER LITER BASED ON C\$ 500 PER COW/YR AND 200 DAY MILKING CYCLE

Per cent Caif crop	6000 lt/yr 30 lt/dy	5000lt/yr 25 lt/dy	4000 lt/yr 20 lt/dy	3000 lt/yr 15 lt/dy	2000 lt/yr 10 lt/dy	1000 lt/yr 5 lt/dy	800 lt/yr 4 lt/dy
100	500/cw .08/lt	500/cw .10/lt	500/cw .13/lt	500/cw .17/lt	500/cw .25/lt	500/cw 50/lt	500/cw .63/lt
90	556/cw .09/lt	556/cw .11/lt	556/cw .14/lt	556/cw .19/lt	556/cw .28/lt	556/cw .57/lt	556/cw .70/lt
80	625/cw .10/lt	625/cw .13/lt	625/cw .16/lt	625/cw .21/lt	625/cw .31/lt	625/cw .63/lt	625/cw .78/lt
70	714/cw .12/lt	714/cw .14/lt	714/cw .18/lt	714/cw .24/lt	714/cw .36/lt	714/cw .72/lt	714/cw .89/lt
60	833/cw .14/lt	833/cw .17/lt	833/cw .21/lt	833/cw .28/lt	833/cw .42/lt	833/cw .83/lt	833/cw 1.04/lt
50	1000/cw .17/lt	1000/cw .20/lt	1000/cw .25/lt	1000/cw .33/lt	1000/cw .50/lt	1000/cw 1.00/lt	1000/cw 1.25/lt
40	1250/cw .21/lt	1250/cw .25/lt	1250/cw .31/lt	1250/cw .42/lt	1250/cw .63/lt	1250/cw 1.25/lt	1250/cw 1.56/lt

All prices are Cordobas = US\$1 = C\$ 5

TABLE 2. COST OF PRODUCTION PER COW AND PER KILO OF WEANED CALF BASED ON C\$ 375 TO MAINTAIN A COW PER YEAR

Per Cent Calf Crop	Weight of Weaned Calves in Kilos					
	200	190	180	170	160	150
100	375/cw 1.88/kg	375/cw 1.97/kg	375/cw 2.08/kg	375/cw 2.21/kg	375/cw 2.34/kg	375/cw 2.50/kg
90	417/cw 2.09/kg	417/cw 2.19/kg	417/cw 2.32/kg	417/cw 2.45/kg	417/cw 2.61/kg	417/cw 2.78/kg
80	468/cw 2.35/kg	469/cw 2.47/kg	469/cw 2.61/kg	469/cw 2.76/kg	469/cw 2.93/kg	469/cw 3.13/kg
70	536/cw 2.68/kg	536/cw 2.82/kg	536/cw 2.98/kg	536/cw 3.15/kg	536/cw 3.35/kg	536/cw 3.57/kg
60	625/cw 3.13/kg	625/cw 3.29/kg	625/cw 3.47/kg	625/cw 3.68/kg	625/cw 3.91/kg	625/cw 4.17/kg
50	750/cw 3.75/kg	750/cw 3.95/kg	750/cw 4.17/kg	750/cw 4.41/kg	750/cw 4.69/kg	750/cw 5.00/kg
40	938/cw 4.69/kg	938/cw 4.94/kg	938/cw 5.21/kg	938/cw 5.52/kg	938/cw 5.86/kg	938/cw 6.25/kg

Values are C\$ May 1991 exchange rate = US\$1 = C\$ 5

TABLE 3. CROSS BREEDING GUIDE FOR DUAL PURPOSE DAIRY

PLAN #1

VACA			TORO	
100% BRAHMAN			100% LECHE *	
F-1	1/2B 1/2L	X	100% BRAHMAN	
F-2	3/4b 1/4L	X	100% LECHE	
F-3	3/8B 5/8L	X	3/8B 5/8L	
F-4	3/8B 5/8L			

*Leche = Dairy breeds e.g. Brown Swiss, Holstein, Jersey

PLAN # 2

VACA			TORO	
F-1	1/2B 1/2L	X	100% LECHE *	
F-2	1/4B 3/4L	X	1/2B 1/2L	
F-3	3/8B 5/8L	X	3/8B 5/8L	
F-4	3/8B 5/8L			

LECHE = Dairy breeds e.g. Brown Swiss, Holstein, Jersey

**CROSS BREEDING GUIDE
FOR CROSS BRED BEEF CATTLE
PLAN #3**

VACA			TORO	
100% BRAHMAN			100% EUROPEAN *	
F-1	1/2B 1/2E	X	100% BRAHMAN	
F-2	3/4 B 1/4E	X	100% EUROPEAN	
F-3	3/8B 5/8E	X	3/8B 5/8E	
F-4	3/8B 5/8E			

*EUROPEAN = Beef breeds, e.g. Hereford, Angus, Simental, Limosin

PLAN #4

VACA			TORO	
F-1	1/2B 1/2E	X	100% EUROPEAN	
F-2	1/4B 3/4E	X	1/2B 1/2E	
F-3	3/8B 5/8E	X	3/8B 5/8E	
F-4	3/8B 5/8E			

B = Brahman

E = European breeds, e.g. Hereford, Angus, Simental, Limosin

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"FONDO GANADERO" AS A DEVELOPMENT TOOL

For various reasons, there have always been agreements between private individuals to operate cattle production enterprises in which one partner provides the cattle and the other provides land and daily care of the cattle. The risk of loss and profits were shared equally between the partners at the end of each production cycle.

Law 26 of 1959, promulgated by the Congress of Colombia with the support of the leaders of the livestock industry, created a means to extend this concept. It provided for the establishment of a FONDO GANADERO in each Department of Colombia. It also established a BANCO GANADERO at the national level. Initial capital was provided by the Government of Colombia in exchange for Class A shares. A surcharge on the income tax of each cattle producer owning more than ten head of cattle amounting to 1% of the value of the capital investment in the livestock industry, was imposed by Law 26 for a ten-year period. Cattle producers had a choice to purchase shares in the FONDO GANADERO of the Department where the ranch was located and in the BANCO GANADERO, or to pay the tax to the Government. In either case, the funds collected by the surcharge were private investment capital to match, over time, the public sector investment. In general, producers preferred to buy shares, which might conceivably have future value, than to pay the tax, which was gone forever.

A FONDO GANADERO is a corporation of mixed public and private capital to engage in cattle production enterprises to earn a profit. The FONDO recruits persons who have uncontested possession of land suitable for a cattle production enterprise. It then uses its financial resources to purchase cattle, which are delivered to the farm to stock the production enterprise. The increase in the value of the cattle is considered gross income. The agreement between the FONDO and the individual provides that the costs of production (salt, minerals, parasite control, vaccinations, transportation) are deducted from the gross income when the time comes to sell the cattle. The increase in the value of the cattle is due primarily to increase in weight and improvement in quality. The net profit is then split 35% for the FONDO and 65% for the individual. Of that 65%, 60% is cash income for the caretaker in return for use of the land and the daily care and management of the cattle. The remaining 5% is in the form of capital shares of the FONDO.

The person who possesses suitable land, has the knowledge and experience necessary to operate a cattle production enterprise, and has access to bank credit (such as BANCO GANADERO in Colombia), should not want to become a partner in a production company with a FONDO. That person would be better off accepting all of the risks and keeping all of the profits.

The person who has uncontested possession of suitable land, has some of the knowledge and experience to operate a cattle production enterprise, and does not have access to bank credit is a proper candidate to enter into an agreement with a FONDO.

The FONDO system works best with feeder or fattening cattle enterprises because:

- cash income is produced when the cattle are sold for slaughter or continued feeding
- the duration of the contract is relatively short and usually does not exceed one year
- the risk of loss due to disease in this enterprise is less than it is in other cattle production enterprises
- the caretaker of this class of cattle needs far less technical knowledge and experience than does the caretaker of breeding and milking cattle.

WHAT FUNCTIONS MUST A FONDO GANADERO PERFORM IN ORDER TO EARN A PROFIT?

It must be able to select suitable partners and suitable cattle production enterprises.

It must be able to buy and sell cattle by weight and with consideration for quality and to achieve a reputation for fair dealing in all of its transactions.

It must be able to keep a full accounting of its various cattle production contracts, to pay the salaries and benefits of FONDO personnel, to manage its accounts receivable and accounts payable efficiently, to provide complete and accurate financial statements, and to comply with all laws and regulations pertinent to its status as a for-profit corporation.

WHAT PERSONNEL ARE NEEDED TO PERFORM THE FUNCTIONS LISTED ABOVE?

Technical personnel must have experience in animal husbandry, so they can make judgements concerning the carrying capacity of the land, the most appropriate cattle production enterprise, the ability of the proposed caretaker partner, and the need for fences, corrals, and drinking water. They must be able to recruit partners, to explain how the FONDO production agreements work, and to convince partners to practice good animal husbandry.

Purchasing agents must know where cattle suitable for the FONDO can be purchased and be able to negotiate fair prices. They must be able to contract for transportation of cattle from farm to farm or from farm to market at acceptable prices. They must be able to purchase salt, mineral supplements, vaccines, and internal and external parasite control materials for use in the cattle production companies.

Accountants must be qualified to maintain all the necessary records, collect monies due, pay proper debts, maintain payroll accounts, and provide management with accurate financial statements.

Executive management must be able to direct and coordinate all activities of the FONDO with the purpose to earn a profit and, in doing so, to perform needed social and economic functions in the society.

WHAT HAS BEEN THE EXPERIENCE TO DATE IN COLOMBIA AND HONDURAS?

COLOMBIA. The combination of BANCO GANADERO and FONDOS GANADEROS is working effectively in Colombia. The continuing capital investment by private enterprise by means of the forced capital subscription through the income tax surcharge and the payments of the partners' share partially in capital shares is an important feature. In addition, these entities have support from the Central Bank, which provides re-discount services to increase the financial resources of the BANCO GANADERO and the FONDOS GANADEROS.

There is additional support for livestock industry development in the Federacion de Ganaderos, FEDEGAN, and the marketing organization, IDEMA. It must also be remembered that Colombia is a large country with a diversified economic base in agriculture, industry, and commerce. Colombia has an active stock market where shares of corporations can be traded. It is probable that just one of the FONDOS controls more cattle than there are in the national herd of Nicaragua. One other factor in the success of these livestock development entities is that they started operations at a time when domestic and foreign markets for beef and slaughter by-products were expanding.

HONDURAS. The FONDO GANADERO DE HONDURAS was inaugurated August 31, 1984, as part of a Small Farmer Livestock Improvement Project Agreement (522-0209). It was necessary to make significant adaptations of the Colombian model to fit the economic, social and political conditions which existed in Honduras in 1983. There were also constraints on the USAID Mission to emphasize the small farmer support features, to promote milk production, and to increase the size and number of breeding herds.

Instead of a cash capital contribution by the Government to start the program, the transfer of GOH-owned farms to the FONDO was accepted. Instead of forcing participation in the venture through a tax of some sort on all the livestock producers, private capital investment was voluntary, except for the partners in cattle production companies, who had to take part of their return in capital shares. The result was that the upward spiraling of capital which was attained in the Colombian model is stagnant in Honduras. Also, the capital contribution by the GOH in the form of farms diverted management and financing resources away from the principal business of the FONDO, which is to form cattle production companies.

The FONDOS GANADEROS OF COLOMBIA concentrated their cattle production enterprises on feeder cattle. These short-term contracts generate cash when the cattle are sold at the end of the term. This class of cattle does not have a high mortality risk and does not require sophisticated management skills from the partner who provides the land. In contrast, the FONDO GANADERO OF HONDURAS was forced by the terms of the agreement with USAID to engage in breeding herd operations and milk production as well as feeder cattle. Breeder cattle operations do not generate cash unless the calf crop is sold each year to other farmers. It is often the case that FONDO management wants to have the calves

raised on the farm where they are born, thus the FONDO has to pay out cash to the partner instead of receiving cash.

Milk is produced by FONDO breeding cattle herds by taking part of the milk from the calves. This practice reduces the growth rate of the calves, to the detriment of the FONDO, while it increases the cash income of the farmer partner. It is difficult for the FONDO to control this practice and to receive its proper share of the cash produced.

SUMMARY

In summary, the FONDO GANADERO concept is ill-adapted to achievement of a goal of increased milk production or the expansion of breeding herds. It is best adapted to feeder and fattening cattle operations.

It must be remembered that this concept is not in-kind credit, but a partnership in which both partners accept risk of loss and share profits in proportion to the resources invested.

The technical supervision personnel of the FONDO are working to protect the interests of the FONDO. They are not extension agents in the same sense that technical assistance is normally provided by a Ministry of Agriculture. FONDO technical personnel transfer animal husbandry technology as they persuade or order the caretaker partner to practice good animal husbandry.

If FONDO GANADERO organizations are allowed by the terms of their charter to operate in such a way that a profit is earned, the economic and social goals of development agencies will automatically be achieved.

SUGGESTIONS AND RECOMMENDATIONS

The FONDO GANADERO concept can make a major contribution to the rehabilitation of the livestock industry in Nicaragua, taking into account the experiences of similar corporations in Colombia and Honduras.

A FONDO GANADERO DE NICARAGUA should be a strictly private enterprise corporation for profit. Seed capital could be provided in the form of a long-term loan of Nicaraguan currency generated and controlled by USAID PL-480 or similar programs. Provision and disbursement of this equity loan must be conditioned upon the enactment of legislation which requires the purchase of capital shares, on an annual basis, for at least a ten-year period by every livestock producer in Nicaragua who possesses ten head of cattle or more. The leaders of the livestock industry must be convinced that establishment of a FONDO GANADERO DE NICARAGUA is a suitable way for all the livestock producers to create their own system to provide production and marketing resources. A possible way would be for each producer to purchase a C\$10 share for each animal in his herd over one year of age on a given date. Certainly there are variations on this system which would be

acceptable to the producers. The leaders of the livestock industry must be able to convince the Nicaraguan legislature to enact the law briefly described above.

Once established, the FONDO GANADERO charter must permit it to engage in any production enterprise which the management of the FONDO deems suitable for the conditions of land and water availability, the animal husbandry capability of the production partner, and the projections of market demand. Production enterprises can include:

- finishing steers for sale to export slaughterhouses
- raising steers from weaning to "ready for finish"
- raising heifer calves to slaughter or breeding age
- raising and training steers for sale as oxen
- raising bulls of recognized genetic quality
- cow/calf breeding operations strictly for meat production

Production enterprises should not include production of milk by specialized or dual purpose enterprises. The best way to provide financial resources for this type of production is through the milk reception and processing plants. Credits advanced to producers to improve the quantity and quality of milk production can be collected by "check off" against receipt of milk. Milk processing plants could use this kind of a credit program to increase the quantity and quality of milk supplied to them by producers. USAID could consider the provision of loans of Nicaraguan currency to the private enterprise milk processing plants to conduct a credit program of this nature with its suppliers. Such a loan of US-controlled local currency should be designed with an interest rate spread of several points to compensate the milk processing plant for its costs of accounting, disbursement, collection, and loan supervision. It would provide a term long enough to permit the roll-over of the loan fund several times. This would reduce the risk by spreading out the risk over more borrowers, and varying climatic, economic and market conditions.

WHAT WOULD A FONDO GANADERO DE NICARAGUA REQUIRE TO BEGIN?

Administration costs must be kept as low as possible. A modest office to provide for the manager, an accountant, a secretary and center of communications would be sufficient to initiate the operation. The facility can be expanded as the number of cattle under contract increases. This headquarters office would handle the payroll for FONDO personnel, generate the contracts between the FONDO and production partners, collect income and pay debts, liquidate contracts, issue capital shares, maintain all the financial records and statements required of "for-profit" corporations under Nicaraguan law, and direct and coordinate the activities of the technical staff.

A two-person technical staff, supplied with 4-wheel drive vehicles will be needed. These technicians should have not only the animal husbandry skills to decide what is required for a successful production enterprise, but also skills in the purchase and sale of cattle. They must be able to contract effectively for trucks to transport cattle from farm to farm or from farm to market. Effective buying and selling of cattle is essential to the financial success of the FONDO. This technical staff must

be seen as the project managers or supervisors to assure the success of each production company. They are not to be conceived of as extension agents. Part of the skill requirement is the ability to persuade the production partner to adopt good animal husbandry practices, but, if this is not possible, it should be possible to enforce the advice by liquidation of the contract.

It is important for the FONDO and its partners to have confidence in the purchase and sale of cattle. Provision must be made to have as many transactions as possible take place over scales. Some combination of portable or fixed livestock scales must be located at strategic places within the operating area of the FONDO.

It should be noted here that a FONDO will do only part of the job. Credit for the installation or improvement of farm infrastructure will have to be provided by some other agency. Construction of fences and corrals, development of water sources for irrigation and cattle, seeding of planting material for pasture and forage grasses, and purchase of equipment for chopping forage grasses is essential to the adoption of improved management practices.

ISSUES

IMPORTATION OF FEMALE CATTLE

There is a proposal under consideration to import a significant number of heifers or cows (We have heard rumors of numbers from 15,000 to 50,000 head.) under the credit program of the Commodity Credit Corporation, sponsored by the USDA. An importation of this size is seen to be one alternative option to increase the size of the national herd and to make some improvement in the genetic pool.

For an operation of this nature to be feasible, there must be an effective demand in the cattle producer community to retain female cattle suited for breeding in the individual herds. Certainly the first priority of the rancher would be to retain heifers born within the herd to increase the number of breeding females. The second choice would be to purchase heifers from neighbors or Nicaraguan breeder herds because the cost of purchase would be in Nicaraguan currency. The team notes newspaper advertisements that breeding cattle are available from the Chiltepe herd. A visit to the Chiltepe ranch revealed that there is virtually no response from the livestock producers to purchase excellent, acclimatized purebred female cattle of dairy breeds. The final option would be to purchase breeding cattle in neighboring Central American countries or in the United States. Whether these purchases are made by cash or credit, the producer must accept both exchange rate and inflation risks.

If a decision is made by the Government of Nicaragua to facilitate the importation of cattle by making arrangements for CCC credits to and through the Central Bank to Banks of the system, the following factors need to be considered:

- buyers should be individual ranchers who will make their own selection of cattle and arrange for their health clearances and transportation to the home ranch. The buyer will have a credit denominated in dollars to be paid out in three years. It seems doubtful under present conditions of political, economic, and social security that many producers would elect this way to increase the size of the breeding herd.
- a more feasible approach to increasing the rate of growth of the national herd would be to provide credit to make the low-cost investments which will result in an increase in the weaned calf crop. Another way would be to help the dairies and slaughterhouses to pay promptly for milk and animals delivered. This would establish a liquidity which would decrease the need for producer credit.

Emphasis should be placed on:

- pastures of quality grasses properly rotated.
- feed reserves in the form of irrigated forage grasses, hay or silage to provide sufficient feed throughout the year and especially during the dry season
- control of breeding to establish a breeding season, followed by a veterinary examination to determine which cows are pregnant so non-producers can be identified, placed under treatment or sent to slaughter, and

- the calf crop should be protected against disease and external and internal parasites, and assured of optimum nutrition. These actions should change the weaned calf crop average from its present 40% of eligible females, to 50% or 60%. See Annex I for projections of herd increase and productivity under varying assumptions of weaned calf crop.

IMPORTATION OF DRY SKIM MILK

The importation of dry skim milk, whether by purchase or gift, is a mixed blessing. On the positive side, if milk producers are not able to produce enough milk to meet the domestic demand, it increases the supply of milk available to the public at a low price. On the negative side, the dairies can use the dry skim milk to reduce their purchases of milk from domestic producers. The effect is that there is a disincentive to producers to increase milk production. The reaction of many milk producers to the existing price structure (see page 23) is to sell their milk in the form of cream to local markets, which avoids the discounts which are applied to gross income by the dairies. Therefore, a considerable quantity of milk does not flow from the producers to the dairies.

The "Programa Nacional de Desarrollo Lechero" gets its funds from a "Programa Mundial de Alimentos" (PMA) which covers the period 1990-94. The PMA makes a gift of 10,400 tons of dry skim milk and 2,500 tons of butter oil to the GON. The GON then sells these products to the dairies for reconstitution. It is expected that about US\$ 2.1 million (the PMA paper states) will be generated in this way. A committee establishes the sale price to the dairies based on a price high enough so the dairies will not reduce their purchases from local producers. The price for dried skim milk, as quoted to us by one of the milk processing plants, was C\$6410 per metric ton, which translates to US\$1282 per metric ton. This figure represents, over a four year period (1990 to 1994), a grand total of \$13.3 million dollars, considerably more than the US\$2.1 million mentioned above. The "Programa Nacional de Desarrollo Lechero" utilizes these funds to operate a project in Region V directed towards small and medium-sized individual producers, cooperatives, and small cheese makers. It also provides funds for the operation of the Chiltepe Dairy Farm.

The report of the PMA technical team from April 8 - 26 of 1991 complains that there is no recent census, that the GON does not provide sufficient credit and technical assistance to the milk production sector, that the executive unit set up to manage the project has been reduced, and that the costs of storage of product delivered to the GON is extremely high.

The reply of La Selecta is that the PMA does not make a provision of support for the processors, who have much need of improved equipment. The plants receive a good percentage of non-fat dried milk (NFDM) in spoiled condition and butter oil which has gone rancid. There is no provision to compensate the dairy for the costs of reconstituting milk. There is a price "squeeze" because the plant price to the consumer is low.

There seems to be serious controversy between the two parties.

PRIVATIZATION

Slaughterhouses

Two slaughterhouses at Nandaime and Amerrisque, near Jutigalpa, are scheduled to be privatized on or about June 15, 1991 according to slaughterhouse leaders. The "Ley de Privatizacion" is reported to be in the final stages of promulgation in May 1991.

Privatization is a good "buzz" word. However, few persons recognize the many complicated questions to be answered as the transfer is made from public to private sector ownership. Some of these complications include:

- What is the facility worth at this time? Careful evaluation of the physical plant and determination of suitability for the intended use is essential.
- The Government has to decide the criteria which will be used to choose an eligible private sector buyer.
- The status of the present employees, their social benefits of vacations, sick pay, eligibility for pensions, etc. needs to be determined so the buyer can know what deferred liabilities come into the deal.
- A determination needs to be made as to what additional investment in the physical plant will have to be made to enable the facility to meet operating requirements.
- A search of the legal status of the facility is needed to establish clear title. The authority of the seller to make the sale must be established.

Extended negotiations on both sides must then take place to adjust the time, price, and terms of sale or transfer from the Government to private enterprise.

The above is a simple statement of the process of privatization. Its purpose is to alert the reader to the fact that considerable time and expertise needs to be invested to transfer property from the public sector to the private sector. The final agreement must be seen as a fair deal for both parties. There must be no room for criticism as to how the final agreement was reached.

Land and Cattle

The team received a copy of a proposal to transfer the assets of the Companies under the administration of HATONIC. No mention is made of liabilities to be transferred.

HATONIC is a Corporation, property of the State, which combines 16 Agrarian Reform entities dedicated primarily to the production of cattle for beef and milk. The Companies administer 259,000 hectares of land and a herd of approximately 70,000 head of cattle. About 3,750 people work with the Corporation.

The transfer of these agricultural/livestock production companies is proposed to be to: the private sector, the present employees of HATONIC, the demobilized Nicaraguan Resistance and the retired officers of the Sandinista Popular Army. The authority to return farms confiscated from previous owners is contained in Decree 11-90. This decree was declared unconstitutional by the Supreme Court of

Nicaragua in mid-May 1991. It is not yet known what effect this ruling of the Court will have upon past and future actions. The privatization of the rest of the holdings is based on two transfer formats:

- economic transfer and
- agrarian reform.

The economic transfer will be to rent, with option to buy, approximately 230 farms or production units. These can be acquired by individuals, societies of personnel of HATONIC, retired officers of the Sandinista Popular Army, and demobilized Nicaraguan Resistance.

The agrarian reform is estimated to reach about 6,600 families, granting individual titles of property for a total of 69,300 hectares.

The team sees this as another step on the long road to privatization. If accomplished, it would transfer ownership of a significant amount of land and cattle from government to private enterprise. It is still too early in the process to predict the final social and economic impact.

PROGRAM STRATEGY TO REACTIVATE CATTLE PRODUCTION

BACKGROUND

The analysis of development needs stated in the draft CDSS, dated May 1, 1991, includes the statement that, "if the economic and social well-being is to improve in the current context, there must be:

- **broad-based, sustainable, economic growth,**
- **a functioning, stable democracy,**
- **a healthy, literate population.**

The cattle industry extends to a large segment of the population, distributed all over rural and urban areas. Employment is generated in rural areas for those many families who own or work on beef and dairy farms. They are engaged in the basic production phases of breeding, milking, feeding, maintenance of infrastructure, providing primary medical attention for the animals, and planting and harvesting forage crops to provide feed during the dry-season.

Other employment includes drivers of cattle transport trucks, and reception and transport of fresh milk from rural areas to dairy processing plants. In summary, many workers participate in the transportation of goods and services vital to the cattle industry.

There are also cottage industry employees engaged in the manufacture of cheese and butter in rural areas.

In the urban areas there is a range of employees engaged in the conversion of cattle into beef, sub-products and by-products. Job activities include pasteurization and bottling of milk; preparation of butter, cream, cheese, and ice cream; killing, dressing, deboning, packaging, and chilling of products. Included are veterinarians, steam and electrical engineers, accountants, secretaries, and common labor to maintain the hygiene and sanitation of the processing plants.

Persons directly involved in the cattle industry range from poor rural inhabitants, to "blue and white collar" urban workers to wealthy persons who have considerable political, social and economic influence.

Briefly stated, the cattle industry meets the criteria of a sub-sector of the economy which has a good potential to earn increased income on a sustainable basis for a large section of the Nicaraguan population.

SPECIFIC STRATEGY SUGGESTIONS

The Government of Nicaragua is engaged in a political and economic stabilization program in an effort to create an environment which will encourage persons to make investments, create jobs, improve productivity and increase production. The Government of the United States and other Governments should take every opportunity to support the GON in this effort. Law and order must exist. There

must be security in the ownership of land, cattle, buildings, factories, machinery, and equipment. The policy of the GON with respect to permissions to export and import must be clearly stated and changed as little as possible over the next decade. Inflation must be kept under control because a runaway inflation quickly destroys capital investment. Rate of exchange reflects the productivity of a nation compared to the world economy.

The cattle population is at a low point in its evolution. Even so, the herd is large enough and the natural resource base is good enough that it is possible not only to increase the production of meat and milk, but also to increase the size of the breeding herd. It is not so much the investment of large amounts of money as it is the application of basic animal husbandry techniques, which are not costly, to improve the calving rate of the cow herd and the survival and growth rate of calves.

The Private Agricultural Services Project (525-0315) is the right project, for the right reasons, directed toward the right persons at this time. It should provide an excellent way to maintain contact with the leaders of the livestock industry to promote the future establishment of a private sector BANCO GANADERO which is capitalized by the livestock industry. This continuing contact with the livestock industry leaders could also result in the establishment of a FONDO GANADERO to serve the needs of that sector of the livestock producers who are not eligible for money credits.

Expanding and improving markets for beef and beef industry products is an absolutely necessary incentive to increased investment. In this respect, the most important immediate strategy is to assist the GON to re-establish its certification to export beef to the USA. The primary problem is to establish a meat testing laboratory, with trained personnel to meet the requirements of the USDA and the Food Safety and Inspection Service, (FSIS).

A grant of money to purchase and install the equipment, and to train the personnel in its use will be a very important contribution to the re-activation of the livestock industry.

An ongoing dialog with the Government to encourage continuation of the privatization of State enterprises is an important element in Program Strategy. The "Ley de Privatizacion" is predicted to be promulgated in the Congress within the next few weeks. Enactment of this law will make possible the privatization of two of the slaughterhouses, possibly as early as June 15, 1991. On the other end of the spectrum, the cattle production enterprises of State owned HATONIC are scheduled soon for transfer to private enterprise, which includes members of rural pressure groups.

Prompt payment for cattle delivered to a slaughterhouse or for milk delivered to a milk processing plant is important to producers. Prompt payment provides essential working capital, so there is less need for credit. Program strategy could include study of the possibility to establish a "Prompt Payment Trust Fund" with Cordobas available to the Mission. Such a project could be implemented through the Corporacion de Carnes and FONDILAC. A better solution would be for the slaughterhouses and dairies to have a line of credit with a local bank, secured by

finished product in warehouse, which could be used to pay suppliers of cattle and milk promptly.

THE ECONOMIC SITUATION OF THE LIVESTOCK INDUSTRY

The most important questions that producers of any commodity should ask are: How large is the demand? Can I produce at prices which are low enough and in sufficient volume that I can earn a profit, which will compensate the risk and the resources used? What are the factors which tend to improve or decrease market demand? Who controls the factors which could affect my management decisions and the possibility of profits or losses?

The development of the livestock industry in Nicaragua depends first and foremost on rural security. Personal safety of owners and employees alike is absolutely essential to the productive use of natural resources. Security in the possession of land, cattle, machinery, and equipment must exist if the livestock industry is to flourish. Rural security is better than it was a short time ago. However, a document prepared by the "Fondo de Desarrollo de la Industria Lactea", (FONDILAC), dated April 23, 1991, states that:

- there is a lack of rule of law, impartial judges, and impartial and efficient police which can counteract series robbery of cattle, irrigation equipment, electrical installations, wood, and barbed wire.
- resolution of the problems noted above is essential to progress and new investment in the rural areas.

With the rural security issue resolved, the Nicaraguan livestock industry depends on three principal factors:

- The domestic demand for meat, milk and their sub-products.
- The effective rate of exchange for the Cordoba in relation to other currencies.
- The international market for beef.

DOMESTIC DEMAND

The domestic market for meat and milk increases at the rate of population increase (3.4% per annum) and varies with changes in the purchasing power of the population. The size of this market is predictable and changes slowly over time.

The domestic demand to increase the size of cattle herds depends upon the thinking of the ranchers and the evaluation that they make regarding the actual and potential markets. If the ranchers are convinced that there is an active demand at attractive prices for all the meat and milk they can produce, the availability of credit would be a key factor. Available credit would permit the ranchers to compete with the slaughterhouse buyers for female cattle that could be retained in the breeding herd to increase future production and sales. The need to repay credits would then force more cattle to market in future years. This market is relatively small and

predictable, since it depends upon credit and capital availability to respond to the incentive of expanding markets.

DEMAND FOR EXPORTATION

Nicaragua has five export slaughterhouses which are owned and operated by agencies of the Government. In the past, each of these were qualified to export beef and beef products to a wide spectrum of countries. Two of the five are presently (May 1991) in operation to export frozen deboned beef to Canada and Mexico. The Minister of Agriculture and Livestock is trying to reactivate the meat testing laboratory so the market in the USA can be reentered. We have been informed that USAID assistance has been provided to MAG to import the required meat testing laboratory equipment. **When this occurs, it can be expected that both the perception and actuality of expanding markets will be evident to cattle producers.**

The transfer of two slaughterhouses from public to private ownership is expected to occur on or about June 15, 1991.

If there is insufficient interest on the part of the private sector to own and operate export slaughterhouses, the GON should continue to do so. It may be necessary or desirable to adjust the rate of exchange for exports of meat to make it attractive for private enterprise to take the risks of the export market.

INCENTIVES TO PRODUCERS TO INCREASE PRODUCTION AND IMPROVE PRODUCTIVITY

The primary incentives to producers include:

- establishment of rural security
- economic stability with respect to inflation and exchange rates
- the perception and reality of expanding markets with prices to producers high enough to meet costs of efficient production.

If the goal of expanding production and expanding herds to utilize existing production areas is to be met, the producers will have to take the actions necessary to:

- improve the weaned calf crop percentage from its present 40% of eligible females to not less than 45%, preferably more
- give up some of the immediate cash flow obtained from selling some of the milk from beef cattle to obtain favorable returns from calves that have been supplied with a good flow of milk and prime grasses to grow rapidly into useful additions to the herd or more efficient beef producers.

COMMENTS ON PAS PROJECT PAPER

PRIVATE AGRICULTURAL SERVICES PROJECT (524-0315)

This project, designed to assist private producers in their recovery efforts, increase agricultural production and increase foreign exchange earnings, has three basic components:

- **institutional strengthening of the Nicaraguan Union of Agricultural Producers (UPANIC) and its affiliated commodity federations and local producer associations.**
- **funding services to improve on-farm productivity**
- **agricultural export promotion to diversify production.**

The grant proposal will establish within UPANIC a mechanism to provide a package of basic institutional strengthening grants to each of the commodity federations and local producer associations. The purpose of this component will be to assist the associations to re-establish themselves at a minimum level of operations to begin to build up to their former level of membership and provision of services. UPANIC itself will be strengthened to recover its ability to represent its affiliates and to conduct a policy dialogue with the GON.

A series of productivity grants will be made on a competitive basis to producer associations to fund services which will have a direct impact on farm productivity.

Assistance will be provided through the Nicaraguan Association of Non-Traditional Export Producers (APENN) to help farmers to diversify their farming activities through production of non-traditional exports.

It is the opinion of the team that this project is just right in size, purpose, and mechanisms for the "first step" that USAID/N can take to assist the livestock industry on the path to recovery.

We would also note that there are products and packages of cattle industry products and sub-products which would merit treatment of them by APENN as legitimate non-traditional export products.

COMMENTS ON 'PROYECTO DE REHABILITACION GANADERA Y PROTECCION AGROFORESTAL

This project proposal is written in the style and with the content requested by international lending agencies. The Annexes present a wealth of information about Nicaragua's geography, geology, and climate. There are well-reasoned estimates of human population, cattle population, herd composition, meat and milk consumption, extraction rates, and mortality loss. A background description of the political, social, and economic events which are believed to have contributed to the present status of the cattle industry is presented.

The objective is stated to be, "to recover the profitability of the livestock sector of the Nicaraguan economy, to improve the standard of living of the producers (especially the small and medium sized producers), to improve the level of protein in the diet of the rural population, and to increase the earning of foreign exchange through exports." Another stated objective is, "to improve the rural environment".

The suggested strategy to achieve the objectives is to make available financial credits, accompanied by technical advice and supervision. The project is confined to areas of the country considered by the project designers to be suitable for increased production and improved productivity in the milk production phase of the livestock industry. Included in the strategy is credit and technical assistance to elements of the milk marketing system. The agro-forestry component is a limited one. The document speaks primarily to "reforestation of the farms through the use of living fences, planting of trees in watershed areas where water flows, planting trees to create copses of shade within pasture areas, and forestation of areas poorly suited to pasture".

The project contains credit components for five sub-groups:

- small farms, average 28 hectares, with semi-specialized milk production
- small farms, average 80 hectares, with dual-purpose herds which emphasize milk production
- medium-sized farms, average 200 hectares, with dual-purpose herds concentrating on beef production
- large farms, in excess of 200 hectares, in dry zones, with breeding and fattening enterprises
- large farms, in excess of 200 hectares, in humid zones, with cattle breeding operations

The terms of the loans can be up to 12 years. Interest rates of 10% to 12% will apply. Grace periods when interest payments only will apply are up to 3 years. The maximum amount of a loan to an individual is the equivalent of US\$ 150,000. It is expected that 2,000 loans will be made. The total amount of the project is US\$57.3 million. US\$45.3 million will be loaned through the banking system to farmers, associations, municipalities, and general deposit companies. US\$9.2 will be used through IRENA for the reforestation phase of the project. The remainder goes to the Ministry of Agriculture and the National Investment Fund as support for their operations and project evaluation.

COMMENTS AND SUGGESTIONS

This amount of money and technical assistance, as comprehensive as the plan of operation is, could be a significant start towards improvement of livestock farm infrastructure. If successful, it would probably be followed by other projects which would extend the influence of the project.

It seems that the banking system will make the loans and technical assistance will be provided by MAG and IRENA. This division of authority and responsibility is not convenient. Technical assistance and loan monitoring needs to be inside the banking system. The bank's loan officials have to make decisions to grant or deny loans, to determine what use will be made of loan funds, and to fix the amount of each loan. The loan officer has the responsibility to collect payments of interest and amortization of principal. Can the loan officer have complete confidence in technical advice from a source outside the Bank which has no responsibility for the success or failure of a loan?

A major fault with the project is that funds are provided for loans to about 2,000 persons. It is a "one time" shot wherein the participating banks have no opportunity to "roll over" loans more than one time. It is essential to a banking institution to be able to "roll over" its resources to reduce the risk of loss. It is not convenient for Nicaragua to have this kind of "Project Loan".

Few details are provided in the project proposal to judge the reforestation aspects. There is no indication regarding the variety of the trees to be planted, whether planting is to be by seed or seedlings, no suggestion as to the availability of seedlings, and no indication of how the new planting will be protected from mice, rabbits, or cattle.

Such narrowly defined regulations about client eligibility, terms and interest rates of loans, and purposes for which resources can be used is not advisable over a long period of time. Banks must be able to adjust to changes in interest rates, exchange rates, and other financial market factors.

The leaders of the livestock industry must take into their own hands the banking services needed in all the phases of the industry. In the team's opinion, an attempt should be made to establish a strictly private enterprise livestock producers bank. Legislation could be promulgated whereby over a period of time, a loan of Nicaraguan currency from funds available to USAID would be matched with forced purchase of capital shares from all the livestock producers. This BANCO GANADERO would have a commercial banking and loan function. Its Board of Directors would be leaders of the livestock and banking industry. It would have its own technical and loan supervision staff. It would provide credit, lines of credit, and commercial banking services for all the production and marketing phases of the industry. The proposed BANCO GANADERO would be owned and operated by private enterprise based on the entire livestock industry population.

ACKNOWLEDGEMENT

On behalf to the USAID Mission in Nicaragua, Winrock International Institute for Agricultural Development (a United States non-profit consulting firm), and consultants, James Bleidner and Raul Hinojosa, we extend our sincere thanks, gratitude, and appreciation to the Nicaraguan Livestock Sector, Beef and Dairy, represented by FAGANIC, FONDILAC, and THE ASOCIACION DE CRIADORES DE GANADO BRAHMAN DE NICARAGUA.

To express our gratitude on an individual basis would be an impossibility because so many members contributed of their time and effort to make our mission easier and above all realistic. It was only through their efforts that we could travel to the country side to visit and interview with livestock producers and their respective regional associations. They took time to receive us and extend their most warm welcome and hospitality.

It is only through actual field visits that a sector analysis of this nature can be accomplished objectively.

Without excluding any single participating contributor to our efforts, we thank one and all. It is our sincere hope that this assessment contributes in a positive way to initiate the long development process that confronts the Nicaraguan Livestock Sector.

BIBLIOGRAPHY

Proyecto de Rehabilitacion Ganadera y Proteccion Agroforestal Nicaragua, Septiembre 1990, prepared by RUTA II, the technical unit of the World Bank, the United Nations, and IICA.

USAID/N Draft CDSS for review purposes Robert Burke, Chief, Program, Economics and Private Sector Office, May 1, 1991.

Politica de Credito Bancario Banco Nacional de Desarrollo Gerencia de Credito.

USAID/N Scope of Work for a Series of Agricultural Sector Studies to Support the Development of a Sector Strategy and a CDSS.

Programa Mundial de Alimentos Proyecto Nicaragua 2593 (Ampliacion 02) Promocion de Desarrollo Lechero Informe de una Mision Tecnica 8 al 26 de Abril, 1991.

USAID/N Project Paper Private Agricultural Services Project (524-0315).

VISITS TO RANCHES

In order to fully orient ourselves with the actual livestock industry situation of Nicaragua, a series of visits to ranches and livestock associations in the different regions of the country were programmed, they are:

AREA VISITED:	SAN JOSE DE LOS REMATES	5/01/91
RANCHES VISITED:	Danilo Machado	Dairy Farmer
	Santiago Mayorga	Dairy Farmer
	Andres Oaziga	Dairy Farmer
	Damaso Flores	Dairy Farmer
	Rogelio Rayon	Dairy Farmer
	Salvador Lopez	Dairy & Beef
	Pablo Antonio Gonzalez	Dairy & Beef
	Lalo Lopez	Dairy Farmer
	Nivaldo Rayo	Dairy Farmer
AREA VISITED:	MANAGUA	5/02/91
MEAT PLANT:	CARNIC	MEAT EXPORTS
EXECUTIVE DIRECTOR:	Dr. Enrique Moncada	
AREA VISITED:	MANAGUA	5/03/91
LIVESTOCK AUCTION SALE:	SUBASTA NACIONAL DE GANADO	
OWNER & MANAGER:	Reinaldo Lacayo	
AREA VISITED:	MASAYA	5/04/91
RANCHES VISITED:	Domingo Bolano	Dairy Farmer
	Roberto Abaunza	Dairy Farmer
	Domingo Abaunza	Dairy Farmer
	Carlos Velasquez	Dairy Farmer
	Carlos Herman Sequeira	Dairy Farmer
AREA VISITED:	CHONTALES	5/05/91
RANCHES VISITED:	Roberto Rondon (Minister of Agriculture)	Beef & Dairy
AREA VISITED:	MANAGUA AREA	5/06/91
FEED LOT: (LYBIAN PROJECT)	Salvador Abdalah	President

	Jose Maria Alvarado Martinez	Manager
AREA VISITED:	MATAGALPA	5/07/91
RANCHES VISITED:	Henry Haslam Blandon	Beef & Dairy
	Dr. Denis Mairena Ortiz	Veterinarian
	Juan Garcia Miranda	Beef & Dairy
	Armando Valenzuela Castro	Beef & Dairy
	Maryin Montez Gutierrez	Beef & Dairy
	Nubia Palacios	Dairy Farmer
	Benedicto Herrera	Dairy Farmer
	Andres Zeledon	Beef & Dairy
	Edmundo Montenegro	Beef & Dairy
	Enrique Mejia	Dairy Farmer
	Celestino Reyes	Beef & Dairy
	Antonio Hernandez	Beef Rancher
	Roberto Reyes	Beef & Dairy
AREA VISITED:	JUTIGALPA (CHONTALES)	5/08/91
MEAT PLANT:	AMERRISQUE	
	Winston Castellon	Plant Manager
RANCHES VISITED:	Dr. Pablo Sierra Chacon	Beef Rancher
(CHONTALES	Juan Villagra Lazo	Beef Rancher
LIVESTOCK	Chester Howay Lunza	Beef Rancher
ASSOCIATION)	(Asso. President)	
	Salvador Veroy Espinoza	Beef Rancher
	Olman Marin Marin	Beef Rancher
	Rene Fernandez Sobalvarro	Beef Rancher
	Nardo Sierra Carrillo	Beef Rancher
	Avelino Martinez	Beef Rancher
	(Hda. Sta. Lydia)	
AREA VISITED:	LEON	5/09/91
RANCHES VISITED:	Alejandro Vaca	Dairy Farmer
	Francisco Zavala Cuadra	Dairy Farmer
	Ernesto Vayares	Dairy Farmer
	(Hda. Chiriqui)	
	Hermojenes Baldizon	Dairy Farmer
	(Hda. Los Angeles)	
	Eliodoro Mejia	Dairy Farmer
	(Hda. Sta. Clelia)	
	Alcides Emilio Zapata Abarca	Beef & Dairy
	Sergio Mario Montenegro Baldizon	
	(Asso. President)	Beef & Dairy
	Jose Antonio Lacayo Herdocia	Beef & Dairy
	Vicente Heliodoro	Dairy Farmer

Nova Saborio	Dairy Farmer
Adolfo Fonseca Proveda	Dairy Farmer
William Gurdian DeBayle	Beef Rancher

AREA VISITED: GRANADA & RIVAS 5/10/91

RANCHERS: (GRANADA LIVESTOCK ASSOCIATION)	Roberto Mejia Arellano	
	(Asso. President)	
	(Hda. Agua Agria)	Beef Rancher
	Silvio Guadavoz	Beef Rancher
	Fernando Anzoatequi	Beef Rancher
	Carlos Herman Sequeira	Dairy Farmer
	Martin Monterrey	Dairy Farmer
	Melico Arguello	Beef Rancher
	Silvio Rodrigues	Beef Rancher
	Silvio Rodrigues, Jr.	Beef Rancher
	Gustavo Vaquera	Beef Rancher
	Emilio Chamorro	Beef Rancher
	Gabriel Lacayo	Beef Rancher
	Emilio Pugama	Beef Rancher
	Roberto Vallosga	Beef Rancher
	Arturo Correa	Beef Rancher
	Alejandro Arguello	Beef Rancher
Ray Lacayo	Beef Rancher	
Carlos Gomez	Beef Rancher	
Abelardo Salamanca	Beef Rancher	
Rene Aleman	Beef Rancher	
Frank Aleman	Beef Rancher	

RANCHERS: (RIVAS LIVESTOCK ASSOCIATION)	Silvio R. Guadavoz	Beef Rancher
	(Hda. Teresa)	
	Jorge Barios	Beef Rancher
	(Hda. Limon)	
	Federico Barios	Beef Rancher
	(Hda. Anaya)	
	Henry Urcuyo	Beef Rancher
	(Hda. Sta. Marta)	
Armando Rayo	Beef Rancher	
Gustavo Cordova	Beef Rancher	
(Hda. Isla Zapatera)		

AREA VISITED: CHINANDEGA 5/11/91

RANCHERS: (CHINANDEGA LIVESTOCK ASSOCIATION)	Guillermo Chamorro	Beef Rancher
	(Asso. President)	
	Enrique Lopez	Beef Rancher
	Omar Ballestero	Beef Rancher
	David Mazanego	Beef Rancher
	Luis Gastiasono	Beef Rancher
Mariano	Beef Rancher	

AREA VISITED: ESTELI, LA TRINIDAD & JALAPA 5/12/91

RANCHERS: Reinaldo Valenzuela Castillo Beef Rancher
(ESTELI (Hda. El Castillo)
LIVESTOCK Jose J. Rodriguez Beef Rancher
ASSOCIATION) (Asso. President)
Jorge Castillo Beef Rancher
Ricardo Valenzuela Beef Rancher
Rolando Payan Beef Rancher
Elias Montoya Beef Rancher
Benjamin Rodriguez Beef Rancher

(LA TRINIDAD Dr. Enrique Herrera Osequeda Beef Rancher
LIVESTOCK (Asso. President)
ASSOCIATION)

(JALAPA Julio Diaz Rivera Dairy & Beef
LIVESTOCK (Asso. President)
ASSOCIATION) Pedro Mendoza OroSCO Dairy & Beef
Francisco Bermudez Dairy & Beef
Felix Pedro Rodriguez Dairy & Beef
Andres Gonzalez Dairy & Beef
Angel Casallero Dairy & Beef
Maximiliano Soza Dairy & Beef
Alejandro Gamez Dairy & Beef
Adau Gamez Dairy & Beef
Felix Gonzalez Dairy & Beef
Ignacio Gonzalez Dairy & Beef
Pedro Gamez Dairy & Beef
Agustin Gamez Dairy & Beef
Orlando Ramos Dairy & Beef

AREA VISITED: BOACO 5/13/9

RANCHERS: Enrique Elizondo Ruiz Dairy & Beef
(BOACO (Hda. San Enrique)
LIVESTOCK Jorge Smith Dairy & Beef
ASSOCIATION) (Hda. San Jorge)
Carlos Espinoza Dairy & Beef
(Hda. Ranch Bonito)
Jorge Ortega Dairy & Beef
(Hda. San Jorge)
Alzides Montiel Dairy & Beef
(Hda. Los Pinares)
Humberto Sanchez Dairy & Beef
(Hda. Vista Hermosa)
Denis Gonzalez Reyes Dairy & Beef
Faustino Tapia Dairy & Beef

	Luis Espinoza Vallecullo	Dairy & Beef
	Ramon Reyes	Dairy & Beef
	Julio Morano	Dairy & Beef
AREA VISITED:	RIVAS (BRAHMAN BREEDERS ASSO.)	5/14/91
RANCHERS:	Fernando Sequeida	Beef Rancher
	Brahman Breeder (Hda. Sta. Elisa de Mombacho)	
	Alberto Caprotti	Beef Rancher
	Brahman & Simental Breeder	
	Adolfo Morice	Beef & Dairy
	Geneticist	
	Ernesto Salazar	Beef Rancher
	Brahman Breeder	
AREA VISITED:	COMALAPA	5/16/91
RANCHERS:	Julio Vargas	Dairy & Beef
(COMALAPA	(Hda. La Pachona)	
LIVESTOCK	Asso. President	
ASSOCIATION)	Ceferino Enriques	Dairy & Beef
	(Hda. El Pilon)	
	Fernando Suarez	Dairy & Beef
	Edgard Miranda	Dairy & Beef
	Bartoldo Bellanger	Dairy & Beef
	Gonzalo Bellanger	Dairy & Beef
	Cesar Duarte	Dairy & Beef
	Jose Morin	Dairy & Beef
	Dimas Morin	Dairy & Beef
	Roberto Sandigo	Dairy & Beef
	Jose Duarte	Dairy & Beef
	Manuel Martinez	Dairy & Beef
	Demetrio Duarte	Dairy & Beef
	Edgard Duarte	Dairy & Beef
AREA VISITED:	CAMOAPA	5/16/91
RANCHERS:	Enrique Martinez Mendoza	Beef Rancher
(CAMOAPA	Francisco Aragon Morin	Beef Rancher
LIVESTOCK	Jose Rodriguez Lopez	Beef Rancher
ASSOCIATION)	Mario Aragon Morin	Beef Rancher
	Juan Aragon Garcia	Beef Rancher
	Alejandro Hurtada Somoza	Beef Rancher
AREA VISITED:	SAN JUAN DE LIMAY	5/17/91
RANCHERS:	Juan Jose Moncada	Beef Rancher
(LIMAY LIVESTOCK	(Hda. La Granja)	
ASSOCIATION)	Danilo Vanejas	Dairy & Beef
	Orlando Cruz	Dairy & Beef

Francisco Lopez	Dairy & Beef
Jose Vindel	Dairy & Beef
Francisco Vindel	Dairy & Beef
Pedro Espinoza	Dairy & Beef
Nector Joaquin	Dairy & Beef
Bismar Rosales	Dairy & Beef
Manuel Pino	Dairy & Beef
Aurelio Guevarra	Dairy & Beef
Ramon Herrera	Dairy & Beef
Alberto Rosales	Dairy & Beef
Blanca Casco	Dairy & Beef
Concho Morales	Dairy & Beef
Manuel Sandoval	Dairy & Beef
Roberto Guzman	Dairy & Beef
Juan Jose Suarez	Dairy & Beef
Estanislado Mendez	Dairy & Beef
Alfredo Gonzalez	Dairy & Beef
Donaldo Espinoza	Dairy & Beef
Juan Espinoza	Dairy & Beef
Santos Valdivia	Dairy & Beef
Benito Casco	Dairy & Beef

AREA VISITED: NAGAROTE 5/20/91

RANCHERS: Noel Guerrero Aguila Dairy & Beef
 (NAGAROTE (Hda. Noel)
LIVESTOCK Juan Jose Roa Baca Dairy & Beef
ASSOCIATION) (Hda. Baca)
 Francisco Arana Hernandez Dairy & Beef
 (Hda. Arana)
 Napoleon Solis Dairy & Beef
 (Hda. La Florida)

AREA VISITED: MANAGUA (CHILTEPE) 5/27/91

DIRECTOR: Luis Arcenas Dairy

AREA VISITED: MANAGUA 5/28/91

DIRECTOR Daniel Nunez UNAG
 Amilcar Navarro UNAG

ANNEX ONE

FIRST YEAR

Assumption: 40% weaned calf crop

3% annual mortality in 1 - 3 years old

2% mortality in mature animals

7 years cow replacement

4 years enter breeding herd or slaughterhouse

Herd Size and Composition at Beginning and End of Year

29

Breeding Herd	Young Stock	Young Stock	Finishing or Gestation
100 Cows 5 Bulls	1 - 2 Years old	2 - 3 Years old	3 - 4 Years old

40 Weaned	39	38	37
20 Males	20	19	19
20 Females	19	19	18

18 Females to Replace Death Loss and /Culls

2 cows die

14 cull SLAUGHTERHOUSE ---
19 males
14 females
33 animals =

TOTAL

100 Mature Cows	102
5 Mature Bulls	5
19 Steers/Bulls ready to market	19
18 Heifers in 1st Gestation Period	18
19 Young Bulls/Steers	19
19 Open Heifers	19
20 Yearling Bulls/Steers	20
19 Yearling Heifers	19
20 Nursing Male Calves	20
20 Nursing Female Calves	20
259	261

12.7% of the Herd of 259 animals

Ratio Male : Female slaughter 57.6% : 42.4%
Herd Increase = 2 or 0.8%
Productivity rate = 13.5%

SECOND YEAR

Assumption: 40% weaned calf crop

3% annual mortality in 1 - 3 years old

2% mortality in mature animals

7 years cow replacement

4 years enter breeding herd or slaughterhouse

Herd Size and Composition at Beginning and End of Year

61

Breeding Herd	Young Stock	Young Stock	Finishing or Gestation
102 Cows 5 Bulls	1 - 2 Years old	2 - 3 Years old	3 - 4 Years old

41 Weaned	40	39	38
21 Males	20	20	19
20 Females	20	19	19

19 Females to Replace Death Loss and /Culls

2 cows die

15 cull

SLAUGHTERHOUSE ---

19 males

15 females

34 animals =

102 Mature Cows	104
5 Mature Bulls	5
19 Steers/Bulls ready to market	19
18 Heifers in 1st Gestation Period	19
19 Young Bulls/Steers	20
19 Open Heifers	19
20 Yearling Bulls/Steers	20
19 Yearling Heifers	20
20 Nursing Male Calves	21
20 Nursing Female Calves	20
TOTAL	261
	267

13.0% of the Herd of

261 animals

Ratio Male : Female slaughter

55.9% : 44.1%

Herd Increase =

6 or 2.3%

Productivity rate =

15.3%

THIRD YEAR

Assumption: 40% weaned call crop
 3% annual mortality in 1 - 3 years old
 2% mortality in mature animals
 7 years cow replacement
 4 years enter breeding herd or slaughterhouse

Herd Size and Composition at Beginning and End of Year

Breeding Herd	Young Stock	Young Stock	Finishing or Gestation
104 Cows 5 Bulls	1 - 2 Years old	2 - 3 Years old	3 - 4 Years old

42 Weaned
 21 Males
 21 Females

19 Females to Replace Death Loss and /Culls]

2 cows die
 15 cull

SLAUGHTERHOUSE ---

20 males
 15 females
 35 animals =

TOTAL

104 Mature Cows 106
 5 Mature Bulls 5
 19 Steers/Bulls ready to market 20
 19 Heifers in 1st Gestaton Period 19
 20 Young Bulls/Steers 20
 19 Open Heifers 20
 20 Yearling Bulls/Steers 21
 20 Yearling Heifers 20
 21 Nursing Male Calves 21
 20 Nursing Female Calves 21
 TOTAL 267 273

13.1% of the Herd of 267 animals

Ratio Male : Female slaughter 57.1% : 42.9%
 Herd Increase = 6 or 2.2%
 Productivity rate = 15.4%

FOURTH YEAR

Assumption: 40% weaned calf crop

3% annual mortality in 1 - 3 years old

2% mortality in mature animals

7 years cow replacement

4 years enter breeding herd or slaughterhouse

Herd Size and Composition at Beginning and End of Year

Breeding Herd	Young Stock	Young Stock	Finishing or Gestation
106 Cows 5 Bulls	1 - 2 Years old	2 - 3 Years old	3 - 4 Years old

42 Weane	41	40	39
21 Males	21	20	20
21 Femal	20	20	19

19 Females to Replace Death Loss and /Culls|

TOTAL

106 Mature Cows	108
5 Mature Bulls	5
20 Steers/Bulls ready to market	20
19 Heifers in 1st Gestaton Period	19
20 Young Bulls/Steers	20
20 Open Heifers	20
21 Yearling Bulls/Steers	21
20 Yearling Heifers	20
21 Nursing Male Calves	21
21 Nursing Female Calves	21
273	275

2 cows die
15 cull SLAUGHTERHOUSE ---->

20 males
15 females
35 animals =

12.8% of the Herd of 273 animals

Ratio Male : Female slaughter 57.1% : 42.9%
Herd Increase = 2 or 0.7%
Productivity rate = 13.6%

ANNEX TWO

FIRST YEAR

Assumption: 40% weaned calf crop
 3% annual mortality in 1 - 3 years old
 2% mortality in mature animals
 7 years cow replacement
 4 years enter breeding herd or slaughterhouse

Herd Size and Composition at Beginning and End of Year

Breeding Herd	Young Stock	Young Stock	Finishing or Gestation
100 Cows 5 Bulls	1 - 2 Years old	2 - 3 Years old	3 - 4 Years old

40 Weaned
 20 Males
 20 Females

39
 20
 19

38
 19
 19

37
 19
 18

18 Females to Replace Death Loss and /Culls|

TOTAL

100 Mature Cows	102
5 Mature Bulls	5
19 Steers/Bulls ready to market	19
18 Heifers in 1st Gestation Period	18
19 Young Bulls/Steers	19
19 Open Heifers	19
20 Yearling Bulls/Steers	20
19 Yearling Heifers	19
20 Nursing Male Calves	20
20 Nursing Female Calves	20
259	261

2 cows die
 14 cull

SLAUGHTERHOUSE ---

19 males
 14 females
 33 animals =

12.7% of the Herd of 259 animals

Ratio Male : Female slaughter 57.6% : 42.4%
 Herd Increase = 2 or 0.8%
 Productivity rate = 13.5%

SECOND YEAR

Assumption: 42% weaned calf crop 3% annual mortality in 1 - 3 years old
 2% mortality in mature animals
 7 years cow replacement
 4 years enter breeding herd or slaughterhouse

Herd Size and Composition at Beginning and End of Year

Breeding Herd	Young Stock	Young Stock	Finishing or Gestation
102 Cows 5 Bulls	1 - 2 Years old	2 - 3 Years old	3 - 4 Years old

43 Weaned 42 41 40
 22 Males 21 21 20
 21 Females 21 20 20

20 Females to Replace Death Loss and /Culls]

2 cows die

15 cull SLAUGHTERHOUSE --- 20 males
 15 females
 35 animals =

102 Mature Cows	105
5 Mature Bulls	5
19 Steers/Bulls ready to market	20
18 Heifers in 1st Gestation Period	20
19 Young Bulls/Steers	21
19 Open Heifers	20
20 Yearling Bulls/Steers	21
19 Yearling Heifers	21
20 Nursing Male Calves	22
20 Nursing Female Calves	21
TOTAL	261

13.4% of the Herd of 261 animals

Ratio Male : Female slaughter 57.1% : 42.9%
 Herd Increase = 15 or 5.7%
 Productivity rate = 19.2%

THIRD YEAR

Assumption: 43% weaned calf crop 3% annual mortality in 1 - 3 years old
 2% mortality in mature animals
 7 years cow replacement
 4 years enter breeding herd or slaughterhouse

Herd Size and Composition at Beginning and End of Year

Breeding Herd	Young Stock	YOUNG Stock	Finishing or Gestation
105 Cows 5 Bulls	1 - 2 Years old	2 - 3 Years old	3 - 4 Years old

45 Weaned 44 43 42
 23 Males 22 22 21
 22 Females 22 21 21

21 Females to Replace Death Loss and /Culls]

2 cows die
 15 cull

SLAUGHTERHOUSE ---

21 males
 15 females
 36 animals =

105 Mature Cows 109
 5 Mature Bulls 5
 20 Steers/Bulls ready to market 21
 20 Heifers in 1st Gestation Period 21
 21 Young Bulls/Steers 22
 20 Open Heifers 21
 21 Yearling Bulls/Steers 22
 21 Yearling Heifers 22
 22 Nursing Male Calves 23
 21 Nursing Female Calves 22
TOTAL 276 288

13.0% of the Herd of 276 animals

Ratio Male : Female slaughter 58.3% : 41.7%
 Herd Increase = 12 or 4.3%
 Productivity rate = 17.4%

67

FOURTH YEAR

Assumption: 45% weaned calf crop

3% annual mortality in 1 - 3 years old

2% mortality in mature animals

7 years cow replacement

4 years enter breeding herd or slaughterhouse

Herd Size and Composition at Beginning and End of Year

breeding Herd	Young Stock 1 - 2 Years old	Young Stock 2 - 3 Years old	Finishing or Gestation 3 - 4 Years old
109 Cows 5 Bulls			

49 Weane
25 Males
24 Femal

48
24
24

47
24
23

46
23
23

23 Females to Replace Death Loss and /Culls]

2 cows die
16 cull SLAUGHTERHOUSE ---->

23 males
16 females
39 animals =

109 Mature Cows	114
5 Mature Bulls	5
21 Steers/Bulls ready to market	23
21 Heifers in 1st Gestaton Period	23
22 Young Bulls/Steers	24
21 Open Heifers	23
22 Yearling Bulls/Steers	24
22 Yearling Heifers	24
23 Nursing Male Calves	25
22 Nursing Female Calves	24
TOTAL	288
	309

13.5% of the Herd of 288 animals

Ratio Male : Female slaughter 59.0% : 41.0%
Herd Increase = 21 or 7.3%
Productivity rate = 20.8%

103

ANNEX THREE

NICARAGUA

LIVESTOCK REHABILITATION AND AGROFORESTRY PROTECTION PROJECT
 TABLE 1.
 DEBONED BEEF PRODUCTION ACCORDING TO USE
 (Metric Tons)

YEAR	TOTAL 1/ PRODUCTION	DOMESTIC CONSUMPTION	%	EXPORT	%
1977	53,842	28,176	52.33	25,666	47.67
1978	65,586	28,933	44.11	36,653	55.89
1979	59,506	24,023	40.37	35,483	59.63
1980	45,125	26,229	58.12	18,896	41.88
1981	34,913	25,346	72.59	9,567	27.41
1982	43,089	27,654	64.18	15,435	35.82
1983	46,391	31,504	67.91	14,887	32.09
1984	45,348	35,877	79.11	9,471	20.89
1985	44,682	38,416	85.97	6,266	14.03
1986	36,297	33,040	91.02	3,257	8.98
1987	26,205	19,799	75.55	6,406	24.45
1988	30,515	20,409	66.88	10,106	33.12
1989	41,364	18,242	44.00	23,122	56.00

SOURCE: Annual Report of Corporación Nicaraguense de la Carne and Basic Statistics of MIDINRA
 1/ Includes illegal slaughter and excludes visera.

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LIVESTOCK REHABILITATION AND AGROFORESTRY PROTECTION PROJECT
TABLE 2.
BEEF PRODUCTION FOR EXPORT
(Metric Tons)

YEAR	NO. OF HEAD	DEBONED BEEF	CARCASS EQUIVALENT
1977	179,106	25,666	36,717
1978	263,137	36,653	51,575
1979	260,359	35,483	49,989
1980	140,763	18,896	26,604
1981	64,757	9,567	13,275
1982	96,935	15,435	21,919
1983	108,107	14,887	20,865
1984	65,650	9,471	13,130
1985	44,497	6,266	8,810
1986	22,921	3,257	4,561
1987	44,778	6,406	8,776
1988	71,419	10,106	13,926
1989	156,478	23,122	31,796

SOURCE: Annual Report of Corporación Nicaraguense de la Carne and S.P.P. and Tables III-8 and III-9.

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LIVESTOCK REHABILITATION AND AGROFORESTRY PROTECTION PROJECT
TABLE 3.
PRODUCTION INDICATORS FOR BEEF EXPORTS

CONCEPT	JAN - DEC 1977	JAN - DEC 1988	JAN - DEC 1989
No. of Cattle Slaughtered 1/	196,820.0	162,315.0	210,864.00
Average Live Weight (kg)	395.0	375.0	389.80
Average Carcass Weight (kg)	205.0	195.0	202.73
Average Deboned Weight (kg)	143.0	142.0	143.99
Liveweight/Carcass Yield (%)	52.0	52.0	52.0
Carcass/Deboned Yield (%)	70.0	72.36	72.72
Liveweight/Deboned Yield (%)	36.0	37.70	37.75

SOURCE: Annual Report of the Corporación Nicaraguense de la Carne and S.P.P.
1/ Refers to all cattle slaughtered in industrial slaughter plant,
a part of which is used for domestic consumption.

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LIVESTOCK REHABILITATION AND AGROFORESTRY PROTECTION PROJECT
TABLE 4.
PER CAPITA BEEF CONSUMPTION (KG)

CENSUS YEAR	POPULATION	POPULATION GROWTH RATE	APPARENT PER CAPITA CONSUMPTION ^{2/}	APPARENT PER CAPITA CONSUMPTION ^{3/}
1977	2,546,067	2.90	11.0	13.3
1978	2,615,524	2.90	11.0	13.8
1979	2,699,454	2.90	8.9	11.3
1980	2,771,008	2.90	9.5	11.4
1981	2,860,818	3.30	8.9	10.2
1982	2,956,798	3.30	9.3	10.9
1983	3,057,979	3.30	10.3	12.0
1984	3,163,390	3.30	11.3	12.9
1985	3,272,064	3.30	11.7	13.2
1986	3,384,444	3.40	9.8	11.0
1987	3,501,176	3.40	5.6	6.5
1988	3,621,594	3.40	5.6	6.6
1989	3,744,728	3.40	4.9	6.0

1/ Hypothetical demographic indicators recommended November 1983.

2/ Production data on domestic meat production from Table III-10.

3/ Meat production from Table III-10, plus total visera from Table III-9, divided by population.

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LIVESTOCK REHABILITATION AND AGROFORESTRY PROTECTION PROJECT
TABLE 5.
VOLUME AND VALUE OF DEBONED BEEF EXPORTS

YEAR	EXPORTS (KG)	VALUE OF EXPORTS FOB (US\$)	US \$ KG	US\$ LB
1977	23,786,263.6	58,114,000.00	2.44	1.11
1978	34,969,091.0	74,926,000.00	2.14	0.97
1979	35,572,727.0	93,257,000.00	2.60	1.18
1980	20,478,182.0	58,551,000.00	2.80	1.27
1981	9,492,444.0	23,153,062.94	2.44	1.11
1982	14,566,742.0	33,799,013.16	2.32	1.05
1983	14,263,795.0	31,425,352.29	2.14	0.97
1984	9,011,307.0	17,600,950.88	1.95	0.89
1985	5,792,431.0	10,958,108.32	1.89	0.86
1986	2,622,430.0	4,723,517.43	1.80	0.82
1987	5,118,446.0	11,092,413.52	2.17	0.99
1988	8,398,997.0	16,646,348.48	1.98	0.90
1989	23,122,000.0	37,006,206.98	1.60	0.73

SOURCE: Annual Report of Corporación Nicaraguense de la Carne.

NOTE: Includes beef exported as chilled carcass.

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LIVESTOCK REHABILITATION AND AGROFORESTRY PROTECTION PROJECT
 TABLE 6.
 PRODUCTION AND USE OF UNPASTEURIZED MILK (MILLIONS OF LITERS)

YEAR	TOTAL PRODUCTION (1) (1=2+5)	TOTAL FLUID (2) (2=3+4)	DELIVERED UNPASTEURIZED TO PLANT (3)	FLUID MILK (4)	HOME INDUSTRY (5)
1977	295.0	93.5	79.9	13.6	201.5
1980	150.0	68.8	37.6	31.2	81.2
1981	150.0	82.7	50.4	32.3	67.3
1982	145.0	87.6	55.0	32.6	57.4
1983	100.0	79.0	40.1	38.9	21.0
1984	154.0	72.4	36.1	36.3	81.6
1985	162.0	74.0	36.6	37.4	88.0
1986	202.0	73.3	30.3	43.0	128.7
1987	178.0	90.8	39.4	51.4	87.2
1988	170.0	92.8	38.2	54.6	77.2
1989	164.0	87.0	31.4	55.6	77.0

SOURCE: Table III-35 and III-37-B Processing Plant Production.
 Estimations of unpasteurized fluid milk and homemade cheese. DGTA.