

AESA

A S E S O R A M I E N T O E M P R E S A R I A L S . A .

FEASIBILITY STUDY OF THE PROJECT

FOR THE

PRODUCTION, FATTENING AND PROCESSING

OF HOGS

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1. INTRODUCTION

1.1. Objective

The primary objective of this study is to determine the economic, financial and technical feasibility of fattening and selling hogs in the Chapare by the small farmers of that region.

With this objective in mind, three basic components which form an integral part of the Project have been defined. These components are: a) Agropecuaria Copacabana (AC), an established firm in the Chapare which breeds pigs; b) Fabrica Nacional de Conservas Dillmann (FNCD), an established company in Cochabamba which processes pork and c) the Small Farmers (SF) of the Chapare who will fatten the hogs provided by AC.

Consequently, this Study will establish the advantage of achieving the following goals:

a) Increase AC's capacity for pig production, thereby covering the demand of the SF.

b) Establish a simple program, complete and profitable, of hog fattening by the SF. The program should be easily assimilated by the majority of the SF of the Chapare.

c) Create an efficient distribution system for the SF of pigs and balanced feed, of technical assistance and of slaughter, transportation and sale of the hogs when they are fattened.

d) Process the entire hog production, AC's as well as SF's in the installations of FNCD.

e) Establish a strict system of control and follow-up for the evaluation of the Project.

1.2. Description of the Project

1.2.1. First Stage

The first stage of the Project is experimental in nature. This phase will last one year and will have the following basic objectives:

a) Evaluation of the economic, financial and technical feasibility of fattening hogs by the SF of the Chapare.

b) Evaluation of the system designed to supply pigs and feed to the SF, to protect the health of the hogs and finally, to provide the slaughter and sale of the fattened hogs to the pork processing plant of FNCD in Cochabamba.

In this stage, 10 farmers will be chosen who are interested in

developing a fattening program. Additionally, these farmers would have to meet certain basic requirements, such as minimum infrastructure and cultivations.

These initial 10 farmers will be sold 10 pigs apiece to be fattened during the course of four months. The feed and the animal sanitation would be provided periodically by AC. At the end of the four months, the SF will deliver the fattened hogs to AC to be weighed and they would subsequently be paid. Payment will consist of multiplying the current price for pork in Cochabamba by the weight. From this sum the following will be deducted: freight charges from the Chapare to Cochabamba, the cost of the balanced feed, the cost of the health services and the interest charges.

Once the four month cycle is over, the Project will be evaluated and, if considered necessary, an additional experimental cycle would be undertaken, this time with 30 modules instead of 10. Naturally, if the evaluation were negative and the problems presented were difficult to resolve, the Project should be terminated at this stage of 10 modules.

If the evaluation were positive, however, the necessary adjustments should be made so that the operation would function well on a larger scale. In this case, attention should be given to the financial and technical aspects and to the management of the Project itself, for once the experimental stage is completed, AC will no longer provide these services.

For this reason, during the experimental cycle, the bases necessary for the creation of a mixed shareholder institution like the Fondo Ganadero del Beni should be studied to help develop porcine livestock in the Chapare. The formation of a development institution of this type is a complicated project with many variables and components which are outside the reach of this Study.

1.2.2. Second Stage

This stage will be the development of the Project which will begin with 100 modules and will gradually reach 1,500 modules (15,000 hogs) in the fifth year with an economic impact on 1,000 families. The technical assistance and financing will be provided by the livestock development institution.

At this stage, another source of pigs should also be found. It may be either the creation of a new hog breeding center or the purchase of pigs from other pig raising farms already in existence, such as Monteagudo in Sucre or El Prado in Santa Cruz.

1.2.3. Primary Participants

a) Agropecuaria Copacabana. To provide the SF with pigs in the experimental stage, AC will use its existing infrastructure in the Chapare. This infrastructure should be enlarged in the second stage to cover the necessities of the Project until it reaches in two years a production of 6,000 and 14,000 pigs per year for the AC and for themselves respectively.

In the first years, AC will be entrusted exclusively with the provision of pigs because it already has the necessary infrastructure and

technology for efficient production. With AC's production limited to 6,000 pigs per year for the SF, other sources will be needed to fulfill the Project's goal of 15,000 pigs for the SF by the fifth year.

In the experimental stage, AC will also have the responsibility of providing balanced feed and veterinarian assistance to the SF and of the financial administration of the Project.

Finally, AC will be responsible for slaughtering the hogs for the SF and for sending them to FNCD in Cochabamba to be purchased. For this purpose, a contract will be subscribed between AC and the SF in which the terms and conditions of the buying and selling of the hogs are clearly defined.

b) Small Farmers. The SF must comply with certain basic requirements to be able to participate in the Project. Basically, they should show interest in the Project and have the minimum infrastructure of a covered shed of 10m² and 1/8 of a hectare cultivated with yucca and 1/8 of a hectare cultivated with kudzu. Other crops such as bananas or citrus fruit could be considered if approved by the technicians.

The SF should also have the financial liquidity to purchase the first 10 pigs (approximately \$b 6,240.- each).

During the fattening period, the SF will receive the balanced feed provided by AC every 15 days and at the same time a visit from the veterinarian. These services will be paid for at the end of the fattening period. This way, the SF do not need to handle money during the fattening cycle.

The hogs should show an approximate weight increase from 15 kg to 80 kg during the four months of fattening.

The financial and technical assistance during the second stage will be provided by the institution for livestock development.

It is important to repeat that the fattening operation in hands of the SF will slowly increase until it reaches 15,000 hogs per year in a period of five years. In the first year, it is estimated that the SF can fatten 3,000 hogs or 300 modules of 10 hogs apiece. These 300 modules signify 150 families which have to be organized, supervised, evaluated etc. Consequently, it is not realistic to consider a greater number of participating SF. In the second year, it is estimated that the SF can fatten double the number of the first year, that is, 6,000 hogs. In the subsequent years, it is estimated that the SF can fatten an additional 3,000 hogs per year. The fifth year would see 15,000 hogs fattened or 1,500 modules. These modules will be managed by approximately 1,000 families, taking into account that some families will manage more than one module. To achieve this goal, it is necessary to install another production center apart from AC beginning in the third year.

c) Fabrica Nacional de Conservas Dillmann. FNCD will be obligated to purchase the entire production of hogs from AC as well as from the SF. This obligation will be supported by formal written contracts which will define clearly the characteristics and volume of the product (hogs) and the financial terms.

FNCD will process the hogs at its facilities and will sell the finished product in the local and international marketplace. A marketing study, prepared by the firm Coopers and Lybrand, shows the existence of a adequate market for pork products.

2. ANALYSIS OF AGROPECUARIA COPACABANA (AC)

2.1. Background

Agropecuaria Copacabana was established by Mr. Alfredo Salazar who, after experimenting with breeding pigs, proved that the raising and fattening of pigs was possible on his property in the Chapare.

Thus, Mr. Salazar made his first investments in infrastructure. He also bought in Buenos Aires 30 brood sows and 6 boars. The herd slowly increased in Agropecuaria Copacabana until it reached a level of considerable importance and rendered a high level of productivity.

Presently, AC has the capacity to produce 1,800 to 2,000 hogs per year by maintaining a group of 140 brood sows.

To arrive at the production capacity of 20,000 hogs, AC should make additional investments in infrastructure and working capital by borrowing the funds as shown in the corresponding chapter. (See Chapter 2.5 Financial Requirements).

2.1.1. Legal Aspects

Agropecuaria Copacabana is a company of limited liability owned by Mr. Alfredo Salazar and his wife with an authorized capital of \$b 5 million.

2.1.2. Financial Aspects

a) Assets.

The Fixed Assets of AC consist of a series of important investments which were recently appraised at a total of \$b 416,464,610.--. These investments are the following:

<u>Fixed Assets</u>	
Land (74,661 hectares)	\$b 215,971,100.--
Covered Areas (sheds, machine room, oven, warehouses, houses, ranch house etc.)	\$b 158,837,850.--
Various (pool, grazing land, fencing, walls, bridges etc.)	\$b 8,407,660.--
Electrical Installations	\$b 17,820,000.--
Potable Water Installations	\$b 3,650,000.--
Sanitary Installations	\$b 511,000.--
Equipment and Tools (tractors, plough, trailers, cages, troughs etc.)	\$b 11,267,000.--
Total	\$b 416,464,610.--

The assets of AC in swine livestock are composed of the following (May, 1982):

<u>Description</u>	<u>No.</u>	<u>Value \$b</u>	<u>Total \$b</u>
Gilts	165	30,000.--	4,950,000.--
Boars	7	46,500.--	325,500.--

<u>Description</u>	<u>No.</u>	<u>Value \$b</u>	<u>Total \$b</u>
Piglets	216	6,240.-	1,347,840.-
Barrows	202	15,600.-	3,151,200.-
Hogs being fattened	142	20,800.-	2,953,600.-
Brood Sows	124	35,000.-	4,340,000.-
Total	856		17,068,140.-

b) Liabilities

On the other hand, the company does not have any debts. The only liability is the capital which was initially \$b 5,000,000.- and which should be increased by the same proportion as the revaluation of assets.

c) Current Profitability per Hog

The current profitability per hog, produced and fattened by AC, is shown in detail in Appendix X. Each hog produced weighing 95 kg has a profitability of \$b 4,062.- or 20% above the sale price.

d) Current Profitability per Pig

The current profitability per pig produced by AC is shown in detail in Appendix XI. Each pig sold weighing 15 kg has a negative profitability over the sale price of approximately 9% or \$b 586.-. This loss, however, is basically the result of the high rate of depreciation which is used because of the revaluation of the assets of AC. This revaluation was done at the end of 1982 in a proportion much higher than the increase in the price of pork. It can be concluded that AC loses money on the sale of pigs but this calculation depends to a great extent on the depreciation that is applied to the breeding of hogs.

2.1.3. Technical Aspects

According to the opinion of experts, AC is considered to be one of the best hog farms in Bolivia. It is known for its excellent infrastructure, its high rate of reproduction, the type of feed used and for being generally well run.

The most important technical statistics delineate the following parameters for Agropecuaria Copacabana. (See Appendix VII)

TABLE 1. TECHNICAL PARAMETERS OF AGROPECUARIA COPACABANA

<u>Description</u>	<u>Indexes</u>
Age of gilt at first farrowing	11 to 12 months
Number of piglets per farrowing	8.69 units
Number of piglets at weaning	6.98 units
Live weight of piglets at birth	1.31 kg
Live weight of piglets at weaning	12.15 kg
Live weight of pigs at market	90-100 kg

Breeds for hybridization: Yorkshire, Hampshire and Duroc

In spite of having all of the necessary information, AC does not keep a genetic plan nor do they have a selection system for the boars. They only change males every 4 years, control mounting and cross the female twice.

Initially, the herd was predominantly Duroc, then Hampshire and now it is Yorkshire which means that the hogs to be fattened are hybrids of three lines and of high productivity.

The livestock is fed balanced feed which is prepared without using the proper proportions. This deficiency will be remedied promptly now that AC has engaged the services of a technician in genetics and nutrition. The services of this expert will result in a higher number of births, farrowings and weanings.

For the moment, food produced in the region is not used in the feeding of the livestock. In the near future, the livestock will be fed kudzu, a leguminous plant, which is grown throughout the Chapare. To this end, 20 hectares will be sowed at the hog farm. Other crops such as yucca and bananas which are locally grown will also be considered.

The hygienic practices of AC are excellent; the hog houses are cleaned once a day and they are disinfected with chemicals 4 times a month. The watertroughs are disinfected once a week. The sanitary program includes vaccinations against swine fever (once a year), foot and mouth disease (every four months), brucellosis (once a year) and pneumoenteritis (once during gestation and once 20 days before farrowing). It also includes the use of supplements such as iron (twice a year) and the use of antibiotics such as penicillin and oxytoxins when necessary.

The pregnant females are totally confined. Before farrowing they are switched to pens after having been washed and undergoing disinfection of the vulva and the teats.

The pigs are taken care on early on. They have their umbilical cords disinfected and their eyeteeth clipped. Castration takes place three weeks before weaning.

2.1.4. Administrative Aspects

Presently the company is run by the owner, Mr. Alfredo Salazar and by a technician in breeding and fattening of hogs who live at the farm. They manage all of the systems and controls of feed, sanitation, production, services, sales, purchases etc. Attached to this Study are the control cards used by AC which serve as an example of the efficiency of their management. (See Appendix I). AC, moreover, has the technical assistance of a veterinarian with much experience in the breeding and fattening of hogs.

2.2. The Role of Agropecuaria Copacabana in the Project.

The suitability of AC to become the breeding center for the Project is assured by the condition and size of its infrastructure, the quality of its animals and its excellent management etc. Above all, AC is the best candidate for the experimental stage.

Therefore, AC will participate actively in the Project in the following areas:

2.2.1. Pig Production

With the enlargement of its infrastructure, AC will be able to provide 6,000 pigs per year to the farmers of the area (3,000 the first year and 6,000 from the beginning of the second year). To solidify this arrangement, AC will formally guarantee the provision of 6,000 pigs per year to the SF for as long as necessary.

The feed system of AC which is based upon a balanced diet of the correct nutritive value and percentage of proteins, enables the pigs to gain 15 kilos in 56 days. (actually the 1981/1982 average of 12.5 kilos per pig has already been surpassed and it is expected that the 15 kilos will be attained with AC's new technical expert).

Two days after birth, the pigs have their eye teeth clipped and receive an injection of iron. At 6 weeks they are vaccinated against swine fever and at 8 weeks against foot and mouth. During this time the animals are also castrated.

With this complete sanitary program the SF will receive the pigs at 56 days of age in optimum condition and ready to be fattened.

2.2.2. Balanced Feed Production

The production of balanced feed will be undertaken by AC who will use a formula designed by experts in swine livestock so that the feed will be the most suitable and at a minimum cost to the SF. The composition of this formula, based on a lineal program especially developed by FNCD and in line with current market prices, is the following:

TABLE 2. FORMULA FOR FATTENING HOGS FOR THE SMALL FARMER

Ingredient	Weight kg	Digestible Protein		Digestible Nutrient		Price \$/kg	Cost \$b
		%	gr/kg	%	gr/kg		
Sorghum	0.3219	7.2	23.18	64.0	206.02	40.00	12.88
Cottonseed Meal	0.3000	39.9	110.70	66.7	200.10	38.00	11.40
Soy Meal	0.2485	38.4	95.42	77.3	192.09	42.00	10.44
Bran Meal	0.1000	10.7	10.70	56.8	56.80	16.52	1.65
Bone Meal	0.0250					36.96	0.92
Iodized Salt	0.0040					50.00	0.20
Zoodry VM SA	0.0006					3,354.85	2.13
Total	1.000	24.0	240.00	65.5	655.01		39.62

The requirements for the preparation of balanced feed are:

- a) The content of bran meal should not be more than 10%.
- b) The cottonseed meal content should not be greater than 30%.
- c) All of the mixtures should contain 2.5% of bone meal, 0.4% of

Iodized salt and 0.06% of Zoodrey (VM-SA vitamin concentrate manufactured by Roche).

d) The percentage of digestible proteins should be 18% for the first month and 30% for the fourth month. For simplicity's sake and in order that the same formula will be used by all of the SF, an average of 24% of digestible protein is used.

e) The total of digestible nutrients should not be less than 500 units.

Therefore, the cost of the balanced feed for the hogs is estimated at \$b 39.62 per kilo. Naturally this formula may vary in accordance with the changing prices of the ingredients.

2.2.3. Technical Assistance

AC's experience enables them to provide technical assistance to the SF who participate in the experimental modules during the first year. After the first year of experimentation, the technical assistance should be provided by a livestock development institution, as the number of modules will have increased considerably and their requirements for technical assistance would be beyond the capabilities of AC. On the other hand, AC does not have any interest in providing this service on a permanent basis.

2.2.4. Evaluation and Control

The evaluation and control of the Project during the experimental stage will also be the responsibility of AC. This responsibility will be shared with the organizations which have promoted the Project, such as USAID/BOLIVIA, IBTA, etc.

Control of the individual experimental module of each SF will be done in writing (control sheets) by the veterinarian in his bimonthly visits. This control will consist of establishing the amount of feed consumed by each hog, balanced feed as well as kudzu, yucca or banana; a health record and, most important, the weight increase of the hogs.

This last point is of great importance because it will show the SF the progress made in the fattening of his hogs. This strict control, moreover, has the advantage of being able to detect problems which require prompt solution. Finally, it has the advantage that the hogs, once fattened, can be transported directly to FNCD without preoccupation.

The evaluation of the progress of the Project should be monthly. The final evaluation will be done by the veterinarian in writing at the end of the program. In this evaluation he should recommend the necessary changes in the Program and indicate if another experimental period is required.

2.3. Price Fixing

At the time that this Study was done (March, 1983) there did not exist an "official" price for pork. According to the Director of the Meat Committee, Engineer Alex Senzano, the Government is studying the possibility of reestablishing an "official" price based on various parameters of Monteagudo (Sucre) hog production costs. When AESA analyzed the Cochabamba

market the prevailing price was \$b 260.- per kilo live in the market or at the three processing plants. Generally the market price for all meat is fixed by the municipality. As an "official" price does not exist this price set by the municipality will be used. (The "official" price refers only to pork of good quality and not to the local native variety.)

Agropecuaria Copacabana will sell the pigs to the SF at a cost of \$b 6,240.- apiece in accordance with the established formula of multiplying the price of live pork by the weight of the pig and by a compensating factor of 1.60 (Jerome D. Belanger. Usted Puede Criar Cerdos. Ed. El Ateneo, Buenos Aires, Argentina, 1977). Thus the price is determined as \$b 260.-/ 15 kg / 1.60.

With respect to the purchase price of the fattened hogs from the SF, various possibilities were considered such as: future contracts where the minimum price is established, for example, the prevailing price in the city of Cochabamba at the time of the signing of the contract; the "official" price set by the Government; or the prevailing price in the Municipal Slaughterhouse of Cochabamba at the time of the sale.

2.4. Relationship between Agropecuaria Copacabana and the Small Farmer

The first year, during the experimental phase of the Project, AC will make available to the SF the required technical assistance, feed and sanitary control by means of the visit of a veterinarian every 15 days. Likewise, AC will serve as administrator of the costs incurred by the SF during the Project, that is to say, the cost of the feed, of the veterinarian products, of the transportation, of the technical assistance and of the interest accrued during the 4 months of fattening.

Consequently, the relationship between AC and the SF will be formal and highly structured. A contract will be signed in which the purchase and sale price of the hogs will be stipulated. It will also include a purchase guarantee for the SF of the fattened hogs. On the other hand, the SF are obligated to carefully follow the technical feed program for their hogs and to sell them to AC once they are fattened.

Later, in the second stage, this relationship will have a more commercial nature as the SF will resort to specialized sources of financing and technical assistance (the development institution). Nevertheless, an informal relationship of mutual benefit will be maintained between AC and the SF whereby the former as the leader in the production of pigs will provide information relevant to bettering the production and fattening of hogs.

In this phase, the same formal relationship will be maintained between the SF and AC with regard to the purchase and sale of the hogs. The difference is that the institution will be responsible for providing the technical assistance and the financial administration of the Project. The institution will also have the responsibility of fixing the prices of the hogs, of the feed, of the veterinarian products and of the other supplies.

2.5. Financial Requirements

2.5.1. Investment Capital Requirements

The actual installations of AC are not sufficient for a production

of 6,000 hogs per year for the SF which is the objective of the Project for the second year. Consequently, all of the areas which would be indispensable for the expansion have been carefully studied at Villa Tunari, Chapare and at Pairumani which will serve as the fattening center for AC's own hogs. The requirements for the resulting capital investment are shown in Table 3 and are described below:

a) Construction

The construction program is divided into two years. In Year 0 or during the experimental year, the evaluation of the Project will take place by the end of the year and the expansion of AC can also begin. In Year 1, also towards the end, construction could commence at the Pairumani Farm to fatten the hogs.

The construction needed is relatively simple to build and would be modular. Therefore, it can be done with the necessary celerity. (See Table 25 Schedule of Activities of the Project and Table 23 Schedule of Hog Production)

1) Agropecuaria Copacabana

AC will produce all of the pigs to be fattened, 13,000 the first year and 20,000 beginning the second year. Taking into account the actual average results of AC, the surface requirements, the average litter, the number of weaner piglets, the cost of feed etc., 1,430 brood sows and 50 males (boars) are needed. To avoid inbreeding and to improve the bloodline 200 females for brood sows and 20 quality males of the three different breeds existing at AC should be imported from the USA.

To shelter these brood sows and their offspring until weaning, the following buildings are needed which also take into account the existing buildings for 140 brood sows and 2,000 hogs being fattened per year:

i) Hog Houses

Four hog houses are needed of 99 meters long by 9 meters wide to cover the necessities of hog production. The 1,290 new brood sows with 80% prepotency need a minimum of 258 pens of the Foester type (one pen for every four brood sows). Each pen will be $9m^2$ ($3m \times 3m$) for the brood sow and her litter. Therefore, each house will have 65 pens of $9m^2$ each built in two rows with a 3 meter wide corridor in the center and a storage room of $9m^2$ at one end.

The total number of pens will be 260 (65×4) in four hog houses of $891m^2$ each. (See Design 2 Hog Houses)

All of the hog houses will have a corridor 3 meters wide in the center for the distribution of feed and for cleaning by means of a small truck (for example, a Ford 350).

ii) Farrowing Pens (cages)

Two houses of 41.36 meters long by 9 meters wide are needed to cover the farrowing needs of the 1,200 brood sows. The sows with 80% prepotency need a minimum of 86 pens or a pen for every 12 brood sows.

Each pen is 5.64m^2 ($3 \times 1.88\text{m}$). Therefore, each house will have 44 pens in two rows with a corridor 3 meters wide dividing them.

Consequently, the total number of pens will be 88 (44×2) in two houses of 372.24m^2 each.

iii) Gestation Houses

Four houses, 62.79 meters long by 9 meters wide are needed to cover the needs of the pregnant sows. The 1,290 brood sows need a minimum of 104 sections or one section per 12.4 sows.

Each partition or section is 14.5m^2 ($3\text{m} \times 4.83\text{m}$). Therefore, each house will have 26 partitions of 14.5m^2 in two lines with a corridor 3 meters wide in the center.

Additionally, each section will have access to a yard of pasture so that the females in the first 12 weeks of pregnancy may eat grass ad-libitum, walk around and get enough sunshine. Each of these open yards is 10m^2 ($2.07\text{m} \times 4.83\text{m}$).

The total number of gestation pens will be 104 (26×4) in four houses with 565.11m^2 of covered space and 259.95m^2 of uncovered area.

Construction Costs

The construction cost for the open houses, taking into account the laying of pipes and the electrical installation is estimated at \$b 10,000.-/ m^2 .

The construction cost of the pasture yards is calculated at half or \$b 5,000.- the square meter.

In addition to these fixed investments which are required for the program of breeding pigs, AC will contribute the existing infrastructure. This infrastructure consists of buildings (sheds), warehouses, laboratory, houses, electrical and sanitary installations etc. (See Appendix VIII for further detail) The actual value of the existing infrastructure, without taking into account the land is \$b 189.4 million. This infrastructure is considered to be the capital investment of AC in the Project.

iv) Total Construction AC

The total cost of the new construction of AC is \$b 70.9 million. The existing construction is valued at \$b 189.4 million making a total of \$b 260.3 million.

2) Pairumani Farm

The Pairumani Farm (PF) will fatten part of the hogs produced by AC. In Year 1, 10,000 hogs will be fattened and beginning in Year 2, 16,000 hogs per year.

The construction program for the hog houses for fattening will be gradual and dependent upon the hog production program of AC. The construction is simple and therefore, can be rapidly done when necessary (See Tables 23 and 25 and Design 2).

1) Hog Fattening Houses

Two houses of 90 meters long by 9 meters wide are needed to cover the need for fattening 14,000 hogs per year.

Each section will be for 10 hogs with a surface of $9m^2$ (3m x 3m). Each house will have 60 sections in two rows with a corridor 3 meters wide in the center.

The total number of sections for fattening will therefore be 480 (60 x 8) in 8 houses of $810m^2$ each.

The fattening capacity will be of 4,800 hogs every four months or 14,400 per year.

As with the houses of AC, the houses of PF will also have a 3 meter wide corridor at the center which will allow for feed distribution and cleaning by a small truck (type Ford 350).

Construction Costs

The cost of construction is estimated at \$b 10,000.- per square meter.

ii) Dung Containers

Two dung containers should be built with a capacity for 10,368 tons of fertilizer per year. This quantity was arrived at by multiplying the total number of hogs (14,400) by 2 kilos of dung per day by 360 days per year.

The estimated cost of each dung container is \$b 500,000.- or \$b 1,000,000.- in total.

iii) Warehouses

Two storage buildings should be built of $50m^2$ each; one to store feed and the other for supplies.

The estimated cost is \$b 10,000.- per square meter of \$b 1,000,000.- in total.

iv) Total Construction PF

The total construction cost for PF in accordance with the above mentioned program is \$b 66.8 million.

3) Total Construction

The total cost of the new buildings for AC and PF is \$b 137.7 million. The total value of all construction including the existing infrastructure of AC is \$b 327.1 million.

b) Machinery and Equipment

The required machinery and equipment for AC as well as for PF is shown in detail with the respective prices in Table 3.

1) Agropecuaria Copacabana

A dung trailer is needed to move the dung so that it can be more easily used as organic fertilizer.

A water pressure system is needed for the cleaning of the yards.

A small 2.5 ton truck (type Ford 350) is needed to deliver the pigs and the feed to the SF and for the supervisory use of the veterinarian.

Two 10 ton trucks are needed to purchase the raw materials used in the preparation of the balanced feed. These raw materials are principally: sorghum, bran meal, cottonseed meal, soy meal, corn etc. which are bought in Santa Cruz. These trucks will also be used for the transport of the balanced feed from Cochabamba to the Chapare for the SF and for AC's own breeding center. Finally, they will be used for the transport of the fattened hogs of the SF to FNCD in Cochabamba.

For better control and to insure permanent communication, especially in an emergency, three radio transmitters are required; one for Cochabamba, one for AC (Chapare) and one for the small truck which will be used by the veterinarian.

Another truck is also needed (4 x 4) for used by AC's management and technicians.

Finally, two separators of dung are needed to optimize the use of the dung. These two separators are adaptable to a leaf production system. The total cost of this equipment and machinery is \$b 46.7 million. Additionally, AC will contribute a Shibaura tractor of 25 HP, a sower, a plow, a fumigator and a weeder for a total value of \$9 million. The total value of machinery and equipment for AC will be \$b 55.7 million.

2) Pairumani Farm

A water pressure system is needed for cleaning the yards.

A small truck (type Ford 350) is needed for the transport of supplies and for the management of PF.

c) Swine Livestock

As explained previously in Chapter a) 1) Construction, it is necessary to import 200 females for brood sows and 20 quality males to better the bloodline of the actual herd of AC.

To reach a production figure of 13,000 hogs the first year, AC should add 730 females and 13 boars. In the second year an additional contribution of 500 females and 17 boars should be made.

The estimated cost of this additional livestock is \$b 47.5 million.

d) Installations

The additional installations needed are:

1) Pens

88 pens are needed for the brood sows of which AC will contribute 36.

2) Doors for the Yards

Hog Houses	260
Farrowing Houses	104
Fattening Houses	<u>480</u>
Total	844

3) Nipple Valves

Hog Houses	260 x 2	520
Farrowing Houses	140 x 1	104
Fattening Houses	480 x 3	<u>1,440</u>
Total		2,064

4) Troughs

A trough is needed for each pen which means 88 troughs are needed in total. AC will provide the 88 troughs.

5) Total Installations

The total cost for these installations is estimated at \$b 22.4 million of which AC will contribute \$b1.4 million. The purchase of the total of these installations has been planned for Year 0 although some would be for PF.

e) Total Investment

The total investment is estimated at \$b 461 million of which AC will contribute \$b 238 million. In the first year (Year 0) only \$b 370.1 million will be required.

Of the total new capital investment for the first year (\$b 370.1 million), financing for only \$b147.8 million (40%) is needed. This financing is only needed to expand AC's productive capacity of pigs in the Chapare (See Table 6). In this way AC will be able to meet the total requirement of pigs by the SF for the first two years and afterwards their partial requirement. The second year does not require financing.

2.5.2. Working Capital Requirements

The working capital needs have been determined based on the gestation period, weaning period and fattening period of the hogs. These requirements have been divided into variable and fixed costs which are shown in detail in Tables 4 and 5 and in Chapter 2.6.2. Cost Determination.

The working capital needs are summed up as follows:

(\$b millions)	<u>Year 1</u>	<u>Year 2</u>
a) Variable Costs	150.2	218.8
b) Fixed Costs	<u>48.6</u>	<u>60.4</u>
c) Total	198.8	279.2

Of the total required working capital financing is only needed for the first year and only for \$b 143.4 million. The rest will be provided by AC and by the Project itself. (See Table 6)

In addition to the working capital needs of AC, financing is also required to keep the fattening program of the SF solvent during the experimental stage.

This program consists in financing for the SF their costs of the balanced feed, the technical assistance, the veterinarian products and the transportation costs incurred during the four months of the fattening period.

These costs are estimated to be \$b 91,700.- per module of 10 pigs excluding the interest charges for four months. (See Chapter 4.3.9. Financial Analysis)

AC will therefore require a loan of approximately \$b 917,000.- for the first 10 modules and \$b 2,751,000.- for the second 30 modules. These loans will be repaid in their totality, capital plus interest, every four months when each fattening cycle is completed. Therefore, the source of repayment is the SF. Consequently, this loan is not considered part of the financial analysis of AC. (See Table 31 SF. Working Capital Requirements)

2.6. Financial Analysis

2.6.1. Income Determination

The hogs are sold directly to Fabrica Nacional de Conservas Dillmann for \$b 24,700.- each, with an average weight of 95 kilos and a price of \$b 260.- per kilo. A sales volume of 10,000 hogs the first year and 14,000 hogs beginning the second year has been estimated.

The pigs are sold directly to the SF for \$b 6,240.- each with an average weight of 15 kilos. A sales volume of 3,000 pigs the first year and 6,000 from the beginning of the second year has been estimated. Therefore, the income from sales would be \$b 265,720,000.- the first year and \$b 383,240,000.- beginning the second year. (See Table 8)

2.6.2. Cost Determination

Operating costs have been divided into variable and fixed and refer exclusively to the operations of AC. The operations relating to the SF are self-financed and are not taken into account in this analysis.

a) Variable Costs

The detail of the variable costs is shown in Table 4. An explanation is presented below of these costs from the beginning of the second year or at full production capacity.

1) Feed

The cost of feed from the second year on, is estimated at \$b 188.7 million. The volume of feed needed is 3,909 tons per year. These estimates take into account a mortality rate of 15% for the pigs and 1% for the hogs, which is reduced by half as an average.

2) Animal Sanitation

To determine the cost of animal sanitation, the costs related to the vaccines against foot and mouth (3 times a year) and swine fever (once a year) etc. were taken. The medicines and vitamins given during the fattening process of swine are many, for example, Oxylosin, Oxytetracylin, Colosal, Arosil, Negubon, Negasin, Iosan etc. The cost of animal sanitation has been estimated at \$b 12 million per year.

3) Transportation

The cost of transportation has been determined based on the delivery of the balanced feed for the boars, the brood sows and the pigs from Cochabamba to the Chapare and the transport of the pigs from the Chapare to Cochabamba. It is assumed that the trucks will pay for the return trip by carrying freight. The total cost of this category is estimated at \$b 2.5 million per year (Year 2). (The transportation cost of raw materials like bran meal, corn, sorghum, cottonseed meal, soy meal etc. for the making of the balanced feed is included in the price of the feed.)

4) Basic Labor Force

Labor necessities have been estimated in the following manner:

Item	No.	Monthly Salary ea.	No. of Salaries	Total (\$b)
Chapare Workers	8	12,400.-	15	1,488,000.-
Pairumani Workers	8	12,400.-	15	1,488,000.-
Drivers	4	20,000.-	15	1,200,000.-
Helpers	4	12,400.-	15	744,000.-
Social Benefits 30%				1,476,000.-
Total				6,396,000.-

5) Renting of Silos

The cost has been calculated at \$b 37.- per quintal or \$b 0.80 / kg with a permanence of a month which signifies \$b 0.80 / kg x 3,909 ton = \$b 3.1 million per year.

6) Various

1) Insurance

An average of two months stock of its annual value has been estimated for feed and for the swine livestock its annual value according to actual rates.

<u>Insured Item</u>	<u>Amount \$b</u>	<u>Rate</u>	<u>Annual Cost</u>
Feed	188,076,000/6	0.004	125,000
Swine Livestock	47,535,000	0.030	<u>1,426,000</u>
Total			1,551,000

ii) Electricity

The electrical cost is composed of the combustibles used in the motors owned by AC. Approximately 60 liters of gasoline are used per day and 48 liters of oil per year to maintain the motors in operation 12 hours a day. In this way the annual cost would be \$b 564,300.-.

iii) Others

A monthly estimate of \$b 500,000.- or \$b 6,000,000.- per year has been calculated.

iv) Total

The total cost of the various items is therefore \$b 8,115,300.-.

b) Fixed Costs

The detail of the fixed costs is shown in Table 5. An explanation of these costs from the beginning of the second year or full production capacity is outlined below:

1) Administrative Expenses

The administrative expenses have been estimated as follows:

<u>Item</u>	<u>No.</u>	<u>Monthly Salary ea.</u>	<u>No. of Salaries</u>	<u>Total (\$b)</u>
General Manager (part time)	1	35,000.-	15	525,000.-
Administrators	2	60,000.-	15	1,800,000.-
Veterinarians	2	50,000.-	15	1,500,000.-
Specialist	1	33,333.-	12	400,000.-
Social Benefits (except for swine specialist)				1,148,000.-
Total				<u>5,372,000.-</u>

2) Maintenance

Maintenance has been calculated at 1.5% of the value of the new and existing buildings and installations whose total value is the sum of \$b 349 million. Likewise, the value of the machinery and equipment has been determined at 3% which reaches a value of \$b 24 million excluding the four trucks. The total cost of maintenance will be \$b 6 million per year.

3) Depreciation

In accordance with legal dispositions the following depreciation rates are used to calculate the depreciation of the assets of the company:

<u>Asset</u>	<u>% Dep.</u>	<u>Value to be Depreciated (\$b)</u>	<u>Cost of Annual Depreciation</u>
Buildings and Installations	10	349,483,000	34,948,300
Machinery and Equipment	20	64,000,000	<u>12,800,000</u>
Total			47,748,300

4) Insurance

Insurance on the buildings and installations and on the machinery and equipment is estimated as follows:

<u>Insured Item</u>	<u>Amount (\$b)</u>	<u>Rate</u>	<u>Yearly Cost</u>
Buildings and Installations	349,483,000	0.004	1,397,932
Machinery and Equipment	64,000,000	0.020	<u>1,280,000</u>
Total			2,677,932

c) Financial Costs

The structure of the loans is shown in Table 6. The repayment schedule of the loans with the following terms is shown in Table 7.:

1) Investment Capital

Total amount required	\$b 370,127,000.-
Amount to be financed	\$b 147,821,000.-
Interest Rate: Banco Central de Bolivia	38% p.a.
Interest Rate: Participating Financial Institution	48% p.a.
Tenor: B.C.B.	6 years (2 years grace)
Tenor: P.F.I.	6 years (2 years grace)
Participation: B.C.B.	80%
Participation: P.F.I.	20%

2) Working Capital

Total amount required	\$b 159,370,000.-
Amount to be financed	\$b 143,433,000.-
Interest Rate: B.C.B.	38% p.a.
Interest Rate: P.F.I.	48% p.a.
Tenor: B.C.B.	2 years (1 year grace)
Tenor: P.F.I.	2 years (1 year grace)
Participation: B.C.B.	80%
Participation: P.F.I.	20%

2.7. Financial Projections

2.7.1. Income Statement

The income statement shows a loss of \$b 49.6 million for the first year. The subsequent years, however, show a positive situation reaching a profit of \$b 100.4 million in Year 6. (See Table 8)

2.7.2. Cash Flow

The cash flow shows a liquidity of \$b 2.4 million in the first year which is not sufficient to cover the deficit of the second year when repayment begins on the capital investment loan. For this reason, the owners must contribute \$b 11.3 million. The Years 4 to 6 show an important level of liquidity reaching \$b 376.3 million of accumulation in Year 6. (See Table 9)

2.8. Profitability Analysis

2.8.1. Net Present Value

The Net Present Value (NPV) has been calculated to the rate of the cost of the capital which is 34% per year. This rate was used because it is the savings account rate offered by the banks. (See Table 10)

To calculate the NPV the cash flow without the additional capital contribution and the capital increase itself are taken independently. The NPV, therefore, is the difference between the two.

The Net Present Value at 34% is \$b 16.8 million.

As can be seen, the NPV is a very positive amount.

2.8.2. Internal Rate of Return

The Internal Rate of Return (IRR) has been calculated at 41%, a reasonable rate of return. To calculate the IRR the cash flow without the capital increase and the same capital contribution were present valued until reaching a value (%) of discount which equaled the two amounts.

2.8.3. Cost Benefit

The cost benefit has been calculated at 34% per year as the cost of the capital. The present value at 34% of the cash flow without the capital increase was taken as a benefit and the present value of the owner's capital contribution also at 34% per year was taken as a cost.

The Cost Benefit at 34% is 1.32.

These ratios reflect positive values.

2.9. Sensitivity Analysis

A sensitivity analysis was done with respect to the sales price of the animals, both for the pigs sold to the SF as well as the fattened hogs sold to FNCD and with respect to the costs of production and operation (including the costs of the investment).

2.9.1. Price Increase of 10%

The price per kilo of live pork was increased from \$b 260.- to

\$b 286.- thereby increasing the price for the pigs from \$b 6,240.- to \$b 6,864.- and the price for the fattened hogs from \$b 24,700.- to \$b 27,170.-. All of the other factors remain constant. The result of this increase is summarized as follows:

10% INCREASE IN THE PRICE OF PORK INCREASES PROFITABILITY (IRR) FOR AC BY 45 PERCENTAGE POINTS FROM 41% TO 86%. (SEE TABLES 10 AND 26)

2.9.2. Cost Increase of 10%

All of the variable and fixed costs, the investments and the owner's capital contribution were increased by 10% (the original price per kilo of pork remains unchanged). The result of this increase is summarized as follows:

10% INCREASE IN COSTS (EXCEPT FOR INTEREST RATES) DECREASES THE PROFITABILITY (IRR) FOR AC BY 31 PERCENTAGE POINTS FROM 41% TO 10%. (SEE TABLES 10 AND 27).

2.9.3. Conclusion

It can be concluded that the Project is sensitive to changes in prices and costs and that the reaction is greater to the price change than to the cost change. An increase of 10% in both prices and costs benefits AC by approximately 14 percentage points.

This sensitivity analysis has a relative validity as it is valid for a very short period of time given the inflationary situation in Bolivia. For this reason, all of the projections made in the Study are based on a static model, that is to say, without increases in prices and costs. The basic premise is that the increases in price and cost will compensate one another.

3. ANALYSIS OF THE FABRICA NACIONAL DE CONSERVAS DILLMANN (FNCD)

3.1. Background

The Fabrica Nacional de Conservas Dillmann was founded in 1923 by Mr. Ricardo Dillmann.

It started its activities as a sausage and processed meat factory and then moved on after experimenting successfully to the canning of meats, fruits and vegetables.

An industrial complex in Pinami, Cochabamba was recently built because of the success of the company. This complex is totally finished, in full production and it utilizes the newest technology.

FNCD can be considered one of the best industrial plants in Bolivia. Its financial, administrative and technical capacity enables it to meet local market demand and to expand production with export markets in mind.

3.1.1. Legal Aspects

The Fabrica Nacional de Conservas Dillmann is a limited liability company which was restructured on September 12, 1958. It has a paid in capital of \$b 53,571,650.-. The revaluation of assets has increased the net worth of the company to \$b 614,804,139.-. (Source: FNCD September, 1982 - See Appendix V)

The shareholders of the company are the following persons:

Esther Fierro vda. de Pena	450 shares
Raul Pena Clavijo	90 shares
Clara Pena Rodriguez	120 shares
Roberto Pena Rodriguez	120 shares
Hugo Pena Rodriguez	120 shares
Total	900 shares

3.1.2. Infrastructure and Equipment Investment

As of September 30, 1982 FNCD showed the following values in its balance sheet:

<u>Account</u>	<u>Net Revalued Balance (\$b)</u>
Land	47,140,012.-
Buildings	564,354,504.-
Machinery and Equipment	88,214,062.-
Vehicles	3,605,214.-
Assets in Transit	313,210,648.-
Total	1,016,524,440.-

3.1.3. Cost of Production for Goods Containing Pork

FNCD produces basically two types of products containing pork. The first is cold meats and sausages and the second is canned meats.

A detailed analysis of the production of canned meat containing

pork would be too complicated for the purposes of this Study. Even more so considering that the volume of pork that actually goes into the canned meat has diminished over the past years. (See Chapter 3.1.4.)

For this reason the analysis of the Project only takes into account the production of cold meats and sausages.

The actual production costs are summarized as follows:

a) Raw Material

For the production of cold meats and sausages, the following raw materials are needed:

Pork without bones	48.54%
Beef without bones	37.01%
Other raw materials	<u>14.45%</u>
Total	100.00%

The estimated results, that is to say, the relationship between the weight of pure meat without bones and the live weight of the hog is the following:

Hogs	63.75%
Cattle	50.00%

Therefore, for the processing of each hog, 0.29 of beef is needed. The cow should be approximately 300 kilos in weight.

Hogs	90 kg x 63.75% = 57.375 kg = 48.54%
Hogs / Cattle	(57.375 kg x 37.01%) / (48.54% x 50% x 300 kg) = 0.29%

The estimated costs of production for the processing of each hog in the making of cold meats and sausages are the following:

1 hog (90 kg x \$b 260.- / kg)	\$b 23,400.-
0.29 beef (300 kg x \$b 160.- / kg)	\$b 13,920.-
Other ingredients (Approx. 52% of the cost of the hog)	<u>\$b 12,174.-</u>
Total Raw Materials	\$b 49,494.-

b) Conversion Cost

The conversion cost for the processing of each hog is estimated at \$b 3,310.-.

c) Total Production Cost

The total cost of production for the processing of each hog of 90 kg in the making of cold meats and sausages is the following:

Raw Materials	\$b 49,694.-
Conversion Cost	<u>\$b 3,310.-</u>
Total	\$b 53,004.-

3.1.4. Production Statistics

The production statistics of FNCD for the meat plant are shown below. One may observe that the largest emphasis was placed on the fresh products because of their greater rotation and the introduction of new more economical lines. The canned products because of their high cost (especially due to the cost of the tin plate which is totally imported) have declined significantly. FNCD is making efforts to change their packaging to less expensive materials such as plastic, cellophane etc.

Production Statistics - FNCD							(000 s)	
	Kg	1980	Kg	1981	Kg	1982(est.)	1983(proj.)	
	—	Unit	—	Unit	—	Unit	Unit	
Fresh Products	366		382		416			
Canned Products	282	562	123	247	55	194		
Hogs (animals)*	495	5,500	385	4,280	360	4,000	20,800	
Cattle (animals)**	480	1,600	372	1,240	348	1,160	6,000	

*For the calculation of the number of hogs and live kilos of pork needed, a conversion rate of 1 live kilo of pork for each 1.31 kilos of fresh product (cold meats and sausages) and canned meats is used. The average weight of the hogs is 90 kg.

**For the calculation of the number of cows and live kilos of beef needed, the conversion rate of 0.29 cows for each hog is used. The average weight of the cows is 300 kilos.

3.1.5. Sources of Raw Material

FNCD supplies itself with raw materials from the local market although the supply is not sufficient to optimize the installed capacity of the factory. Their traditional suppliers of hogs are:

<u>Supplier</u>	<u>Place where Slaughtered</u>
Luis Sandoval	Monteagudo
Florencio Sanchez	Monteagudo
Marina de Vargas	Monteagudo
Felix Gamboa	Cochabamba
Angel Mercado	Cochabamba
Felix Mercado	Cochabamba
Alfredo Salazar	Chapare
Proyecto Fomento a la Ganaderia Porcina	Monteagudo
Marciano Sanchez	Monteagudo
Agapito Vargas	Monteagudo
Gaston Herboso	Monteagudo
Edgar Claros	Monteagudo
Juan Llanos	Punata
Mario Galindo	Punata
Carmela Torrico	Cochabamba

3.1.6. Installed Production Facilities

FNCD possesses a complete and modern factory for the processing of

meats, both beef and pork. The capacity of the plant in all of its areas is:

Maximum Capacity:

Hogs: 12 per hour or 89,856 per year*
Cattle: 4 per hour or 29,952 per year

Actual Capacity: (70%)

Hogs: 8.4 per hour or 62,899 per year*
Cattle: 2.8 per hour or 20,966 per year

* 24 hours per day x 26 days / month x 12 months

3.1.7. Process of Meat Production Beginning with the Hog

In this chapter the process by which meat products are elaborated beginning with the hog will be described.

a) Purchase of Animals

1) Live Purchases

The hogs which meet the weight requirements (not less than 80 kg) and other sanitary conditions are purchased live. The animals are then put into yards to relax.

2) Purchase of Slaughtered Animals

This procedure consists of acquiring hogs killed away from the factory, usually from slaughterhouses. The weight as well as the price per kilo are determined in function of preestablished profit guide lines. After a sanitary evaluation is made, the meat is cleaned before putting it in a cold storage room.

b) Hog Slaughter

The hogs which were resting in the yards are selected for quality and then guided down a corridor equipped with showers where they are cleaned. Continuing on, they enter the slaughterhouse where they are stunned by means of an electric shock. Once stunned they are transported by means of a system of rails to where they are killed and bled. The blood is later used to make blood sausage or blood meal.

The animal then passes through a scalding process where it is submerged in a tub of hot water to wet the skin, permitting quicker peeling. The hog then goes to the peeling machine where 90% of the skin is removed. The skin may be used for the manufacture of brushes or for feed concentrates. The rest of the skin is taken off manually with a knife. Once deskinning, the animal is quartered and the internal organs, intestines, lungs, heart, spleen, liver etc. are removed. The resulting carcass is cleaned and cut up. In this step the head, ears, hoofs and tails are separated out. The carcass is then divided into two parts which are weighed and stored in a refrigerated room for approximately 15 hours. This meat is now ready to be processed.

c) Deboning and Selection

The carcasses are brought from the refrigerated room to the

deboning tables where the meat is separated from the bones. The bones are ground down to be used for balanced feed and the meat goes to the lean meat tables. At these tables, the meat is separated and put into trays of standard weight. The meat is then cured by a dry process or by immersion and chilling. After the meat is chilled in the refrigerated chamber, it is ready to be used as a raw material in the process of making sausages and cold meats.

d) Processing of the Meat until the Finished Product

The meat products can be divided into scalded, cooked, raw, cured and cold cuts.

1) Scalded Sausages

The process begins with the grinding of the meat selected for this purpose. The meat then goes to a machine called "Cutter" where it is cut and emulsified with other ingredients such as bacon, water and spices. This emulsified mass passes to a sausage making machine where various sizes and lengths of sausages are made. The sausages are then sent to a heated smoked room where they acquire the desired aroma and color. Afterwards these sausages are put in a pot with a false bottom where they are cooked and then chilled in water. Finally, the sausages are weighed, the quality is checked and they are stored as a finished product.

2) Cooked Sausages

The process begins with the cooking of the meat along with special bones. Then the fat is removed manually at a table for this purpose. From there it passes to the grinder to obtain the desired consistency. The meat is then taken to the mixer where it is blended with spices and other ingredients according to each type of desired finished product. The mass passes to the sausage making machine where it is encased in different size sausages. These sausages are then cooked in false bottom pots and later cooled in water. The sausages are then weighed, the quality is checked and they are sent to the finished product storehouse.

3) Uncooked Sausages

The process begins with the selection of meat which is then ground in the meat grinder. It then passes to a mixer where it is blended with spices and other ingredients in accordance with each type of finished product. From there the mass goes to the sausage making machine where it is encased in sausages of different sizes. These sausages are weighed, checked for quality and sent to the finished product storehouse.

4) Smoked Sausages

The process also begins with the selection of the type of cured meat which is then ground in the meat grinder to obtain the desired size in accordance with the type of finished product being made. Then the meat is taken to the mixer where spices are added and the mass is homogenized. This mass then goes to the sausage making machine where it is encased in sausages of various sizes. These sausages are then sent to a cold smoked chamber and later to a drying room. Then they are weighed, checked for quality and sent to the storehouse of finished products.

5) Cold Cuts

These are selected cured meats prepared without casings to enhance their preservation.

i) Cooked Cold Meats

The process begins with the selection of meat for these products and continues with the preparation of the meat. Once prepared, it is transported to the injector where brine is injected. From there it goes to a massage machine where the muscular fibers are broken down. In the case of ham the meat is placed in a mold, cooked, weighed, quality controlled and sent to the storehouse for finished goods. In the case of encased ham, the meat is put into a synthetic sheath.

ii) Smoked Bacon

In the case of smoked bacon, the meat is prepared and then passed to a vat containing brine to complete the curing process by immersion. Afterwards the bacon is quality controlled, weighed and sent to the storehouse for finished goods.

3.1.8. Financial Aspects

The expansion of the installations in Pinami required an investment of approximately US\$3.5 million which was financed by several national banks, shareholder capital increases and by the repeated reinvestment of dividends.

The expansion was affected by substantial increases in costs as a result of inflationary factors which were adversely affecting the economy of the country. This caused a high degree of illiquidity as working capital had to be used for the construction of the Pinami complex.

The company, however, is in acceptable financial condition and there are strong possibilities of increasing its sales nationally as well as in the export market.

The preliminary financial statements of FNCD as of September 30, 1982 can be found in Appendixes V and VI. The results as of December 31, 1982 are still not audited so they have not been taken into consideration in this Study.

3.1.9. Administrative Aspects

As illustrated by the Organizational Chart shown in Table 11, FNCD has at their disposal an adequate administrative structure which allows it to efficiently confront the marketing, financial, productive, planning and administrative functions of the business.

Major policy decisions are taken by the shareholders in Extraordinary Meetings. The Ordinary Shareholders Meetings are called annually on a regular basis to deal with items relating to the approval of the financial statements, the distribution of profits, the designation of committees and other matters relating to the normal activity of the company.

The Executive Committee is charged with analyzing administrative matters and it meets once a month or when necessary. The attributions of this Committee are specified by the by-laws of the company.

The General Manager is responsible for the executive decisions of the company and he controls and administers its operations through each one of his Area Managers.

3.2. The Role of the Fabrica Nacional de Conservas Dillmann

The role which FNCD plays in the Project of Breeding and Fattening of Hogs in the Chapare will be fundamentally commercial in nature. It will have the function of buying the hog production of Agropecuaria Copacabana and of the small farmers of the Chapare, paying the market price in cash and at the moment of delivery of the animals. This way a constant dynamic process will be obtained whereby the suppliers of hogs can count on a permanent liquidity.

3.2.1. Market

The market for FNCD's pork products (cold meats, sausages and canned meats) is divided into the national market and the foreign (export) market. Actually, FNCD has ample national coverage. Their sales volume, however, is concentrated in the city of Cochabamba. Outside of the country FNCD has very good possibilities for exporting meat, fresh and canned to Peru as well as to the north of Chile. In Peru a distributor has already been contracted who will begin this year to actively sell FNCD's products. With respect to the national market, the unsatisfied demand for hogs in the City of Cochabamba is estimated as sufficient to absorb the supply generated by the Project (according to a Marketing Study prepared by Coopers & Lybrand especially for FNCD. See Appendix XII).

In any case, the Project contemplates a strong promotional and publicity campaign. As a result FNCD will invest 12% of the value of their sales in promotion and publicity and 5% of the sales value in additional administrative expenses. (See Chapter 3.3.2. Working Capital Requirements)

3.2.2. Means of Supply

Agropecuaria Copacabana will deliver the hogs to FNCD in an amount of 20,000 per year under a written contract guaranteeing this supply. This quantity of hogs will include the 14,000 hogs of AC and the 6,000 hogs of the SF. The hogs will be delivered by AC to the plant in Pinami where they will be weighed and payment made.

3.2.3. Relationship with the Small Farmer

In the present Study there is no direct relationship between the SF and FNCD as the SF at first will deal principally with AC and in the second stage with the development institution.

3.3. Financial Analysis

3.3.1. Investment Capital Requirements

FNCD will not require any investment capital because it already has

the necessary infrastructure to carry out its function in the Project.

3.3.2. Working Capital Requirements

The monthly requirements of working capital for FNCD are shown in Tables 12 and 14. Below is the yearly summary:

<u>Working Capital Requirements</u>		
	(\$b)	
	<u>1984</u>	<u>1985</u>
a) Purchases		
Hogs (animals)	13,000	20,000
Value (average weight 90 kg per hog at \$b 260/kg)	304,200	468,000
Cattle and others	<u>339,240</u>	<u>521,880</u>
Total Purchases	643,440	989,880
b) Conversion Cost (26 days / month x 12 months)	43,032	66,203
c) Administrative Cost 5% of sales	54,334	83,591
d) Marketing Cost 12% of sales	119,535	194,767
e) Total Working Capital	860,341	1,334,441

Of the total working capital needs, financing is only required for \$b 171,613,000.-. (See Chapter 3.3.3. Financing and Table 13.)

3.3.3. Financing

To determine the financing requirements, monthly cash flows have been prepared for the first two years (See Table 14). Financing is only needed the first year according to the following detail:

a) Investment Capital	
Not required	
b) Working Capital	
See Tables 12 and 13	
Total Amount	\$b 191,536,000.-
Amount to be Financed	\$b 171,613,000.-
Interest Rate - Banco Central de Bolivia	38% p.a.
Interest Rate - Participating Financial Institution	48% p.a.
Average Interest Rate	40% p.a.
Tenor - B.C.B.	6 months
Tenor - P.F.I.	6 months
Participation: B.C.B.	80%
Participation: P.F.I.	20%
c) Investment Program	
January 1984	

Shareholders contribution	\$b 4,528,000.-
Financing	\$b 57,204,000.-
February 1984	
Shareholders contribution	\$b 15,395,000.-
Financing	\$b 57,204,000.-
July 1984	
Financing	\$b 57,204,000.-
d) Repayment Schedule	
June 1984	
Capital	\$b 57,204,000.-
Interest	\$b 11,441,000.-
July 1984	
Capital	\$b 57,204,000.-
Interest	\$b 11,441,000.-
December 1984	
Capital	\$b 57,204,000.-
Interest	\$b 11,441,000.-

3.3.4. Financial Projections and Profitability Ratios

The financial projections have been made only for the Project and combined to see the effect of the same in the operations of FNCD.

a) Hog Project

The projection of the income statement and of the cash flow for the years 1984-86 are shown in Table 15.

1) Income Statement

The financial results of the Project are extremely positive for FNCD (See Table 15). The first year already shows a profit of \$b 210 million before taxes and of \$b 147 million after taxes increasing to \$b 221 million after taxes in the year 1986.

2) Cash Flow

With respect to the cash flow the result presented for the first year is a liquidity of \$b 30.8 million which increases to \$b 230 million in the year 1986. (See Table 15)

3) Profitability Ratios

As to be expected, the profitability ratios are very favorable. (See Table 15)

The net present value at 34% is \$b 182 million. The owner capital contribution of \$b 19.9 million is considered as an expense and the present value of the cash flows without the capital increase as income.

The internal rate of return of the Project is 274%.

The Cost Benefit at 34% is 10.15 times. The present value of the

cash flows without the owner capital increase is taken as a benefit and the owner capital increase is taken as a cost.

b) Combined Hog Project plus Current Operations

1) Cash Flow

The combined projected cash flow is shown in Table 16. For the projection of the current operations of FNCD, the projections done by FNCD on November 30, 1982 were used as the base.

The results of the combined cash flow are relatively similar to those obtained by the Project alone. This is due to the fact that the projected cash flow by FNCD does not show major shareholder capital contributions nor major cash surpluses. Consequently, the Project because of its dimension relies preponderately on results.

The combined result is a positive cash flow of \$b 44 million the first year which increases to \$b 252 million in the year 1986.

2) Profitability Ratios

See Table 16.

The NPV at 34% is	\$b 183 million
The IRR is	273%
The Cost Benefit at 34% is	7.67 times

These results make it necessary to analyze more profoundly the loans programed by FNCD for the years 1985 and 1986 and other items such as the sale of assets, shareholder capital contributions etc.

On the other hand, it should be remembered that the high rate of return of the combined Project is because the large investments and capital increases made by FNCD up to 1983 were not taken into account.

This analysis, however, goes beyond the objectives of the present Study. It is enough to repeat that the Project will be of great benefit to FNCD as they will be able to duplicate the production of their meat processing plant from 30% to 60% of capacity without the necessity of any fixed investment and which will be highly profitable.

3.4. Sensitivity Analysis

A sensitivity analysis has been made with respect to the sale price of the cold meats and sausages and with respect to the production and operating costs. This analysis was done only with the Hog Project and not with the Combined Project.

3.4.1. Price Increase of 10%

The sales prices were increased by 10% (all of the other factors remain constant) from \$b 709.- per kilo of cold meat and sausages to \$b 780.-. The result of the increase is summarized as follows:

10% INCREASE IN PRICES INCREASES THE PROFITABILITY OF THE PROJECT BY 255 PERCENTAGE POINTS FROM 273% TO 528% (SEE IRR TABLES 15 AND 28)

3.4.2. Cost Increase of 10%

All costs, investments, operations, capital increases etc. were increased by 10% (the original sales price remains constant). The result of this increment is summarized as follows:

10% INCREASE IN ALL COSTS DIMINISHES THE PROFITABILITY OF THE PROJECT BY 233 PERCENTAGE POINTS FROM 273% TO 40% (SEE IRR TABLES 15 AND 29)

3.4.3. Conclusion

It may be concluded that the Project for FNCD is very sensitive to changes in price and costs and that the sensitivity is greater in the prices than in the costs. An increase of 10% in both would benefit FNCD by approximately 22 percentage points. (See also Chapter 2.9.3. Conclusion)

4. ANALYSIS OF HOG FATTENING BY THE SMALL FARMER

4.1. Present Condition of Swine Raising in the Chapare

In spite of the fact that a number of socio-economic studies have been made in the Chapare, not enough emphasis has been placed on the raising and fattening of swine.

According to statistics provided by PRODES (1978) 40% of the farmers are directly employed in the raising of hogs but they do so under rustic conditions in terms of quality of feed and pasture.

According to the same source, there existed in 1981 a swine population of 757 as shown below:

TABLE 17. SWINE POPULATION OF THE CHAPARE

<u>Settlement</u>	<u>Number</u>
Puerto Alegre	108
Mariposas	55
Chimore	75
Valle Ivirza	296
Cooperatives	10
Coloma Independencia	115
Valle del Sajta	98
Total	757

4.2. Survey Taken

A survey was made of 56 farmers who raise hogs to discover certain technical indicators of the profitability of hogs in the Chapare and to get to know the opinion of these farmers regarding the Project. (See Survey Form in Appendix II)

The survey was taken in zones 7,8 and 9 (the divisions are those of Prodes - See Appendixes III and IV: Map and Work Areas of the Chapare) which include the following regions:

- Zone 7: Ibuelo, Lauca, Ene
- Zone 8: Chimore, Mariposas, Melga
- Zone 9: Ivirza, Ivirgarzama, Puerto Villarroel

Of these areas, the most populated is zone 7 where spontaneous colonization took place and the settlements are 50 years old or more. These settlements are grouped together in 24 unions and 3 federations. On the other hand, zone 8 has controlled colonization and the settlements are 15 to 20 years old. These farmers have formed 33 unions and 4 federations.

These regions were chosen for the Hog Project for the following reasons:

a) There is not as much precipitation in this region as in other areas according to the "Tosi" report.

b) Agropecuaria Copacabana is already established in zone 7.

c) Currently, zone 8 is the area with the most activity in livestock. This area has the Heifer Project and the Cattleman's Association of Chimore.

d) Zone 9 is a natural extension of zone 8. It has good drainage areas with easy access to Puerto Villarroel.

e) The three zones 7,8, and 9 have a highway which runs from west to east, that is, from Villa Tunari to Puerto Villarroel.

The survey covered the following sub-zones and communities in its sampling:

- Sub-zone A: Paraiso, Mariposas, Trails I, II, III and IV
- Sub-zone B: Chimore, Victoria, Santa Rosa and Trails A, B, C, D, E and F
- Sub-zone C: Loma Ene, Tacuaral and Trails 2 and 3
- Sub-zone D: Villa Tunari, Agrigento, Dorado, Ibuelo, Rio Vinchuta, Rio Coni and Tropical

The results of the survey are the following:

4.2.1. Landholding

98% of the farmers possess one piece of land or a lot. The majority of the properties were given to them by the Colonization Institute according to the following distribution: 3% of the farms have more than 20 hectares, 86% from 10 to 20 hectares and 11% have less than 10 hectares.

The majority of the farms in question are managed by their owners, that is, no additional labor is employed.

4.2.2. Technical Aspects

At the 56 farms surveyed there were 241 hogs registered which signifies an average of 4.3 hogs per surveyed farm.

The survey determined that 62% of the farmers raise hogs to be fattened, 29% for breeding and 9% did not provide the necessary information.

The animals destined for fattening have different characteristics as can be seen below:

<u>Initial Weight</u>	<u>%</u>	<u>Age</u>	<u>%</u>	<u>Fattening Time</u>	<u>%</u>
To 6 kg	11	3 mos.	21	6 months	16
6 to 15 kg	7	3-6 mos.	9	12 months	32
More than 15 kg	5	6+ mos.	20	12 months	2
(not weighed)	77	(unknown)	50	(unknown)	50

Only 29 % of the farmers know the size of the litters, therefore it can be established that the average litter ranges around 7 piglets.

Likewise, from the small percentage of answers, it can be determined that only 45% live to weaning.

With respect to animal sanitation the following can be concluded from

the results of the sampling and from visual observations:

a) The small farmer places little importance on the health of his hogs. More than 60% of those consulted are ignorant of the diseases that can affect their animals.

b) A small percentage of the SF sporadically vaccinate against swine fever, foot and mouth disease and rabies. There are no facts on the predominant diseases.

c) An excess of internal parasites including triganosis was also noted in the observations. The SF do not treat the animals to rid them of these parasites.

With respect to the type and quality of the hogs of the SF, the survey showed that in general the genetic and physical quality of the hogs of the area is poor. The exceptions are Agropecuaria Copacabana and the area where the Heifer Project (Chimore) has been operating with the introduction of better hogs. The hog most adaptable to the conditions and lack of management of the Chapare is apparently the native hog. This hog is used to prepare "chicharron" but it is not good enough for the production of cold meats and sausages because of the excessive quantity of fat.

4.2.3. Nutritional Aspects

The census showed that yucca is predominant as the basic feed. To the yucca other crops grown on the farm are added. To a smaller degree, pasture, corn and waste products are used.

4.2.4. Commercialization and Markets

The majority of the SF acquire their animals from neighboring farms, 28% purchase them in the city and the remainder find them in other areas such as Potosi and Sucre.

As is logical, almost all of the farms sell their fattened hogs to their neighbors. From this fact it is obvious that the hog production of the SF hardly reaches Cochabamba.

From the prices that the SF said they received for the sale of their hogs, the majority were between \$b 150.- and \$b 170.- per kilo live. The exceptions registered in this category refer to areas of active commercial activity in illicit coca where as much as \$b 600.- per kilo live has been received (May, 1983).

4.2.5. Receptivity towards the Project

82% of the farmers surveyed showed considerable predisposition to join the Project in terms of fattening and marketing hogs. The rest pointed out limitations of space or other deterrents.

4.3. Design of the Module

The beginning of the program has been designed for the establishment of 10 modules for which 10 farmers should be chosen who have expressed interest and who are located in the area of Chimore.

The size of each module will be of 10 pigs apiece. Each pig will be 56 days old and weigh approximately 15 kilos.

The basic infrastructure will be built by the small farmer using materials of the area. For demonstration purposes, Agropecuaria Copacabana will construct a module where a training course for interested farmers will be given. This demonstration will be given by Dr. Magrobejo (veterinarian) and by Mr. Marcelo Tonaggoli (AC) both of whom are known and respected in the area.

In the modular program, it is taken for granted that the farmer will be able to acquire the pigs with his own money and at market prices.

As a fundamental requirement, the farmer who participates in the module program must possess 1/8 of an hectare sowed with yucca and kudzu in addition to having a minimum infrastructure.

In the third month all of the hogs will be deparasited and vaccinated against foot and mouth disease. The costs of this treatment will be absorbed by the farmer. The program will last a total of 4 months.

4.3.1. Pig Production

Agropecuaria Copacabana will provide 3,000 pigs the first year for the SF and starting from the second year 6,000 pigs. In a later stage of the Project, it is foreseen that the SF should be provided with up to 15,000 hogs per year from different sources. (See Chapter 4.3.11. Projection of the Modules)

The pigs delivered to the farmers will weigh 15 kilos and be 56 days old. They will be delivered detoothed, vaccinated, dosed with iron and castrated.

4.3.2. Production of Feed Concentrates

The formula for the nutritional and vitamin content of the balanced feed to be used by the SF has been carefully balanced to provide all of the basic requirements at the least possible cost. This formula was developed by computer and reflects the minimum cost in accordance with current prices for the foodstuffs. These rations will be delivered to the SF at their own farms every 15 days. (See Chapter 2.2.2.)

4.3.3. Technical Assistance

The technical assistance called for in the Project should be skilled and readily available. It should be provided by a specialized institution such as the Instituto Boliviano de Tecnologia Agropecuaria.

In the experimental stage during the first year, Agropecuaria Copacabana will be the one in charge of assisting the farmer in the fattening process.

The success of the Project depends to a large extent on the technical assistance given to the SF. For this reason, it will be given the necessary importance and resources.

4.3.4. Size and Location of the Module

The size of the module has been fixed at 10 pigs for at least the

experimental stage. These 10 pigs need a covered shelter of 10m². It is assumed that this quantity of animals should be relatively easy to maintain and to feed.

The zone of the Chimore has the following advantageous conditions for the execution of the Project at the level of the SF:

- a) There are a great number of farmers in older settlements who therefore are established in the area.
- b) The cooperatives of the area have been successful in their work and organization.
- c) The road infrastructure is ideal as there is an asphalted highway, lateral roads and available communication by the trails.
- d) Hog raising is a traditional activity of the area.
- e) Its proximity to Agropecuaria Copacabana and IBTA allows for the provision of all needed supplies and for adequate technical assistance.

4.3.5. Minimum required Infrastructure

The minimum required infrastructure consists of a housing system. All pasture land should be eliminated because the humid tropical conditions signify a risk in the well being of the hog as disease, weight loss and low productivity result.

The fattening shelter as mentioned previously will have a surface of 10m² (1m² per hog) with a dirt floor. This floor will be inclined $\frac{3}{8}$ towards the south. The construction will be rustic and can be built by the same SF using only the materials of the area.

The feeders and watertroughs at the north end of the hog house will be built out of wood as seen in Design 1.

For protection the hog house will be surrounded by half walls, one meter high. Pillars of Almendrillo or Coloradillo will be built on top of the walls. The site of the shelter should be on high ground to protect the hogs from the rain and possible flooding which occurs in the Chapare.

The walls and the roof support system could be made from whatever tree grows in the area such as the laurel.

4.3.6. Proposed Management System

The small farmer in addition to receiving the 10 pigs to fatten, also receives bimonthly the required amount of feed concentrates according to the growth pattern of the hogs. (See Table 24. Schedule of Activities)

As a daily routine the farmer should clean the floor of the hog house and then water them down but being careful that the water does not accumulate near the shelter.

After the floor is cleaned the SF should feed the hogs the yucca, kudzu or bananas and the balanced feed twice a day.

The provision of water should be preceded by a thorough cleaning of the watertrough. Water should never be lacking in the life of the hog.

The fattening period will be 4 months until reaching approximately 80 kilos in weight. At that age the hogs will be picked up to be transferred to AC where they will be weighed and the operation terminated.

The fattening period of 4 months was chosen after a long discussion between the technicians of AC and AESA for the following reasons:

- a) If the SF is responsible and follows the technical instructions faithfully, his hogs may reach 80 to 100 kilos, like the AC hogs.
- b) If the SF is unreliable and squanders the balanced feed by giving it to the chickens for example, his hogs will not reach 80 kilos in the four or five months. An effort is made to select those SF who really have an interest in carrying out the Project correctly as far as possible.
- c) It is better to have a fixed date for the pick up of the hogs from all of the SF participants. To search for hogs individually who have different weights costs money, time and creates greater difficulties in the running of the Project.
- d) After a hog weighs 80 kilos the efficiency of the fattening process diminishes and each kilo of additional meat produced costs more. Until 80 kilos the conversion rate from feed to meat is approximately 4 to 1; passing the 80 kilos this conversion rate decreases to 5 to 1 after 100 kilos.
- e) During the four months of fattening, the veterinarian will visit the SF every 15 days to control the sanitary condition of the hogs and the management of the same. He will also distribute the feed ration for the next 15 days.

Naturally when the results of the experimental stage are in, adjustments in the fattening process, in the feed etc. can be analyzed.

4.3.7. Feed System

The factor that will determine the success or failure of the fattening program by the SF, in addition to the technical assistance, is the feed. The animals should be properly fed so that optimum results in terms of meat may be attained. If the hogs receive in their rations a greater quantity of energy than protein, they will produce a lot of soft fat and will also take more time in fattening. If the hogs receive more protein than energy, the cost of the feed will go up as each gram of protein costs much more than a kilogram of energy.

In the Chapare the limiting food factor is the shortage of protein as there are few crops grown in the area which are rich in protein such as corn, soybeans, sorghum etc. For this reason, to properly feed the hogs protein rich balanced feed should be used and complemented with feed rich in energy such as yucca, banana and kudzu which are produced locally.

TABLE 18 BALANCED FEED REQUIREMENTS PER HOG

First Month	1.00 kg/day per hog	x	30 days	=	30 kg
Second Month	1.20 kg/day per hog	x	30 days	=	36 kg
Third Month	1.30 kg/day per hog	x	30 days	=	39 kg
Fourth Month	1.40 kg/day per hog	x	<u>30 days</u>	=	<u>42 kg</u>
Total			120 days		147 kg

The total feed requirements can be seen in the following table:

TABLE 19 TOTAL FEED REQUIREMENTS PER HOG

Kg/Day	Balanced Feed	Kudzu	Banana Yucca*	Total
-----	-----	-----	-----	-----
First Month	1.00	0.50	0.30	1.80
Second Month	1.20	1.00	0.80	3.00
Third Month	1.30	1.50	1.30	4.10
Fourth Month	<u>1.40</u>	<u>2.00</u>	<u>1.80</u>	<u>5.20</u>
Total 4 mos. kg	147.00	150.00	126.00	423.00

*The use of any of these crops fulfills the feed requirement. Basically its use will depend upon market prices. When the Study was prepared, the banana sold for \$b 3.75 per kilo and the yucca for \$b 26.00 per kilo. Therefore, it can be assumed that the SF will use the banana for feed for their hogs and the yucca will be sold for human consumption. However, many SF are used to giving yucca to their hogs and it is believed that they will continue to do so in spite of the price.

4.3.8. Support Organizations

The organizations which will support the Project will be all thoses which provide technical, financial and marketing assistance such as the Instituto Boliviano de Tecnologia Agropecuaria, PRODES, Agropecuaria Copacabana, Fabrica Nacional de Conservas Dillmann, Asociacion de Ganaderos de Chimore etc. An institution, however, which can fulfill all of the requirements of the Project does not exist. For this reason, as is mentioned in the Introduction, a mixed shareholder institution should be created for the development of livestock in the Chapare.

4.3.9. Financial Analysis

The financial analysis of the SF has been done by taking three different approaches.

The first approach is what is believed to be the most accurate reflections of the condition of the SF in the Chapare in relation to the fattening of hogs. In this approach the SF have the money with which to purchase the pigs from AC. They also have sufficient labor between the farmer and his family to avoid having to hire workers to care for the hogs. On the other hand the value that the kudzu, banana or yucca that is used for feed for the hogs could have is not taken into account. The result of this approach is shown in Table 20. The profit of the SF in four months is 65%, certainly an attractive rate of return.

The second approach is to estimate the value of labor and of the feed (kudzu, banana and yucca) which is given to the hogs in the Project. The result of this approach is shown in Table 21. The profitability of the SF in four months is 47%, also an acceptable return.

The third approach is that which assumes that the SF do not have the money and therefore need financing to purchase the pigs. The result of this approach is seen in Table 22. The profitability of the SF in four months is practically nil as the SF does not contribute any money.

Of these three approaches, the first is the one used throughout this Study. The three are positive, however, as can be easily seen in the tables which follow:

TABLE 20 INCOME STATEMENT AND RETURN ON CAPITAL

a) Estimate of Operational Costs per Module

1) Purchase of pigs: 10 pigs x 15 kg/pig x \$b 260.-/kg x 1.60	\$b 62,400.-
2) Feed: Balanced (Table 2) \$b 39.62 / kg Making and usage (13%) \$b 5.16 Transport to the Chapare (Cbba-AC Appendix IX) \$b 5.22 Total \$b 50.00 / kg 147 kg / 4 months x \$b 50.00 / kg	\$b 73,500.-
3) Transport of Feed (AC-SF): 8 trips (every 15 days) at \$b 125.-/km x 10 km	\$b 10,000.-
4) Transport of Animals (AC-SF-AC): 2 trips (delivery and pick up) at \$b 125.-/km x 10 km	\$b 2,500.-
5) Veterinarian Technical Supervision: Salary \$b 50,000.-/month divided by 25 days/mo. = \$b 2,000.-/day divided by 5 daily visits = \$b 400.-/visit times 9 visits	\$b 3,600.-
6) Training Course: AC administrator and veterinarian at \$b 2,000.-/ day each = \$b 4,000.-/course divided by 10 modules	\$b 400.-
7) Vaccines: Against foot and mouth disease and parasites \$b 170.- x 10	\$b 1,700.-
8) Interest Charges: Working Capital (2 to 7) = \$b 91,700.- divided by 2 (average) = \$b 45,850.- x 40% p.a. divided by 4 months	\$b 6,113.-
9) Total Costs:	\$b 160,213.-
Working Capital requirement (less pig purchases and interest charges)	\$b 91,700.-

ASESORAMIENTO EMPRESARIAL S.A.

b) Estimate of Income	
Sale of 10 hogs of 80 kg each at \$b 260.- per live kilo	\$b 208,000.-
Less: transportation from the Chapare to Cochabamba at \$b 745.- per hog times 10 hogs	<u>\$b 7,450.-</u>
Total Income	\$b 200,550.-
c) Net Profit Calculation	
Total income	\$b 200,550.-
Total expenses	<u>\$b 160,213.-</u>
Net Profit	\$b 40,337.-
d) Return on Capital Calculation	
Capital investment	\$b 62,400.-
Net Profit	\$b 40,337.-
Profitability of Investment:	65% in four months

TABLE 21 ADJUSTED INCOME STATEMENT AND RETURN ON CAPITAL

The information contained in Table 20 is used at the base for this table.

a) Estimate of Operational Costs per Module	
Total Costs	\$b 160,213.-
Labor:	
Infrastructure and construction of pens 2 days at \$b 600.-/day	\$b 1,200.-
Care of the hogs: 1 hour daily at \$b 600.-/day of 8 hours times 120 days	<u>\$b 9,000.-</u>
Total Labor	\$b 10,200.-
Sub-Products:	
Kudzu 150 kg at \$b 0.50*/kg (cost)	\$b 75.-
Banana 126 kg at \$b 3.75**/kg	<u>\$b 472.-</u>
	547.-
*Cost price (\$b 35,000/hectare divided by 70 tons/hectare	
**Sale price	
Total Costs	\$b 170,960.-
b) Estimate of Income	\$b 200,550.-
c) Calculation of Net Profit	\$b 29,590.-
Profitability of Investment (\$b 62,400.-) in four months	47%

TABLE 22 INCOME STATEMENT AND RETURN ON CAPITAL WITH ADDITIONAL FINANCING

The information contained in Table 20 is used as the base for this table.

a) Estimate of Operating Costs per Module

Working Capital plus the pig purchase
\$b 91,700.- + \$b 62,400.- \$b 154,100.-

Interest charges:

\$b 154,000 divided by 2 (average) = \$b 77,050.-
x 40% p.a. divided by 4 months \$b 10,273.-

Total Costs \$b 164,373.-

b) Estimate of Income \$b 200,550.-

c) Calculation of Net Profit \$b 36,177.-

d) Profitability of Investment: infinite

4.3.10. Design of a Marketing System

At four months the fattened hogs are picked up by truck by Agropecuaria Copacabana, weighed and checked over in front of the SF. Afterwards they are moved to AC and placed at a distance from AC's own hogs to avoid possible contagion. Later they are classified according to their appearance and the fattening is terminated and they are immediately sent to Cochabamba.

The price which is given to the farmer for his animals is the same as the prevailing market price which will be paid in cash once the costs of transportation, veterinarian attention, medicines and accrued interest have been deducted.

It is estimated that the hogs will have a minimum weight of 80 kilos in 120 days by means of the planned feed program. However, if the SF is responsible and pays attention to the care of his hogs, the same can reach 90 kilos in the same four months increasing in this way his income considerably.

4.3.11. Projection of the Modules

The following projection for the modules has been estimated for the SF:

TABLE 30 PROJECTION OF THE MODULES

Year	Semester	Stage	New Modules	Repeated Modules	Total Modules	Total Hogs
0	first	I	10		10	100
	second		20	10	30	300
1	first	II	70	30	100	1,000
	second		100	100	200	2,000
2	first		100	150	250	2,500
	second		100	250	350	3,500
3	first*		100	350	450	4,500
	second		100	350	450	4,500
4	first		100	450	550	5,500
	second		100	550	650	6,500
5	first		100	650	750	7,500
	second		100	650	750	7,500

*At the start of this semester it is assumed that a second center of hog production will enter into operation.

4.3.12. Total Working Capital Requirements

The total working capital requirement has only been determined for the new modules as it is assumed that the old and repeating modules no longer need financing.

TABLE 31 WORKING CAPITAL REQUIREMENTS

<u>Year</u>	<u>New Modules</u>	<u>Capital/Module(\$b)</u>	<u>Total (\$b 000)</u>
0	30	91,700.-	2,751
1	170	91,700.-	15,589
2	200	91,700.-	18,340
3	200	91,700.-	18,340
4	200	91,700.-	18,340
5	<u>200</u>	91,700	<u>18,340</u>
Total	1,000		91,700

Therefore to implement the Project at the level of the SF, \$b 91.7 million is needed in a 5 year period. This capital will serve to raise 45,400 hogs and benefit approximately 1,000 families.

5. CONCLUSION

The participation of the three basic groups of the Project is highly profitable in the program of raising and fattening hogs in the Chapare.

Likewise, the results obtained from the evaluation of the Project show that excellent conditions exist thereby permitting the expectation of good possibilities for success. These conditions among others are the large unsatisfied demand for hogs in Cochabamba and the positive disposition of the small farmer, the owner of Agropecuaria Copacabana and of the Fabrica Nacional de Conservas Dillmann towards the Project.

Likewise, it can be noted that the activity of raising and fattening hogs is practically traditional in the region of Chimore where the first part of the program will be carried out with the small farmers. This tradition of fattening hogs will serve as a base for the implementation of a more technical and profitable program.

The proposed technical assistance if correctly and timely applied will greatly help the success of the Project. The technical assistance along with the financing are the principal factors of the Project. Both factors should be handled carefully by specialized institutions.

The experimental phase of the Project which will last approximately one year should provide efficiency, dynamism and sufficient experience so that the farmer of the Chimore and other regions of the Chapare will be attracted to the activity of fattening hogs.

It is hoped that the reasonable profit margin provided by the fattening of hogs will be sufficiently attractive to the small farmer to provide him with a limited alternative to growing coca. That is why it is extremely important that the Program provide continuity and stability in the purchase of pigs, in the technical assistance and likewise in the sale of the hogs. This stability and fairness will counteract the temporary and risky nature which characterizes the growing of coca.

As for Agropecuaria Copacabana, the situation of this company is most favourable for the production of pigs both for their own needs as well as to supply the small farmer.

For this reason the role that Agropecuaria Copacabana plays in the Project is of great importance especially in the beginning when the small farmer finds himself in the experimental period and needs assistance. The expansion of AC's breeding capacity of pigs is an integral and indispensable part of the Project.

Lastly, the role which Fabrica Nacional de Conservas Dillmann will play will be to absorb the totality of the hog production of the small farmers and of Agropecuaria Copacabana. The productive infrastructure of FNCD jointly with its technical, administrative and marketing capacity will offer the Project a guaranteed market and above all continuity. To achieve this, a considerable amount of working capital will be needed.

6. RECOMMENDATIONS

By the conclusions presented, implementation of the Project is recommended.

For the initial phase the setting up of 10 experimental modules to fatten 10 pigs apiece is recommended. In the beginning the breeding of pigs by the small farmer is not recommended due to his lack of experience and infrastructure. A fattening program is simpler to carry out than a hog breeding program.

In the second phase the necessary adjustments should be made and the implementation of the modules should take place as planned.

Later on, once the Project is successful, the creation of one or more hog breeding centers is recommended. They will perform the same function as Agropecuaria Copacabana. In this way the supply of pigs for the small farmers is guaranteed and the continuity of the Project is assured.

With this purpose in mind two alternatives are proposed:

a) The Canadian Institute of Chimore - for the following reasons:

1) It is an agricultural school and has shown interest in the Project.

2) It has access to Bolivian professionals to teach agriculture and zoology.

3) The students are the sons and daughters of the SF of the area and they will be the ones caring for the hogs.

4) It has the necessary infrastructure to shelter livestock.

5) It has a tractor and agricultural machinery with which to produce a large part of the feed, such as yucca, corn, bananas and kudzu.

6) Chimore is in the center of the area of great livestock activity.

b) Design of a New Project for the Production of Pigs

For the first alternative as well as for this one, a special study to determine the costs, functions, administration etc. of a center for the breeding of hogs should be prepared.

The farmers who join the Project should fulfill the indispensable requirements as in explained in the pertinent section.

Marketing agreements should be made as to price and volume between the small farmer and Agropecuaria Copacabana and between Agropecuaria Copacabana and the Fabrica Nacional de Conservas Dillmann as this is what provides security and trust within the Project and to its different participants.

As with AC it is recommended that in the future alternative markets be found for the fattened hogs. These alternatives could be the other

processors of pork located in Cochabamba such as Fysal and Haas.

With respect to the institution which will take over the Project once the experimental phase is over (one year) i.e. the Fondo de Desarrollo de Ganado, it is recommended that a special study be prepared to determine the shareholding, its functions, its administration etc. This study should be done and approved during the experimental period so that it can begin operating in the second stage of the Project.

TABLE 3

AGROPECUARIA COPACABANA

INVESTMENT CAPITAL

	(\$b 000)	END OF <u>YEAR 0</u>	<u>YEAR 1</u>	<u>TOTAL</u>
A) BUILDINGS				
1) Agropecuaria Copacabana				
4 Hog Houses	10000 \$b/m2 x 891.00m2/ea.	35640		35640
2 Farrowing Houses	10000 \$b/m2 x 372.24m2/ea.	7445		7445
4 Gestation Houses	10000 \$b/m2 x 565.11m2/ea.	22604		22604
4 Yards - Gestation	5000 \$b/m2 x 259.95m2/ea.	5199		5199
In existence: Warehouses, Lab., Houses, Elec./San.		189409	Own.Cont.	189409
2) Pairumani Farm				
8 Hog Houses	10000 \$b/m2 x 810.00m2/ea.		64800	64800
2 Dung Containers	500000 \$b/each		1000	1000
2 Warehouses	10000 \$b/m2 x 50.00m2/ea.		1000	1000
3) Total Buildings		260297	66800	327097
B) MACHINERY AND EQUIPMENT				
1) Agropecuaria Copacabana				
1 Dung trailer	\$b 1000000 each	1000		1000
1 Water pressure system	\$b 3300000 each	3300		3300
1 Truck F-350 (2.5 ton)	\$b 5000000 each	5000		5000
2 Trucks (10 ton)	\$b 15000000 each	30000		30000
3 Radio Transmitters	\$b 200000 each	600		600
1 Truck (4 x 4)	\$b 2800000 each	2800		2800
2 Dung Separators	\$b 2000000 each	4000		4000
1 Tractor and Weeder	\$b 9000000 each	9000	Own.Cont.	9000
2) Pairumani Farm				
1 Truck F-350 (2.5 ton)	\$b 5000000 each		5000	5000
1 Water pressure system	\$b 3300000 each		3300	3300
3) Total Machinery and Equipment		55700	8300	64000
C) SWINE LIVESTOCK				
	<u>Year 0</u>	<u>Year 1</u>	<u>Cost \$b/ea.</u>	
Gilts	200		40000	8000
Quality Males	20		62000	1240
Gilts	730	500	30000 OwnCon. 21900	15000 36900
Boars	13	17	46500 OwnCon. 605	791 1395
Total Swine Livestock			31745	15791 47535
D) INSTALLATIONS				
	<u>Year 0</u>	<u>Year 1</u>	<u>Cost \$b/ea.</u>	
Pens	36		27200 OwnCon. 979	979
Pens	52		30000	1560
Yard Doors	841		12000	10092
Nipple Valves	2064		5000	10320
Troughs	88		4700 OwnCon. 414	414
Total Installations			22386	22386
E) TOTAL INVESTMENT		370127	90891	461018

TABLE 4

AGROPECUARIA COPACABANA

WORKING CAPITAL

		13000 AU Year 1				20000 AU Year 2			
A) VARIABLE COSTS	Year 1	Days	Racion	Total	Price	Cost/au	Total	Year 2	Total
	No.		kg/au	kg	\$b/kg	\$b	\$b000	No.	\$b000
1) FEED									
Boars*	33	365	912.50	30113	47.94	43745	1444	50	2187
Pregnant Sows*	935	243	486.00	454251	43.27	21029	19655	1437	30219
Milking Sows*	935	112	560.00	523417	50.47	28263	26417	1437	40614
Sows in heat*	935	10	35.00	32714	47.97	1679	1569	1437	2413
Pigs (13000+15/2% mortality)	13975	56	11.20	156520	57.23	641	8958	21622	13859
Growing Hogs*	10050	60	66.00	663300	48.02	3169	31852	14070	44592
Hogs being Fattened	10050	60	81.00	814050	47.55	3852	38708	14070	54191
Total				2674364			128603		188076
*Includes 1/2% mortality rate									
2) ANIMAL SANITATION	Year 1	Year 2			Cost/au	Total		Total	
	No.	No.			\$b	\$b000		\$b000	
Boars	33	50			900	30		45	
Sows	935	1437			900	841		1293	
Pigs	13975	21622			200	2795		4324	
Hogs	10050	14070			450	4523		6332	
Total	24993	37179				8188		11994	
3) TRANSPORTATION									
Gasoline: Feed	197014	1841188	/ 10 ton x 163km	x \$b 25/km-lt		488		750	
Pigs	10000	14000	/ 105 au x 163km	x \$b 25/km-lt		388		543	
Oil: Trips (Pigs+Feed 215)		317	x 163km / 400km-lt	x \$b350/lt-oil		31		45	
Truck Maintenance No.	3	4	x 3% of their value			1050		1200	
Total						1957		2539	
4) BASIC LABOR FORCE	Year 1	Year 2	Monthly	No. of	Total	Total			
	No.	No.	Salary \$b	Salaries	\$b000	\$b000			
AC workers	8	8	12400	15	1488	1488			
PF workers		8	12400	15		1488			
Drivers	3	4	20000	15	900	1200			
Helpers	3	4	12000	15	558	744			
Social Benefits					884	1476			
Total					3830	6396			
5) RENTING OF SILOS									
Annual feed in kg	2674364	3909478	x 0.80 \$b/kg			2139		3128	
6) OTHERS									
Insurance-feed	128603	188076	(\$b 000) /6(ave.2 mos.)	x 4/1000%	86	125			
Insurance-livestock	31745	47535	(\$b 000)	x 3%	952	1426			
Elec.:Gas. lt.	21900	21900	x \$b 25/lt + 48 lt oil	x \$b350/lt	564	564			
Various \$b000/mo)	400	500	x 12 months		4800	6000			
7) TOTAL VARIABLE COSTS						150167		218822	

TABLE 5

AGROPECUARIA COPACABANA

WORKING CAPITAL

B) FIXED COSTS	Year 1	Year 2	Monthly Salary \$b	No. of Salaries	Year 1	Year 2
	No.	No.			Total \$b000	Total \$b000
1) ADMINISTRATIVE COSTS						
General Manager (part time)	1	1	35000	15	525	525
Administrators	1	2	60000	15	900	1800
Veterinarians	1	2	50000	15	750	1500
Swine Specialist (contracted)	1	1	33333	12	400	400
Social Benefits 30%					<u>653</u>	<u>1148</u>
Total					3227	5372
2) MAINTENANCE						
Buildings & Inst.(\$b000)	282683	349483	x	1.50% per year	4240	5242
Machinery & Equip.(\$b000)	20700	24000	x	3.00% (no trucks)	<u>621</u>	<u>720</u>
Total					4861	5962
3) DEPRECIATION						
Buildings & Inst.(\$b000)	282683	349683	x	10.00% per year	28268	34948
Machinery & Equip.(\$b000)	55700	64000	x	20.00% per year	<u>11140</u>	<u>12800</u>
Total					39408	47748
4) INSURANCE						
Buildings & Inst.(\$b000)	282683	349483	x	0.40% per year	1131	1398
Machinery & Equip.(\$b000)	55700	64000	X	2.00% per year	<u>1114</u>	<u>1280</u>
Total					2245	2678
5) TOTAL FIXED COSTS (EXCEPT FINANCIAL)					48611	60363
TOTAL VARIABLE AND FIXED COSTS					198778	279185

TABLE 6

AGROPECUARIA COPACABANA

WORKING CAPITAL

C) FINANCIAL EXPENSE	Owner Contribution	B.C.B.	P.F.I.	Total Financing	Total
Financing Year 1	-----	-----	-----	-----	-----
Investment Capital	222306	118257	29564	147821	370127
Working Capital	15937	114746	28687	143433	159370 without depreciation
Total	<u>238243</u>	<u>233003</u>	<u>58251</u>	<u>291254</u>	<u>529497</u>
% Participation	45	44	11	55	100
% of Participation in Financing		80	20	100	
% Interest Rate		38	48	40	

TABLE 7

AGROPECUARIA COPACABANA

LOAN REPAYMENT SCHEDULE (\$B 000)

	<u>Year 0</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>	<u>Total</u>
<u>B.C.B. (Inv. Cap.) % = 38</u>								
Loan Balance: Sem. 1		118257	118257	103475	73911	44346	14782	
Sem. 2	118257	118257	118257	88693	59128	29564		
Capital Payments: Sem. 1				14782	14782	14782	14782	
Sem. 2			14782	14782	14782	14782		
Total Capital Payments:			14782	29564	29564	29564	14782	118257
Interest Payments: Sem. 1		22469	22469	19660	14043	8426	2809	
Sem. 2		22469	22469	16852	11234	5617		
Total Interest Payments		44938	44938	36512	25277	14043	2809	168516
<u>P.F.I. (Inv. Cap.) % = 48</u>								
Loan Balance: Sem. 1		29564	29564	25869	18478	11087	3696	
Sem. 2	29564	29564	29564	22173	14782	7391		
Capital Payments: Sem. 1				3696	3696	3696	3696	
Sem. 2			3696	3696	3696	3696		
Total Capital Payments:			3696	7391	7391	7391	3696	29564
Interest Payments: Sem. 1		7095	7095	6208	4435	2661	887	
Sem. 2		7095	7095	5322	3548	1774		
Total Interest Payments:		14191	14191	11530	7982	4435	887	53216
<u>B.C.B. (Work.Cap.) % = 38</u>								
Loan Balance: Sem. 1		114746	57373					
Sem. 2	114746	114746						
Capital Payments: Sem. 1			57373					
Sem. 2			57373					
Total Capital Payments:			57373	57373				114746
Interest Payments: Sem. 1		21802	10901					
Sem. 2		21802						
Total Interest Payments:		43604	10901					54504
<u>P.F.I. (Work.Cap.) % = 48</u>								
Loan Balance: Sem. 1		28687	14343					
Sem. 2	28687	28687						
Capital Payments: Sem. 1			14343					
Sem. 2			14343					
Total Capital Payments:			14343	14343				28687
Interest Payments: Sem. 1		6885	3442					
Sem. 2		6885						
Total Interest Payments		13770	3442					17212

AGROPECUARIA COPACABANA

INCOME STATEMENT (\$b 000)

	<u>Year 0</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>	<u>Total</u>
SALES								
Hogs Weight 95 kg au		10000	14000	14000	14000	14000	14000	80000
Pigs Weight 15 kg au		3000	6000	6000	6000	6000	6000	33000
Hogs Price \$b 260/kg		247000	345800	345800	345800	345800	345800	1976000
Pigs Price \$b 6240/au		18720	37440	37440	37440	37440	37440	205920
TOTAL SALES		265720	383240	383240	383240	383240	383240	2181920
VARIABLE COSTS		150167	218822	218822	218822	218822	218822	1244278
FIXED COSTS		48611	60363	60363	60363	60363	60363	350426
INTEREST EXPENSE (without accrual)		116501	73472	48042	33260	18478	3696	293448
PROFIT		-49559	30583	56013	70795	85577	100359	293768

CASH FLOW (\$b 000)

TABLE 9

INCOME								
Sales		265720	383240	383240	383240	383240	383240	2181920
Investment Cap. Own Contribution	222306	15791						238097
Working Cap. Own Contribution		15937	11335					27272
Loan-Invest. Cap.	147821							147821
Loan-Working Cap.		143433						143433
TOTAL INCOME	370127	440880	394575	383240	383240	383240	383240	2738542
EXPENSES								
Investments	370127	90891						461018
Variable Costs		150167	218822	218822	218822	218822	218822	1244278
Fixed Costs (without Depreciation)		9203	12615	12615	12615	12615	12615	72276
Interest Expense		116501	73472	48042	33260	18478	3696	293448
Loan Amortization		71716	90194	36955	36955	36955	18478	291254
TOTAL EXPENSES	370127	438478	395103	316434	301652	286870	253610	2362274
CASH FLOW	0	2402	-528	66806	81588	96370	129630	376268
ACCUMULATED CASH FLOW	0	2402	1874	68680	150268	246638	376268	

PROFITABILITY RATIOS (\$b 000)

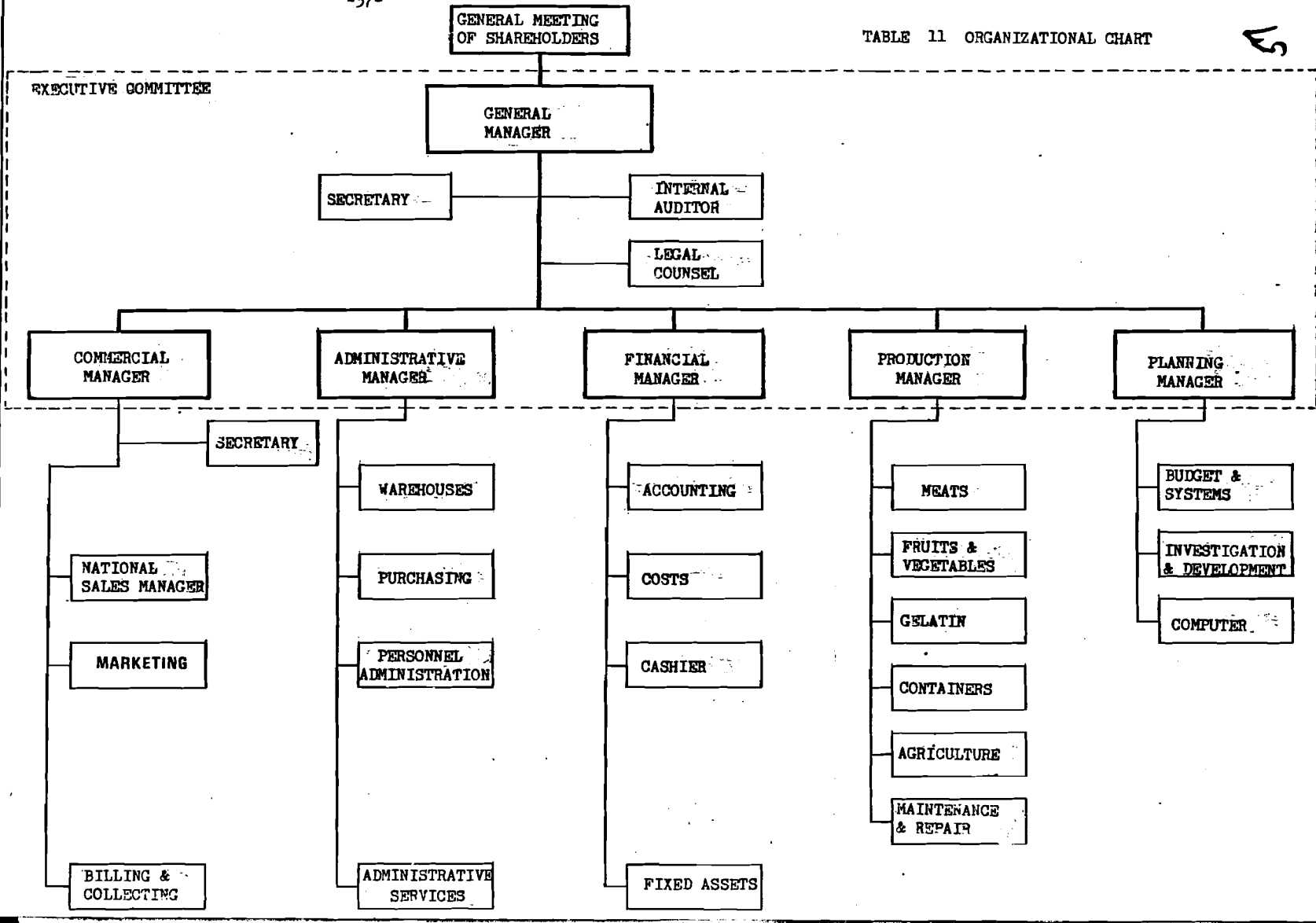
TABLE 10

CASH FLOW without owner Contribution	-29325	-11863	66806	81588	96370	129630	333206
OWNER CONTRIBUTION (new investments)*	22505	31727	11335				65567
PRESENT VALUE OF CASH FLOW WITHOUT OWNER CONTRIBUTION	34%	=	69276				
PRESENT VALUE OF OWNER CONTRIBUTION	34%	=	52494				
NET PRESENT VALUE	34%	=	16782				
IRR OF CASH FLOW WITHOUT OWNER CONTRIBUTION	41%	=	50609				
IRR OF OWNER CONTRIBUTION	41%	=	50609				
NET INTERNAL RATE OF RETURN	41%	=	0				
COST BENEFIT	34%	=	1.32				

TABLE 11 ORGANIZATIONAL CHART

15

HIGHER MANAGEMENT
AREA MANAGERS
DEPARTMENTS
SECTIONS



FNCD - HOG PROJECT

INVESTMENT CAPITAL

Not necessary.

MONTHLY WORKING CAPITAL FOR YEARLY PROCESSING:

Hogs Processed per month:

13000 HOGS

20000 HOGS

1083.33

1666.67

MONTHLY SALES

Each hog of 90 kg is converted into
117.90 kg of cold meats and sausages
at \$b 709/kg

(\$b 000)

%

(\$b 000)

%

90557

100.00

139318

100.00

MONTHLY PURCHASES

1.00 Hog of 90 kg purchased at \$b 260/kg
0.29 Beef of 300 kg purchased at \$b 160/kg
Other purchases at \$b 12174 per hog

25350

27.99

39000

27.99

15080

16.65

23200

16.65

13188

14.56

20290

14.56

TOTAL PURCHASES

53618

59.21

82490

59.21

MONTHLY CONVERSION COST

3586

3.96

5517

3.96

ADMINISTRATIVE COST - 5% of Sales

4528

5.00

6966

5.00

MARKETING COST - 12% of Sales

10867

12.00

16718

12.00

TABLE 13

FNCD - HOG PROJECT

FINANCING REQUIREMENTS*

YEAR 1984**

	<u>Owner Contribution</u>	<u>Banco Central de Bolivia</u>	<u>P.F.I.</u>	<u>Total Financ.</u>	<u>Total</u>
WORKING CAPITAL	19923	137291	34323	171613	191536
% Participation	10	72	18	90	100
% of Participation in Financing		80	20	100	
% Interest Rate		38	48	40	

*In accordance with Table 14.

** The initiation of the Project is planned for January, 1984.

FNCD - HOG PROJECT

TABLE 14

CASH FLOW FOR THE PROCESSING OF 13000 HOGS													YEAR 1984	TOTAL
	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5	MONTH 6	MONTH 7	MONTH 8	MONTH 9	MONTH 10	MONTH 11	MONTH 12	TOTAL	
INCOME														
SALES			90557	90557	90557	90557	90557	90557	90557	90557	90557	90557	90557	905570
OWNER CONTRIBUTION	4528	15395												19923
LOANS	57204	57204					57204							171613
TOTAL INCOME	61732	72599	90557	90557	90557	90557	147762	90557	90557	90557	90557	90557	1097106	
EXPENSES														
HOG PURCHASES	25350	25350	25350	25350	25350	25350	25350	25350	25350	25350	25350	25350	25350	304200
BEEF/OTHER PURCHASES	28268	28268	28268	28268	28268	28268	28268	28268	28268	28268	28268	28268	28268	339222
CONVERSION COST	3586	3586	3586	3586	3586	3586	3586	3586	3586	3586	3586	3586	3586	43032
ADMINISTRATIVE COST	4528	4528	4528	4528	4528	4528	4528	4528	4528	4528	4528	4528	4528	54334
MARKETING COST		10867	10867	10867	10867	10867	10867	10867	10867	10867	10867	10867	10867	119535
INTEREST EXPENSE						11441	11441							34323
LOAN REPAYMENT						57204	57204							171613
TAXES														0
TOTAL EXPENSES	61732	72599	72599	72599	72599	141245	141245	72599	72599	72599	72599	141245	1066260	
CASH FLOW	0	0	17958	17958	17958	-50688	6517	17958	17958	17958	17958	-50688	30847	
ACCUMULATED CASH FLOW	0	0	17958	35916	53873	3186	9703	27661	45619	63576	81534	30847		

CASH FLOW FOR THE PROCESSING OF 20000 HOGS													YEAR 1985	TOTAL
	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5	MONTH 6	MONTH 7	MONTH 8	MONTH 9	MONTH 10	MONTH 11	MONTH 12	TOTAL	
INCOME														
SALES	90557	90557	139318	139318	139318	139318	139318	139318	139318	139318	139318	139318	139318	1574299
OWNER CONTRIBUTION														0
LOANS														0
TOTAL INCOME	90557	90557	139318	139318	139318	139318	139318	139318	139318	139318	139318	139318	139318	1574299
EXPENSES														
HOG PURCHASES	39000	39000	39000	39000	39000	39000	39000	39000	39000	39000	39000	39000	39000	468000
BEEF/OTHER PURCHASES	43490	43490	43490	43490	43490	43490	43490	43490	43490	43490	43490	43490	43490	521830
CONVERSION COST	5517	5517	5517	5517	5517	5517	5517	5517	5517	5517	5517	5517	5517	66203
ADMINISTRATIVE COST	6966	6966	6966	6966	6966	6966	6966	6966	6966	6966	6966	6966	6966	83591
MARKETING COST	10867	16718	16718	16718	16718	16718	16718	16718	16718	16718	16718	16718	16718	194767
INTEREST EXPENSE														0
LOAN REPAYMENT														0
TAXES				63125										63125
TOTAL EXPENSES	105240	111691	111691	174816	111691	111691	111691	111691	111691	111691	111691	111691	111691	1397567
CASH FLOW	-15233	-21134	27627	-35498	27627	27627	27627	27627	27627	27627	27627	27627	27627	176732
ACCUMULATED CASH FLOW	15164	-5570	22057	-13441	14187	41814	69442	97069	124697	152324	179951	207579		

Best Available Document

TABLE 15

FNCD - HOG PROJECT

INCOME STATEMENT

(\$b 000)

	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>TOTAL</u>
INCOME				
Sales	996127	1623061	1671822	4291010
EXPENSES				
Cost of Purchasing Hogs	253500	440700	468000	1162200
Cost of Purchasing Beef and Others	282685	491437	521880	1296002
Conversion Cost	35860	62341	66203	164404
Administrative Cost - 5% of Sales	49806	81153	83591	214550
Marketing Cost - 12% of Sales	119535	194767	200619	514921
Interest Expense	34323			34323
Depreciation	10000	15385	15385	40769
TOTAL EXPENSES	785709	1285783	1355677	3427170
PROFIT BEFORE TAXES	210418	337277	316145	863840
30% TAX	63125	101183	94843	259152
PROFIT AFTER TAXES	147293	236094	221301	604688

CASH FLOW

INCOME				
Sales	905570	1574299	1671822	4151691
Owner Contribution	19923			19923
Loans	171613			171613
TOTAL INCOME	1097106	1574299	1671822	4343227
EXPENSES				
Hog Purchases	304200	468000	468000	1240200
Other Purchases	339222	521880	521880	1382982
Conversion Cost	43032	66203	66203	175438
Administrative Cost	54334	83591	83591	221516
Marketing Cost	119535	194767	200619	514921
Interest Expense	34323			34323
Loan Amortization	171613			171613
Taxes (to be paid the following year)		63125	101183	164309
TOTAL EXPENSES	1066260	1397567	1441476	3905303
CASH FLOW	30847	176732	230346	437925
ACCUMULATED CASH FLOW	30847	207579	437925	676350
CASH FLOW WITHOUT OWNER CONTRIBUTION	10924	176732	230346	418002
NET PRESENT VALUE OF CASH FLOW	34%	=	182389*	
INTERNAL RATE OF RETURN	274%	=	0**	
COST BENEFIT	34%	=	10.15***	

*The owner contribution is not included because it is made at the beginning of 1984.

**The owner contribution is taken as an expense and the present value of the cash flow without the owner contribution is taken as income.

***The present value of the cash flow without the owner contribution is taken as a benefit and the owner contribution is taken as a cost.

TABLE 16

FNCD - HOG PROJECT

COMBINED CASH FLOW

(\$b 000)

	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>TOTAL</u>
INCOME				
National Sales	1516988	2277430	2459329	6253747
Export Sales	677673	779324	872843	2329840
Owner Contribution - Capital	19923	10000		29923
Loans	542222	401743	349227	1293192
Representations	114448	126664	137904	379016
Accounts Receivable	500	500	500	1500
Sale of Assets	280000			280000
Returns/Recoveries	8375	9631	10787	28793
Other Income	900	900	900	2700
TOTAL INCOME	3161029	3606192	3831490	10598711
EXPENSES				
Raw Material (Hogs and others)	1242836	1680356	1763213	4686405
Conversion Cost	97049	124541	129208	350798
Administrative Cost	75124	106460	108747	290331
Marketing Cost	154452	234921	239740	629114
Interest Expense	294563	185124	149258	628945
Loan Amortization	1102549	875111	865309	2842969
Export Cost	60331	69380	77706	207417
Representations	71032	81687	91490	244209
Other Expenses	19255	18002	54007	91264
Taxes (only of the Hog Project)		63125	101183	164309
TOTAL EXPENSES	3117192	3438708	3579862	10135761
CASH FLOW	43838	167484	251628	462950
ACCUMULATED CASH FLOW	43838	211322	462950	718110
CASH FLOW WITHOUT OWNER CONTRIBUTION	23915	157484	251628	433028
PRESENT VALUE OF CASH FLOW WITHOUT OWNER CONTRIBUTION		34%	=	210132
PRESENT VALUE OF OWNER CONTRIBUTION		34%	=	27385 (Present value only of 1985 contribution)
NET PRESENT VALUE		34%	=	182747
IRR OF CASH FLOW WITHOUT OWNER CONTRIBUTION		273%	=	22603
IRR OF OWNER CONTRIBUTION		273%	=	22605
NET INTERNAL RATE OF RETURN		273%	=	-2
COST/BENEFIT / OWNER CONTRIBUTION		34%	=	7.67

SOURCE: Cash Flow without Hog Project: FNCD Analysis of present and projected condition. November, 1982

Cash Flow of Hog Project: See previous table.

TABLE 23

SCHEDULE OF HOG PRODUCTION

	YEAR 0		1		2		3		4		5	
	SEMESTER 1	2	1	2	1	2	1	2	1	2	1	2
1. CURRENT												
Agropecuaria Copacabana - Breeding	900	900	900	900								
Agropecuaria Copacabana - Fattening	800	600	900	900								
Small Farmers - Fattening	100	300										
2. NEW												
Agropecuaria Copacabana - Breeding			4100	7100	9500	10500	10000	10000	10000	10000	10000	10000
New Breeding Center - Breeding							1500	1500	2500	3500	4500	4500
Pairumani Farm - Fattening			3100	5100	7000	7000	7000	7000	7000	7000	7000	7000
Small Farmers - Fattening			1000	2000	2500	3500	4500	4500	5500	6500	7500	7500
3. TOTAL												
AC and New Center - Breeding	900	900	5000	8000	9500	10500	11500	11500	12500	13500	14500	14500
AC and Pairumani Farm - Fattening	800	600	4000	6000	7000	7000	7000	7000	7000	7000	7000	7000
Small Farmers - Fattening	100	300	1000	2000	2500	3500	4500	4500	5500	6500	7500	7500

TABLE 24

SF. SCHEDULE OF ACTIVITIES

	0		1		2		3		4			TOTAL
	MONTH	DAY	MONTH	DAY	MONTH	DAY	MONTH	DAY	MONTH	DAY	DAY	
Training Course		X										1
Building of Infrastructure		X										1
Purchase of Pigs				X								1
Feed Delivery				X	X	X	X	X	X	X		8
Visit of Veterinarian				X	X	X	X	X	X	X	X	9
Vaccine against Foot and Mouth and Parasites										X		1
Weight Control					X		X		X		X	4
Sale of Hogs											X	1
Payment Received											X	1
Evaluation											X	4
Final Report											X	1
Daily Activity:												
Feed				X	X	X	X	X	X	X	X	
Water				X	X	X	X	X	X	X	X	
Cleaning				X	X	X	X	X	X	X	X	

Note: Months 5 and 6 are for rest, cleaning, disinfecting and repair of pens.

TABLE 25

SCHEDULE OF ACTIVITIES OF THE PROJECT

	YEAR 0		YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5	
	SEMESTER 1	SEMESTER 2	SEMESTER 1	SEMESTER 2	SEMESTER 1	SEMESTER 2	SEMESTER 1	SEMESTER 2	SEMESTER 1	SEMESTER 2	SEMESTER 1	SEMESTER 2
1. Approval of the Project (USAID)	X											
2. Experimental Stage:												
Begin 10 Modules	X											
Evaluation of the 10 Modules	X											
Begin 30 Modules		X										
Evaluation of Experimental Stage		X										
3. Development Institution:												
Study and Approval	X											
Formation		X										
Implementation			X									
4. Agropecuaria Copacabana:												
Begin 10 Modules	X											
Begin 30 Modules		X										
Begin Expansion (last semester)		X										
Finish Expansion (last semester)			X									
Production			X									
5. Pairumani Farm:												
Begin Construction (last semester)				X								
Finish Construction (last semester)				X								
Hog Fattening					X							
6. New Breeding Center:												
Study and Evaluation of Possibilities	X											
Begin Construction			X									
Pig Production				X								
7. Module Projections			X	X	X	X	X	X	X	X	X	X

AGROPECUARIA COPACABANA

SALES PRICE INCREASE OF 10%

INCOME STATEMENT (\$b 000)

	<u>Year 0</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>	<u>Total</u>
SALES								
Hogs Weight 95 kg au		10000	14000	14000	14000	14000	14000	80000
Pigs Weight 15 kg au		3000	6000	6000	6000	6000	6000	33000
Hogs Price \$b 286/kg		271700	380380	380380	380380	380380	380380	2173600
Pigs Price \$b 6864/au		20592	41184	41184	41184	41184	41184	226512
Total Sales		292292	421564	421564	421564	421564	421564	2400112
VARIABLE COSTS		150167	218822	218822	218822	218822	218822	1244278
FIXED COSTS		48611	60363	60363	60363	60363	60363	350426
INTEREST EXPENSE (without accrual)		116501	73472	48042	33260	18478	3696	293448
PROFIT		-22987	68907	94337	109119	123901	138683	511960

CASH FLOW (\$b000)

INCOME								
Sales		292292	421564	421564	421564	421564	421564	2400112
Investment Cap.								
Own contribution 222306		15791						238097
Working Cap. Own Cont.		15937	11335					27272
Loan-Investment Cap 47821								147821
Loan-Working Cap.		143433						143433
TOTAL INCOME	370127	467452	432899	421564	421564	421564	421564	2956734
EXPENSES								
Investments	370127	90891						461018
Variable Costs		150167	218822	218822	218822	218822	218822	1244278
Fixed Costs (without deprec.)		9203	12615	12615	12615	12615	12615	72276
Interest Expense		116501	73472	48042	33260	18478	3696	293448
Loan Amortization		71716	90194	36955	36955	36955	18478	291254
TOTAL EXPENSES	370127	438478	395103	316434	301652	286870	253610	2362274
CASH FLOW	0	28974	37796	105130	119912	134694	167954	594460
ACCUMULATED CASH FLOW	0	28974	66770	171900	291812	426506	594460	

PROFITABILITY RATIOS (\$b 000)

CASH FLOW without owner contribution		-2753	26461	105130	119912	134694	167954	551398
OWNER CONTRIBUTION (new investments)*	22505	31727	11335					65567
PRESENT VALUE OF CASH FLOW WITHOUT OWNER CONTRIBUTION				34%	=	153754		
PRESENT VALUE OF OWNER CONTRIBUTION				34%	=	52494		
NET PRESENT VALUE				34%	=	101260		
IRR OF CASH FLOW WITHOUT OWNER CONTRIBUTION				86%	=	42875		
IRR OF OWNER CONTRIBUTION				86%	=	42875		
NET INTERNAL RATE OF RETURN				86%	=	0		
COST BENEFIT				34%	=	2.93		

TABLE 27

AGROPECUARIA COPACABANA

FIXED, VAR., INVEST., OWN. CONTR. COST
INCREASE OF 10%

	<u>INCOME STATEMENT (\$b 000)</u>							
	<u>Year 0</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>	<u>Total</u>
SALES								
Hogs Weight 95 kg au		10000	14000	14000	14000	14000	14000	80000
Pigs Weight 15 kg au		3000	6000	6000	6000	6000	6000	33000
Hogs Price \$b 260/kg		247000	345800	345800	345800	345800	345800	1976000
Pigs Price \$b 6240/au		18720	37440	37440	37440	37440	37440	205920
TOTAL SALES		265720	383240	383240	383240	383240	383240	2181920
VARIABLE COSTS		165183	240705	240705	240705	240705	240705	1368706
FIXED COSTS		53472	66399	66399	66399	66399	66399	385469
INTEREST EXPENSE (without accrual)		128152	80819	52846	36586	20325	4065	322793
PROFIT		-81087	-4683	23290	39550	55811	72071	104953
		<u>CASH FLOW (\$b 000)</u>						
INCOME								
Sales		265720	383240	383240	383240	383240	383240	2181920
Investment Cap. Own Contribution	244537	17370						261906
Working Cap. Own Contribution		17531	12468					29999
Loan- Invest. Cap.	162603							162603
Loan-Working Cap.		157776						157776
TOTAL INCOME	407140	458396	395708	383240	383240	383240	383240	2794204
EXPENSES								
Investments	407140	99980						507120
Variable Costs		165183	240705	240705	240705	240705	240705	1368706
Fixed Costs (without depreciation)		10123	13876	13876	13876	13876	13876	79504
Interest Expense		128152	80819	52846	36586	20325	4065	322793
Loan Amortization		78888	99213	40651	40651	40651	20325	320379
TOTAL EXPENSES	407140	482326	434613	348078	331817	315557	278971	2598501
CASH FLOW	0	-23930	-38905	35162	51423	67683	104269	195703
ACCUMULATED CASH FLOW	0	-23930	-62834	-27672	23751	91434	195703	
		<u>PROFITABILITY RATIOS (\$b 000)</u>						
CASH FLOW without owner contribution		-58830	-51373	35162	51423	67683	104269	148335
OWNER CONTRIBUTION (new investments)*	24755	34900	12468					72123
PRESENT VALUE OF CASH FLOW WITHOUT OWNER CONTRIBUTION				34%	=	-8274		
PRESENT VALUE OF OWNER CONTRIBUTION				34%	=	57744		
NET PRESENT VALUE				34%	=	-66017		
IRR OF CASH FLOW WITHOUT OWNER CONTRIBUTION				10%	=	66814		
IRR OF OWNER CONTRIBUTION				10%	=	66813		
NET INTERNAL RATE OF RETURN				10%	=	0		
COST BENEFIT				34%	=	-0.14		

TABLE 28

FNCD - HOG PROJECT

COMBINED CASH FLOW

PRICE INCREASE OF 10% IN SALE OF MEAT (\$b 000)

	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>TOTAL</u>
INCOME				
National Sales	1607545	2434860	2626511	6668916
Export Sales	677673	779324	872843	2329840
Capital Contribution	21915	10000		31915
Loans	542222	401743	349227	1293192
Representations	114448	126664	137904	379016
Accounts Receivable	500	500	500	1500
Sale of Assets	280000			280000
Returns/Recoveries	8375	9631	10787	28793
Other Income	900	900	900	2700
TOTAL INCOME	3253579	3763622	3998672	11015873
EXPENSES				
Raw Material (Hogs and others)	1242836	1680356	1763213	4686405
Conversion Cost	97049	124541	129208	350798
Administrative Cost	80558	114819	117106	312483
Marketing Cost	166406	254398	259217	680021
Interest Expense	294563	185124	149258	628945
Loan Amortization	1102549	875111	865309	2842969
Export Cost	60331	69380	77706	207417
Representations	71032	81687	91490	244209
Other Expenses	19255	18002	54007	91264
Taxes (only of the Hog Project)	0	87929	141597	229526
TOTAL EXPENSES	3134579	3491347	3648112	10274038
CASH FLOW	119000	272275	350561	741835
ACCUMULATED CASH FLOW	119000	391275	741835	1252110
CASH FLOW WITHOUT OWNER CONTRIBUTION	97085	262275	350561	709920
PRESENT VALUE OF CASH FLOW WITHOUT OWNER CONTRIBUTION			34% =	364213
PRESENT VALUE OF OWNER CONTRIBUTION			34% =	29377 (Present value only of 1985 contribution)
NET PRESENT VALUE			34% =	334836
IRR OF CASH FLOW WITHOUT OWNER CONTRIBUTION			528% =	23506
IRR OF OWNER CONTRIBUTION			528% =	23506
NET INTERNAL RATE OF RETURN			528% =	0
COST BENEFIT / OWNER CONTRIBUTION			34% =	12.40

SOURCE: Cash Flow without Hog Project; FNCD Analysis of present and projected condition
Cash Flow of Hog Project; See previous table

TABLE 29

FNCD - HOG PROJECT

COMBINED CASH FLOW

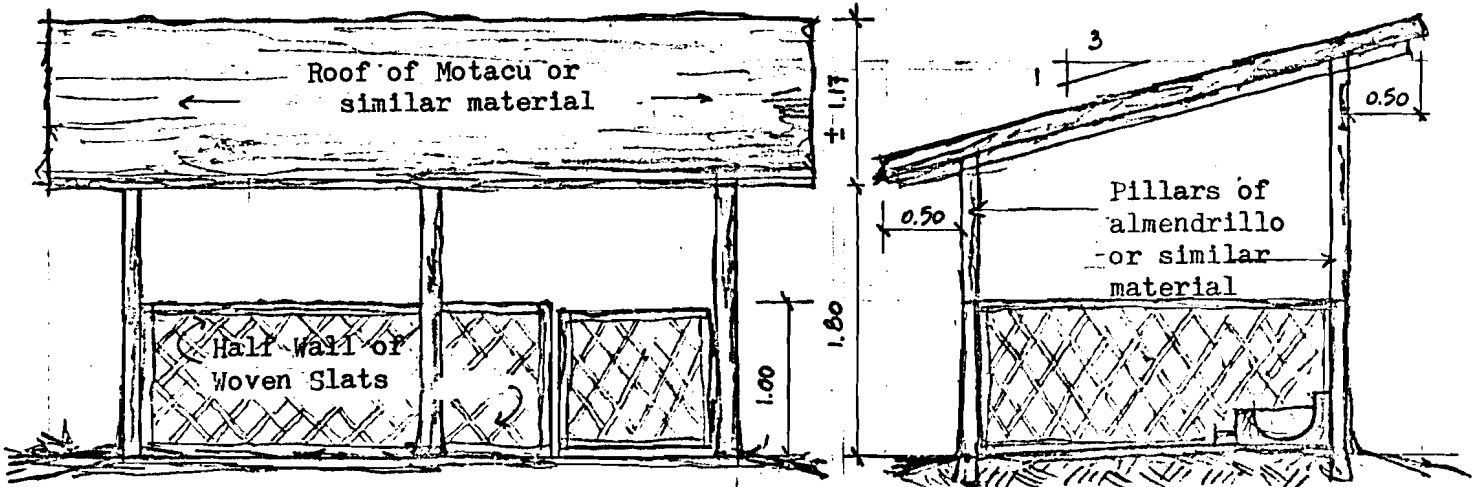
COST INCREASE OF 10% * (\$b 000)

	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>TOTAL</u>
INCOME				
National Sales	1516988	2277430	2459329	6253747
Export Sales	677673	779324	872843	2329840
Capital Contribution	21915	10000		31915
Loans	559384	401743	349227	1310354
Representations	114448	126664	137904	379016
Accounts Receivable	500	500	500	1500
Sale of Assets	280000			280000
Returns/Recoveries	8375	9631	10787	28793
Other Income	900	900	900	2700
TOTAL INCOME	3180183	3606192	3831490	10617865
EXPENSES				
Raw Material (Hogs and others)	1307178	1779344	1862201	4948723
Conversion Cost	101352	131161	135828	368342
Administrative Cost	80558	114819	117106	312483
Marketing Cost	166406	254398	259217	680021
Interest Expense	297995	185124	149258	632377
Loan Amortization	1119711	875111	865309	2860131
Export Cost	60331	69380	77706	207417
Representations	71032	81687	91490	244209
Other Expenses	19255	18002	54007	91264
Taxes (only of the Hog Project)	0	44934	71349	116283
TOTAL EXPENSES	3223818	3553961	3683471	10461250
CASH FLOW	-43635	52231	148019	156615
ACCUMULATED CASH FLOW	-43635	8596	156615	121577
CASH FLOW WITHOUT OWNER CONTRIBUTION	-65550	42231	148019	124700
PRESENT VALUE OF CASH FLOW WITHOUT OWNER CONTRIBUTION			34% =	36120
PRESENT VALUE OF OWNER CONTRIBUTION			34% =	29377 (Present value only of 1985 contribution)
NET PRESENT VALUE			34% =	6742
IRR OF CASH FLOW WITHOUT OWNER CONTRIBUTION			40% =	29076
IRR OF OWNER CONTRIBUTION			40% =	29076
NET INTERNAL RATE OF RETURN			40% =	0
COST BENEFIT / OWNER CONTRIBUTION			34% =	1.23

SOURCE: Cash Flow without Hog Project: FNCD Analysis of present and projected condition November, 1982

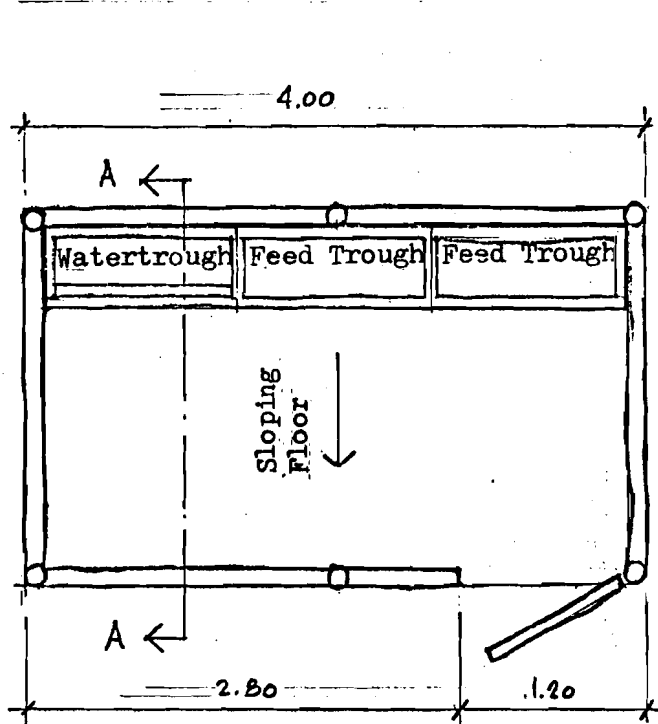
Cash Flow of Hog Project: See previous table

*Only the costs related to the Hog Project; all other costs remain constant.

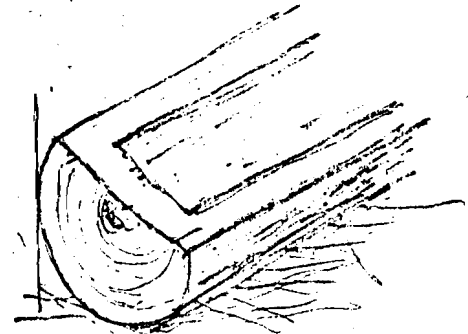


ELEVATION

PROFILE A-A



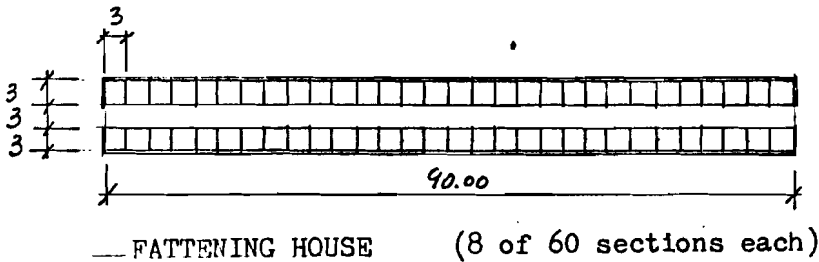
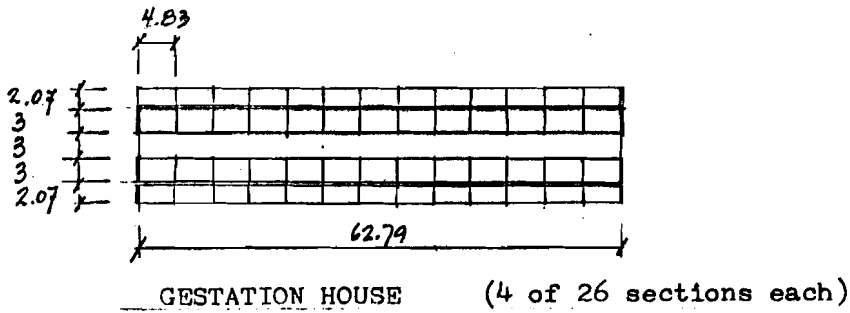
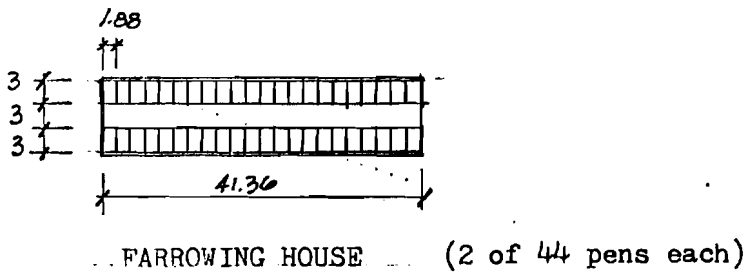
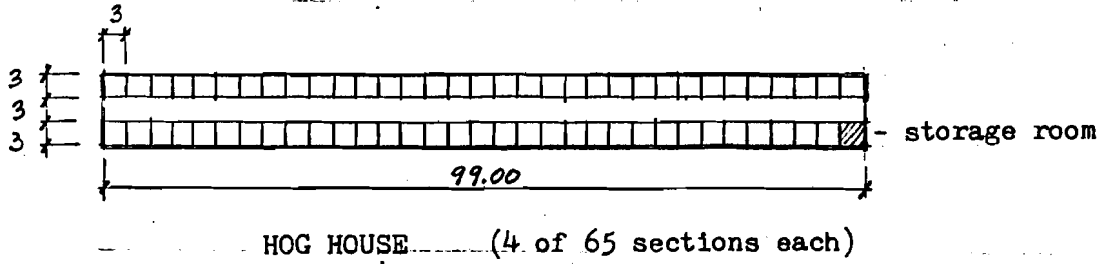
FLOOR PLAN



Detail of Water/
Feed Trough

DIAGRAM OF SHELTER FOR 10 PIGS

DIAGRAM OF HOG HOUSES



APPENDIX I

ACROPECUARIA "COPACABANA"

INDIVIDUAL REGISTER OF FEMALES

Name
Number
Breed
Date of birth
Character
Size
Udders
Color
Origin

HEALTH SERVICES

VACCINATIONS									
Foot & mouth									
Swine fever									
Anthrax									
Brucellosis									
Antibiotics									
Hormones									
Vermifuges									
Other									

PRODUCTION REGISTER

Size of litter																			
Father																			
Date of service																			
Date of farrow																			
Temperament																			
Piglets born																			
" alive																			
" dead																			
" still-born																			
" eliminated																			
Sex																			
Color																			
Weight																			
WEANING date																			
Days																			
Number																			
Weight																			
Reserved																			
Males																			
Females																			
SALE OF FEMALE																			

AGROPECUARIA "COPACABANA"

LITTER REGISTER

Number	
Breed	
Data Father	
Data Mother	
Date of birth	
Piglets born	
Piglets weaned	
Other	

HEALTH SERVICES

Eye-teeth clipped															
Iron injection															
Foot & mouth vacc.															
Swine fever "															
Anthrax "															
De-worming															
Antibiotics															
Vitamins															
Castration															

INDIVIDUAL REGISTER OF WEANER PIGS

Number																				
Sex																				
Weight																				
Color																				
Defects																				
Hour born																				
Castration																				
Weaning weight																				
Date of death																				
Cause																				
Date of sale																				
To whom																				

FARROWING NOTES

Contractions	
Birth	
Placenta	
Transfer piglets	

FEED REGISTER

AGROPECUARIA "COPACABANA"

Date								
Feed 20-22%								
18%								
KG 16%								
14-15%								
12%								
Gestating								
Sires								
Farrowing (Fibre)								
Suckling								

Date								
Preinic.Feed 20-22								
Preini. 18								
Growing A16								
Growing B14-15								
Gestating								
Sires								
Farrowing (Fibre)								
Suckling								
Conc.Feed boxes 12								

Date								
Preinic.20-22%								
Preinic.18%								
Growing A								
Growing B								
Sires								
Farrowing(Fibre)								
Suckling								
Conc.Feed boxes								

FORM FOR CENSUS RE HOG STOCK
SMALL FARMERS.

1.- GENERAL ASPECTS:

- 1.1. Name of farmer.....
- 1.2. Place and date of birth.....
- 1.3. Present place of residence.....
- 1.4. No. of children.....children who live on the farm.....Age.....
- 1.5. How many years have you lived in the Chapare?.....

2.- LANDOWNERSHIP:

- 2.1. How many properties or lots do you have?.....
- 2.2. Name of the property.....
- 2.3. How did you get it?.....
- 2.4. Area held.....
- 2.5. Documents proving ownership.....
- 2.6. Situation of the farm in the project (co-ordinated and in relationship to the existing tracks).....
- 2.7. Way of reaching the property.....

3.- ADMINISTRATION & MANAGEMENT:

- 3.1. Do you administer the property personally or do you have employees?.....
- 3.2. If you have employees, how many? a)On a fixed salary...
.....b)On shares.....
.....c) Others.....
- 3.3. Have you ever bred pigs? Yes....No....How many?.....
- 3.4. If you have bred pigs, what feed did you give them?....
- 3.5. Have you bred pigs for fattening or for reproduction?..
- 3.6. On what feed do you think pigs fatten best?.....
.....and what did they weigh?.....
- 3.8. How long did you fatten them?.....
- 3.9. What did the fat pigs weigh when you sold them?.....
- 3.10. What method did you use to feed the pigs?.....
On direct grazing.....Cost.....

- 2 -

- On grazing and balanced feed.....
- Cost.....
- On grazing with bananas and cassava.....
- Cost.....
- On balanced feed only.....
- Cost.....
- On cassava and bananas only.....Cost.....
- Other methods.....
- 3.11. Where did you buy the young pigs for fattening?.....
- 3.12. Who or what company bought the pigs?.....
-at what price?.....
- 3.13. If they paid by weight what price did they pay?.....

AGE OF PIG	WEIGHT KGRS	TOTAL SALE PRICE	PRICE PER KGR. LIVEWEIGHT
0-4 Months			
4-6 Months			
6-8 Months			
8-10 Months			
10-12 Months			
More than 12 Months			

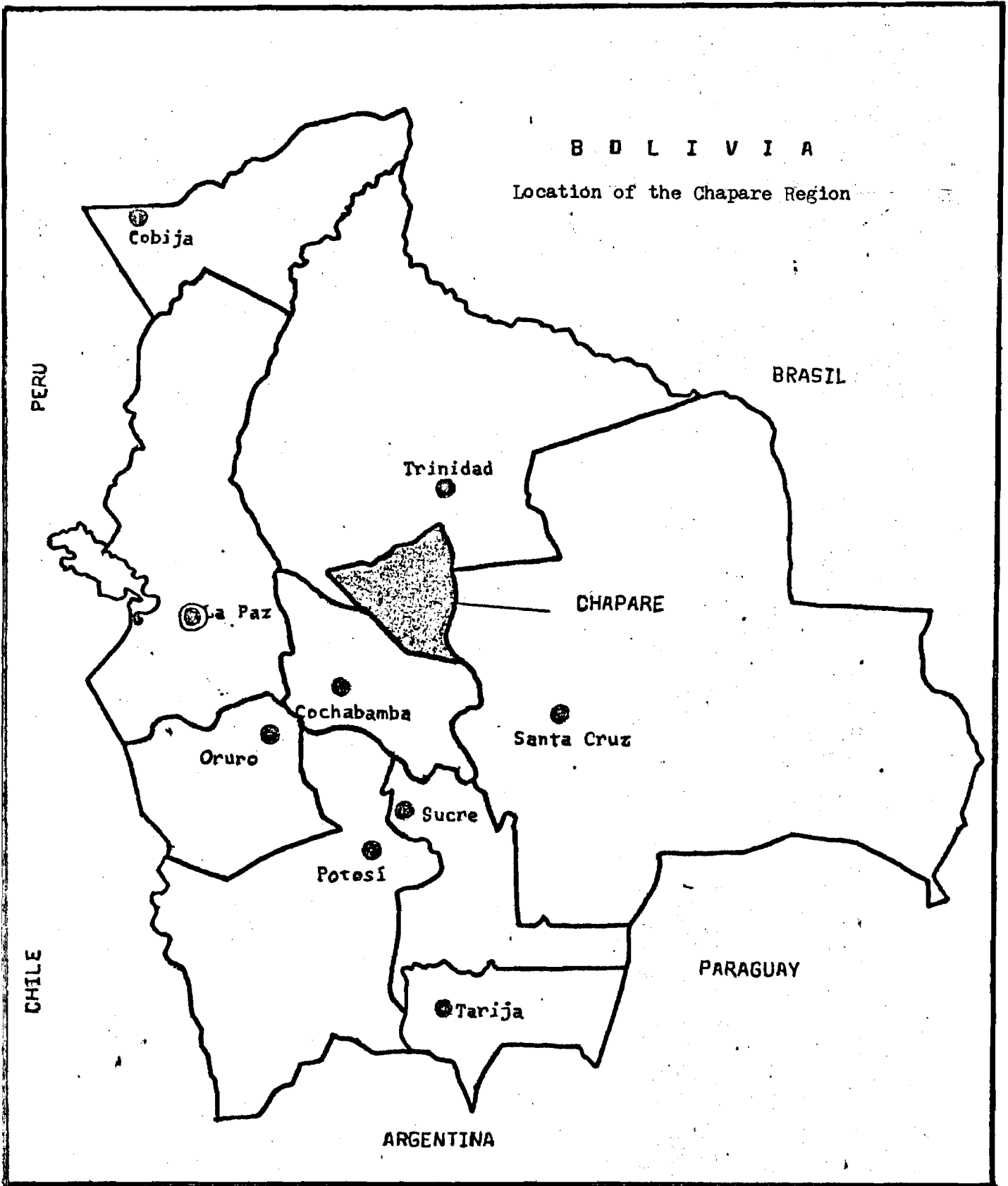
4.- REPRODUCTION

- 4.1. Do you have a boar? Yes.....No....Where did you get it?
.....
- 4.2. At what time do you put the boar with the sows?.....
- 4.3. If you have bred sows for reproduction, at what age does
the sow have her first litter?.....
- 4.4. Do you use a brand or any identification for your pigs?
.....
- 4.5. What animal husbandry techniques do you use on your....
piglets?.....
- Eyetooth clipping
- Weaning (Age)
- Left over food
- Cleaning
- 4.6. If you have bred sows for reproduction, how many piglets
do they have in each litter?.....
- How many live until weaning?.....

5.- OTHER TECHNICAL DATA:

- 5.1. Are you familiar with the different breeds of pig? Such as:-
 - Duroc Jersey.....Yorkshire.....
 - Hampshire.....Poland China.....
 - Landrace.....Berkshire.....
- 5.2. Do you practice selection in your herd? Yes....No.....
What method do you use?.....
- 5.3. Are you familiar with heterosis? If so, until what generation do you consider technique should be used?...
- 5.4. Do you vaccinate your herd? For which diseases?.....
 - Foot and mouth.....
 - Rabies.....
 - Swine fever.....
 - Bruçelosis.....
 - Others.....
- 5.5. What are the diseases that most affect your herd?.....
- 5.6. What problems of major importance do you consider affect the exploitation of pigs?.....
- 5.7. If you were offered good quality pigs to fatten, would you dedicate yourself to this activity? Yes.....No.....
- 5.8. Would you fatten pigs if you were offered a safe market? Yes.....No.....
- 5.9. If you agreed to fatten young pigs, would you build the styas that the specialists advise? Yes.....No.....
- 5.10. Would you agree to work in a system of Co-operatives for fattening pigs or would you prefer to breed on your property?.....

APPENDIX III

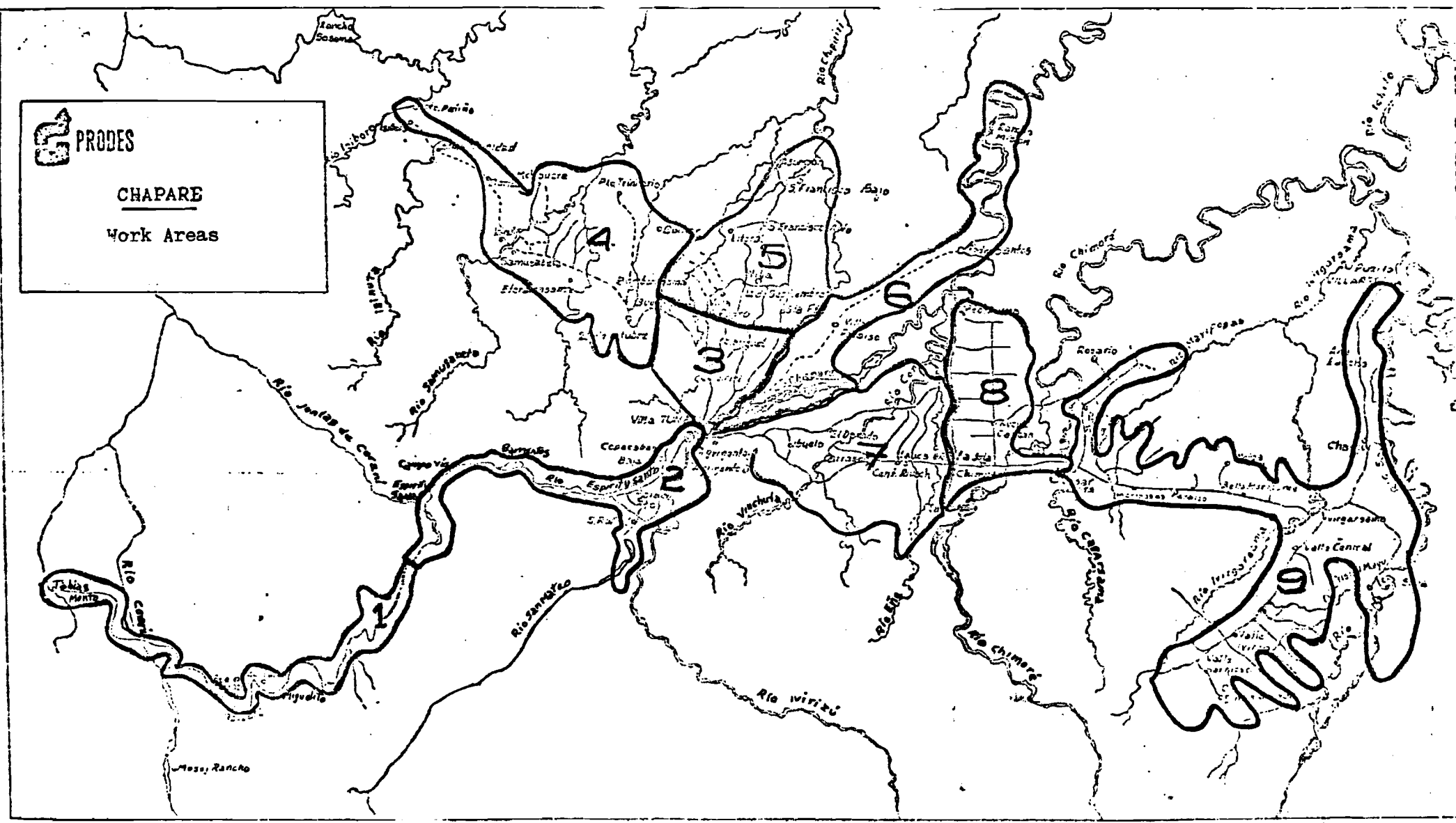




PRODES

CHAPARE

Work Areas



FABRICA NACIONAL DE CONSERVAS DILLMANN
SUCCESSORS OF CARLOS PENA S.R.L.
BALANCE SHEET
as of SEPTEMBER 30, 1982

	\$b	\$b
<u>ASSETS</u>		
<u>CURRENT ASSETS</u>		
CASH		
Cash and Banks		6,733,209.--
ACCOUNTS RECEIVABLE		
Accounts Receivable - Clients	21,551,284.--	
Down Payments to Suppliers	839,264.--	
Accounts Receivable - Personnel	12,592,795.--	
Prepaid Taxes	1,648,059.--	
Other accounts receivable	5,859,241.--	
Provision for Past Due Loans	<u>(580,763.--)</u>	41,909,880.--
INVENTORY		
Raw Material	756,000.--	
Work in Progress	12,368,275.--	
Finished Goods	41,359,428.--	
Stored Materials and Supplies	96,974,025.--	
Goods in Transit	<u>79,263,147.--</u>	230,720,875.--
TOTAL CURRENT ASSETS		<u>279,363,964.--</u>
<u>OTHER ASSETS</u>		
ACCOUNTS RECEIVABLE		
From Building Sale		181,339,389.--
INVESTMENTS		
Shares and Securities		10,100.--
FIXED ASSETS		
Land, plant and equipment (net of accumulated depreciation of \$12,478,389.--)		1,016,524,440.--
DEFERRED EXPENSES		
Planning Studies and Projects		4,106,609.--

New Product Promotional Expenses (net of accumulated amortization of \$b979,754.--)		653,169.--
OTHER DEFERRED EXPENSES		
Foreign Exchange Position		<u>50,028,780.--</u>
TOTAL OTHER ASSETS		<u>1,252,662,487.--</u>
TOTAL ASSETS		<u><u>1,532,026,451.--</u></u>
<u>LIABILITIES AND CAPITAL FUNDS</u>		
<u>LIABILITIES</u>		
<u>CURRENT LIABILITIES</u>		
LOANS		
Banks (net of prepaid interest of \$b933,250.00)	114,889,537.--	
Bills Discounted	46,134,150.--	
Suppliers	4,275,358.--	
Salaries and Bonuses	2,515,283.--	
Interest Payable (net of deferred interest of \$b6,498,820.--)	141,448,746.--	
Employee Benefits	1,076,973.--	
Taxes Payable	9,735,410.--	
Commercial Representations Payable	29,070,846.--	
Others	<u>8,049,990.--</u>	<u>357,196,293.--</u>
TOTAL CURRENT LIABILITIES		357,196,293.--
<u>LONG TERM LIABILITIES</u>		
LOANS		
Banks	474,313,561.--	
Bills Discounted	78,335,739.--	
Accounts Payable	<u>4,681,049.--</u>	<u>557,330,346.--</u>
PROVISIONS		
Social Benefits	<u>7,119,404.--</u>	<u>7,119,404.--</u>
TOTAL LONG TERM LIABILITIES		<u>564,449,750.--</u>
TOTAL LIABILITIES		921,646,043.--
<u>CAPITAL FUNDS</u>		
CAPITAL		

Paid in Capital	53,571,650.--	
Capital by Revaluation Supreme Decree 17.240	33,404,691.--	
Capital by Revaluation	<u>527,827,798.--</u>	<u>614,804,139.--</u>
RESERVES		
Legal		387,269.--
RETAINED EARNINGS		
Loss 1981	(6,369,802.--)	
Profit of the Period	<u>1,558,802.--</u>	<u>(4,811,000.--)</u>
TOTAL CAPITAL FUNDS		<u>610,380,408.--</u>
TOTAL LIABILITIES AND CAPITAL FUNDS		<u><u>1,532,026,451.--</u></u>

APPENDIX VI

FABRICA NACIONAL DE CONSERVAS DILLMANN

SUCCESSORS OF CARLOS PENA S.R.L.

INCOME STATEMENT

as of SEPTEMBER 30, 1982

Period beginning January 1, 1982

	<u>\$b</u>	<u>\$b</u>
Net Sales		72,110,279.--
Cost of Sales		<u>30,866,252.--</u>
Gross Profit		41,244,027.--
Commissions Received on Consignments		<u>5,630,941.--</u>
		46,874,968.--
Administrative Expenses	7,087,913.--	
Marketing Expenses	13,388,288.--	
Financial Expenses	<u>25,077,585.--</u>	<u>45,553,786.--</u>
		1,321,182.--
Plus:		
Other Income		257,179.--
Less:		
Other Expenses		<u>(19,559.--)</u>
Net Profit of the period		1,558,802.--

APPENDIX VII.
 ASESORAMIENTO EMPRESARIAL S.A.

AGROPECUARIA COPACABANA

The following data covers the agricultural year July, 1981 to June, 1982. This data is but a small percentage of the total information recorded by AC and it serves as an example of the type of data registered.

DATE	FARROWINGS (NO.)	PIGS PER LITTER (NO.)	BIRTH WEIGHT PER PIGLET (KG)	PIGLETS BORN (AVERAGE) (NO.)	PIGLETS WEANED (NO.)	WEIGHT PER PIGLET AT WEANING (KG)	PIGLETS WEANED (AVERAGE) (NO.)
81 July	25	238	1.384	9.52	193	12.841	7.72
August	20	173	1.25	8.65	141	12.315	7.05
September	21	179	1.34	8.52	148	12.243	7.04
October	30	266	1.28	8.87	220	12.393	7.33
November	10	69	1.362	6.90	53	11.727	5.30
December	13	109	1.303	8.38	91	12.802	7.00
82 January	15	139	1.403	9.27	105	10.828	7.00
February	20	166	1.277	8.30	133	12.254	6.65
March	21	190	1.204	9.05	154	11.445	7.33
April	19	151	1.302	7.95	117	12.24	6.15
May	5	47	1.33	9.40	34	11.808	6.80
June	18	158	1.317	8.78	126	12.896	7.00
TOTAL	217	1885	15.752	8.63	1515	145.792	6.86
AVERAGE (Divided by 12 months)			1.31			12.15	

A P P R A I S A L

PROPERTY:

AGROPECUARIA COPACABANA

OWNER:

MR. ALFREDO SALAZAR RIVAS

APPRAISAL

Property: Agropecuaria Copacabana

Juan Gallo Palacios, architect with professional registry no. 148, at the request of the manager and owner, Mr. Alfredo Salazar Rivas to value his property Agropecuaria Copacabana, do hereby present the following appraisal:

1. Location:

The property Agropecuaria Copacabana is located in the zone of Ibuelo of Villa Tunari, Province of Carrasco of the State of Cochabamba.

2. Extension of the land:

General Characteristics: The agricultural property has a total extension of 74,661.25 hectares. The land is rectangular in shape, 320.00 meters wide by approximately 1,700.00 meters long with a north-south orientation and is transversally crossed by the asphalted highway 1-4 between Ibuelo and Villa Tunari. Because of its layout, the property is easily divided into four sections for the sole purpose of making the appraisal more exact.

a. Zone 1:

With 20,541.25 hectares, it is located at the southern end of the property, more specifically, from the southern boundary or Trail 2 to the asphalted highway. In this area are located all of the buildings of the farm including the houses. Consequently it has an internal road system for the circulation of vehicles and people, a sewage system, potable water and electrical current with outside illumination.

b. Zone 2:

With an extension of 28,243.10 hectares located in the center of the property, this is totally cleared agricultural land with infrastructure for the circulation of heavy farm equipment. It also has two bridges of reinforced concrete and a drainage system for torrential rains. The entire area is planted with citrus trees, 286 per hectare totalling 7,120 trees planted scientifically.

c. Zone 3:

With an extension of 23,199.90 hectares, this is land which is in the process of being cleared. It has brooks for water.

d. Zone 4:

It corresponds to the area covered by the streams and the Ibuelo River which is 2,677 hectares.

3. Cost of the land:

To more correctly estimate the value of the land, I investigated other property values in the area to determine the present value of the land. Taking into account my research, below is my appraisal:

ASESORAMIENTO EMPRESARIAL S.A.

<u>Zone</u>	<u>Surface in hectares</u>	<u>Price per hectare</u>	<u>Total in \$b</u>
1	20,541.25	400,000.-	82,165,000.-
2	28,243.10	300,000.-	84,729,300.-
3	23,199.90.	200,000.-	46,399,800.-
4	2,677.00	100,000.-	2,677,000.-
		Sub Total \$b	215,971,100.-

4. Covered Area:

The buildings consist of a. breeding houses for pigs, machine room, oven b. warehouses c. worker houses, veterinarian house, laboratories d. administrator house and e. ranch house and guest house.

a. Breeding houses for pigs, machine room, oven

These buildings are constructed of the following materials: stone foundations with cement mortars in the outside and dividing walls; columns of reinforced concrete in the supporting roof structure; cement over the foundation; walls of cement blocks of 1.40 meters high; roof of fibrocement "Duralit" above layers of almendrillo wood of 2" x 7" with lathing of 2" x 3" all over beams of 6" x 6" bolted to the columns of reinforced concrete of 0.25 x 0.25 meters; concrete floors; flooring of stone, stone drainage system finished with concrete sheets between open gutters of 0.40 x 0.40 meters with overpasses of iron grilles of $\frac{1}{2}$ " in diameter; metallic doors with frames of galvanized pipes of 2" and round iron grille of $\frac{1}{2}$ " rustproofed; all of the buildings painted with latex paint due to the humidity of the area.

b. Warehouses

They are built with stone foundations covered with cement; walls of cement blocks with a network of beams of reinforced concrete; roof of fibrocement "Duralit" above layers of almendrillo wood of 2" x 6"; soffits of stuccoed plaster over lathing; concrete floors and stone floorings; metallic doors with frames of galvanized pipes of 2" and iron metal grille, circular of $\frac{1}{2}$ "; windows of wood with screens; latex paint on walls and soffits; oil of the windows and rustproofed metallic doors.

c. Worker houses, Veterinarian house, Laboratories

These are built with stone foundations with cement mortars, covered with cement; walls of cement blocks with a network of reinforced concrete beams; roof of fibrocement "Duralit" above layers of wood 2" x 6"; floors of leveled cement; plastering of sandy cement; soffits of plaster over lathing; doors and windows of wood with screens in the windows; latex paint of the walls; the workers houses have turkish type bathrooms; the veterinarian house has a bathroom with a toilet, a tank. a wash basin, a shower and tiles imported from Brazil.

d. Administrator House

The house has a stone foundation with cement mortars; stone walls seen from the outside to the height (1.00 meter) of the windowsills; brick walls with a network of concrete beams; roof of fibrocement above layers of almendrillo wood 2" x 6"; cement floors, cement sidewalks, plastered walls with sandy cement; soffits with stuccoed plaster above wood lathing; doors and windows of mara wood with screens in the windows; latex paint on the walls,

soffits and eaves; oil on the doors and windows. The house has three bedrooms, a living-dining room, a kitchen with a sink and cabinets, a bathroom with Brazilian fixtures including the toilet, shower, basin and tiles.

e. Ranch House

It has two sections; the ranch house has an entrance hall, den, four bedrooms, dining room, kitchen with cabinets and sink built into the cabinets, bathroom with Brazilian fixtures including tiles, toilet, sink, mirror, cabinet all in white. The guest house has a large bedroom, two bathrooms with toilets and showers, a space for a sink, covered garage for 2 vehicles.

It should be noted that these houses are separated from the rest of the farm by a metallic door for vehicles and barbed wire fence 1.80 meters high.

The ranch and guest houses have stone foundations with cement mortars; stone walls seen from the outside to 1.00 meter then brick with a network of reinforced concrete beams, roof of fibrocement above almendrillo wood of 2" x 6"; concrete floors; walls plastered with fine sandy cement; soffits plastered with stucco above lathing; doors and windows of mara wood; screens in the windows, security locks on the doors.

f. Pool

Inside the barbed wire compound is a reinforced concrete pool of 140.00m² and 1.60 meters deep, painted with plastic paint for this type of construction.

g. Pasture land

Alongside shed 2 is 1,750.00 m² of grazing land, divided by barbed wire fences 1.20 meters high into 10 areas; pillars of reinforced concrete. Each area has a metallic door of 2.00 meters long by 1.20 meters high built with a galvanized pipe frame of 2" and metal grille of $\frac{1}{2}$ " rustproofed.

h. Hen House

With a surface of 1,260m² perimetrically closed with galvanized screening of 1" to a height of 1.80 meters fixed to posts of 2" galvanized pipes with metallic doors.

5. Infrastructure

5.1. Road System

All of the roads have beds filled with refuse and surfaced with stone. The entrance road to the warehouses is U shaped and is surfaced with stone as are the roads to the garages and to the ranch house.

5.2. Reinforced Concrete Bridges

In zone 2 there are two bridges of reinforced concrete above streams and built over containment walls of stone with cement mortars and buttresses of 45 degrees according to calculations for that purpose. The first bridge is 4.90 meters wide by 3.05 meters long. The second bridge is 4.90 meters wide by

4.85 meters long. The two bridges have inverted beams of 0.50 meters high as handrails.

5.3. Disinfecting Well

To enter the agricultural property one passes a metallic gate 3.90 meters wide at whose sides are some walls with cement mortars 2.5 meters high. Immediately thereafter is located a disinfecting well with some containing walls with cement mortars, and a cement floor. This well is built in such a way to permit the entry of heavy vehicles on ramps to allow for washing and disinfecting.

5.4. Cess Pool

It is a tank built of reinforced concrete with a capacity of 56.20m². It has a drainage system to the sewage system which passes previously through the septic tank.

5.5. Potable Water System

The water system has two sources; one in the southeast section of the property with a tank and pipes of 3" and 2½" at a distance of 245.00 meters; the second is in the southwest section with a tank and pipes of 3" and 2½" at a distance of 90 meters. Both ran water to a storage tank of 32.00m³ capacity at the highest point on the property so there is pressure. From the tank pipes go to the complex and to the houses by means of 1", ¾" and ½" pipes which are normal for this type of installation.

5.6. Sanitary Installation

The entire complex has a sewage system with cement tubes whose sections, interceptors etc. are built according to constructions of this type. The system flushes from each house to the septic tank then into an open canal to a brook on the property. The agricultural complex has an independent sewage system from the houses.

5.7. Electrical Installation

The electrical system is generated by two diesel and gasoline generators on galvanized steel posts which distribute current throughout the complex.

5.7. Equipment

The company has a Shibaura tractor of 25 horsepower, a weeder, a sower and a trailer.

6. Appraisal of Covered Areas

No.	Name	Unit	Amount	Price in \$b	
				Unit	Total
6.1.	Sheds 1 & 2	m ²	2,072.80	39,000.-	80,839,200.-
6.2.	Farrowing Shed	m ²	289.00	40,500.-	11,704,500.-
6.3.	Gestation Shed	m ²	517.50	40,500.-	20,958,750.-
6.4.	Boar Shed	m ²	239.00	35,000.-	8,365,000.-
6.5.	Storagehouse	m ²	82.50	32,000.-	2,640,000.-
6.6.	Laboratory	m ²	18.60	34,000.-	632,400.-
6.7.	Machine Room	m ²	201.00	32,000.-	6,432,000.-
6.8.	Oven	m ²	31.30	35,000.-	1,095,500.-

ASESORAMIENTO EMPRESARIAL S.A.

No.	Name	Unit	Amount	Price in \$b	
				Unit	Total
6.9	Workers Houses	m ²	186.00	32,000.-	5,952,000.-
6.10	Veterinarian House	m ²	60.00	35,000.-	2,100,000.-
6.11	Administrator House	m ²	117.00	42,000.-	4,914,000.-
6.12	Ranch House	m ²	190.00	45,000.-	8,550,000.-
6.13	Guest House	m ²	107.00	43,500.-	4,654,500.-
				Sub total	158,837,850.-
7. Appraisal - Various					
7.1.	Pool				3,215,000.-
7.2.	Pasture Land				
	a. Barbed Wire 1.20m	ml	620.00	1,500.-	930,000.-
	b. Posts	pieces	88	5,500.-	484,000.-
	c. Metallic doors	pieces	10	9,000.-	90,000.-
7.3.	Barbed wire and posts around houses	ml	242.00	4,250.-	1,028,500.-
7.4.	Entrance doors 3				
	a. Stone walls	m ²	33.60	2,100.-	70,560.-
	b. Posts	m ³	1.00	50,000.-	50,000.-
	c. Metallic Door	m ²	30.00	4,500.-	135,000.-
7.5.	Screens & Posts				
	Hen House	ml	166.00	3,100.-	514,600.-
7.6.	Bridges A				650,000.-
	B				820,000.-
7.7.	Cess Pool				420,000.-
				Sub total	8,407,660.-
8. Appraisal Electrical Installation					
8.1.	Electrical artefacts	piece	20	40,000.-	800,000.-
8.2.	Cables				520,000.-
8.3.	Caterpillar motor 60kw				10,500,000.-
8.4.	Onan motor 12.5 kw				6,000,000.-
				Sub total	17,820,000.-
9. Appraisal Potable Water System					
9.1.	Water tank				950,000.
9.2.	Pipe system	ml	340.00	5,000.-	1,700,000.-
9.3.	Distribution system				750,000.-
9.4.	Field tanks				250,000.-
				Sub total	3,650,000.-
10. Appraisal Sanitary Installation					
10.1.	Tube system				275,000.-
10.2.	Inspection tanks	Pieces	10	7,500.-	75,000.-
10.3.	Interceptors	Pieces	11	6,000.-	66,000.-
10.4.	Septic tank				50,000.-
10.5.	Waste canal				45,000.-
				Sub total	511,000.-
11. Tools and Equipment					

11.1.	Shibaura tractor sower, trailer, fumigator	Piece	1	7,500,000.-	7,500,000.-
11.2.	Weeder	Piece	1	1,500,000.-	1,500,000.-
11.3.	Metallic cages for Farrowing	Piece	36	27,200.-	979,200.-
11.4	Feeders	Piece	274	4,700.-	<u>1,287,800.-</u>
				Sub total	11,267,000.-

Sum of Sub Totals

3.	Cost of the land	\$b	215,971,100.-
6.	Appraisal covered area	\$b	158,837,850.-
7.	Appraisal Various	\$b	8,407,660.-
8.	Appraisal Electrical Inst.	\$b	17,820,000.-
9.	Appraisal Potable Water	\$b	3,650,000.-
10.	Appraisal Sanitary Inst.	\$b	511,000.-
11.	Appraisal Equipment	\$b	<u>11,267,000.-</u>
	Grand total	\$b	416,464,610.-

Cochabamba, March 24, 1983

Signed Architect Juan Gallo Palacios

AGROPECUARIA COPACABANA

TRANSPORTATION COSTS

1) Truck (type Ford-350) of 2.5 tons

Total Cost		\$b 5000000
Financing	80%	\$b 4000000
Maintenance	3%	\$b 150000
Payment of Capital	5 year tenor	\$b 800000
Payment of Interest	40% p.a. (first year)	\$b 1600000
Total cost first year		\$b 2550000
Depreciation	20% p.a.	\$b 1000000
Total		\$b 3550000
Distance covered	40000 km	
Cost per km		\$b 88.75
Gasoline	\$b 25/lt-km	\$b 25.00
Total cost per km		\$b 113.75
Approximate Profit	10%	\$b 11.25
Total Price per km		\$b 125.00

2) Truck of 10 tons

Total Cost		\$b 15000000
Financing	80%	\$b 12000000
Maintenance	3%	\$b 450000
Payment of Capital	5 year tenor	\$b 2400000
Payment of Interest	40% p.a. (first year)	\$b 4800000
Total cost first year		\$b 7650000
Depreciation	20% p.a.	\$b 3000000
Total		\$b 10650000
Distance covered	40000 km	
Cost per km		\$b 266.25
Gasoline	\$b 25/lt-km	\$b 25.00
Total cost per km		\$b 291.25
Approximate Profit	10%	\$b 28.75
Total Price per km		\$b 320.00
Cost per truck	\$b 320/km x 163 km	\$b 52160
Cost per hog*	70 hogs / truck	\$b 745
Cost per kg/freight	10000 kg / truck	\$b 5.22

*hog weighing between 80 and 100 kg

AGROPECUARIA COPACABANA

PRESENT PROFITABILITY PER HOG

1) Cost per Fattened Hog

					%sales
Boar:	Annual feed	912.50 kg			
	x Cost of feed	47.94 \$b/kg			
	/ Sows serviced	28.60 / year			
	/ Piglets weaned	13.95 / year			
	= Cost		\$b	110	0.44
Sow:	Gestation feed	486 kg	43.27 \$b/kg	\$b	21029
	+ Milking feed	560 kg	50.47 \$b/kg	\$b	28263
	+ In heat feed	35 kg	47.97 \$b/kg	\$b	1679
	Total feed	1081 kg		\$b	50971
	/ Piglets weaned		13.96 / year	\$b	3651
					14.78
Pig:	Feed for 56 days	11.20 kg			
	x Cost of feed	57.23 \$b/kg			
	= Cost		\$b	641	2.60
Hog Being Fattened:	Growing Feed	66 kg	48.02 \$b/kg	\$b	3169
	+ Fattening feed	81 kg	47.55 \$b/kg	\$b	3852
	= Cost			\$b	7021
					28.42
Cost of Medicines:					
	Boar	\$b 900 / (13.96L x 28.6)		\$b	2
	+ Sow	\$b 900 / (13.96)		\$b	64
	+ Pig			\$b	200
	+ Hog			\$b	450
	= Cost			\$b	717
					2.90
Transportation Cost:					
	Hog	95 kg x \$b/kg	4.35	\$b	413
	Feed:				
	Boar	912.50 kg / (13.96 x 28.6)			
	+ Sow	1081.00 kg / 13.96			
	+ Pig	11.20 kg			
	+ Hog	147.00 kg			
	= Cost of feed	238 kg x \$b/kg	4.35	\$b	1034
	= Cost			\$b	1447
					5.86
Labor:					
	1 Technician/Administrator	\$b 25000 x 15 sal.		\$b	375000
	3 Workers	\$b 12400 x 15 sal.		\$b	558000
	30% Social Benefits			\$b	279900
	1 Veterinarian (contract)	\$b 20000 x 12 sal.		\$b	240000
	Total			\$b	1452900
	= Cost divided by	1800 hogs		\$b	807
					3.27
Other Costs:					
	Insurance, Electricity, Maintenance etc.			\$b	150
					0.61
Administrative Cost:					
	1 General Manager	\$b 30000 x 15 sal.		\$b	450000
	30% Social Benefits			\$b	135000
	Various, Accounting			\$b	360000
	Total			\$b	945000
	= Cost divided by	1800 hogs		\$b	525
					2.13
Depreciation:					
	Fixed Assets	\$b 200439.5M x 10% x 50%/1800			5568
					22.54
Total Costs				\$b	20637
					83.55
2) Income per Hog	95 kg x \$b 260/kg			\$b	24700
					100.00
3) Profit per Hog				\$b	4063
					16.45

ASESORAMIENTO EMPRESARIAL S.A.

AGROPECUARIA COPACABANA

PRESENT PROFITABILITY PER PIG

						%Sales
1) Cost per Pig						
Boar:	Annual Feed	912.50 kg				
	x Cost of feed	47.94 \$b/kg				
	/ Sows serviced	28.60 / year				
	/ Piglets weaned	13.96 / year				
	= Cost			\$b	110	1.76
Sow:	Gestation feed	486 kg	43.27 \$b/kg	\$b	21029	
	+ Milking feed	560 kg	50.47 \$b/kg	\$b	28263	
	+ In heat feed	35 kg	47.97 \$b/kg	\$b	1679	
	Total feed	1081 kg		\$b	50971	
	/ Piglets weaned		13.96 / year	\$b	3651	58.51
Pig:	Feed for 56 days	11.20 kg				
	x Cost of feed	57.23 \$b/kg				
	= Cost			\$b	641	10.27
Cost of Medicines:						
	Boar	\$b 900 / (13.96L x 28.6)		\$b	2	
	+ Sow	\$b 900 / 13.96		\$b	64	
	+ Pig			\$b	200	
	= Cost			\$b	267	4.27
Transportation Cost:						
	Feed:					
	Boar	912.50 kg / (13.96 x 28.6)				
	+ Sow	1081.00 kg / 13.96				
	+ Pig	11.20 kg				
	= Cost	90.92 kg x \$b/kg	4.35	\$b	395	6.34
Labor:						
	1 Technician/Administrator	\$b 25000 x 15 sal.		\$b	375000	
	3 Workers	\$b 12400 x 15 sal.		\$b	558000	
	30% Social Benefits			\$b	279900	
	1 Veterinarian	\$b 20000 x 12 sal.		\$b	240000	
	Total			\$b	1452900	
	/ Cost divided by	1800 hogs		\$b	807	
	= By 25% estimated for breeding of pigs			\$b	202	3.23
Other Costs:						
	Insurance, Electricity, Maintenance etc.			\$b	150	
	= By 25% estimated for breeding of pigs			\$b	38	0.60
Administrative Cost:						
	1 General Manager	\$b 30000 x 15 sal.		\$b	450000	
	30% Social Benefits			\$b	135000	
	Various, Accounting	Dep. Gas.		\$b	360000	
	Total			\$b	945000	
	/ Cost divided by	1800 hogs		\$b	525	
	= By 25% estimated for breeding of pigs			\$b	131	2.10
Depreciation:						
	Fixed Assets	\$b 200439.5M x 10% x 50%/1800		\$b	5568	
	= By 25% estimated for breeding of pigs			\$b	1392	22.31
Total Costs				\$b	6826	109.40
2) Income per Pig		1.60 x 15.00 kg / \$b 260/kg		\$b	6240	100.00
3) Profit (Loss) per Pig				\$b	-586	-9.40

APPENDIX XII
 ASESORAMIENTO EMPRESARIAL S.A.

SUPPLY AND DEMAND FOR PORK IN COCHABAMBA (STATE)

<u>Pork</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
Supply (000 MT)	5820	5880	5940	6000	6060	6120
Demand (000 MT)	9134	9313	9504	9694	9886	10087
Balance (000 MT)	-3314	-3433	-3564	-3694	-3826	-3967
Project (000MT)*			746	1147	1320	1492
% Project of Balance			21	31	35	38
Project (hogs)			13000	20000	23000	26000

Source: Coopers & Lybrand - June 18, 1983

*It is assumed that the Project will begin operating in 1985. For the calculation of the metric tons of the Project, the quantity of hogs produced times the average weight of 90 kilos per hog times the rendition of 63.75% in meat is taken. (Example: 1985 - 13,000 hogs x 90 kg/hog x 0.6375 = 746 MT)