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CHAPARE PROJET PRODUCTION ANALYSIS

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INTRODUCTION

This report was prepared in order to have updated information on production costs of the main crops being developed in the Chapare, the production systems in effect and a relation of incomes and expenditures of the model developments for each one of the microregions in which the areas 15 divided.

The work was performed in stages beginning with a survey of the main production areas, discussions were held with individual producers and groups and the La Jota and Chipiriri Experimental Stations were visited. This stage lasted three days.

Later on, at the Central Office of PRODES in the city of Cochabamba, a very general review of the work previously prepared related to production costs or to crop systems in the Chapare was made. At the same time, a brief questionnaire was designed in order to collect the required updated -- information in interviews with a limited number of producers.

In Villa Tunari, in accordance with the opinion of the technicians working in the area, mainly Eng.Carlos Hoffman, it was decided not to use the questionnaires but rather to take notes on copybooks to record the information gathered through informal discussions with producers.
Therefore, it was not possible to use any sampling design statistically valid due to the extreme susceptibility of the producers which did not permit interviews with persons not previously known or who would not trust PRODES technicians. Approximately 25 discussions were held in 5 working days in the Chapare, later on the information collected was tabulated

in Cochabamba and the tables and schemes which are part of this report were prepared. The work was performed with the cooperation of PRODES technical personnal, Messrs. Mario Ballón, Carlos Hoffman an Wilfredo Garvizu, to whon we wish to express our appreciation for their valuable opinions and suggestions that made more productive our visit to Chapare and Cochabamba.

A.- GENERAL CONSIDERATIONS ON PRODUCTION COSTS

Traditional agriculture in the Chapare is developed following very varied crop systems mainly dependent on the following factors:

a) Availability of economic resources by the producers to select betweein yearly and permanent crops.

b) Experience acquired through residence period in the area.

c) Soil and drainage limitations.

d) Market expectations and pricing for the produce.

The preparation of soils begins with the slash and burn process and the clearing of the ground. Normally, the burning is followed by the planting of yearly crops such as rice and corn, alone or combined, followed by semi-permanent crops.

This is why it is said that rice pays the cost of the slash and burn process, but lately plantations were observed where Coca was the first crop. In all cases, the crop cycle is very short, and the land must be left to fallow (chume) for periods ranging between 3 to 9 years.

The cost of the slash and burn operation, usually performed under contract, will vary whether it covers virgin land ($b.17.000/Ha.) or 3 or more years fallow land ($b.12.000 - 14,000/Ha.).

Crop husbandry work is reduced to weeding and clearing of the ground. The application of fertilizers is not usual and the use of insecticides or any other plague control chemical is limited and reduced to the most profitable crops.

The modalities for the hiring of labor for harvesting vary with the crops, although lately it is becoming common the contracting fixing a price per specif weight unit or per number of units harvested.

To calculate the costs included in this report items such as harvesting bags, ladders, etc. have been charged directly to the crop.

Under the other Expenser chapter, the costs of administration of the operation were included, considering a minimum monthly wage of $b.8.490 as established by legal dispositions in effect, multiplied by 14 wages per year and divided by 4.3 Has. according to the average cultivated area established by the Agricultural Surve Of Tropical Chapare 1981-82 MACA-PRODES, resulting in $b.27.642/Ha/year

The household of the farmer (pahuichi) is estimated in $b.250.000 with a 10 year depreciation period, resulting in $b.5.814 per cultivated hectare.

The tools generally used for all types of crops are the following:

TABLE 1

INVENTORY OF TOOLS USED IN A CHAPARE TYPE OPERATION (4.3 HAS.)

I T E M	N°	PRESENT COST $b.	TOTAL INVESTMENT $b.	EFFECTIVE LIFE YEARS	ANNUAL DEPRECIATION $b.
Machetes	3	2.500	7.500	3	2.500
Axes	3	2.400	7.200	3	2.400
Pickaxes	2	1.300	2.600	3	867
Scratch shovels	2	2.000	4.000	3	1.333
Picks	1	2.200	2.200	3	733
Shovels	2	2,200	4,400	3	1.467
Whellbarrow	1	18.000	18.000	3	6.000
Pruning Scissors	1	1.200	1.200	3	400
Pulverization equip	1	36.000	36.000	3	12.000
T O T A L:			83,100		27.700
PER HECTARE			19.326		6.441

Labor is usually paid for the regular work fo one person per day. Payment varies fron $b.200 to $b.400 including the following:

1 meal (which may be repeated)
1 soft drink, lemonade, etc.,
1 ration of aproximately 50 gr. of coca leaves
1 pack of local cigarettes costing $b.10.-
1 pack of matches.

To calculate the cost of labor we estimated that the cost of the meal amounts to $b,200, making a total wage of $b.400-$b.600 according to the crops.

1.- C O C A

Coca is the most diffused crop in Chapare from the point of view of area. Although statistics differ according to the source, it is estimated that presently coca plantations cover approximately 35.000 Has. Official statistics are underestimated due to the sensitivity of the coca producers who are reluctant to provide true information fearing repressive or control measures.

TABLE 2

AREA AND PRODUCTION OF COCA IN THE CHAPARE
1978 - 1983

Y E A R	CULTIVATED AREA HAS.	PRODUCTION	SOURCE
1978	15.065	15.785	MACA
1979	15.900	20.350	MACA
1980	16.350	22.305	MACA
1981	12,774	24.935	MACA-PRODES
1982	35.000-37.000	---	GUERRA-MERCADO (1)
1983	35.000	---	HOFFMAN (1)

(1) Estimated.

Coca is practically spread over all the microregions, but the main producers are microregions 3,4,6,7 and 8.

1,1. Production cost

In the life cycle of the coca there are 3 stages.

The first is the nursery tree stage lasting 6 months approximately, but for this work the purchasing of 6-12 months old plants at a costs of $b.1.000 per head (1Head=1.000 small plants) was considered. The second stage or implantation stage requires about one year. A slash and burn plot of land (chaqueado) over virgin land is generally used although some producers use also fallow lands. The third stage or production stage is 9 years long on the average, but there are producers harvesting coca plantations that can be 20 year old.

The main difference between present costs and those found on the bibliographic review is that the pressing of the coca is no longer used and the costs of the "Kusuru" (coca seeds) are therefore avoided. The usual present practice is that the coca is packed directly in plastic bags commonly know as quintaleras. Once filled with 50 pounds these bags are called "tercio" or "tambor" and are equivalent to ancient units weighing 62.5 lbs. Therefore, the carga which years ago included two 62.5 lbs. drums making a total of 125 lbs, is now 100 lbs. only including two 50 lbs. bags.

Another remarkable fact is that coca is the only crop paying a $b.600 wage while the other crops can only reach $b.400 for the same work.
These differences are not easy to explain but possibly are due to:

a) High rentability of the crop.

b) The need to have a permanent offer of labor.

The costs of the crop husbandry for coca production contemplate the procurement and application of mirex to kill ants and sevin as insecticide. However, some producers practice the use and application of herbicides mixing 2-4-D and paracuat alternating its application with manual scratching.

The harvesting is paid by tiradas which is a weight unit of 12.5 lbs. of fresh coca. A harvester will gather 10 tiradas on average for each working day.

TABLE 3

NUMBER OF HARVESTED TIRADAS OF COCA PER YEAR, WEIGHT OF FRESH LEAVES AND DRY LEAVES PER HARVEST

HARVEST	N° OF TIRADAS	WEIGHT OF FRESH LEAVES (LBS.)	WEIGHT OF DRY LEAVES (LBS.)	WEIGHT OF DRY LEAVES (100 LBS.CARGAS)
I	360	4.500	1.800	18
II	340	4.250	1.700	17
III	200	2.500	1.000	10
IV	300	3.750	1.500	15
TOTAL:	1.200	15.000	6.000	60

The first year of production or second of plantation, only 900 tiradas are obtained because the harvest is made tearing the leaves very carefully since the branches are not sufficiently strong.

1.2. Production and incomes per years

The yielding of coca varies between crops (four per year) and is influenced mainly by rain fall and by soil factors from one microregion to another.

The crop husbandry is also used will influence as well the yielding, but on the average a yield of 60 cargas of coca with 100 lbs. of dried leaves each is harvested.

Prices were fluctuating very much during the latest year with a maximum of $b.52.000 per carga in November 1982, dropping to $b.23.000 in January 1983.

For calculation of incomes, $b.25.000 per carga would reflect the average for January 1983.

TABLE 4

STRUCTURE OF THE PRODUCTION COST OF COCA PER HECTARE

C O N C E T	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
1. LABOURS										
1.1. Soil preparation										
Chaqueado under contract	42 DH									
Burn	1 DH									
Cleaning and "japuchado"	20 DH									
Cleared and "estaqueado"	30 DH									
1.2. Plantation										
Plantation	36 DH									
1.3. Cultural Labours										
Weed	120 DH	100 DH	100 DH	100 DH	100 DH	100 DH	100 DH	100 DH	100 DH	100 DH
Aplication of mirex	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH
Aplication of sevin	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH
Harvest										
Harvest under contract		90 DH	120 DH	120 DH	120 DH	120 DH	120 DH	120 DH	120 DH	120 DH
Dry		8 DH	8 DH	8 DH	8 DH	8 DH	8 DH	8 DH	8 DH	8 DH
SUB-TOTAL:	257 DH	206 DH	236 DH	236 DH	236 DH	236 DH	236 DH	236 DH	236 DH	236 DH
2. MATERIALS										
Plantules	50.000									
Mirex	2 pounds	2 pounds	2 pounds	2 pounds	2 pounds	2 pounds	2 pounds	2 pounds	2 pounds	2 pounds
Quintal bags		5 bags	5 bags	5 bags	5 bags	5 bags	5 bags	5 bags	5 bags	5 bags
Awnings		1 piece	1 piece	1 piece	1 piece	1 piece	1 piece	1 piece	1 piece	1 piece
Sevin	2 Kgs.	2 Kgs.	2 Kgs.	2 Kgs.	2 Kgs.	2 Kgs.	2 Kgs.	2 Kgs.	2 Kgs.	2 Kgs.
3. OTHER EXPENSES										
Administratives	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH
Depreciation house hold	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %
Depreciation set of tools	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %
Average yield (in charges)		45	60	60	60	60	60	60	60	60

DH = Day/man
1 Charge = 100 pounds.

TABLE 5

COST OF PRODUCTION FOR COCA PER HECTARE
(January 1983, In Pesos Bolivianos)

C O N C E P T	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
1. LABOURS										
1.1. Soil preparation										
Chaqueado under contract	17.000									
Burn	400									
Cleaning and "Japuchado"	8.000									
Cleared and "estaqueado"	18.000									
1.2. Plantation										
Plantation	21.600									
1.3. Cultural labours										
Weed	72.000	60.000	60.000	60.000	60.000	60.000	60.000	60.000	60.000	60.000
Aplication of mirex	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400
Aplication of sevin	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400	2.400
1.4. Harvest										
Harvest under contract		45.000	60.000	60.000	60.000	60.000	60.000	60.000	60.000	60.000
SUB-TOTAL:	141.800	114.600	129.600	129.600	129.600	129.600	129.600	129.600	129.600	129.600
2. MATERIALS										
Plantules	50.000									
Mirex	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Quintal bags		1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400
Awnings		4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500
Sevin	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000
SUB-TOTAL:	57.000	12.900	12.900	12.900	12.900	12.900	12.900	12.900	12.900	12.900
3. OTHER EXPENSES										
Administratives	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642
Depreciation house hold	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814
Depreciation set of tools	6.441	6.441	6.441	6.441	6.441	6.441	6.441	6.441	6.441	6.441
SUB-TOTAL:	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897
TOTAL:	238.697	167.397	182.397	182.397	182.397	182.397	182.397	182.397	182.397	182.397
Average Price	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000

TABLE 6

BALANCE PER HECTARE OF COCA
(In Pesos Bolivianos)

C O N C E P T	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
1. INCOME		1.125.000	1.500.000	1.500.000	1.500.000	1.500.000	1.500.000	1.500.000	1.500.000	1.500.000
Production		1.125.000	1.500.000	1.500.000	1.500.000	1.500.000	1.500.000	1.500.000	1.500.000	1.500.000
2. EXPENSES	238.697	167.397	182.397	182.397	182.397	182.397	182.397	182.397	182.397	182.397
Labours	141.800	114.600	129.600	129.600	129.600	129.600	129.600	129.600	129.600	129.600
Materials	57.000	12.900	12.900	12.900	12.900	12.900	12.900	12.900	12.900	12.900
Other Expenses	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897
3. DIFERENCE	(-238.697)	957.603	1.317.603	1.317.603	1.317.603	1.317.603	1.317.603	1.317.603	1.317.603	1.317.603

2.- BANANAS

Bananas are one of the main crops of the Chapare region, as a rapid source of income permitting the settler to cover his sttlement costs.

Production covers all microregions, particularly those surrounding Villa 14 de Septiembre, Puerto San Francisco, Todos Santos, Ibuelo, Chimoré, Ivirgarzama and Bomborasama, as shown on the table.

TABLE 7

BANANAS-NUMBER OF PRODUCERS, CULTIVATED AREA, PRODUCTION AND YIELD BY MICRO REGIONS

1980 - 1981 a/

MICRO REGION b/	NUMBER OF PRODUCERS	AREA IN GROWTH Has.	AREA IN PRODUCTION Has.	PRODUCTION M.T.	YIELD Kg/Ha.
I (1)	20	---	13	135	10.000
II (2)	693	84	293	5.903	20.147
III (3)	245	---	269	4.035	15.000
IV (4)	1.099	91	762	15.088	19.800
V (3)	1.040	267	1.367	26.657	19.500
VI (5)	27	36	456	12.850	28.180
VII (6)	980	101	1.623	33.921	20.900
VIII (7)	1,083	304	713	16.335	22.907
IX (8-9)	1,044	146	1.525	28.371	18.604
T O T A L:	6,231	1,029	7.021	143.293	20.409

a/ Prepared on results of the MACA-PRODES Survey 1981

b/ Roman figures correspond to microregionalization in effect until the end of 1981.

The area of cultivation for 1983 is estimated in 10,000 hectares. Its production is continuous throughout the year, with 15-20 crops every 28 days in winter. However, production is interrupted in some areas during the rainy season, sometimes up to a six month period due to floodings and destruction of roads.

TABLE 8

PRODUCTION OF BANANAS PER HECTARE/YEAR

YEAR	PRODUCTION (CHIPAS) a/
1	80
2	218
3	320
4	320
5	320
6	218
7	100

a/ Prepared on information on PRODES products and technicians.

Initially the crop is normally associated to, or follows to, rice, corn or yucca, to continue alone or associated with citrics or coca. Production starts after one year of implantation and it is continues in some cases for 15 years. For the purposes of this analysis of costs, an average productive life of 7 years is assumed. The marketing unit used at producer's

level is the chipa, with a veight of approximately 100 kilos and a variable number of fingers according to the variety.

TABLE 9

NUMBER OF FINGERS PER CHIPA OF BANANAS ACCORDING TO VARIETIES

VARIETY	NUMBER OF FINGERS PER CHIPA
Guineo	900
Dulce cajita	1,200
Papancha	520
Mockotaqui	720

Production costs and prices are related to the "Mockotaqui" variety wich is the most common and commercial in the Chapare.

Negative balances in years 2 and 8 are notorious, as the producer normally does not hire day-labourers and thus their wages and those of their dependents as the item of other expenses are not accounted in his costs.

TABLE 10

STRUCTURE OF PRODUCTION COST FOR BANANO PER HECTARE

C O N C E P T	V E A R S							
	1	2	3	4	5	6	7	8
1. LABOURS								
1.1. Soil preparation								
Chaqueado under contract	42 DH							
Burn	1 DH							
Cleaning and "japuchado"	20 DH							
Traced	2 DH							
Making holes	3 DH							
1.2 Plantation								
Plantation	10 DH							
1.3 Cultural Labours								
Weed	30 DH	30 DH	30 DH	30 DH	30 DH	30 DH	30 DH	30 DH
1.4 Harvest								
Harvest and others		8 DH	20 DH	30 DH	30 DH	30 DH	20 DH	10 DH
SUB-TOTAL:	108 DH	38 DH	50 DH	60 DH	60 DH	60 DH	50 DH	40 DH
2. MATERIALS								
Sucker	625 H							
3. OTHER EXPENSES								
Administration	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH
Depreciation house hold	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %
Depreciation set of tools	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Average yield		80 chipas	218 chipas	320 chipas	320 chipas	320 chipas	218 chipas	100 chipas

TABLE 11

COST OF PRODUCTION OF BANANO PER HECTARE
(January 1983 In Pesos Bolivianos)

C O N C E P T	Y E A R S 1	2	3	4	5	6	7	8
1. LABOURS								
1.1 Soil preparation								
Chaqueado under contract	17.000							
Burn	400							
Cleaning and "japuchado"	8.000							
Traced	800							
Making holes	1.200							
1.2. Plantation								
Plantation	4.000							
1.3 Cultural Labours								
Weed	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
1.4 Harvest								
Harvest, transport and other	--	3.200	8.000	12.000	12.000	12.000	8.000	4.000
SUB-TOTAL	43.400	15.200	20.000	24.000	24.000	24.000	20.000	16.000
2. MATERIALS								
Sucker	3.125	--	--	--	--	--	--	--
SUB-TOTAL:	3.125	--	--	--	--	--	--	--
3. OTHERS EXPENSES								
Administration	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642
Depreciation house hold	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814
Depreciation set of tools	6.441	6.441	6.441	6.441	6.441	6.441	6.441	6.441
SUB-TOTAL:	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897
T O T A L:	86.422	55.097	59.897	63.897	63.897	63.897	59.897	55.897
Average price		400	400	400	400	400	400	400

TABLE 12

BALANCE PER HECTARE OF BANANO
(In Pesos Bolivianos)

C O N C E P T	Y E A R S							
	1	2	3	4	5	6	7	8
1. INCOME								
Production		32.000	87.200	128.000	128.000	128.000	87.200	40.000
2. EXPENSES	86.422	55.097	59.897	63.897	63.897	63.897	59.897	55.897
Labours	43.400	15.200	20.000	24.000	24.000	24.000	20.000	16.000
Materials	3.125	—	—	—	—	—	—	—
Others expenses	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897
3. DIFERENCE	(86.397)	23.097	27.303	64.103	64.103	64.103	27.303	(15.897)

3.- CITRICOS

Citrics, including oranges, tangerines, 1 mes and grapefruits are common crops in the Chapare, with continuous growth production to be increases even more in the next few years as the plants presently at the growth stage start production of citrics originates from indigenous varieties and non- grafted plants.

TABLE 13

NUMBER OF PRODUCERS, CULTIVATED AREA, PRODUCTION AND YIELD OF CITRICS
1980 - 1981

CROP	NUMBER OF PRODUCERS	AREA IN GROWTH Has.	AREA IN PRODUCTION Has.	PRODUCTION M.T.	IN GROWTH Kg./Ha.
Oranges	9.920	4.165	2.186	35.803	16.378
Limes	6.279	454	264	4.861	18.343
Tangerines	7.639	1.279	572	6.480	11.329
Grape fruit	3.241	330	108	1.858	17.204
T O T A L:	27.079	6.228	3.131	49.002	---

SOURCE: Encuesta Agropecuaria del chapare Tropical 1980-1981 MACA-PRODES.

Costs and incomes were referred to the orange crop as this is one of the most extended crop by its nature and its varieties showing very special characteristics regarding quality and longevity of the product.

Normally, it has an 8 year establishment period

with production starting on the ninth year extended to the fifteenth year with only seven years of effective life for the plant.

In the productive process of the crop, there are two modalities of payment according to the type of work. During the crop husbandry stage payment is made by working day, while during the harvesting stage payments are made as a function of the number of harvestd fruits and in direct relation to prices in effect at the market. Under this modality, payment is made on the 10 % of the value, that is, if el price at the market amounts to $b.200/100 oranges the producer will pay to the harvester $b.200/1.000 harvested oranges, regardless of the harvestin time.

TABLE 14

NUMBER OF PRODUCERS, CULTIVATED AREA, PRODUCTION AND YIELD OF ORANGES BY MICROREGIONES
1980 - 1981

MICRO REGION	NUMBER OF PRODUCERS	A R E A IN GROWTH Has.	A R E A IN PRODUCTION Has.	PRODUCTION M.T.	YIELD Kg/Ha.
I (1)					
II (2)	898	136	290	2.060	7.103
III (3)	562	171	205	3.664	17.873
IV (4)	2.003	1.483	276	2.879	10.431
V (3)	1.927	930	782	18.366	23.486
VI (5)	322	86	134	2.112	15.761
VII (6)	1.540	264	100	1.704	17.040
VIII (7)	1.444	456	163	2.453	15.049
IX (8and9)	1.224	639	236	2.565	10.869
T O T A L:	9.920	4.165	2.186	35.803	16.378

SOURCE: Encuesta Agropecuaria del Chapare Tropical 1980-1981. MACA - PRODES.

TABLE 15

STRUCTURE OF THE PRODUCTION COST OF ORANGES PER HECTARE

CONCEPT	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
1. LABOURS															
1.1. Soil preparation															
"Chaqueado" under contrac															
Burn	35 DH														
Cleaning and "japuchado"	20 DH														
Making holes	10 DH														
1.2. Plantations															
Plantations	7 DH	1 DH													
1.3. Cultural Labours															
Weeds	45 DH	45 DH	45 DH	45 DH	45 DH	45 DH	45 DH	45 DH	45 DH	45 DH	45 DH	45 DH	45 DH	45 DH	45 DH
Prune and "deschuponado"		3 DH	3 DH												
Aplication of mirex	12 DH	12 DH	12 DH	12 DH	12 DH	12 DH	12 DH	12 DH	12 DH	12 DH	12 DH	12 DH	12 DH	12 DH	12 DH
1.4. Harvest															
Harvest under contrac									30 DH	60 DH	80 DH	80 DH	80 DH	60 DH	40 DH
SUB TOTAL	130 DH	61 DH	60 DH	57 DH	57 DH	57 DH	57 DH	57 DH	87 DH	117 DH	137 DH	137 DH	137 DH	117 DH	97 DH
2. MATERIALS															
Plantules	440	20													
Mirex (small bags)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3. OTHER EXPENSES															
Administratives	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH
Depreciation household	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %
Depreciation set of tools	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %
yiel in units (Average)									60.000	120.000	160.000	160.000	160.000	120.000	80.000

DH = Day / Man

TABLE 16

COST OF PRODUCTION OF ORANGES PER HECTARE

JANUARY 1983 (In pesos)

CONCEPT	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
1. LABOURS															
1.1 Soil preparation															
"Choqueado" under contract	14.000														
Burn	400														
Cleaning and "japuchado"	8.000														
Making holes	4.000														
1.2 Plantations															
Plantations	2.800	400													
1.3 Cultural Labours															
Weeds	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000
Prune and "deschuponado"		1.200	1.200												
Aplication of mirex	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800
1.4 Harvest															
Harvest under contract									12.000	24.000	32.000	32.000	32.000	24.000	16.000
SUB TOTAL	52.000	24.400	24.000	22.800	22.800	22.800	22.800	22.800	34.800	46.800	54.800	54.800	54.800	46.800	38.800
2. MATERIALS															
Plantules	4.400	200													
Mirex (small bags)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
SUB TOTAL	5.400	1.200	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
3. OTHER EXPENSES															
Administratives	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642
Depreciation household	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814
Depreciation set of tools	6.441	6.441	6.441	6.441	6.441	6.441	6.441	6.441	6.441	6.441	6.441	6.441	6.441	6.441	6.441
SUB TOTAL	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897
TOTAL	97.297	65.497	64.897	63.697	63.697	63.697	63.697	63.697	75.697	87.697	95.697	95.697	95.697	87.697	79.697
Price for 100 units. (Average)									200	200	200	200	200	200	200

TABLE 17

BALANCE PER HECTARE OF ORANGE

(PESOS BOLIVIANOS)

I T E M	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
1. INCOME									120.000	240.000	320.000	320.000	320.000	240.000	160.000
Producction									120.000	240.000	320.000	320.000	320.000	240.000	160.000
2. EXPENSES	97.297	65.497	64.897	63.697	63.697	63.697	63.697	63.697	75.697	87.697	95.697	95.697	95.697	87.697	79.697
Labour	52.000	24.400	24.000	22.800	22.800	22.800	22.800	22.800	32.800	46.800	54.800	54.800	54.800	46.800	38.800
Materials	5.400	1.200	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Other expenses	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897	39.897
3. DIFFERENCE	(97.297)	(65.497)	(64.897)	(63.697)	(63.697)	(63.697)	(63.697)	(63.697)	44.303	152.303	224.303	224.303	224.303	150.303	80.303

21

4.- PAPAW

Papaw is produced in the Chapare suice colonial times and it is being developed in other regions of the country at family and domestic level.

In general terms and considering the total of 236 hectares cultivated in 1981 (PRODES-MACA), it can be stated that most papaw producers are merely trying to meet the needs of family consumption.

Although at present there are soma instances of commercial production, restricted market conditions for consumption of fresh fruits added to a tremendous fluctation of prices prevent the producers from being interested in expanding the crops.

This crop is implemented on newly prepared or traditionally rotated land, it requires a minimum effort regardin both preparation of soils and crop husbandry during the productive process.

Production starts after 9 months. Commercial plantations are harvested continuously every seven days during two years making up to 50 collections of the fruit per year forcing the producer to provide constant care.

The measure unit used at producer level for sales is the case or jaba with approximately 80 to 100 fruits and 100 kilos average weight.

TABLE 18

STRUCTURE OF PRODUCTION COST FOR PAPAW PER HECTARE

C O N C E P T	YEAR 1	YEAR 2	YEAR 3
1. LABOURS			
1.1 Soil preparation			
Chaqueado under contract	42 DH		
Burn	1 DH		
Cleaning and "japuchado"	18 DH		
1.2 Plantation			
Obtention of seed	1 DH		
Seed	2 DH		
1.3 Culturals Labours			
Weed	30 DH	30 DH	30 DH
1.4 Harvest			
Hand harvest		100 DH	100 DH
SUB-TOTAL:	94 DH	130 DH	130 DH
2. MATERIALS			
Boxes		10 boxes	
3. OTHER EXPENSES			
Administration	12 MH	12 MH	12 MH
Depreciation house hold	10 %	10 %	10 %
Depreciation set of tools	33.3 %	33.3 %	33.3 %
Average yield		400 boxes	200 boxes

DH = Day man

TABLE 19

COST OF PRODUCTION FOR PAPAW PER HECTARE

(January 1983 In Pesos Bolivianos)

C O N C E P T	YEAR 1	YEAR 2	YEAR 3
1. LABOURS			
1.1 Soil preparation			
Chaqueado under contract	17.000		
Burn	400		
Cleaning and "japuchado"	7.200		
1.2 Plantation			
Obtention of seed	400		
Seed	800		
1.3 CUltural Labours			
Weed	12.000	12.000	12.000
1,4 Harvest			
Hand harvest		40.000	40.000
SUB-TOTAL:	37,300	52.000	52,000
2. MATERIALS			
Boxes	--	10.000	--
3. OTHERS EXPENSES			
Administration	27,642	27,642	27.642
Depreciation house hold	5.814	5.814	5,814
Depreciation set of tools	6.441	6.441	6.441
SUB-TOTAL:	39.897	39.897	39.897
T O T A L:	77,697	101.897	91.897
Average price per box or jaba		1.000	1.000

TABLE 20

BALANCE PER HECTARE OF PAPAW

(In Pesos Bolivianos)

C O N C E P T	YEAR 1	YEAR 2	YEAR 3
1. INCOME	--	400.000	400.000
Production	--	400.000	400.000
2. EXPENSES	77.697	101.897	91.897
Labours	37.800	52.000	52.000
Materials	--	10.000	--
Others	39.897	39.897	39.897
3. DIFERENCE	(77.697)	298.103	308.103

5.- ANANAS

The indigenous anana was introduced to the Chapare by the first settlers as a crop for family consumption exclusively with surplus production marketed in the city of Cochabamba.

According to various reports it is known that at the time of implementation of the settlement program conducted by the Instituto Nacional de Colonización (INC) through the Experimental Station "La Jota" several varieties were introduced such as Pucallpa, Espina Rosita and Cayena Lisa symultaneouly with Empresa "La Tucandera" which is commercially operating in this activity for serveral years.

At present this crop has become highly important in commercial terms considering the ecoclimatic characteristics prevalent in the Mariposas region, to the point that farmers in the region are placing a large portion of their economies on it. The area of cultivation with ananas is estimated in 300 Has. by 1983.

Implantation is made with very low density of plants per hectare (approximately 10.000) due to the scarcity of sucker plants and lack of technical assistance.

The productive process of the plantation demands a first stage of establishment lasting between 1 and 2 years, according to the origin of the sucker plants used.

For our purposes, however, a period of 1 1/2 years has been defined. The second stage or production stage defines an effective life period of 2 1/2 years making a total of 4 years of life. It should be noted that in the last two years several large producers have been farming ananas with a seeding density from 45.000 to 55.000 sucker plants and using other inputs such as fertilizers and plague control chemicals, with good results regarding production although with some problems regarding commercialization.

TABLE 21

STRUCTURE OF PRODUCTION COST FOR ANANA
PER HECTARE

C O N C E P T	YEAR 1	YEAR 2	YEAR 3	YEAR 4
1. LABOURS				
1.1 Soil preparation				
Chaqueado under contract	42 DH			
Burn	1 DH			
Cleaning and "japuchado"	20 DH			
Traced	3 DH			
1.2 Plantation				
Plantation	5 DH			
1.3 Cultural Labours				
Weed	30 DH	30 DH	30 DH	30 DH
Lop		15 DH	15 DH	15 DH
1.3 Harvest				
Harvest		16 DH	14 DH	10 DH
SUB-TOTAL:	101 DH	61 DH	59 DH	55 DH
2. MATERIALS				
Sucker	12,000			
3. OTHERS EXPENSES				
Administration	12 MH	12 MH	12 MH	12 MH
Depreciation house hold	10 %	10 %	10 %	10 %
Depreciation set of tools	33.3 %	33.3 %	33.3 %	33.3 %
Average yield (unites)		10,000	10,000	8.000

DH = Day man

MH = Month man

TABLE 22

STRUCTURE OF PRODUCTION COST FOR ANANA PER HECTARE

January 1983 (In Pesos Bolivianos)

C O N C E P T	YEAR 1	YEAR 2	YEAR 3	YEAR 4
1. LABOURS				
1.1.Soil preparation				
Chaqueado under contract	17.000			
Burn	400			
Cleaning and "japuchado"	8.000			
Traced	1.200			
1.2 Plantation				
Plantation	2.000			
1.3 Cultural Labours				
Weed	12.000	12.000	12.000	12.000
Lop		6.000	6.000	6.000
1,4 Harvest				
Harvest		6.400	5.600	4.000
SUB-TOTAL:	40.600	24,400	23.600	22,000
2. MATERIALS				
Sucker	50.000			
3. OTHERS EXPENSES				
Administration	27.642	27.642	27.642	27.642
Depreciation house hold	5.814	5.814	5.814	5.814
Depreciation set of tools	6.441	6.441	6.441	6.441
SUB-TOTAL:	39.897	39.897	39.897	39.897
T O T A L:	130,497	64.297	63.497	61.897
Average price (per unites)		35	35	35

TABLE 23

BALANCE PER HECTARE OF ANANA

(In Pesos Bolivianos)

C O N C E P T	YEAR 1	YEAR 2	YEAR 3	YEAR 4
1. INCOME	--	350.000	350.000	280.000
Production	--	350.000	350.000	280.000
2. EXPENSES	130.497	64.297	63.497	61.897
Labours	40.600	24.400	23.600	22.000
Materials	50.000	--	--	--
Others expenses	39.897	39.897	39.897	39.897
3. DIFERENCE	(130.497)	285.703	286.503	218.103

6.- RICE, CORN AND OTHER ANNUAL CROPS

6.1. RICE AND CORN

Rice is normally cultivated as a first crop following slash and burn operations. In spite of the fact that it uses soils of untouched fertility its yield is low as compared to other regions of the country

The Chapare farmer in most cases plants rice to pay slash and burn costs and to cover family consumption needs. The increase or decrease of the area used for this crop depends basically of the price paid to the producer and climatic factors.

Normally it is associated or interspersed with corn in order to rationalize its harvest. Independent cultivation of corn is a small-scale operation as it is not an economic operation and is practiced for family consumption only.

According to MACA-PRODES, 10.406 and 2.440 hectares of rice and corn respectively were harvested in 1981, but due to problems related to burning operations on plots of land already cleared, it is estimated that only 4.000 hectares of rice and approximately 300 hectares of corn are under cultivation in 1983.

Crop husbandry labor for rice is paid by working day completed. For harvesting, however,

payment is made in-kind, that is, out of each 5 arrobas (25 lbs.) harvested, 4 are for the producer and 1 is for the harvester.

The commercial measurement unit at producer level is the arroba, with 25 lbs. of husked rice.

6.2. OTHER ANNUAL CROPS

Less important from a commercial point of view or considering the area under cultivation, we include production costs for yucca, peanuts and tomatos as its production can be easily increasee with a rotation system with other annual crops to meet domestic and population needs in the region.

Available statistics for 1981 and estimations for 1983 are as follows.

TABLE 24

SURFACE CULTIVATED WITH YUCCA, PEA-NUT AND TOMATO

(In Hectare)

CROPS	S U R F A C E				
	1978(1)	1979(1)	1980(1)	1981(2)	1983(3)
Yucca	1.150	1.800	3.050	2.910	3.000
Pea-nut	20	60	55	268	200
Tomato	--	--	--	5	10

SOURCE: (1) Statistcs Department MACA
(2) MACA - PRODES
(3) Stimated in base information of Mr.Carlos Hoofman

TABLE 25

PRODUCTION OF COST OF ANANAS PER HECTARE
January 1983 (In Pesos Bolivianos)

C O N C E P T	STRUCTURE	C O S T TOTAL	C O S T PER HA./YEAR
1. LABOURS			
1.1 Soil preparation			
Chaqueado under contract	42 DH	17.000	5.668
Burn	1 DH	400	400
Cleaning and "japuchado"	20 DH	8.000	2.667
1.2 Seed			
Seed	5 DH	2.000	2,000
1.3 Cultural Labours			
Weed	20 DH	8.000	8:000
1.4 Harvest			
Harvest under contract	25 DH	16.000	16,000
Dry	6 DH	2.400	2.400
SUB-TOTAL:	119 DH	53.800	37.135
2. MATERIALS			
Seedbeds	2 @	2.000	2,000
SUB-TOTAL:		12.000	2,000
3. OTHERS EXPENSES			
Administration	12 MH		27.642
Depreciation house hold	10 %		5,814
Depreciation set of tools	33.3 %		6.441
SUB-TOTAL:			39.897
T O T A L:			79,032

Average yield 35 qq. In chala

Average price 3,200 qq.

TABLE 26

STRUCTURE OF PRODUCTION COST FOR CORN
PER HECTARE

January 1983 (In Pesos Bolianos)

C O N C E P T	STRUCTURE	C O S T TOTAL	C O S T PERHA/YEAR
1. LABOURS			
1.1 Soil preparation			
Chaqueado under contract	30 DH	12.000	4.000
Burn	1 DH	400	400
Cleaning and "japuchado"	10 DH	8.000	2.667
1.2 Seed			
Seed	3 DH	1,200	1.200
1.3 Cultural Labours			
Weed	10 DH	4.000	4.000
1.4 Harvest			
Harvest under contract	10 DH	4.000	4.000
Thrash	10 DH	4.000	4.000
Dry	3 DH	1.200	1.200
SUB-TOTAL:	77 DH	34.800	21.467
2. MATERIALS			
Seed	1.5	3.000	3.000
SUB-TOTAL;		3.000	3.000
3. OTHERS EXPENSES			
Administration	12 DH		27.642
Depreciation house hold	10 %		5.814
Depreciation set of tools	33.3 %		6.441
SUB-TOTAL:			39.897
T O T A L:			64.364

Average yield 22 qq.

Average price 1.400 qq.

TABLE 27

STRUCTURE OF PRODUCTION COST FOR YUCCA
January 1983 (In Pesos Bolivianos)

C O N C E P T	STRUCTURE	C O S T TOTAL	C O S T PERHA/YEAR
1. LABOURS			
1.1 Soil preparation			
Chaqueado under contract	30 DH	12.000	4.000
Burn	1	400	400
Cleaning and "Japuchado"	20 DH	8.000	2.667
1.2 Seed or plantation			
Seed	6 DH	2.400	2.400
Obtain of plants	4 DH	1.600	1.600
1.3 Cultural Labours			
Weed	30 DH	12.000	12.000
1.4 Harvest			
Hand harvest	30 DH	12.000	12.000
SUB-TOTAL:	121 DH	48.400	35.067
2. MATERIALS	--	--	--
3. OTHERS EXPENSES			
Administration	12 MH		27.642
Depreciation house hold	10 %		5.814
Depreciation set of tools	33,3 %		6.441
SUB-TOTAL:			39.897
T O T A L:			74.964

Average yield	300 qq.
Average price	1,000

TABLE 28

STRUCTURE OF PRODUCTION COST FOR PEA-NUT
January 1983 (In Pesos Bolivianos)

C O N C E P T	STRUCTURE	C O S T TOTAL	C O S T PER HA/YEAR
1. LABOURS			
1.1 Soil preparation			
Chaqueado under contract	30 DH	12.000	4.000
Burn	1 DH	400	400
Cleaning and "japuchado"	20 DH	8.000	8.000
1.2 Seed or plantation			
Siembra	4 DH	1.600	1.600
1.3 Cultural Labours			
Weed	25 DH	10.000	10.000
1.4 Harvest			
Hand harvest	40 DH	16.000	16.000
SUB-TOTAL:	120 DH	48.000	40.000
2. MATERIALS			
Seedbeds	15 Kls.		4.500
Bags	10 bags		2.800
SUB-TOTAL:			7.300
3. OTHERS EXPENSES			
Administration	12 MH		27.642
Depreciation household	10 %		5.814
Depreciation set of tools	33.3 %		6.441
SUB-TOTAL:			39.897
T O T A L:			87.197

Average yield 40 qq.(dry with husk)

Average price 6.900 qq.

TABLE 29

STRUCTURE OF PRODUCTION COST FOR TOMATO
January 1983 (In Pesos Bolivianos)

C O N C E P T	STRUCTURE	C O S T TOTAL	C O S T PER HA/YEAR
1. LABOURS			
1.1 Soil preparation			
Chaqueado under contract	30 DH	12.000	4.000
Burn	1 DH	400	400
Cleaning and "japuchado"	20 DH	8.000	8.000
1.2 Seed or plantation			
Mastic	6 DH		2.400
Transplant	4 DH		1.600
1.3 Cultural Labours			
Weed	30 DH		12.000
Weed	40 DH		16.000
Aplication of fertilizer	48 DH		19.200
1.4 Harvest			
Hand harvest	48 DH		19.200
SUB-TOTAL	227 DH		82.800
2. MATERIALS			
Seedbeds	-		-
Fertilizer Potrilan Combi	2 Lts.		2.820
Elcatox 50	3 Lts.		8.923
Matathron 25 %	1 "		1.456
Amtracaol	2 Kls.		2.400
Oxicloruro de cobre	2 Kls.		2.928
Manzate 200	2 Lbs.		1.638
Basket	10 Unit.		1.500
SUB-TOTAL:			21.665
3. OTHERS EXPENSES			
Administration	12 MH		27.642
Depreciation house hold	10 %		5.814
Depreciation set of tools	33.3 %		6.441
SUB-TOTAL:			39.897
T O T A L:			144.362

Average yield 400 boxes of 20 Kg.

Average price 800 by box

TABLE 30

CASH FLOW PER HECTARE FOR ANNUAL CROPS
(In Pesos Bolivianos)

C O N C E P T	RICE	CORN	YUCCA	PEA-NUT	TOMATO
1. INCOME	112.000	30.800	300.000	276.000	320.000
Production	112.000	30.800	300.000	276.000	320.000
2 EXPENSES	79.032	64.364	74.964	87.197	144.362
Labours	37.135	21.467	35.067	40.000	82.800
Materials	2.000	3.000	--	7.300	21.665
Others expenses	39.897	39.897	39.897	39.897	39.897
3. DIFERENCE	32.968	(33.564)	225.036	188.803	175.638

The interpretation of the table precedent, can to cause distorsion if we not consider losses post-hervest, for defects of the market or defects in the oportune transport in another cases.

TABLE 31

DISTRIBUCION OF PRODUCTION OF SPECIES ANNUALS

(In porcentage) a/

PRODUCT	DISTRIBUTION					
	CONSUME FAMILIAR	CONSUME ANIMAL	RESERVA P/SEED	LOSS	SALE	TOTAL
Rice	39	2	3	2	54	100
Yucca	37	4	-	23	36	100
Corn	33	9	4	11	43	100

a/ Elaborado en base a la Encuesta Agropecuaria del Chapare Tropical, Año Agrícola 1980-1981 MACA-PRODES.

Using the per-cents of losses in the Table 31 the correct balance in terms of cash money, will be:

TABLE 32

BALANCE PER HECTARE OF ANNUAL CROPS
SUSTRACTING LOSSES

(In Pesos Bolivianos)

I T E M	RICE	CORN	YUCCA
1. INCOME	109.760	27.412	231.000
2. EXPENSES	79.032	64.412	74.964
3. DIFERENCE	30.728	(37.055)	156.036

If we consider only the sales, the cash incomes are the following:

TABLE 33

CASH FLOW FOR ANNUALS CROPS
PER HECTARE

(In Pesos Bolivianos)

I T E M	RICE	CORN	YUCCA
1. INCOME			
Sales	60.480	13.244	108.000
2. EXPENSES	79.032	64.467	74.964
3. DIFERENCE	18.552	(51.223)	33.036

7.- RUBBER AND "TEMBE"

Although presently these are not diffused crops and there are few rubber plantations covering 50 hectares approximately, not farmed by owners but rather cultivated on lease contracts, they offer interesting prospects as alternatives in new production systems combined with bananas, papaw fruits kudzu and tembe. On the other hand, although there are no tembe plantations so far, the introduction of imported varieties could offer interesting propects for concerned producers.

Indigenous varieties could also present an alternative for the use of rotation plots or associated with others.

The costs shown are estimations of low technology plantations in the case of tembe, and the nearest to actual costs regarding existing crops are those given for rubber.

STRUCTURE OF PRODUCTION COST OF RUBER BY HECTARE

TABLE 34

CONCEPT	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Years 8-9	Years 10-14	Years 15-20
1. LABOURS										
1.1. Soil preparation										
Chaqueado	42 DH									
Burn	1 DH									
Cleaning and japuchado	20 DH									
Traced	5 DH									
Making holes	10 DH									
1.2. Plantations										
Plantation	5 DH									
1.3 Cultural Labours										
Weed	30 DH	30 DH	30 DH	30 DH	30 DH	30 DH	30 DH	30 DH	30 DH	30 DH
Prune and deschuponado		10 DH	10 DH	10 DH	10 DH	10 DH	10 DH			
To fertilize	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH	4 DH
1.4 Harvest										
To prick	—	—	—	—	—	—	—	120 DH	120 DH	120 DH
To put "ticheias"	—	—	—	—	—	—	—	4 DH	4 DH	4 DH
SUB TOTAL	117 DH	44 DH	44 DH	44 DH	44 DH	44 DH	44 DH	158 DH	158 DH	158 DH
2. MATERIALS										
Plantules	575 plant.									
Fertilizers 15-15-15	2 bolsas	2 bolsas	2 bolsas	2 bolsas	2 bolsas	3 bolsas	3 bolsas	3 bolsas	3 bolsas	5 bolsas
Acetic Acid	—	—	—	—	—	—	—	30 litros	40 litros	50 litros
Pricker	—	—	—	—	—	—	—	3 unids.	3 unids.	3 unids.
Casks	—	—	—	—	—	—	—	2 unids.	2 unids.	2 unids
"Ticheias"	—	—	—	—	—	—	—	500 "	500 "	500 "
Iron Ware	—	—	—	—	—	—	—	500 mts.	500 mts.	500 mts.
Protectors	—	—	—	—	—	—	—	500 unids.	500 unids.	500 unids.
3. OTHER EXPENSES										
Administratives	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH
Depreciation household	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %
Depreciation set of tools	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %
Average yiel (kg rubber dried)								852 kls.	1.065 kls.	1.941 kls.

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COST OF PRODUCTION OF RUBER BY HECTARE

(In pesos. January 1983)

TABLE 35

CONCEPT	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Years 8-9	Years 10-14	Years 15-20
1. LABOURS										
1.1 Soil preparation	16.800									
Burn	400									
Cleaning and "japuchado"	8.000									
Traced	2.000									
Making holes	4.000									
1.2 Plantation										
Plantation	2.000									
1.3 Cultural Labours										
Weed	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
Prune and "deschuponado"		4.000	4.000	4.000	4.000	4.000	4.000			
To fertilize	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600
1.4 Harvest										
To prick	—	—	—	—	—	—	—	48.000	48.000	48.000
"Tichelas"	—	—	—	—	—	—	—	1.600	1.600	1.600
SUB TOTAL	46.800	17.600	17.600	17.600	17.600	17.600	17.600	63.200	63.200	63.200
2. MATERIALS										
Plantules	8.625	—	—	—	—	—	—	—	—	—
Fertilizers 15-15-15	11.400	11.400	11.400	11.400	11.400	17.100	17.100	17.100	17.100	28.500
Acetic Acid	—	—	—	—	—	—	—	90.000	120.000	150.000
Pricker	—	—	—	—	—	—	—	4.050	4.050	4.050
Casks	—	—	—	—	—	—	—	3.000	3.000	3.000
"Tichelas"	—	—	—	—	—	—	—	5.000	5.000	5.000
Iron were	—	—	—	—	—	—	—	5.000	5.000	5.000
Protectors	—	—	—	—	—	—	—	5.000	5.000	5.000
SUB TOTAL	20.025	11.400	11.400	11.400	11.400	17.100	17.000	129.150	159.150	200.550
3. OTHER EXPENSES										
Administratives	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642
Depreciation household	5.814	5.814	5.814	5.814	5.814	5,814	5.814	5.814	5.814	5.814
Depreciation set of tools	1.139	1.139	1.139	1.139	1.139	1.139	1.139	1.139	1.139	1.139
SUB TOTAL	34.595	34.595	34.595	34.595	34.595	34.595	34.595	34.595	34.595	34.595
TOTAL	101.420	63.595	63.595	63.595	63.595	69.295	69.295	226.945	257.945	298.345
Price : Kg by ruber dry (average)								400	400	400

TABLE 36

CASH FLOW PER HECTARE OF RUBBER
(In Pesos Bolivianos)

I T E M	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8-9	YEAR 10-14	YEAR 15-20
1. INCOME								340.800	426.000	596.400
Sale								340.800	426.000	596.400
2. EXPENSES	101.420	63.595	63.595	63.595	63.595	69.295	69.295	226.945	256.945	298.345
Labours	46.800	17.600	17.600	17.600	17.600	17.600	17.600	63.200	63.200	63.200
Materials	20.025	11.400	11.400	11.400	11.400	17.100	17.100	129.150	159.150	200.550
Others expenses	34.595	34.595	34.595	34.595	34.595	34.595	34.595	34.595	34.595	34.595
3. DIFERENCE	(101.420)	(63.595)	(63.595)	(63.595	(63.595)	(68.295)	(69.295)	(113.855)	(169.055)	(298.055)

TABLE 37

STRUCTURE OF PRODUCTION COST FOR TEMBE PER HECTARE

(Estimed)

C O N C E P T	Y E A R S 1	2	3	4	5	6	7	8	9	10-20
1. LABOURS										
1.1 Soil preparation										
Chaqueado	42 DH									
Burn	1 DH									
Cleaning and "japuchado"	20 DH									
Traced	8 DH									
Making holes	10 DH									
1.2 Seed and plantation										
Plantation	20 DH									
1.3 CUltural Labours										
Weed	30 DH	30 DH								
Aplication of herbicidas			8 DH	8 DH	8 DH	8 DH	8 DH	8 DH	8 DH	8 DH
1.4 Harvest										
Harvest			35 DH	55 DH	55 DH	55 DH	55 DH	55 DH	55 DH	55 DH
SUB-TOTAL:	131 DH	30 DH	43 DH	63 DH	63 DH	63 DH	63 DH	63 DH	63 DH	63 DH
2. MATERIALS										
Plantules	5.500 plants									
Gramoxone			8 Lts.	8 Lts.	8 Lts.	8 Lts.	8 Lts.	8 Lts	8 Lts.	8 Lts
3. OTHERS EXPENSES										
Administration	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH	12 MH
Depreciation house hold	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %	10 %
Depreciation set of tools	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %	33.3 %
Average yield (units)			2.500	5.000	5.000	5.000	5.000	5.000	5.000	5.000

TABLE 38

COST OF PRODUCTION OF TEMBE PER HECTARE

January 1983 (In Pesos Bolivianos)

C O N C E P T	Y E A R S 1	2	3	4	5	6	7	8	9	10-20
1. LABOURS										
1.1 Soil preparation										
Chaqueado	16.800									
Burn	400									
Cleaning and "japuchado"	8.000									
Traced	3.200									
Making holes	4.000									
1.2 Seed and plantation										
Plantation	8.000									
1.3 Cultural labours										
Weed	12.000	12.000								
Aplication of herbicidas			3.200	3.200	3.200	3.200	3.200	3.200	3.200	3.200
1.4 Harvest										
Harvest			14.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000
SUB-TOTAL:	52.400	12.000	17.200	25.200	25.000	25.000	25.000	25.000	25.000	25.000
2. MATERIALS										
Plantules	55.000									
Gramoxone			21.200	21.200	21.200	21.200	21.200	21.200	21.200	21.200
SUB-TOTAL:	55.000		21.200	21.200	21.200	21.200	21.200	21.200	21.200	21.200
3. OTHERS EXPENSES										
Administration	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642	27.642
Depreciation house hold	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814	5.814
Depreciation set of tools	3.014	3.014	3.014	3.014	3.014	3.014	3.014	3.014	3.014	3.014
SUB-TOTAL:	36.470	36.470	36.470	36.470	36.470	36.470	36.470	36.470	36.470	36.470
T O T A L:	143.870	48.470	74.870	82.870	82.870	82.870	82.870	82.870	82.870	82.870
Average yield per unit.	100	100	100	100	100	100	100	100	100	100

TABLE 39

BALANCE PER HECTARE OF TEMBE

(In Pesos Bolivianos)

I T E M	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 15-20
1. INCOME			250.000	500.000	500.000	500.000	500.000	500.000	500.000	500.000
Sales			250.000	500.000	500.000	500.000	500.000	500.000	500.000	500.000
2. EXPENSES	143.870	48.470	74.870	82.870	82.870	82.870	82.870	82.870	82.870	82.870
Labours	52.400	12.000	17.200	25.200	25.200	25.200	25.200	25.200	25.200	25.200
Materials	55.000	--	21.200	21.200	21.200	21.200	21.200	21.200	21.200	21.200
Others expenses	36.470	36.470	36.470	36.470	36.470	36.470	36.470	36.470	36.470	36.470
3. DIFERENCE	(143.870)	(48.470)	175.130	417.130	417.130	417.130	417.130	417.130	417.130	417.130

B.- COSTS INCOMES RATIO IN MODEL DEVELOPMENTS

1.- Main practices of development existing in the Chapare region

Chapare farmers are using independent crops and those associated with annual and perennial plants with a clear prevalence of the latter, according to the quality of soils and the experience acquired from neighbors and friends. Those with several years of settlement inthe area employ cultivation systems which try a better use of the land, although they cannot provide a technical explanation on the advantages or desadvantages of their systems. It appears that they are guided by their pragmatism and instinct concerning possible economic advantages to be gained when selling their production.

In connection with land tenancy practices, is should be noticed the growing practice of "shared" ("al partido") work, a modality originated in the practice by the owners of leasing the land to a tenant or "partidario" in charge of the work.

The cuases of this absenteeism could be explained by:

a) Harsh living conditions due to lack of infrastructure to make more bearable the permanence in the are, lack of electricity, potable water and health services, in addition to excessive moisture,

b) Newly acquired economic resources resulting from the increase of the price of coca, giving them access to the purchasing of vehicles and houses and to other investments in the city of Cochabamba.

c) Temporary nature of the migration to the Chapare region as they consider the area as an expansion only of their original settlement places allowing them a diversification of their production and an increase of their incomes.

The proliferation of "partidarios" or producers without land is causing a larger demand of new settlement land as well as problems between owners and "partidarios" as this practice is prohibited under Bolivian law.

Payment practices vary according the crops. For rice, the seed is drawn from the production to be returned to the provider and the balance is divided equally between the owner and the "partidario".

For coca, production is divided in equal parts between the owner and the "partidario", remarking only thar when the "partidario" plants the coca, he is entitled to the produce of the first year of production.

In all cases, the owner must provide the tools and the "partidario" must cover all expenditures and perform all the necessary work.

Tables 37 to 45 show the most common systems practiced presently, with the understanding that there are several more, almost as many as the number of producers in the Chapare.

TABLE 40

SYSTEMS TRADITIONALS MORE COMMONS IN THE CHAPARE

SISTEMS	Y				E			A			R			S			MICROREGIONS
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1,A,Sp.P.P,	Ba,A. Pa	Ba,Pa ci	Ba ci	Ba ci	Ba ci	Ba ci	Ba ci	Ba ci	Ci	Ci	Ci	Ci	Ci	Ci	Ci	Ch	3.5.6.7.8.
2.A.P.P.	ba, A	Ba ci	Ba ci	Ba ci	Ba ci	Ba ci	Ba ci	Ba ci	Ci	Ci	Ci	Ci	Ci	Ci	Ci	Ch	2.3.4.5.6. 7.8.9.
3.A.A.P.P.	A.	Y. co	ci Co	ci Co	ci Co	ci Co	ci Co	ci Co	Ci Co	Ci Co	Ci	Ci	Ci	Ci	Ci	Ch	2.3.4.5.6 7.8.9.
4. A.A.P.	A.	Y. co	Co	Co	Co	Co	Co	Co	Co	Co	Ch	Ch	Ch	Ch	A.	Y co	2.4.6.7.8 9.
5. A.A.A.P.	A	Y.M. co	Co	Co	Co	Co	Co	Co	Co	Co	Ch	Ch	Ch	Ch	A.	YM co	2.3.4.5.6 7.8.9.
6. A.P.	A ba	Ba	Ba	Ba	Ba	Ba	Ba	Ba	Ch	Ch	Ch	Ch	Ch	Ch	A. ba	Ba	3.5.6.7.9.
7. A.Sp.P.	A Pa	Pa co	Co	Co	Co	Co	Co	Co	Co	Co	Ch	Ch	Ch	Ch	A. pa	Pa co	3.
8. A.	A	A	Ch	Ch	Ch	A.	Ch	Ch	Ch	A.	Ch	Ch	Ch	A.	Ch	Ch	7.89.

Reference:

CROPS

ba = Banana en crecimeinto
Ba = Banana en producción
pa = Papaya en crecimiento
Pa = Papaya en producción
ci = Cítricos en crecimiento
Ci = Cítricos en producción
co = Coca en crecimiento
Co = Coca en producción
A = Arroz
M = Maíz
Y = Yuca
Ch = Chume

CICLE

A. = Anual
P. = Perenne
Sp. = Semiperenne

NOTE: En la microregiones 7 existen 2 zonas bien diferenciadas en cuanto a capacidad productiva, Chimoré y Mariposas. Los sistemas 1-2-6 y 7, no se observaron en Mariposas por factor limitante del suelo.

TABLE 41

SYSTEM 1: ANUAL, SEMIPERENNE, PERENNE, PERENNE (A.Sp.P.P)
RICE, PAPAW, ANANA, CITRICS

LABOURS	YEARS															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Rozada	x															
Trazado, hoyada y plantación	Banano	citrics														
Tumba y picado	x															
Secado, quema y japuchado	x															
Siembra 1	Rice															
Siembra	papaw															
Deshierbes	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Raleo y eliminación de plantas machos		papaw														
Cosecha 1	Rice															
Cosecha 2		papaw														
Cosecha 3		Banana	Banana	Banana	Banana	Banana	Banana	Banana								
Cosecha 4									Citrics	Citrics	Citrics	Citrics	Citrics	Citrics	Citrics	
Enchumado																x

(x) Para todos los cultivos.

TABLE 42

SYSTEM 2: ANUAL, PERENNE, PERENNE (A.P.P)

ANANA, RICE, CITRICS

LABOURS	YEARS															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Rozado	x															
Trazado, hoyado y plantación	Banano	citrics														
Tumba y picado	x															
Secado, quema y japuchado	x															
Siembra 1	Rice															
Siembra 2																
Deshierbes	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Cosecha 1	Rice															
Cosecha 2		Banano	Banano	Banano	Banano	Banano	Banano	Banano								
Cosecha 3									Citrics	Citrics	Citrics	Citrics	Citrics	Citrics	Citrics	
Enchumado																x

(x) Para todos los cultivos.

TABLE 43

SYSTEM 3: ANUAL, ANUAL, PERENNE, PERENNE (A.A.P.P.)

RICE, YUCCA, COCA, CITRICS

L A B O U R S	Y				E			A			R				S	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Rozado	x	x														
Tumbado y picado	x															
Secado, quema y japuchado	x	x														
Siembra 1	Rice	Yucca														
Siembra 2																
Deshierbes	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Trazado		coca	citrics													
Hoyado, estaqueado y plantado		coca	citrics													
Cosecha 1	Rice															
Cosecha 2		Yucca														
Cosecha 3			Coca	Coca	Coca	Coca	Coca	Coca	Coca	Coca						
Cosecha 4										Citrics	Citrics	Citrics	Citrics	Citrics	Citrics	
Enchumado																x

TABLE 44

SYSTEM 4: ANUAL, ANUAL, PERENNE (A.A.P.)

RICE, YUCCA, COCA

L A B O U R S	Y				E			A			R				S	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Rozado	x	x													x	x
Tumba picado	x														x	
Secado, quema y japuchado	x	x													x	x
Siembra 1	Rice														Rice	
Siembra 2		Yucca														Yucca
Plantación 1		coca														coca
Deshierbes	x	x	x	x	x	x	x	x	x	x					x	x
Control fitosanitario		coca	Coca	Coca	Coca	Coca	Coca	Coca	Coca	Coca						coca
Cosecha 1	Rice														Rice	
Cosecha 2		Yucca														Yucca
Cosecha 3			Coca	Coca	Coca	Coca	Coca	Coca	Coca	Coca						
Enchumado											x	x	x	x		

(x) Para todos los cultivos

TABLE 45

SYSTEM 5: ANUAL, ANUAL, ANUAL, PERENNE (A.A.A.P.)

RICE, YUCCA, CORN, COCA

L A B O U R S	Y				E			A			R				S	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Rozado	x	x													x	x
Tumba y picado	x														x	
Secado, quema y japuchado	x	x													x	x
Siembra	Rice														Rice	
Siembra		Yucca														Yucca
Siembra		Corn														Corn
Transplante, trazado, hoyado		coca														coca
Deshierbes	x	x													x	x
Tratamientos fitosanitarios		coca	Coca	Coca	Coca	Coca	Coca	Coca	Coca	Coca						coca
Cosecha 1	Rice														Rice	
Cosecha		Corn														
Cosecha		Yucca														
Cosecha			Coca	Coca	Coca	Coca	Coca	Coca	Coca	Coca						Y.M.Co.
Enchumado											x	x	x	x		

(x) Para todos los cultivos

TABLE 46

SYSTEM 6: ANUAL, PERENNE (A.P.)

RICE, BANANO

L A B O U R S	Y				E			A				R				S
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Rozado	x														x	
Trazado, hoyado y plantación	banano														banano	
Tumbado y picado	x														x	
Secado, quema y japuchado	x														x	
Siembra	Rice														Rice	
Deshierbes	x														x	
Cosecha	Rice														Rice	
Cosecha		Banano	Banano	Banano	Banano	Banano	Banano	Banano								Banano
Enchumado										x	x	x	x	x		

(x) Para todos los cultivos.

TABLE 47

SYSTEM 7: ANUAL, SEMIPERENNE, PERENNE (A.Sp.P.)

RICE, PAPAW, COCA

L A B O U R S	V					E			A			R			S	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Rozado, tumbado y picado	x														x	
Quema, "japuchado	x														x	
Siembra	Rice														Rice	
Siembra	Papaw														Papaw	
Plantación		coca														coca
Deshierbes	x	x	x	x	x	x									x	x
Tratamiento fitosanitarios																
Cosecha	Rice														Rice	
Cosecha		Panaw														Papaw
Cosecha			Coca	Coca	Coca	Coca	Coca	Coca	Coca	Coca						
Enchumado											x	x	x	x		

(x) Para todos los cultivos.

TABLE 48

SYSTEM 8: ANUAL (A)

RICE

LABOURS	Y				E			A				R				S
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Rozado	x				x				x				x			
Tumbado y picado	x															
Secado, quema y japuchado	x				x				x				x			
Siembra	Rice				Rice				Rice				Rice			
Deshierbes	Rice				Rice				Rice				Rice			
Cosecha	Rice				Rice				Rice				Rice			
Enchumado		x	x	x		x	x	x		x	x	x		x	x	x

(x) para todos los cultivos.

2.- Model development in the Chapare

As a consequence of the diversity of the development systems existing in the Chapare it is very difficult to determine or to identify model developments or farms. In general, its structure depends to a large extent on the following reasons.

a) The size of the farm and the existence or not of virgin land are significatively influenced by the period of time of operation of the farm (oldest farms are ten or less hectares).

b) Its location within the microregions or more properly its ecoclimatic characteristics which determine the prevalent crops in each settlement.

c) The tipe of settlement (directed or spontaneous) influencing the size of the land-plots and cultivation practices.

d) Proximity to roads and consequently to consumption markets.

Once selected the different models of farms, those representing each microregion and the crops, combinations and prevalent associations are shown on tables 49 through 54.

TABLE 49

USE OF THE LAND IN THE FARMS - MODEL
BY MICRO REGIONS

January 1983 (In Hectare)

U S E		M II 1	I II 2	C III 3	R III 4	O IV 5	R IV 6	E V 7	G V 8	I VI 9	O VI 10	N VII 11	S VII 12	VIII 13	VIII 14
Coca	P	2.00	2.00	1.50	3.00	2.00	1.80	2.00	1.60	2.00	2.50	1.00	1.30	2.00	2.00
	c			0.50		0.50			1.00			0.50	0.50		
Anana	P	0.50				1.00	0.60				0.50		0.40	2.00	
	c														
Orange	P		0.40	0.20	1.00							2.00	0.50	0.50	
	c	0.50	1.00	0.20			1.00					0.50		0.50	
Anana	P		0.20										0.80		
	c	0.30													
Papaw	P				0.10			0.30							0.50
	c														
Coca-Orange	P									1.00	0.50		1.00		0.60
	c														
Yucca-Coca	P								1.00						
	c														
Banana-Citrics	P					1.00	0.60			1.00					1.00
	c														
Rice	-			0.30				0.50					1.00		
Yucca			0.16						0.40		0.16	0.20	0.50	0.50	
Corn								0.16							
Pea-nut							0.30								0.50
Tomato									0.16						
Rice-Corn		0.60			0.50	0.40			0.32	0.60		1.00		1.00	0.60
SUB-TOTAL:		3.90	3.76	2.70	4.60	4.90	4.30	2.96	4.48	4.60	3.66	5.20	6.00	6.50	5.20
Chume		3.10	2,00	3.00	3.50	2.00	4.00	4.04	6.02	8.00	5.00	7.00	5.00	9,00	5.80
Monte		2.00	—	4.00	2.00	2.60	1.70	3.00	5.50	7.40	3.34	7.80	9.00	4.50	8.00
SUB-TOTAL:		5.10	2.00	7.00	5.50	4.60	5.70	7.04	12.02	15.40	8.34	14.80	14.00	13.50	13.80
T O T A L:		9.00	5.76	9.70	10.60	10.00	10.00	10.00	16.00	20.00	12.00	20.00	20.00	20.00	20.00

TABLE 50

EXPENSES IN LABOURS OF THE FARIS-MODEL BY MICRO REGIONS
YEAR 1982-1983

(In Pesos Bolivianos of price January 1983)

CROPS		M II 1	I II 2	C III 3	R III 4	O IV 5	R IV 6	E V 7	G V 8	I VI 9	VI 10	O VII 11	N VII 12	S VIII 13	VIII 14
Coca	P	259.200	259.200	194.400	388.800	259.200	233.280	259.200	207.360	259.200	324.000	129.600	168.480	259.200	259.200
	c			70.900		70.900			141.800			70.900	70.900		
Banana	P	12.000				15.200	14.400					12.000	8.000	48.000	
	c														
Orange	P		21.920	10.960	46.800							109.600	23.400	27.400	
	c	11.400	22.800	4.560			22.800					11.400		11.400	
Anana	P		4.880										19.520		
	c	12.180													
Papaw	P				5.200			15.600							26.000
	c														
Coca-Orange	P									132.000	66.000		132.000		79.200
	c														
Yucca-Coca	P								182.200						
	c														
Banana-Citrics	P					34.800	20.880			34.800					34.800
	c														
Rice				11.140				18.567					37.135		
Yucca			5.611						14.027		5.611	7.013	7.533	17.533	
Corn									3.435						
Pea-nut							12.00								20.000
Tomato									6.400						
Rice-Corn		23.000			19.167	15.334			12.267	23.000		38.335		38.335	23.000
TOTAL:		317.780	314.411	291.960	459.967	324.534	303.360	293.367	567.489	449.000	395.611	378.848	466.968	401.868	442.200

P = In production
c = In average

TABLE 51

EXPENSES IN MATERIALS OF TH. FARMS-MODEL BY MICRO REGIONS
YEAR 1982-1983

(In Pesos Bolivianos of price January 1983)

CROPS		MICRO-REGIONS													
		II 1	II 2	III 3	III 4	IV 5	IV 6	V 7	V 8	VI 9	VI 10	VII 11	VII 12	VIII 13	VIII 14
Coca	P	25.800	25.800	19.350	38.700	25.800	23.220	25.800	20.640	25.800	32.250	12.900	16.770	25.000	25.800
	c			28.500		28.500			57.000			28.500	28.500		
Bananas	P														
	c														
Orange	P		400	200	1.000							2.000	500	500	
	c	500	1.000	200			1.000					500		500	
Anana	P														
	c	15.000													
Papaw	P				1.000			3.000							
	c														
Coca-Orange	P									12.900	6.450		12.900		7.740
	c														
Yucca-Coca	P								62.900						
	c														
Banana-Citrics	P					1.000	600			1.000					1.000
	c														
Rice				600				1.000					2.000		
Yucca															
Corn								480							
Pea-nut							2.190								3.650
Tomato									3.466						
Rice-Corn		1.380			1.150	920			736	1.380	2.300			2.300	1.380
TOTAL:		42.680	27.200	48.850	41.850	56.220	27.010	30.280	144.742	41.080	38.700	46.200	60.670	29.100	39.570

P = In production
c = In average

TABLE 52

INCOMES OF FARMS MODEL BY MICRO REGIONS
1982 - 1983

(IN PESOS - JANUARY 1983)

CROPS	MICRO REGIONS													
	II	II	III	III	IV	IV	V	V	VI	VI	VII	VII	VIII	VIII
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
COCA	3.000.000	3.000.000	2.250.000	4.500.000	3.000.000	2.700.000	3.000.000	2.400.000	3.000.000	3.750.000	1.125.000	1.950.000	3.000.000	3.000.000
BANANA	64.000				32.000	76.800				64.000		34.880	256.000	
ORANGE		128.000	64.000	240.000							640.000	120.000	160.000	
ANANA		70.000										280.000		
PAPAW				40.000			120.000							200.000
COCA - ORANGE									1.500.000	700.000		1.500.000		900.000
YUCCA - COCA								400.000						
BANANA CITRUS					128.000	76.800			128.000					128.000
RICE			33.600				56.000					112.000		
YUCCA		64.000						160.000		64.000	80.000	200.000	200.000	
CORN							4.928							
PEANUTS						82.800								138.000
TOMATO								51.200						
RICE - CORN	60.480 1.848			50.400 1.540	40.320 1.232			32.252 985	60.480 1.848		100.800 3.080		100.800 3.080	60.480 1.848
TOTAL	3.126.328	3.262.000	2.347.600	4.831.940	3.201.552	2.936.400	3.180.928	3.044.437	4.690.328	4.628.000	1.948.880	4.196.880	3.719.880	4.428.328

TABLE 53

BALANCE OFF THE EXPENSES AND INCOMES OF THE FARMS MODEL BY MICRO REGIONS

(IN PESOS, JANUARY 1983)

	MICRO REGIONS													
	II 1	II 2	III 3	III 4	IV 5	IV 6	V 7	V 8	VI 9	VI 10	VII 11	VII 12	VIII 13	VIII 14
EXPENSES	532.020	513.571	512.370	673.377	623.214	502.030	495.207	883.791	661.640	605.871	596.608	699.398	602.528	662.230
Labours	317.780	314.411	291.960	459.967	395.434	303.360	293.367	567.489	449.000	395.611	378.848	467.168	401.868	442.200
Coca	259.200	259.200	265.300	388.800	330.100	233.280	259.200	349.160	259.200	324.000	200.500	239.380	259.200	388.800
Coca and Associated	—	—	—	—	—	—	—	182.200	132.000	66.000	—	132.000	—	79.200
Others permanents and associated	35.580	49.600	15.520	52.000	50.000	58.080	15.600	—	34.800	—	133.000	50.920	86.800	60.800
Annuals and associated	23.000	5.611	11.140	19.167	15.334	12.000	18.567	36.129	23.000	5.611	45.348	44.668	55.868	43.000
Materials	42.680	27.200	48.850	41.850	56.220	27.110	30.280	144.742	41.080	38.700	46.200	60.670	29.100	52.470
Coca	25.800	25.800	47.850	38.700	54.300	23.220	25.800	77.640	25.800	32.250	41.400	45.270	25.800	38.700
Coca and Associated	—	—	—	—	—	—	—	62.900	12.900	6.450	—	12.900	—	7.740
Others permanents and associated	15.500	1.400	400	2.000	1.000	1.600	3.000	—	1.000	—	2.500	500	1.000	1.000
Annuals and associated	1.380	—	600	1.150	920	2.190	1.480	4.202	1.380	—	2.300	2.000	2.300	5.030
Other expenses	171.560	171.560	171.560	171.560	171.560	171.560	171.560	171.560	171.560	171.560	171.560	171.560	171.560	171.560
Administratives	118.860	118.860	118.860	118.860	118.860	118.860	118.860	118.860	118.860	118.860	118.860	118.860	118.860	118.860
Depreciation household	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000
Depreciation tools	27.700	27.000	27.000	27.000	27.000	27.000	27.000	27.000	27.000	27.000	27.000	27.000	27.000	27.000
INCOMES	3.126.328	3.262.000	2.347.600	4.831.940	3.201.552	2.936.400	3.180.928	3.044.437	4.690.328	4.628.000	1.948.880	4.196.880	3.719.880	4.428.328
Sales	3.126.328	3.262.000	2.347.600	4.831.940	3.201.552	2.936.400	3.180.928	3.044.437	4.690.328	4.628.000	1.948.880	4.196.880	3.719.880	4.428.328
Coca	3.000.000	3.000.000	2.250.000	4.500.000	3.000.000	2.700.000	3.000.000	2.400.000	4.500.000	4.500.000	1.125.000	3.450.000	3.000.000	3.900.000
Others permanents y associated	64.000	198.000	64.000	28.000	180.000	153.600	120.000	400.000	128.000	64.000	640.000	434.880	416.000	328.000
Annuals and associated	62.328	64.000	33.600	51.940	41.552	82.800	60.928	244.437	62.328	64.000	183.880	312.000	303.880	200.328
BALANCE	2.594.308	2.748.429	1.835.230	4.158.563	2.578.338	2.434.370	2.685.721	2.160.646	4.028.688	4.022.129	1.352.272	3.497.482	3.117.352	3.766.098

The production cost and the incomes, for permanents crops or semi-permanents, was calculated in accordance of the age of the plantations.

TABLE 54

AGE OF THE PLANTATIONS WITH PERMANENTS CROPS IN THE FARM-MODEL (YEARS)

FARM-MODEL N°		Coca	Bana-na	Orange	Anana	Papaw	Coca Orange	Yucca Coca	Banana Orange
Micro-Reg. II - 1	P	6	5						
	c				1				
Micro-Reg. II- 2	P	4		12	2				
	c			5					
Micro-Reg. III- 3	P	5		13					
	c	1		4					
Micro-Reg. III- 4	P	7		10		2			
	c								
Micro-Reg. IV- 5	P	3	2						6
	c	1							5
Micro-Reg. IV- 6	P	4	6						6
	c			7					5
Micro-Reg. V- 7	P	3				2			
	c								
Micro-Reg. V- 8	P	4						1	
	c	1						1	
Micro-Reg. VI- 9	P	2					6		6
	c						5		5
Micro-Reg. VI-10	P	3	4				6		
	c						5		
Micro-Reg. VII-11	P	2		11					
	c	1		5					
Micro-Reg. VII-12	P	3	3	10	2		6		
	c	1					5		
Micro-Reg. VIII-13	P	4	5	11					
	c			4					
Micro-Reg. VIII-14	P	3				3	6		6
	c						5		5

CONCLUSIONS AND RECOMMENDATIONS

1.- Chapare agriculture is centered on few annual and permanent crops which, excepting coca, offer limited incomes.

Coca is characterized because it requires 1 - 1 1/2 years for implantation, with an effective life of ten or more years, and presenting no problems so far regarding market or price.

2.- Bananas which until recent years were the main crop in the region, begins production after one year of implantation but its effective life is lesser and is very perishable requiring careful handling. On the other hand, in terms of price and market these are small for fresh fruits so far making more evident its desadvantage vis-a-vis coca. This crop is a good indicator of the fertility of soils, with the best producing for ten or more years with good yields going down to those producing for only two years with low yields.

3.- Citrics and particularly oranges with current varieties require a long period of growth (8 years) and present and average effective life of seven years only, foreing producers to long-term investments with a relatively short period of recovery. There are problems of handling and low prices due to symultaneous ripeness in the entire region.

4.- Papaw is established in approximately one year

competing in this regard with coca. Its yield is good and prices make this produce a crop with expectations. It requires careful handling with many post-crop losses and an effective life on only two years. Given the required care and attention it may provide constant income throughout the year with the problem, however, that a substantial increase of production would cause problems of market and prices.

5.- Ananas require a 1 to 1 1/2 years implantation period, showing a two years effective life and currently a reduced market, as it happened in 1982 when a small production increase resulted in lower prices.

6.- Tomatos show a better picture as its yield is higher than in other regions, but it is heavily dependent on the market that shows extremely fluctuating variations in prices.

For marketing, tomatos require a good transportation infrastructure and the assurance of labor at harvest time.

7.- Peanuts present advantages from the point of view of soils preservation through rotation and good yields.

It requires a considerable amount of labor which is not always available.

8.- Other annual crops such as rice, corn and yucca are

rather addressed toward household consumption because of low yields as compared with other regions of the country. The fluctuations of price for rice and the reduced market for yucca present these crops as of rather low expectations for the producer.

9.- Rubber presents good prospects due to good pricing. Although establishment of rubber takes 8 years, its effective life reaches 20 or more years. It requires considerable handling before marketing.

10.- Tembo requires two years before production which lasts up to 20 years. At present, there is no certainty on its marketing which would basically depend on the installation of processing and packing facilities.

11.- From the point of view of the use of the land in farms, we find that this depends largely on how long the land was in use and the existence of access to roads and consequently to markets. The absenteeism ofowners in all the fields leaving farms to "partidario" workers may constitute a problem for credit assistance or high technology transferrence programs, aside from possible social problems.

12.- The excessive use of the land for coca crops by the producers is resulting in the reduction of areas used for other crops, a situation affecting consumption centers outside the Chapare as well as food supply in the region itself with the resulting increase of prices,

Therefore, it is recommended that:

a) Development plans in the Chapare should cover not only agricultural aspects but should address as well problems including proyects such as electrification, potable water, health, education, roads infrastructure and land tenancy.

b) Existing cultivation systems should be improved in order to preserve soils and achiere sustained crops economically profitable.

c) Cultivation practices should be promptly introduced to improve productivity without significant technological changes, such as citrics with varieties resistent to diseases and presenting earley and late periods of reapness. Regarding papaw, diffusion of small varieties more resistent to transportation losses, and a larger density of implantation, fertilizer use and changes concerning ananas. Corcrage crops could be used includieng leguminous such as kudzo or desmodium in permenent crops or fallow lands.

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SCOPE OF WORK

The Contractor, as Production Economics Advisor, will:

- Review previous studies of production costs for major crops produced in the Chapare.

- Drawing upon such studies, on consultations with PRODES staff in the Chapare, and possibly on limited interviews with Chapare farmers, prepare updated production cost estimates for major cash crops--citrus, coca, bananas and rice-- including estimates for labor input requirements and purchased inputs.

- Collect data on farm gate prices of major cash crops and development income estimates for each.

- Prepare farm income statements for three prototype "typical farms" in the Chapare, each prototype developed in conjunction with PRODES as typical of a microregion in the Chapare.