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18, chemin des Lilas
43000 LE PUY/FRANCE

17081-E

August 1988

Technico-economical study

Cocoa beans processing unit

in Thailand

Final report

UNITED NATIONS FOR INDUSTRIAL
DEVELOPMENT ORGANIZATION

Section des Marchés
Division des Services Généraux
Département de l'Administration
BP 300
A - 1400 VIENNE/AUTRICHE

UNIDO Contract N° 88/15

Project n° US/THA/87/089

Activity group 601100

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I. GENERAL FEATURES

1.1 COCOA , A RAW MATERIAL

The cocoa beans, most commonly met on the market are the seeds of a small tree known botanically as Theobroma cacao belonging to the Sterculiaceae family.

There are three types of cocoa : the 2 main types are Criollo and Forastero. The Forastero type yields, most of the cocoa production from Brazil and West Africa.

The third type is a hybrid between the first 2 types, known as Trinitario. It supplies 10 to 15 % of the world cocoa production.

The trees grow up 6 to 9 m in height requiring some shade at their early stage of development.

The flowers, 12 mm in diameter develop in clusters on the mature trees trunks.

They are bisexual, and pollination is essentially achieved by insects.

The cocoa fruit is a pool, when fully ripe it usually contains 20 to 40 seeds in a mucilaginous pulp.

A pod weights around of 400 g, including 100 g fresh beans that will yield 40 g saleable cocoa.

The best favourable conditions for the plants growth are a high humidity and a temperature from 21° to 32°C with an average rainfall above 1 500 mm. (these conditions prevail in the area from equator to a latitude of 20°).

The cocoa trees best grow on firm soil with sufficient water retention.

Cocoa beans are an important source of income for 5 tropical countries, among which 4 african countries : 7 % Ivory Coast, Ghana, Nigeria and Cameroon produce 2/3 of the world's supply.

The world's cocoa production is about 1.5 millions tones per year, 61 % of which from Africa, 34 % from Latin America (Malaysia, Papoua, New Guinea).

The cocoa bean is the raw material of an important industry producing

1. semi finished products intended for other industries

. cocoa masse used in chocolate and biscuit factories and confectionnery
. chocolate liquor intended for different sweetened food industries
. cocoa butter used in sweets, chocolates, perfumes and pharmaceutic products
. cocoa powder used in some food products

2. finished products intended to the consumers market

. chocolate bars
. chocolate powder
. chocolates

The by-products (shells, fats extracted from the germs) might be valorized into cattle food, fertelizers, soap or pharmaceutic products.

The finished products, especially chocolates and cocoa butter are almost exclusively consumed in the industrialized countries : Europe, USA, USSR.

Those processed products are found in the producing as well as in the consuming countries.

Yet, the actuel trend in the producing countries is to export all the products to be included in the chocolate making process : beans, cocoa mass, butter and powder.

1.2 COCOA IN THAILAND

The yearly thai cocoa production is 8 000 tones (FAO 1985). The beans are small and belong to the theobroma cacao L. type.

Analyses concerning the beans quality have been carried out on one hand by the Thai Institute of Scientific and Tecnological Research (TISTR) and on the other hand in France, by the Research Institute for Coffee , Cocoa and other stimulant plants (IRCC), branch of the International Agronomical Research Center for Development (CIRAD) ; they have led to the following results : the rate of bean shells is reasonable, fermentation and drying is satisfactorily completed : low acidity rate and sufficient amount of ammoniac nitrogen. Cultivated areas spread over about 22 500 ha. However the amount of fats is relatively low (see figure n° 1).

This will affect the pressing out of cocoa butter (the beans theoretically contain 55 % fats). In this case only, a relatively small percentage will be pressed out (33 %) considering also that the specific composition of the cocoa powder must be kept in mind.

Nevertheless the dietetic, physicochemical, organoleptic qualities of the other elements are excellent.

Figure 1

IRCC France Analysis (April 1988)

Number of beans/100 g	120
Percentage of shells	14,7 %
H20	5,8 %
pH	5,5
Acidity	3.11 ml NaoH 0,1 N/g
Volatile acidity	0.67 ml NaoH 0,1 N/g
Nytrogen (NH3)	344 ppm
Fats	42,7 %

Cultivated areas spread over about 22 500 ha i.e 140 600 rai. The average yield of dried beans is valued to 360 Kg/ha ie 58 Kg/rai.

The needs for imported raw material are not important (3,179 tonnes in 1984), which tends to prove that no industrial use of the Cocoa beans has been developed in Thailand. Most of the imports come from Malaysia.

Dried beans prices may vary from 35 to 40 bahts/kg. They are to be compared to the world market price: 38,5 baht/kg (may 88 - New York).

II. THE PARTNERS

2.1 THE LOCAL PROMOTOR

SANIT and SONS Ltd
35871 Soi Pradoo 1
BANGKOK Yannawa

Managing director : Mr SANIT Tangpoolchapoen

Tel : 289 1860 Tx : 20 736
289 3126
289 1950

The company was created in 1985, with the present management. It manufactures washing and dressing items and aerosol products.

Seeking diversification, it has been involved in the food industry for the past 2 years and plans by means of a joint-venture to install a chocolate mass, cocoa butter and powder processing plant. The company is experimentally running a cocoa farm in the South of Thailand and a small chocolate mass pilot plant.

It employs 87 persons ; its registered capital is 40.000 $.

2.2 MANUFACTURING PARTNER

SARL Gauthier
18, Chemin des Lilas/Mondon

43000 LE PUY/FRANCE

Manager : Philippe GAUTHIER
Technical manager : Alain GEVAUDAN

Tél : 67.61.11.56
Tx : 485 762 F

2.2.1 Gauthier SARL

The Gauthier SARL, capital 200 000 FF was created in 1983 aiming at :

* innovation, development and research in the industrial field, especially in the food industry.

* exports towards warm regions.

2.2.2 Gauthier SARL skills and operations

In Europe

- for over 60 years, it has been involved in the food industry and more specifically in the following branchers : malting, flour milling flakes-making, dried-vegetables transformation, sweets, cattle-food, forest seeds.

. It has designed and built equipment for such operations as : grinding, drying, granulating, weighing, roasting, handling, gauging, sorting out, measuring, sifting, stocking, washing, clarifying, clearing, separating and shelling.

In the tropical regions

* cassava processing into "gari", including several individualized stages : grating, pressing, crumbling and defibering, sifting, cooking, drying (pilot plant in Togo)

* cocoa processing

* millet and sorghum processing

* peanut processing

* rice processing

* legume inoculant production unit

* coffee pulp-removing unit

2.2.3 The Gauthier group

The gauthier group consists of 5 companies

* Mrs late Pierre Gauthier works in Le Puy, created in 1875 , originated the group , it specialized in (mechanical) engineering for industry and agriculture.

* AMV Limited company (application Mécanique du Velay SA) created in 1971, it developped complementary operations to the Pierre Gauthier works in engineering dandpits and quarries equipment.

* Gauthier SARL

* Inter Forêt Service SARL, created in 1987 specialized in maintenance, clearing an improvement of the forests.

* Racines SA, created in1987 is a distribution company for the EEC countries of traditional food products (cassava flour, chile, palmnut cream soup etc...)

The Gauthier group employs 75 persons.

Its a consequence of market's influences the groups activites have progressively developped into engineering, supplying "required size turnkey" units.

Total turnover is about 50 millions francs, 40 % of which come from food industry equipment , 5 % from exotic food products distribution.

III. LOCAL MARKET

3.1 COCOA BEANS NEEDS

Some small size chocolate and cocoa powder processing plants presently use locally produced or imported cocoa beans.

Among them :

* Thai cocoa Ltd processing 1 440 t of cocoa powder + 720 tones of cocoa butter yearly.

* suraphan cocoa ltd : 450 t/year cocoa powder
90 t/year cocoa butter

Other projects are to be launched

* National Product (Thai) with the trade mark MILO will process 3 500 t/year of cocoa powder under a NESTLE know how licence.

* wander will process the same quantity is above with trademark OVALTINE.

Topy (Japan) and Casino (France) are also involved.

The need for cocoa beans of these plants is about 10 000 t/year.

3.2 COCOA BEANS QUALITY

Thai beans quality cannot be compared to that of African or South America beans, nevertheless the IRCC analysis, as mentioned above, prone that the raw material quality reaches the standards for cocoa masse , powder and butter processing.

3.3 SEMI FINISHED AND FINISHED PRODUCTS

Cocoa beans are thus the raw material for an industry processing various products

3.3.1 Semi finished products

3.3.1.1 Cocoa mass

Also called cocoa liquor, it is the result of the fine grinding of previously treated cocoa viles (sorting out, cleaning and roasting). The liquor contains 20 to 50 % fats. It will undergo other operations before being processed into cocoa powder and butter.

3.3.1.2 Cocoa butter

It is obtained by hydraulic pressing of the cocoa liquor; at this point fat is expelled from the nibs.

Yet in some countries, it is referred to as the cocoa fat obtained by hydraulic pressing of the raw nibs.

Cocoa butter might also be produced by means of pressing by extrusion or solvent extraction.

3.3.2 Finished products

Cocoa powder is made from the cocoa press cake, resulting from butter extraction, that is crushed and finely milled into powder. The proportion of residual powder fat is 12 to 25 %.

3.4 FINISHED PRODUCST CONSUMPTION

3.4.1 Cocoa powder

The local market consists of a network of small confectionary industries using cocoa powder into cakes, sweets etc... The biggest local purchaser is the TOBACCO MONOPOLY Co that imports 600 t cocoa powder yearly.

3.4.2 Chocolate

In thailand, only milk chocolate is eaten most often with nuts, raisins and other dried fruits.

Chocolate is mainly imported from Switzerland (NESTLE), Belgium (VERKAEDE), France (POULAIN), England (CADBURY) and Netherlands (VAN HOUTEN).

Distribution is provided by local companies reselling the products to supermarkets like Robinson, Foodland, Ville Market.

Chocolate is sold in the high quality confectionary departments at high prices due to imprtent custom duties : 60 % of CIF Price.

Chocolate paralell imports from Europe developped in order to bypass tariff walls.

It is thus difficult to estimate what chocolate quantities are sold in Thailand considering distributors, appeling to confidence are not willing to give any information.

Chocolate is not traditionnaly eaten in Thailand, its high price keeps middle consumers at a distance.

Nevertheless the thai consumption ways have changed with regard to European culture influences and chocolate has become an expensive yet in demand product. Lowering selling prices would as a consequence widely increase the market together with the number of customers.

On the other hand chocolate local production is not important, only 2 trade marks share it : MILO (Nestle Licence) and CARNATION. Locally produced chocolate is twice as cheap as imported chocolate. Yet its quality is different from European chocolate ; its specific composition is adapted to local temperatures cheres European chocolate melts around 30°C (cocoa butter melting point) and is sold exclusively in air conditionned department stores.

The market characteristics are a low local production and important imports. As illustrated by the following imports figures tables, cocoa powder and chocolate have been increasing by imported as cocoa mass and butter yet in much lesser quantities.

The national production will be able to face the imports and the SNS will sell off its production on the local market.

Year / Products	1986		
	Quantity Kg	Unit price Baht/kg	Total Baht
Beans	-	-	-
Shells	-	-	-
Mass	5 446	115.00	626 246
Butter	4 256	232.31	998 731
Powder	622 278	60.52	37 660 282
Chocolate	448 899	134.01	60 156 968
Total	1 808 879	-	99 432 227

TOTAL OF IMPORTS 1984-1985

Year / Products	1984			1985		
	Quantity Kg	Unit Price Baht/Kg	Total Baht	Quantity Kg	Unit Price Baht/kg	Total Baht
Beans	3 179	78.86	250 715	-	-	-
Shells	-	-	-	60	22.75	1 365
Mass	2 465	92.46	227 905	2 212	103.73	229 452
Butter	2 725	151.81	413 687	650	192.06	124 841
Powder	658 029	51.20	33 689 534	825 987	55.86	46 138 436
Chocolate	419 266	84.67	35 497 729	292 601	109.34	31 993 742
Total	10 856 644	-	70 079 957	1 121 510	-	78 487 836

COCOA IMPORTATIONS

BAHTS (1984)

1984	J	F	M	A	M	J
Mass	38 954	54 535	-	-	43 147	49 402
Butter	60 010	78 013	-	-	87 106	-
Powder	574 790	770 220	3 050 596	1 911 803	4 313 417	979 047
Chocolate	648 785	869 372	1 163 659	1 405 516	503 287	1 984 420

	J	A	S	O	N	D
Mass	-	-	-	41 867		
Butter	-	39 626	-	-	-	-
Powder	2 801 205	3 502 297	2 821 699	2 722 241	6 459 154	2 564 950
Chocolate	1 969 099	4 040 612	2 207 121	1 444 460	10 812 128	3 757 442

COCOA IMPORTATIONS

BAHTS (1985)

1985	J	F	M	A	M	J
Mass	20 869	12 173	53 136	-	-	-
Butter	19 715	10 753	-	-	-	-
Powder	6 770 284	4 254 508	2 356 153	3 677 783	6 154 746	3 687 151
Chocolate	3 759 742	3 648 709	1 906 915	2 829 811	2 011 129	448 217

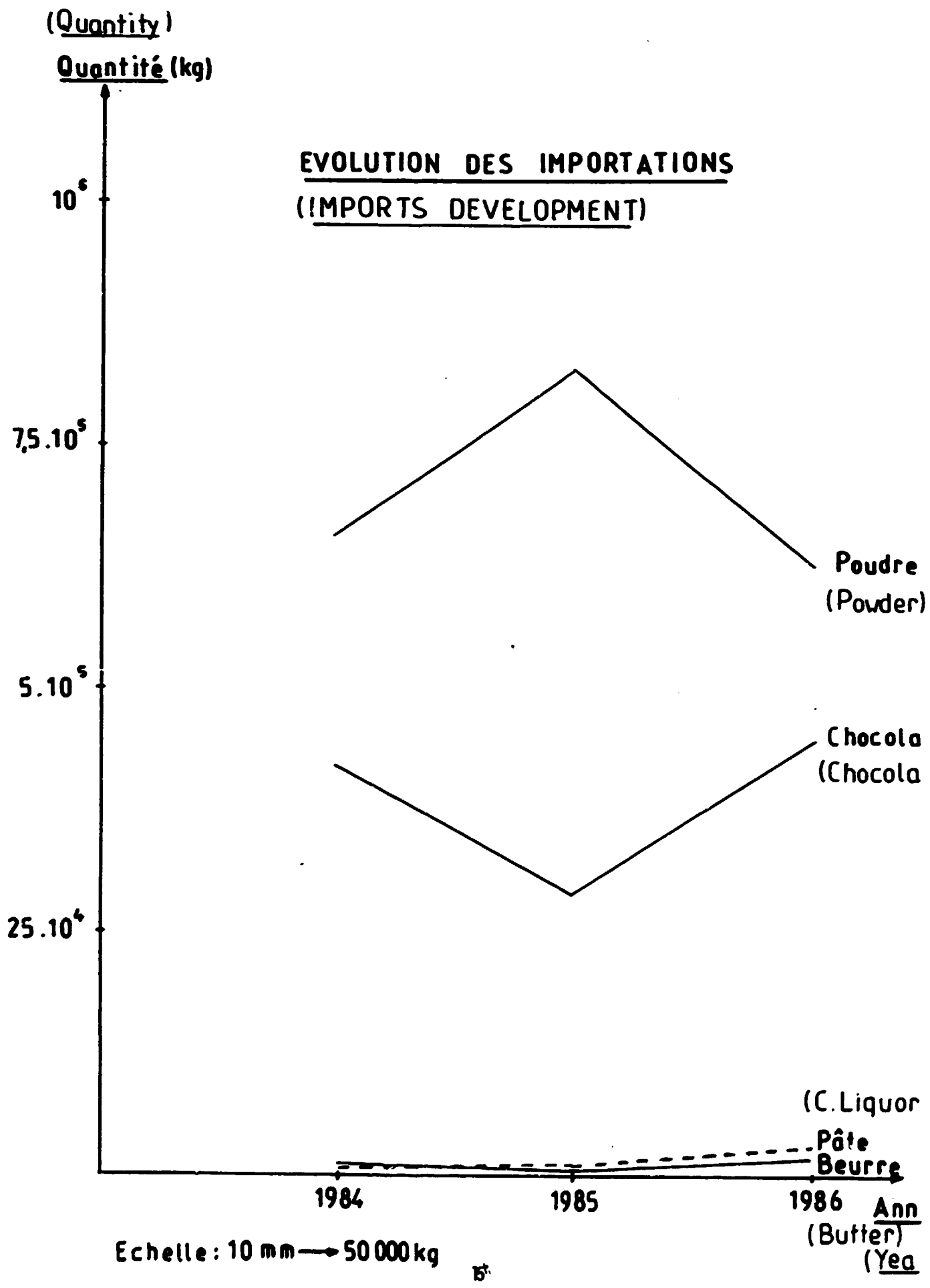
	J	A	S	O	N	D
Mass	-	44 907	-	75 645	34 895	149 874
Butter	-	39 968	65 428	-	-	-
Powder	2 507 096	4 137 172	4 098 923	5 093 906	3 070 413	2 852 747
Chocolate	2 658 450	1 383 931	1 922 536	3 945 328	7 478 973	5 695 617

COCOA IMPORTATIONS

BAHTS (1986)

1986	J	F	M	A	M	J
Mass	-	-	-	-	-	28 984
Butter	-	149 184	148 120	-	-	370 160
Powder	5 059 177	1 655 338	2 578 509	4 307 188	1 222 515	3 659 959
Chocolate	1 830 095	2 429 118	5 927 888	3 962 319	1 905 956	4 181 900

	J	A	S	O	N	D
Mass	33 116	32 884	-	23 661	355 692	151 909
Butter	18 308	-	292 992	9 967	-	-
Powder	2 917 977	1 281 674	2 895 210	3 339 873	3 996 743	4 752 119
Chocolate	3 466 212	4 991 791	7 711 272	7 862 892	8 453 027	7 434 498


(Quantity)
Quantité (kg)
EVOLUTION DES IMPORTATIONS
(IMPORTS DEVELOPMENT)
10^6
7,5.10^5
5.10^5
25.10^4
Poudre
(Powder)
Chocola
(Chocola
(C.Liquor
Pâte
Beurre
1984
1985
1986
Ann
(Butter)
(Yea
Echelle : 10 mm → 50 000 kg

IV. TECHNICAL FEATURES

4.1 GENERALITIES

The capacity of the present plant is to be raised to 500 Kg/h cocoa beans. The present facilities do not allow such a capacity because of 2 bottlenenecks : the pressing and grinding operations.

Setting up a 6 pots press (350 Kg/h) and a roll refiner (500 Kg/h) would help reach the desired capacity.

4.2 THE PLANT'S LAY OUT

The equipment will be set up in the actual plant, in Yannawa South of Bangkok, of 400 m2 area (see appendix). The buildings and other facilities (water, elecricity, telephone) being actually set, establishment costs are reduced to a minimum.

4.3 THE PLANT'S CAPACITY

The plant has been designed to process 1000 t/year fermented dried cocoa beans.

It will operate 300 days per year on the basis of 8 working hours a day in order to produce 100 t cocoa masse, 476 t cocoa powder and 50 t cocoa butter.

The unit will reach its maximum capacity after 3 years functionning, its potential will develop as follows :

1st year : 70 %
2nd year : 85 %
3rd year : 100 %

4.4 TECHNICAL DESCRIPTION OF THE PROCESS

The process consists of the following operations :

- sorting out
- roasting
- winnowing
- grinding

- pressing
- milling

4 4.1 Sorting out

The beans are sorted out into different calibre batches will optimize the roasting.

4.4.2 Roasting

It this thermal treatment developps cocoa flavour. Roasting is carried out before the winnowing operation ; it helps separating the shells easily realeased by heat treatment from the nibs, yet the risk appears that expelled butter from the nibs be absorbed by the shells under steam action.

The beans are roasted in cylinder rotating inside a drum. An electroventilator blows hot air around the cylinder, the cooking is done therefore by indirect heating.

The roasting temperature depends upon the product one wishes to obtain :

100°C to 12°C for powder
90°C to 104 °C for chocolate

Operating time may vary from 15 to 70 mn depending on the equipment capacity.

4.4.3 Winnowing

A very important operation where the shells are almost completely removed from the nibs.

The technique relies on the weight difference between shells and nibs that will be separated by sifting and air-blowing combined operations.

4.4.4 Grinding

An important stage in the cocoa masse processing because it affects the finished product quality and especially its texture.

It also affects manufacturing costs. The beans are grinded through adjustable dented cylinders.

Cocoa nibs hold 55 % solid fats contained in the cell clusters. During the grinding operation the cellulose wall is broken, the rise of temperature due to the friction produces the fats liquefaction. The size of particles is reduced and the cocoa mass is progressively changed into a liquid mass, the so-called cocoa masse or liquor.

Further to these operations is the powder and butter processing.

4.4.5 Alkalization

The cocoa mass is treated with reacting alkaline solutions or suspensions of which potassium carbonate. This leads to free acids degradation ; there is no saponification but other presently unknown chemical reactions.

The unit consists of a batch feeder, a first quality reactor in which the process is carried out and an agitator for stirring the product.

The reactor is vapour heated.

The unit is fitted with an evaporating device for vacuum creating and water evaporating at the end of the process.

The operation is carried out at a temperature of 115°C.

4.4.6 Pressing

It consist of a hydraulic pressing during which 55 % of the butter quantity contained in the liquor is evacuated. The result is a solid mass called cocoa press cake with 12 to 25 % fats operation time depends on the desired final fats content in the cake. 15 mn are needed to obtain a 22 % fat cake 30 mn for a 14 % fat cake.

The press is constructed from a set of cylindrical pot perforated at the bottom. A filter is added to the bottom, the tank is filled with liquor and a second filter is placed on top at the liquor which is thus pressed. The butter is squeezed and passes through the filter into special pipes and adapted containers.

4.4.7 Milling

The press cake is broken down into a homogenous product. This preliminary operation will facilitate and optimize the milling i.e powder processing. The unit is fed by endless screw device and the feeding is regulated by valve.

The roll breaker is cooled by water circulation, it includes two oplked rollers moving in opposite directions. The cocoa powder must be refrigerated for color effects and will pass through a cyclone separator.

4.4.8 Butter refining (optional)

Cocoa butter is cleaned from remaining particles through a sifting-press. Solidification happens at room temperature. It is ready for packaging.

4.5 THE PLANT'S PROVISIONNING

Assessment of available areas in 1987 of the SANIT company is given in the following table.

	RAI	Ha
Productive area	4 018	643
Future productive area	15 207	2 433
TOTAL	**19 225**	**~ 076**

Dried beans production is estimated to 80,7 kg/rai
i.e 504 kg/ha

Yearly production would amount to 324 t/year. Considering the whole cultivated area available it would amount to 1 550 t/year.

If, nevertheless, calculation is done according to the national average production of 360 Kg/ha, the yearly production amounting to 1 107 t, the need for raw material of the plant is still met (1 000 t/year).

V. Economic and financial analysis

5.1 Production planning and turnover

The provided unit will process 1 000 tons saleable cocoa beans yearly.

5.1.1 Potential increase

YEAR	1	2	3	4	5	6	7	8	9	10
%	70	85	100	100	100	100	100	100	100	100

5.1.2 Production planning and raw material purchases

YEARS	1	2	3
Raw material (tons)	700	850	1 000
Delivery Duty Paid Cocoa price (Baht)	40	40	40
Raw material Total cost baht X 1 000	28 000	34 000	40 000

5.1.3 Turnover

Years	1	2	3
Cocoa mass	70 t	85 t	100 t
60 bahts/kg	4 200	5 100	6 000
Cocoa powder	333 t	405 t	476 t
80 bahts/kg	26 656	32 368	38 080
Cocoa butter	35 t	42.5 t	50 t
100 bahts/kg	3 500	4 250	5 000
TOTAL BAHT X 100	34 356	41 718	49 080

5.2 Production costs

5.2.1 Labour costs

POSITION	YEARLY SALARY BAHT X 1000	EFFECTIFS		
		YEAR		
		1	2	3
Manager	350	1	1	1
Foreman	192	1	1	1
Semi skilled workers	25	14	17	20

	1st year	2nd year	3rd year
Total labour costs Bahts x 1 000	892	967	1 042

5.2.2 Gauthier technical assistance

It will amount to 213 500 bahts per year.

5.2.3 Fuel

The fuel used for beans roasting is butane.

Roasting needs an average of 0,625 Kg/h butane. The total consumption is estimated to :

0,7 x 8 x 300 = 1 680 kg/year butane

5.2.4 Electricity

Operations	Unit power Kwh	Number	Total energy Kw h/day
Winnowing	10	1	80
Shelling	2	1	16
Pressing	5	1	40
Grinding	10	1	80
Milling	30	1	240
Compressor	20	1	160
others (pump...)	10	1	80
Total	87	7	696

The unit price of Kwh is 4 bahts annual electricity charges :

700 x 4 x 300 = 840 000 bahts

5.2.5 Packaging

Packaging is done in plastic 50 kg containers at 10 bahts each.

Powder packaging

N = $\frac{476}{0.05}$ = 9 520 containers Cost : 95 200 bahts

Masse packaging

$N = \frac{100}{0.05} = 2\,000$ containers Cost : 20 000 bahts

Butter packaging

$N = \frac{50}{0.05} = 1\,000$ containers Cost : 10 000 bahts

Total packaging cost : 125.200 bahts

5.2.6 Maintenance and spare parts

Maintenance costs are estimated to :

- 3 % of the buildings and fixed equipment price:
  0.03 x 1 260 000 = 37 800 Bahts

- 7 % of rotating machinery price:
  0.07 x 6 000 000 = 420 000 bahts

Total expenses : 460.000 Bahts

5.2.7 Insurance

Insurance costs are estimated to 85.000 bahts fixed price.

5.2.8 Administration costs

They include administration expenses, different fees, telephone, telex, sundries and advertising expenses.

Estimation : 200.000 bahts.

5.2.9 Taxes

Endowment : 60.000 bahts

R 3 DATE : 04/27/1988 TIME : 10:40

Gauthier S.a.r.l. / Le Puy - FRANCE

- FINANCIAL DATA OPERATING EXPENDITU

CACAO CURRENCY :BAHT X 1000

YEARS	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
VARIABLE EXPENDITURES										
RAW MATERIALS	28000	34000	40000	40000	40000	40000	40000	40000	40000	40000
INTERMEDIATE MATERIALS	560	680	800	800	800	800	800	800	800	800
OTHER MATERIALS	0	0	0	0	0	0	0	0	0	0
SPARE PARTS	105	127	150	150	150	150	150	150	150	150
WATER	0	0	0	0	0	0	0	0	0	0
FUEL OIL	12	14	17	17	17	17	17	17	17	17
ELECTRICITY	588	714	840	840	840	840	840	840	840	840
PACKAGING	91	110	130	130	130	130	130	130	130	130
FREIGHT AND DISTRIBUTION	149	181	213	213	213	213	213	213	213	213
LABOUR	350	425	500	500	500	500	500	500	500	500
OTHER	0	0	0	0	0	0	0	0	0	0
TOT.VARIABLE OPERATING EXPEND.	29855	36251	42650	42650	42650	42650	42650	42650	42650	42650
FIXED EXPENDITURES										
MAINTENANCE	460	460	460	460	460	460	460	460	460	460
INSURANCE	85	85	85	85	85	85	85	85	85	85
TAX	60	60	60	60	60	60	60	60	60	60
OFFICE AND ADMIN. EXPENDITURES	200	200	200	200	200	200	200	200	200	200
PERSONNEL	542	542	542	542	542	542	542	542	542	542
RENT ON OFFICE & FACTORY BUILDINGS	0	0	0	0	0	0	0	0	0	0
OTHER	0	200	200	200	200	200	200	200	200	200
TOT.FIXED OPERATING EXPEND.	1347	1547	1547	1547	1547	1547	1547	1547	1547	1547
TOTAL OPERATING EXPENDITURES	31202	37798	44197	44197	44197	44197	44197	44197	44197	44197

5.3 Investment

	Imported equipment Price CIF Bangkok	Works carried out in Thailand Price ex-works
Hydraulic press Pumps	2 250 000	312 000
Freight and installation costs Tools / small equipements Laboratory equipment		250 000 125 000 85 000
	2 250 000	772 000

Total cost of investment : 3 022 000 Bahts

5.4 Financial survey

5.4.1 Increase in capital expenses

Fixed costs : 25 620 Bahts

5.4.2 Intercalary interests

They correspond to the interests of the loans, payable during the plant's construction :

- bank charges from local credit
  amouting to 19 700 bahts

Realization is done in different steges, with an average term of 12 months ; and an annual rate

Interests to be budgeted for . 2 167 000 bahts

5.4.3 Working capital

Working capital corresponds to 2 months normal working expenses (exclusively interest and

1st year : 15 432 000 bahts
2nd year : 19 673 000
3rd year 23 166 000

R 6 DATE : 04/27/1988 TIME : 10:

Gauthier S.a.r.l. / Le Puy - FRANCE

- FINANCIAL DATA WORKING CAPITAL REQUIRE

CACAO CURRENCY :BAHT X 1000

	MONTHS	1989	1990	1991	1992	1993	1994	1995	1996	1997	19
CURRENT ASSETS											
CASH	2	149	161	174	174	174	174	174	174	174	1
RAW MATERIAL	2	4667	5667	6667	6667	6667	6667	6667	6667	6667	66
INTERMEDIATE MATERIAL	2	93	113	133	133	133	133	133	133	133	1
OTHER MATERIALS / SPARE PARTS	2	17	21	25	25	25	25	25	25	25	
WORK IN PROGRESS	0	0	0	0	0	0	0	0	0	0	
FUEL	1	1	1	1	1	1	1	1	1	1	
PACKAGING ETC.	2	15	18	22	22	22	22	22	22	22	
FINISHED PRODUCTS	2	5726	6953	8180	8180	8180	8180	8180	8180	8180	81
RECEIVABLES	2	4772	6748	7975	8180	8180	8180	8180	8180	8180	81
TOTAL CURRENT ASSETS		15440	19682	23177	23382	23382	23382	23382	23382	23382	233
MINUS : CURRENT LIABILITIES											
RAW MATERIAL	0	0	0	0	0	0	0	0	0	0	
INTERMEDIATE MATERIAL	0	0	0	0	0	0	0	0	0	0	
OTHER MATERIALS / SPARE PARTS	0	0	0	0	0	0	0	0	0	0	
FUEL	0	0	0	0	0	0	0	0	0	0	
PACKAGING	1	8	9	11	11	11	11	11	11	11	
CURRENT LIABILITIES		8	9	11	11	11	11	11	11	11	
WORKING CAPITAL REQUIREMENTS		15432	19673	23166	23371	23371	23371	23371	23371	23371	233
WORKING CAPITAL INCREASE/(DECREASE) P.A.		15432	4241	3493	205	0	0	0	0	0	

5.4.4 Summary of capital requirements

R 1 DATE : 04/27/1988 TIME : 10:4

Gauthier S.a.r.l. / Le Puy - FRANCE

- INVESTMENT COST FINANCING CAPITAL REQUIREMENTS AND TIME SCHEDULE OF EXPENDI

CACAO CURRENCY :BAHT X 1000

	TOTAL CAPITAL REQUIRED (1)+(2)	1	2								
LAND	0	0	0	0	0	0	0	0	0	0	0
INFRASTRUCTURE	0	0	0	0	0	0	0	0	0	0	
FACTORY BUILDINGS	0	0	0	0	0	0	0	0	0	0	
OFFICE BUILDINGS	0	0	0	0	0	0	0	0	0	0	
STAFF HOUSES	0	0	0	0	0	0	0	0	0	0	
MACHINERY (C.I.F.)	2562	2562	0	0	0	0	0	0	0	0	0
FREIGHT AND INSTALLATION COSTS	250	250	0	0	0	0	0	0	0	0	
TOOLS.SMALL EQUIPMENTS	125	125	0	0	0	0	125	0	0	0	0
FACTORY AND OFFICE EQUIPMENT	85	85	0	0	0	0	85	0	0	0	
VEHICLES	0	0	0	0	0	0	0	0	0	0	0
FURNITURE AND EQUIPM.STAFF HOUSES	0	0	0	0	0	0	0	0	0	0	
TOTAL FIXED ASSETS BEFORE CONTIGENCIES	3022	3022	0	0	0	0	210	0	0	0	0
CONTIGENCY	151	151	0	0	0	0	11	0	0	0	
TOTAL FIXED ASSETS	3173	3173	0	0	0	0	221	0	0	0	0
WORKING CAPITAL (NET)	19673	15432	19673	23166	23371	23371	23371	23371	23371	23371	2337
PRELIM. EXPEND. & COSTS OF ESTABL.	1110	1110	0	0	0	0	0	0	0	0	
TOTAL FUNDS REQUIRED	23956	19715	19673	23166	23371	23371	23592	23371	23371	23371	23371
FIXED ASSETS BEFORE CONTINGENCY AND PRELIM. EXPEND. IN :											
DOMESTIC CURRENCY	23956	19715	19673	23166	23371	23371	23592	23371	23371	23371	2337
FOREIGN CURRENCY	0	0	0	0	0	0	0	0	0	0	

5.4.5 Source of funds

- self-financing (shareholders' capity)
- bank credit (local bank)

5.4.5.1 Shareholders' capity

amount : 4 256 000 bahts

Contribution of capital is made as follows :

- cash, site and part of the equipment Mr SANIT : 3 617 000 Bahts
- material contribution SARL Gauthier : 638 400 Bahts

5.4.5.2 Loans

Local bank credit : 19.700 000 bahts

Annual interest rate : 11 %

Repayment in 3 years

R 4 DATE : 04/27/1988 TIME : 10:4

Gauthier S.a.r.l. / Le Puy - FRANCE

- FINANCIAL DATA REPAYEMENT OF LOANS AND FINANCIAL CHAR

CACAO CURRENCY :BAHT X 1000

YEARS	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
FOREIGN BANK 1-LOAN AT BEGINNING YEAR	0	0	0	0	0	0	0	0	0	0
REPAYMENT OF PRINCIPAL	0	0	0	0	0	0	0	0	0	0
PAYMENTS OF INTEREST	0	0	0	0	0	0	0	0	0	0
LOAN AT YEAR END	0	0	0	0	0	0	0	0	0	0
FOREIGN BANK 2-LOAN AT BEGINNING YEAR	0	0	0	0	0	0	0	0	0	0
REPAYMENT OF PRINCIPAL	0	0	0	0	0	0	0	0	0	0
PAYMENTS OF INTEREST	0	0	0	0	0	0	0	0	0	0
LOAN AT YEAR END	0	0	0	0	0	0	0	0	0	0
FOREIGN BANK 3-LOAN AT BEGINNING YEAR	0	0	0	0	0	0	0	0	0	0
REPAYMENT OF PRINCIPAL	0	0	0	0	0	0	0	0	0	0
PAYMENTS OF INTEREST	0	0	0	0	0	0	0	0	0	0
LOAN AT YEAR END	0	0	0	0	0	0	0	0	0	0
LOCAL BANK 1-LOAN AT BEGINNING YEAR	19700	13133	6566	0	0	0	0	0	0	0
REPAYMENT OF PRINCIPAL	6567	6567	6569	0	0	0	0	0	0	0
PAYMENTS OF INTEREST	2167	1445	722	0	0	0	0	0	0	0
LOAN AT YEAR END	13133	6566	-3	0	0	0	0	0	0	0
LOCAL BANK 2-LOAN AT BEGINNING YEAR	0	0	0	0	0	0	0	0	0	0
REPAYMENT OF PRINCIPAL	0	0	0	0	0	0	0	0	0	0
PAYMENTS OF INTEREST	0	0	0	0	0	0	0	0	0	0
LOAN AT YEAR END	0	0	0	0	0	0	0	0	0	0
LOCAL BANK 3-LOAN AT BEGINNING YEAR	0	0	0	0	0	0	0	0	0	0
REPAYMENT OF PRINCIPAL	0	0	0	0	0	0	0	0	0	0
PAYMENTS OF INTEREST	0	0	0	0	0	0	0	0	0	0
LOAN AT YEAR END	0	0	0	0	0	0	0	0	0	0
TOTAL LOANS AT BEGINNING YEAR	19700	13133	6566	0	0	0	0	0	0	0
TOTAL REPAYMENT OF PRINCIPAL	6567	6567	6569	0	0	0	0	0	0	0
TOTAL PAYMENTS OF INTEREST	2167	1445	722	0	0	0	0	0	0	0
TOTAL LOANS AT YEAR END	13133	6566	-3	0	0	0	0	0	0	0

5.4.6 Amortization

R 5 DATE : 04/27/1988 TIME : 10:00

Gauthier S.a.r.l. / Le Puy - FRANCE

- FINANCIAL DATA DEPRECIATION AND TAX ON PROFI

CACAO CURRENCY : BAHT X 1000

YEARS	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
TAX DEPRECIATION AND ALLOWANCES										
INFRASTRUCTURE	0	0	0	0	0	0	0	0	0	0
FACTORY BUILDINGS	0	0	0	0	0	0	0	0	0	0
OFFICE BUILDINGS	0	0	0	0	0	0	0	0	0	0
STAFF HOUSES	0	0	0	0	0	0	0	0	0	0
PLANT AND MACHINERY INCLUD.FREIGHT ETC.	295	295	295	295	295	295	295	295	295	295
VEHICLES	0	0	0	0	0	0	0	0	0	0
OTHER EQUIPMENT	44	44	44	44	44	44	44	44	44	44
PRELIMINARY EXPENDITURES	233	233	233	233	233	0	0	0	0	0
TOTAL DEPRECIATION	572	572	572	572	572	339	339	339	339	339
TAXABLE PROFIT/(LOSS)	-5311	535	2027	3818	3467	3812	3878	3943	4000	4059
ACCUMULATED PROFITS/(LOSSES)	-5311	-4776	-2749	1069	4536	8348	12226	16169	20169	24228
TAX	0	0	0	374	1213	1334	1357	1380	1400	1421

5.4.7 Taxes

The survey refers to the Thai normal tax system which does not offer the most favourable conditions.

The company will apply for the priority agreement tax system.

The authorities we met, the general secretary of the plan and cooperation, general director of the plan, have given our project their support for a priority agreement, as it is suited to the Thai

The company will indeed fulfil 3 conditions related to the achievement of priorities as provided in the thai investment regulations :

- a small and medium size firm
- a company valorizing local raw material
- a company set up in an economically less developped area.

The priority agreement allows the company to benefit from :

- exemption from import duties and taxes including turnover tax applied to capital goods in Thailand, during the initial investment period starting up with the agreement becoming operative ending up with the lounching of the agreed activity.

- exemption from training levy and flat rate on wages during a period of five financial years beginning at the start of the operations and 40 % reduction of those taxes during the next 3 years.

- exemption from industrial and commercial profit tax during the first 5 financial years following the start of the operations

- reduction of a third of the turnover tax rate levied on the company's production during the first 5 financial years following the start of the operations.

5.4.8 Forecast operation account

R 7 DATE : 04/27/1988 TIME : 10:40

Gauthier S.a.r.l. / Le Puy - FRANCE

- FINANCIAL DATA PROFIT AND LOSS ACCOUNT FORECAST

CACAO CURRENCY : FRANC X 1000

YEARS	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
TOTAL NET SALES	28630	40491	47853	49080	49080	49080	49080	49080	49080	49080
OPERATING EXPENDITURES	31202	37798	44197	44197	44197	44197	44197	44197	44197	44197
DEPRECIATION AND AMORTISATION	572	572	572	572	572	339	339	339	339	339
TOTAL COST OF PRODUCTION	31774	38370	44769	44769	44769	44536	44536	44536	44536	44536
LOAN INTEREST	2167	1445	722	0	0	0	0	0	0	0
OVERDRAFT INTEREST	0	141	335	493	844	732	666	601	544	485
TOTAL FINANCIAL CHARGES	2167	1586	1057	493	844	732	666	601	544	485
TOTAL COSTS	33941	39956	45826	45262	45613	45268	45202	45137	45080	45021
NET PROFIT/(LOSS) BEFORE TAX	-5311	535	2027	3818	3467	3812	3878	3943	4000	4059
TAX	0	0	0	374	1213	1334	1357	1380	1400	1421
PROFIT/(LOSS) AFTER TAX	-5311	535	2027	3444	2254	2478	2521	2563	2600	2638
RETURN ON EQUITY %	0	13	48	81	53	58	59	60	61	62
APPROPRIATION OF PROFITS										
DIVIDENDS - AMOUNT	0	426	638	851	1064	1277	1490	1490	1490	1490
DIVIDENDS - % ON EQUITY	0	10	15	20	25	30	35	35	35	35
RETAINED EARNINGS FOR THE YEAR	-5311	109	1389	2593	1190	1201	1031	1073	1110	1148
CUMULATIVE RETAINED EARNINGS	-5311	-5202	-3813	-1220	-30	1171	2202	3275	4385	5533

5.4.9 Cash flow - financial plan

R 8 DATE : 04/27/1988 TIME : 10:

Gauthier S.a.r.l. / Le Fuv - FRANCE

- FINANCIAL DATA CASH F

CACAO CURRENCY :BAHT X 1000

YEARS	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
SOURCES OF CASH										
EQUITY	4256	0	0	0	0	0	0	0	0	0
LOANS	19700	0	0	0	0	0	0	0	0	
NET PROFIT/(LOSS) BEFORE TAX	-5311	535	2027	3818	3467	3812	3878	3943	4000	405
DEPRECIATION AND AMORTISATION	572	572	572	572	572	339	339	339	339	339
CASH INCOME	19217	1107	2599	4390	4039	4151	4217	4282	4339	439
WORKING CAPITAL DECREASE	0	0	0	0	0	0	0	0	0	
SALE OF FIXED ASSET	0	0	0	0	0	0	0	0	0	0
TOTAL CASH AVAILABLE	19217	1107	2599	4390	4039	4151	4217	4282	4339	439
CASH REQUIREMENTS										
CAPITAL INVESTMENT/REPLACEMENT ASSETS	4283	0	0	0	0	221	0	0	0	0
DIVIDENDS PAYMENTS	0	0	426	638	851	1064	1277	1490	1490	1490
TAX PAYMENTS	0	0	0	0	374	1213	1334	1357	1380	1400
WORKING CAPITAL INCREASE	15432	4241	3493	205	0	0	0	0	0	0
PAYMENT OF PRINCIPAL	6567	6567	6569	0	0	0	0	0	0	0
TOTAL CASH REQUIREMENTS	26282	10808	10488	843	1225	2498	2611	2847	2870	2890
CASH SITUATION AT YEAR END	-7065	-9701	-7889	3547	2814	1653	1606	1435	1469	1508

5.4.10 Conclusion to the financial survey

5.4.10.1 Forecast operating account

A negative profit is showing for the first year ; yet it is very soon balanced in the 2nd year, reaching 109 000 bahts.

5.4.10.2 Financing plan

It is a key element to the survey. Comparing the needs and resources allows an estimation of the project's profitability.

It points out the cash flow during the project's life.

The balance is negative at the start then it becomes and remains positive which allows a satisfactory financing of the project. It is thus a profitable operation economically as well as financially.

R 9 DATE : 04/27/1988 TIME :

Gauthier S.a.r.l. / Le Puy - FRANCE

- FINANCIAL DATA BALANCE SHEET PRO

CACAO CURRENCY :BAHT X 1000

YEARS	1989	1990	1991	1992	1993	1994	1995	1996	1997	1
ASSETS										
CASH	149	161	174	174	174	174	174	174	174	
STOCKS	10519	12773	15028	15028	15028	15028	15028	15028	15028	15
RECEIVABLES	4772	6748	7975	8180	8180	8180	8180	8180	8180	8180
RESERVE	0	0	0	0	0	0	0	0	0	0
TOTAL CURRENT ASSETS	15440	19682	23177	23382	23382	23382	23382	23382	23382	233
FIXED ASSETS GROSS	4283	4283	4283	4283	4283	4504	4504	4504	4504	45
DEPRECIATION AND AMORTISATION	572	1144	1716	2288	2860	3199	3538	3877	4216	45
NET FIXED ASSETS	3711	3139	2567	1995	1423	1305	966	627	288	-7
TOTAL ASSETS	19151	22821	25744	25377	24805	24687	24348	24009	23670	23331
LIABILITIES										
TAX PAYABLE	0	0	0	374	1213	1334	1357	1380	1400	14
DIVIDENDS PAYABLE	0	426	638	851	1064	1277	1490	1490	1490	14
CURRENT ACCOUNT (MINUS = SURPLUS)	7065	16766	24655	42213	36585	33279	30067	27197	24259	212
CURRENT LIABILITIES	8	9	11	11	11	11	11	11	11	11
TOTAL CURRENT LIABILITIES	7073	17201	25304	22344	20582	19263	17893	16481	15032	135
LONG TERM DEBT	13133	6566	-3	0	0	0	0	0	0	0
EQUITY (1)	4256	4256	4256	4256	4256	4256	(4256	4256	4256	42
RESERVES	-5311	-5202	-3813	-1220	-30	1171	2202	3275	4385	5533
TOTAL SHAREHOLDERS EQUITY	-1055	-946	443	3036	4226	5427	6458	7531	8641	97
TOTAL LIABILITIES	19151	22821	25744	25377	24805	24687	24348	24009	23670	2333
DEBT: EQUITY RATIO (2)	0.0	0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.(
SECURITY COVERAGE RATIO (3)	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
LIQUIDITY RATIO (4)	2.2	1.1	0.9	1.0	1.2	1.3	1.4	1.6	1	

(1) Amount on Equity plus eventual future Increase
(2) Long Term Debt : Total Shareholders Equity
(3) Net Fixed Assets : Long Term Debt
(4) Total Current Assets : Total Current Liabilities

R 10 DATE : 04/27/1988 TIME : 10:40

Gauthier S.a.r.l. / Le Puy - FRANCE

- FINANCIAL DATA . SENSITIVITY ANALYSIS FOR 2ND YEAR AT 10

CACAO CURRENCY :BANT X 1000

RESULTS : NET PROFIT/(LOSS) BEFORE TAX

	SELLING PRICES OF FINISHED PRODUCTS						
	-30%	-20%	-10% CONSTANT	+10%	+20%	+30%
TOTAL OPER. EXPEND. +30%	-24165	-19257	-14349	-9441	-4533	375	5283
TOTAL OPER. EXPEND. +20%	-19745	-14837	-9929	-5021	-113	4795	9703
TOTAL OPER. EXPEND. +10%	-15326	-10418	-5510	-602	4306	9214	14122
TOTAL OPER. EXPEND. CONSTANT	-10906	-5998	-1090	3818	8726	13634	18542
TOTAL OPER. EXPEND. -10%	-6486	-1578	3330	8238	13146	18054	22962
TOTAL OPER. EXPEND. -20%	-2067	2841	7749	12657	17565	22473	27381
TOTAL OPER. EXPEND. -30%	2353	7261	12169	17077	21985	26893	31801

R 15

DATE : 04/27/1988 TIME : 10:

Gauthier S.a.r.l. / Le Puy - FRANCE

, - FINANCIAL DATA

. CALCULATION OF BREAK-EVEN POINT 2ND YEAR FULL

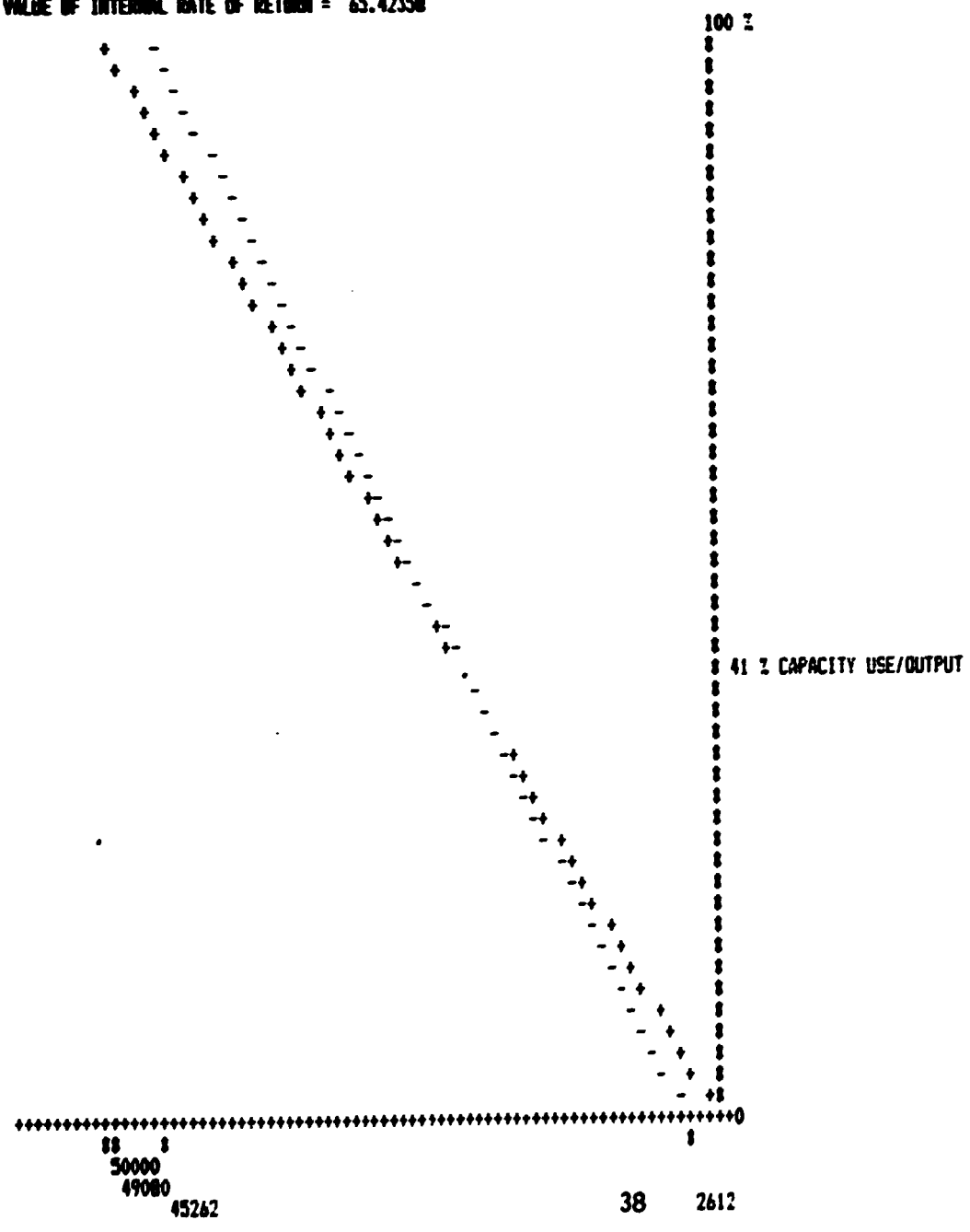
CACAO

CURRENCY :DMNT X 1000

FOR SECOND YEAR AT 100 % OF CAPACITY YEAR = 1992

TOTAL OUTPUT VALUE = 49080
TOTAL COST = 45262
FIXED PRODUCTION EXPENDITURE = 2612
FINANCIAL CHARGES = 493
DEPRECIATION = 572

VALUE OF P&L ACCOUNT BREAK EVEN POINT FOR
SECOND YEAR AT 100 % CAPACITY = 41 %
VALUE OF INTERNAL RATE OF RETURN = 65.42358



5.4.11 Estimated work schedule for starting off

After signing the agreement between Gauthier Ltd and Sanit and Sons Ltd, work schedule will be the following :

Months	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Establishment of specific.	X														
Plans for the line instal.		X	X												
Fabrication equipment		X	X	X	X										
Bench test					X	X									
Expedition							X								
Transport (Asia)								X							
Transport (from docks to the site)									X						
Site preparation					X	X	X	X	X						
'Working									X	X					
Starting off .' Formation of local personnel											X				
Technical assistance												X	X	X	X

5.4.12 Possible agreements with SANIT and SONS

5.4.12.1 Joint Venture

Sarl GAUTHIER will propose to SANIT and SONS to contribute to the capital increase at around 15 % of the total amount. This contribution will be realized in supplying processing equipment.

5.4.12.2 Technical assistance

Sarl GAUTHIER will propose to SANIT and SONS two types of assistance :

- a technical assistance for the good running of the plant : efficiency of equipment, quality of the end-products, supplementary investments, etc...

- a technical assistance in the field of cocoa beans production, especially in the research of varietal selection or processing improvement (fermentation, drying) in order to obtain higher fat content beans. For information GAUTHIER Sarl is developping for more then one year with I.R.C.C / CIRAD a research programm about controlled fermentation of cocoa beans in France and in Togo.

One a more know-how license contracts will have to be written if possible with the assistance of UNIDO.

ANNEXES

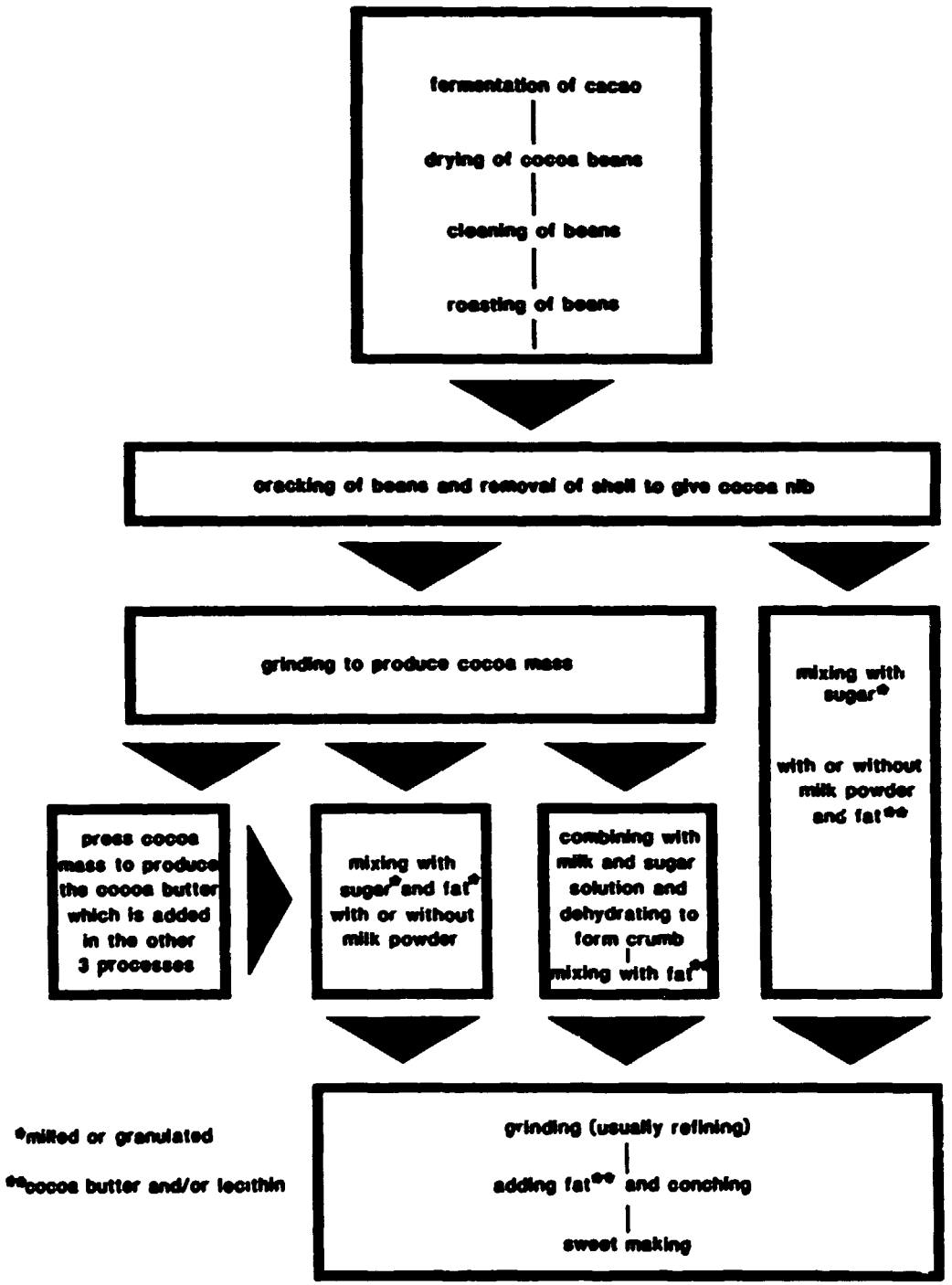
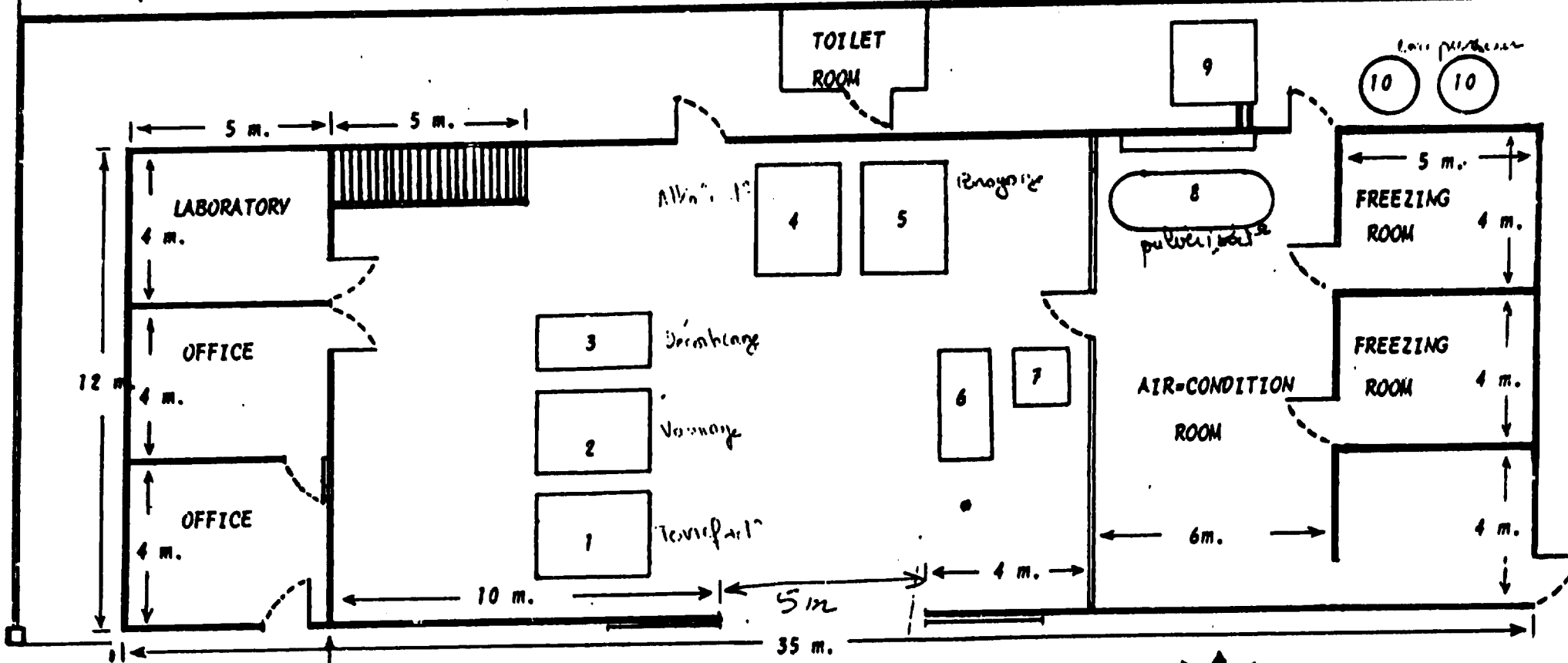


Figure 1.1 Schematic diagram of traditional chocolate-making process.

SANIT 6 SONS COMPANY LIMITED

1. Roasting bean
2. Pre-Winnowing
3. Seperate shell
4. Akalising
5. Grinding nibs
6. Tempering
7. Tank storage
8. Pulverizing
9. Compressor 10 tons for air-condition room
10. Compressor for freezing rooms



1.4 Cm. : 1 m.

Cm. : Centimetre

m. : Meter

TLX : 20736 SKI SNS TH.

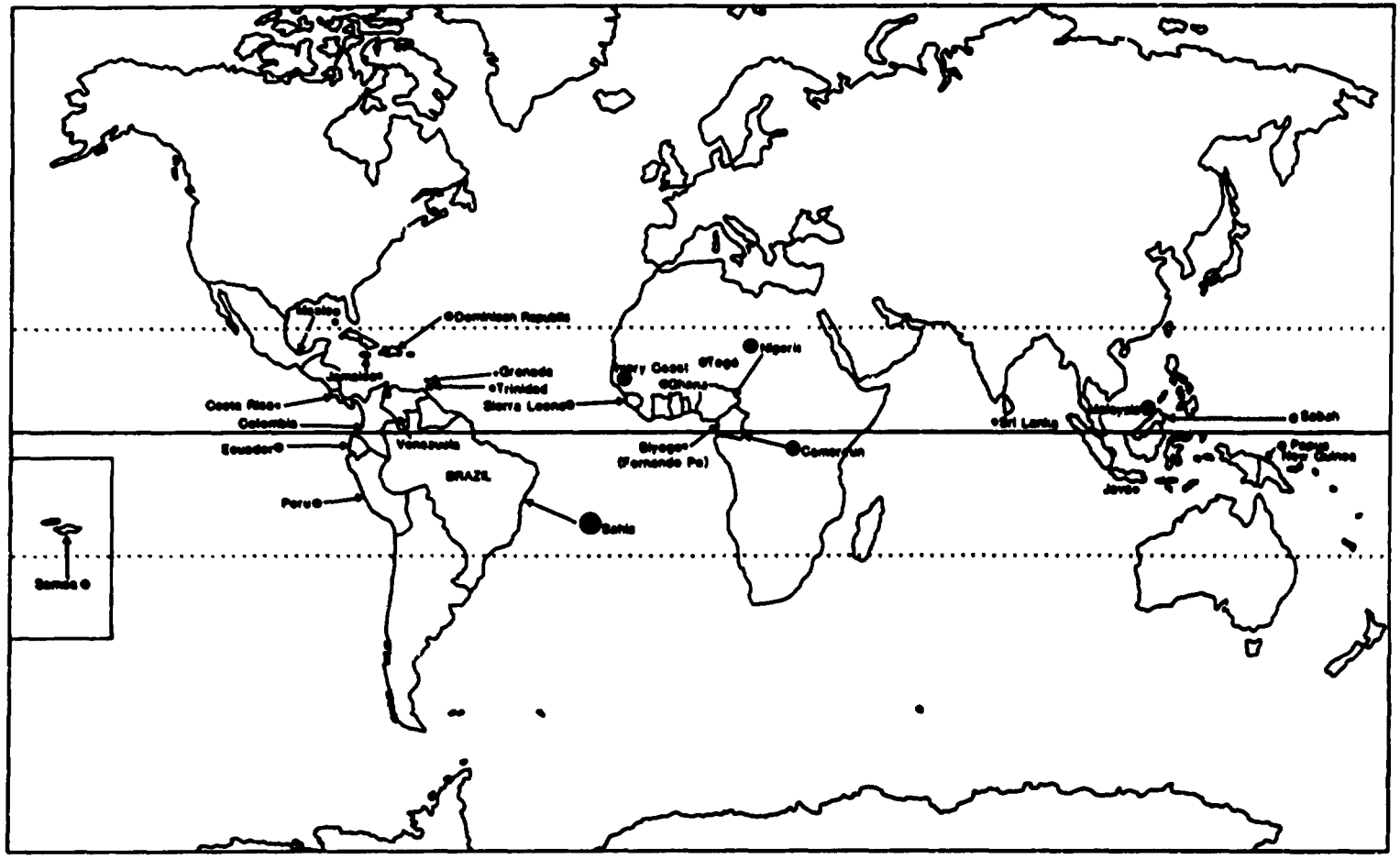


Figure 2.1 The named countries produce most of the world's cocoa in the areas marked. The circles indicate relative areas under cultivation.

Request No. 032 / 27

TSC.No. 0694 / 27

ACL.No. 289 / 27

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

196 Phahonyothin Road, Bang Khen, Bangkok 10900

REPORT ON TESTING AND ANALYSIS

For

Need Brother Ltd., Part.

Testing/analysis of Cocoa mass (No,5 from oversea)
(No,6 " our factory)

Method of testing/analysis:— A.O.A.C., Atomic absorption spectrophotometry

Condition of testing/analysis:— Temperature .... Relative humidity .... %

Result of testing/analysis:—

		Cocoa mass No. 5	Cocoa mass No. 6
Moisture	%	1.96	2.92
Fat	%	56.33	54.46
Sodium as sodium carbonate	%	0.26	0.11
Nitrate as sodium nitrate	%	0.11	0.11
Potassium as potasstium carbonate	%	1.47	2.47
Ammonium as ammonium carbonate	%	0.21	0.21
Magnesium as magnesium oxide	%	0.30	0.38

Tested/analysed by

1. [illegible]
2. [illegible]
3. Vilavel Pongpitch

Approved by

[illegible]

(Mr. [illegible]ndhasri)

Director

TESTING AND STANDARDS CENTRE

Examined by

[illegible]

(Mr. Chumnong Hayakijkosol)

Director of Analytical Chemistry Laboratory

Date. 5 June 1984

Remark: The above results are valid exclusively for tested/analysed samples as mentioned in this report. Publicity of the results on testing and analysis is prohibited unless written permission is obtained from the governor of TISTR.

Request No. 027/27

TSC.No. 0917/26

ACL.No. 615/26

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

196 Phahonyothin Road, Bang Khen, Bangkok 10900

REPORT ON TESTING AND ANALYSIS

For

Need Brother Ltd., Part.

Testing/analysis of Cocoa powder (From our factory)

Method of testing/analysis:— Standard methods of chemical analysis, AA

Condition of testing/analysis:— Temperature ..... Relative humidity ..... %

Result of testing/analysis:—

		Cocoa powder	
Moisture	=	5.93	%
Fat	=	17.80	%
Carbonate	=	11.74	%
Sodium	=	0.59	%
Ammonium	=	0.03	%
Potassium carbonate	=	3.78	%
Sodium carbonate	=	1.36	%

Tested/analysed by

1. Somsri Jarungsawan
2. Banchern Jampa
3. V. Yubungphing

Approved by

(Mr. [illegible])
Dir.
TESTING AND STANDARDS CENTRE

Examined by

(Mr. Chumnong Hayakijkosol)
Director of Analytical Chemistry Laboratory

Date. 14 October 1983

Remark: The above results are valid exclusively for tested/analysed samples as mentioned in this report. Publicity of the results on testing and analysis is prohibited unless written permission is obtained from the governor of TISTR.

Production locale de poudre de chocolat

Afin de substituer une production locale aux importations, deux entreprises étrangères de produits alimentaires vont s'implanter en Thaïlande pour fabriquer et commercialiser de la poudre de cacao et de chocolat.

La NATIONAL PRODUCT (THAILAND) utilisera le savoir faire de NESTLE pour produire, sous la marque MILO, 3 500 tonnes de poudre de chocolat pour petit déjeuner; l'investissement d'origine suisse s'élève à 320 millions de Bahts (12,5 millions de USD).

Les mêmes quantités du même produit seront réalisées par la société WANDER sous la marque OVALTINE. Pour 75% suisse et 25% de la "BORNEO CO LTD", l'investissement s'élève à 450 millions de Bahts (17,6 millions de USD). Ces deux projets ont bénéficié des aides du B.O.I.

Ovaltine, Milo win BoI support for expansion

THE Board of Investment has approved promotional privileges for Ovaltine and Milo producers to set up local production facilities to substitute imports.

Last year, Thailand imported about 4,200 tons of malt-extract beverages, of which Ovaltine accounted for 60%, Milo 37% and other brands the rest.

The rate of growth of the market for this type of nutritional products is 5% a year.

The BoI once granted promotion privileges to Vitaco Co to produce 2,240 tons of powdered chocolate annually, but as the firm could produce only 10% of that volume, the privileges were withdrawn in 1985.

The details of the two approved projects are:

■ Nutritional Product (Thailand) Co will invest 169 million baht (100% Swiss) in the annual production of 3,500 tons of Milo worth 320 million baht for the local market. Its factory will be located on the Navanakorn Industrial Estate and use Nestle's production techniques.

■ Wander (Thailand) Co will invest 350 million baht in the production of 3,500 tons of Ovaltine worth 450 million baht a year for the local market. The shareholding structure is 75% Wander Swiss and 25% Borneo and Foremost. Its factory will be located in Phra Pradaeng District, Samut Prakan, and employ 61 people.

The BoI has set a major condition that they will not be exempted from import duties or business taxes, but this is compensated with the right to own land, ease in importing foreign technicians and ease of money transfers to and from abroad.

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Résultats d'analyses

Nombre de fèves/100 g	: 120
% Coques	: 14,7 %
H_2O	: 5,8 %
pH	: 5,5
Ac. Totale	: 3,11 ml NaOH 0,1 N/g
Ac. Volatile	: 0,67 ml NaOH 0,1 N/g
N(NH3)	: 344 ppm
Mat. Grasse	: 42,7 %

B. GUYOT

J.-C. VINCENT
chef des laboratoires
de chimie-technologie

THE NATION - 1 MAR 1988

Topy of Japan in B200m joint venture with Thais

By Virat Thaveesaurat

TOPY Enterprises Ltd, the Japanese steel and supermarket giant, has set up a 200-million-baht joint venture with Thai partners to grow cocoa and other crops in Kanchanaburi and Surat Thani.

With registered capital of 80 million baht, and a 51 per cent Thai shareholding, Thai Topy International Corporation Ltd, will also grow asparagus and jute, produce seafood and export minerals, according to Komtawat Srihiran, director and general manager.

Komtawat and the other major Thai partner, Dumrong Tongkao-on, director and manager of planning and research, are former businessmen involved in mining.

Thai Topy is applying to the Forestry Department and the Army to rent 30,000 rai of desecrated forest land in Kanchanaburi and 10,000 rai in Surat Thani for growing cocoa. Species would be imported from Ghana, and the cocoa would be processed at a Kanchanaburi factory planned for construction in the next three years. The processed cocoa would be exported to Japan.

Komtawat said at least 15,000 farmers would be involved in the project in Kanchanaburi, and at least 2,000-3,000 in Surat Thani. Some of the farmers would work on the rented land and others on their own land. Details and terms have yet to be worked out, he said.

Asparagus, with species imported from the United States and produce also targeted for Japan, would be grown in Kanchanaburi. It will be kept separate from the cocoa, but on similarly rented land. Komtawat said 1,000 rai is planned.

Jute would be planted a few months after the cocoa and asparagus are established, he said.

Initial investment would be 80 million baht, he said, with an increase to at least 200 million baht planned later.

"The Japanese are interested in the project because they are expanding their business base into agriculture. The project is also consistent with the business interests of Topy's supermarket chain," Komtawat said.

To encourage farmers to participate, Topy will deposit about 30-40 million baht with the Bank for Agriculture and Agricultural Cooperatives, he said. Farmers will be able to borrow the money at an interest rate of 12.5 per cent, but the company will pay 6.5 per cent interest for them leaving only six per cent to pay.

Thai Topy could also export seafood to Japan and is currently studying data related to this plan.

It is also prepared to buy gypsum, fluorite and dolomite for export to Japan. In the first year, it plans to export 10,000 tonnes per month of gypsum, 100 tonnes of fluorite and 15,000 tonnes of dolomite.

"We are in the process of negotiating prices and quantities with miners. We have talked to two or three," Komtawat said.

Bangkok Post 11/12/66

Producer of Ovaltine plans plant

SWITZERLAND - based Wander Ltd, producer of Ovaltine and other food products, will join Thais in a 300-million-baht venture to set up a factory to produce Ovaltine in Thailand.

Viroj Trairatanobhas, representative of the Swiss firm in Thailand, said the local partner in the project would be Bernes Co (Thailand), sole distributor of Ovaltine in Thailand.

The construction of the plant, he said, will begin in January 1967 and is scheduled to be completed in mid-1968.

The factory's production capacity will be 5,000 tons of the tonic food drink per year, he said, adding that raw materials for the production would include malt, cocoa, minerals, vitamins and sugar.

Initially, all these ingredients except sugar will be imported.

"We intend to invest here because we are very confident in the potential of the Thai market. We are also certain that the trend of the consumption of this tonic food drink will be ever-increasing in the future," Mr Viroj said.

He reasoned that Thai people were more conscious in health care and this tonic food drink should meet their demand satisfactorily.

He added that the trend of fresh milk consumption among Thais had been growing. Fresh milk, he said, is the complementary beverage of tonic food drink.

"So, taking all these factors into consideration, we have decided to set up a tonic food drink production plant here," he noted.

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