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(R) CO-OPERATION BETWEEN BRAZIL AND ANGOLA
IN THE FOOD PROCESSING INDUSTRY*.

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ANGOLA .

-3 DEC 1979

Final Report of Mission

Prepared for the Government of Angola by the
United Nations Industrial Development Organization

Based on the work of Messrs. R.H. Moretti and L. Hartmann
Contractors of the Fundacao Tropical de Pesquisas (Brazil)

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COOPERATION BETWEEN BRAZIL AND ANGOLA IN THE DEVELOPMENT OF THE
FOOD PROCESSING INDUSTRY IN ANGOLA

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1. INTRODUCTION

The Angolan Food Industry was created and developed under the conditions of a competitive market shared by various enterprises. There exists a great variety of food and beverage factories constructed mainly after 1955 and therefore with relatively modern technology. There is good integration between the various sections and subsections of the food industry, such as:

Food and packaging production units, food industry by-products processing units, adequate supply of electricity, water, fuel and means of transportation.

The Angolan Food Industries display generally a rational conception, an adequate lay-out and production methods formulated in accordance with a proper employment of raw materials and by-products.

With the war of liberation and independence of the country the industrial system was largely disrupted. The owners of the enterprises have left the country together with the major part of the qualified personnel. Furthermore, a great part of productive and auxiliary equipment was damaged and in certain cases, when the managers, the technical staff of medium level and qualified operators left the country they carried with them all the administrative and technical experience and leadership. Products formulation and technology used during the colonial period, are not available as a rule in a written form, and in

many cases only the experience and observation capacity of the remaining workers are followed in the formulation and production of foodstuffs and beverages.

The Angolan Government has nationalized the majority of industrial plants and is trying to reorganize them in such manner as to attain the pre-war production level.

In order to attain this desired production level in a relatively short time, there is urgent need for the elaboration of an activity program suitable for the conditions of the country.

Brazil, a country situated in the same geographical latitudes as Angola, using the same language, having similar habits and customs, consuming many similar foodstuffs and beverages, producing similar raw materials under practically identical climatic conditions and in addition sharing with Angola a common origin and culture, can make, in this context, a very efficient contribution in transferring her experience in the food sector in a shortest possible time.

These reasons have prompted the Government of the People's Republic of Angola to study, under the auspices of UNIDO and with the technical cooperation of Brazil provided by the Tropical Foundation of Research and Technology of Campinas, a plan of activities with the view of elaborating Terms of Reference for a Large Scale Project aimed at rehabilitation, modernization and expansion of the Angolan Food Industry.

2. OBJECTIVES OF THE PROJECT

The objectives of the Project are the following:

1. Formation of a team of qualified professionals who during the period of one month would, according to a set program, visit factories representative of each sub-section of the Food Industry, in order to pin-point the problems existing in that section.
2. These visits would make possible the elaboration of a report describing the existing plants, their location, equipments, technology employed, present situation regarding supply of raw materials, quality control, civil construction and other factors that determine the present state of the Food Industry in Angola.
3. Based on the data collected during the visits of the experts to various industries representative of each sub-section, a program will be worked out, which would make possible the rehabilitation, modernization and expansion of the Food and Beverage Industry in Angola.

3. SUMMARY AND CONCLUSIONS

Before the declaration of the Independence, there existed in Angola a Portuguese colony of approximately 500.000 persons, whose great part accounted for the qualified personnel of the country. The departure of this qualified labour force left the industry without professional human resources, which in turn caused an abrupt fall of production quantitatively and qualitatively despite all the efforts and dedication of the remaining workers. There was in addition a considerable decrease of agricultural production accompanied by scarcity of raw materials. This sudden change created serious problems in the food industry affecting deeply the socio-economic life of the country.

The results arising from this situation can be summerized as follows:

1. Lack of qualified labour force mainly of medium level, comprising foremen of production lines, and staff responsible for the supervision of production, equipment maintenance, quality control, administration and other activities essential for the proper functioning of the industry.
2. Interruption of commercial relations with the exterior and deficient programming of raw material stocks.
3. Interruption of production and supply of local, agriculture

ral raw materials.

4. Lack of spare parts for existing equipments and difficulties in obtaining new ones.
5. Rupture of diplomatic relations with countries which were traditional suppliers of equipment and industrial "know how" in question.
6. Migration of great population masses from rural zones into urban centres.
7. Devastation of agricultural zones and production centres resulting from foreign invasions and internal conflicts, combined with illicit transfer of material and live stock resources, including dairy cattle.
8. Interruption of communication and transport lines.

To bring the food industry to prewar levels and to achieve an accelerated progress it is necessary to seek solutions, and this is the aim of the present project.

4. PROPOSALS FOR A TECHNICAL COOPERATION PROGRAM BETWEEN
BRAZIL AND ANGOLA

Based on the experience gained during the visits to the industries representing various sub-sectors, the following collaboration scheme is suggested:

1. In view of the present state of food industries characterized by:

lack of human resources such as personnel of university and medium level, qualified labour, the state of production lines in need of spare parts and maintenance;

deficient education system for training specialized man power for the food industry;

deficient system of purchasing raw materials of local and foreign origin;

there has been elaborated a plan of technical cooperation between Brazil, represented by Fundação Tropical de Pesquisas e Tecnologia and the Government of People's Republic of Angola under the general coordination of UNIDO.

This plan has following objectives:

- a) Make possible a recuperation of the Angolan Food Industry in the shortest time possible.

- b) Make available to the Angolan population an alimentation of better quality and quantity.
- c) Make the best use of the resources existing in the country.
- d) Utilize the human and material resources existing in Brazil to achieve the aims in question.
- e) Training of the Angolan personnel in Brazil.

Bearing in mind the impossibility of attending to the needs of all industrial units in Angola, the following proposal is presented:

One unit of each sub-sector to be selected, to serve as example and at the same time as training centre for the workers of this sub-sector, at the production and administrative level, as well as regarding quality control, maintenance and social assistance to the staff members.

The advantages would be the following ones:

a great economy of time and resources, by avoiding the necessity of a great number of foreign personnel and making possible a better selection of a higher qualified personnel;

assisting the efforts of the Angolan Government of forming a working force;

possibility of a better control and assessment of the results obtained during the execution of the program.

2. Selection of Production units representative of each sub-sector of the Food Industries.

For the above selection certain parameters have been considered in order that the selected industry should satisfy all requirements of a good functioning of the project and to guarantee the achievement of the pre-established objectives.

- a) The industry selected should be under Government control or to pass soon under this control.
- b) The industry should present the best functioning conditions between those belonging to the sub-sector.
- c) The industry should, by preference, be situated in industrial zones of the country's main cities.
- d) The industry should possess actual or immediately obtainable infra structure indispensable for its good functioning such as: adequate supply of water, electricity, raw materials, human resources, transport facilities and so on.
- e) The selection should be approved by the National Direction of Food Industry - MINDEN, or by the Agriculture and Fisheries Ministries.

Taking the above criteria as base, the following list of representative industries of each sub-sector has been established with the approval of the D.N.I.A.

THE LIST OF SUGGESTED FACTORIES-TRAINING CENTRES

<u>Sub-Sector</u>	<u>Selected Industry</u>	<u>Localization</u>
1. Soft Drinks	Sumangol	Benguela
2. Breweries	Cuca	Luanda
3. Pastas and Biscuits	Combal	Luanda
4. Mills	10 de Dezembro	Lobito
5. Oils and Fats	Induve	Luanda
6. Meat and Meat Products	Buçaco	Huambo
7. Dairy Products	Silal	Huambo
8. Sugar	19 de Maio	Catumbela
9. Coffee	Liangol	Luanda
10. Vegetable Canning	Dombo-Vinelo	kwanza Norte
11. Animal Rations	Protector	Luanda
12. Distillates, Liqueurs and Wines	Intrafrutos	Benguela
13. Fish Products	Mampeza	Benguela
14. Abattoir	Dinaprope	Huambo
15. Bread Making	Angolana	Luanda
16. Ice Creams	Leão	Luanda

Note: Owing to insufficient statistical data at the time of making this report, Mampeza - Industrial has been included, although a private enterprise.

3. Obtention of resources needed for the realization of the program.

In order to realize the plan in question, following en tities should be approached with the request for assistance:

UNDP/UNIDO - UNITED NATIONS DEVELOPMENT PROGRAM/UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION.

GOVERNMENT OF ANGOLA

BRAZIL

1. FUNDAÇÃO TROPICAL DE PESQUISAS E TECNOLOGIA
2. SUBIN

UNDP/UNIDO could direct part of the resources alloted to Angola, to finance the recruitment of Brazilian technical staff of medium level, and equip the "Food Industry Development Centre", which will be discussed under item 5.

UNDP/UNIDO could be responsible for contracting technical personnel of university level, that would be entrusted with the coordination of each sub-sector and act as intermediate between the field operations and the above mentioned Centre.

The Angolan Government in accordance with the usual practice, would bear the expenses of the maintenance and repair

of the installations existing in the selected units, of civil construction of the Centre, and of contracting administrative and auxiliary personnel.

SUBIN could through its bilateral cooperation program with developing countries, provide resources for contracting technical personnel, acquisition of equipments and necessary raw materials and for granting scholarships to Angolan trainees in Brazil.

Fundação Tropical de Pesquisas e Tecnologia could be responsible for recruitment and selection of the technical personnel of medium and university level, for supplying the "know how", technical assistance and elaboration of industrial projects.

4. Requirements as to the qualifications of the technical personnel needed for each sector:

4.1. The technical personnel of university level should possess following qualifications:

- a) Technical and practical knowledge of the sub-sector in question.
- b) Aptitude for technical cooperation between developing countries.

- c) Good character and satisfactory health.
- d) Quality of leadership and communicativeness.
- e) Fluent Portuguese and adequate knowledge of one of the official UNO languages.

4.2. Personnel of medium level should possess:

- a) Proved professional qualifications.
- b) Practical experience and familiarity with the industrial sector in question.
- c) Good character and satisfactory health.
- d) Facility in human relations.

5. Evaluation of the present conditions of the processing lines and of the necessary measures to put them into working order.

This should be the task of the Brazilian technical staff of both levels who should identify "in loco" existing conditions such as:

- a) The functioning of the production lines.

- b) Lack of spare parts.
 - c) Adequateness of the quality control.
 - d) The state of laboratories.
 - e) The state of repair shops.
 - f) Quality of the labour force.
6. Elaboration of preliminary projects in order to determine the steps to be taken in each industry, indication of complementary equipment and spare parts, calculation of the cost and time table of the execution of the project.

Fundação Tropical de Pesquisas e Tecnologia would be responsible for the elaboration of plans for each sub-sector and establishment of the Food Industry Development Centre, after receiving necessary data obtained by the specialists in the field.

7. Selection of priority sub-sectors of the Food Industry.

UNIDO with the cooperation of Fundação Tropical and guidance of D.N.I.A - MINDEN of Angola, will establish the priority order to satisfy the nutritional needs of the Angolan people.

8. Recruitment of specialized personnel in Brazil.

Fundação Tropical shall recruit all the necessary technical personnel by means of adequate publicity.

The selection of the candidates will be based on:

- a) Examination of solicited documents.
- b) Personal and professional references.
- c) Interviews of the candidates with the specialists of Fundação.

9. Commencement of activities in Angola

After securing the resources needed for the execution of the program in accordance with item 2, the activities will begin following the established time table.

Owing to the precarious state of the Angolan food industry and the resulting food shortage, no efforts should be spared to ensure priority for the approval and initiation of the proposed program, the initial step of which is described in item 5.

UNIDO has already a program entitled:

"Services Center for Repair and Maintenance for Angola"

The program should begin in 1979 and envisages services of repairs and maintenance for the Angolan industry. The linking up of this program with that described in the present report

would be very valuable, inasmuch as the proposed cooperation between Brazil and Angola would benefit greatly from the above mentioned "Services Centre for Repair and Maintenance" enabling the food industry plants to be put in good working conditions.

5. SCHEME FOR THE REALIZATION OF THE FIRST STEP OF THE PROGRAM

5.1. Justifications

In sections 1, 3 and 6, there was explained the urgent necessity of a program aiming at a rehabilitation of the Angolan food industry.

In view of the magnitude of the problem, that would involve great human, material and financial resources, not available at this moment, there is suggested the establishment of a Food Industry Development Centre, as part of the first stage of the project.

The principal problems encountered in the Angolan Food Industry, which require immediate attention, are:

- a) Repair and maintenance of existing equipments.
- b) Adequate stock of spare parts.
- c) System of supply of raw materials.
- d) Qualified labour force.

5.2. Objectives

Immediate objectives of the first stage of the Program, are:

5.2.1. Establishment of a Food Industry Development Centre,
which involves:

- a) Adaptation of an existing building or construction of a new one.
- b) A "lay-out" of laboratories.
- c) Acquisition and installation of laboratory equipments.

5.2.2. Contracting technical personnel

- a) Recruitment and selection of Brazilian technical personnel specialized in the sub-sectors deserving priority.
- b) Selection of Angolan counter-parts.
- c) Selection of auxiliary and administrative personnel.

5.2.3. Activities

- a) Programming the "modus operandi" of the Centre.
- b) Assessment of priority requirements of each sub-sector.
- c) Cooperation between the representatives of UNIDO, Angolan Government, Brazilian agencies and Food Industry.
- d) Training of qualified Angolan personnel in the Centre, in industrial establishments and in Brazil.
- e) Extension service for the sub-sectors, aiming at solving immediate problems of the industry, technical assistance, and reorganization or initiation of quality control to sa tisfy urgent needs.

5.3. Duration of the first stage of the program

It is assumed that the first stage could be completed in 12 months.

5.4. Estimates for the first stage

Following financing agencies are suggested:

5.4.1. UNDP/UNIDO

UNDP/UNIDO would finance the contracting of 12 Brazilian specialists with university degrees during 12 months, totalling 144 men/months. The Brazilian specialists should be Food Engineers experienced in sub-sectors included in the priority group. UNDP/UNIDO would also take care of acquiring laboratory equipments, glassware and reagents, 2 motorcars and office equipment.

5.4.2. Angolan Government

The Government of Angola would provide the building for the Development Centre, local technical, administrative and auxiliary personnel, means of transport and its maintenance.

5.4.3. BRAZIL

FUNDAÇÃO TROPICAL DE PESQUISAS E TECNOLOGIA

Fundação Tropical would be responsible for:

- a) Recruitment and selection of Brazilian specialists.
- b) Selection and acquisition of the laboratory equipment for the Food Industry Development Centre.
- c) Technical and Administrative Assistance during the duration of the project.

In order to perform these functions Fundação Tropical should be contracted by UNDP/UNIDO and reimbursed with 10% of the contributions of UNDP/UNIDO and Angolan Government.

The amounts of the above contributions are shown in Appendices 1, 2, and 3.

SUBIN - MINISTRY OF FOREIGN RELATIONS

SUBIN would offer 20 scholarships, each one for 3 months, or 60 men/months, for Angolan trainees in Brazilian industries, research institutes and universities.

APPENDIX 1

ESTIMATE OF UNDP/UNIDO CONTRIBUTION
(in US dollars)

Country: Peoples' Republic of Angola

Project n°:

Title of the Project: First stage of the Program: Technical collaboration between Brazil and Angola in the development of the food processing industry in Angola.

Components	Total		1980	
	m/m	c.c.	m/m	c.c.
11. Technical Personnel				
11.01. Project Manager	12	54.000	12	54.000
11.02. Food Technology Specialist	12	54.000	12	54.000
11.03. " " "	12	54.000	12	54.000
11.04. " " "	12	54.000	12	54.000
11.05. " " "	12	54.000	12	54.000
11.06. " " "	12	54.000	12	54.000
11.07. " " "	12	54.000	12	54.000
11.08. " " "	12	54.000	12	54.000
11.09. " " "	12	54.000	12	54.000
11.10. " " "	12	54.000	12	54.000
11.11. " " "	12	54.000	12	54.000
11.12. " " "	12	54.000	12	54.000
16.00. Project Revision/ Evaluation Mission		16.000		16.000
40.00. Equipments				
40.01. Laboratory Equipment		300.000		300.000
40.02. Motorcars for Project Personnel		10.000		10.000
40.03. Office Equipment		20.000		20.000
TOTAL			144	994.000

APPENDIX 2

ESTIMATE OF THE ANGOLAN GOVERNMENT'S CONTRIBUTION
(in Kwanzas)

Country: Peoples' Republic of Angola

Project n°:

Title of the Project: First stage of the Program: Technical collaboration between Brazil and Angola in the development of the food processing industry in Angola.

Component	Total		1980	
	m/m	kz (x 1000)	m/m	kz (x 1000)
10. Project Personnel				
- Director (1)	12	240	12	240
- Department Heads (11)	132	2,640	132	2,640
- Technicians of medium level (20)	220	2,200	220	2,200
- Administration Personnel (10)	120	1,200	120	1,200
- General Services Personnel (5)	60	384	60	384
19. Total	544	6,664	544	6,664
40. Equipment				
Building (20 x 260 m at 6500 kwanzas/m ²)		7,800		7,800
Furniture and office Equipment, Vehicles for Personnel transport		400		400
Boiler, compressed air, vacuum, electricity, water, distilled water, etc.		1,800		1,800
59. Divers - Operation and Maintenance costs		8,000		8,000
99. Total		24,484		24,484

APPENDIX 3

ESTIMATE OF SUBIN CONTRIBUTION
(in Cr\$ - cruzeiros)

Country: Peoples' Republic of Angola

Project n°:

Title of the Project: First stage of the Program: Technical collaboration between Brazil and Angola in the development of the food processing industry in Angola.

Project Component	Total		1980	
	m/m	c.c. (Cr\$ x 1000)	m/m	c.c. (Cr\$ x 1000)
39. Scholarships (20)	60	800	60	800
Total	60	800		

SUMMARY OF EXPENDITURE IN THE FIRST STAGE

	Total in US\$	
UNDP/UNIDO	984.000	
ANGOLAN GOVERNMENT	800.000	<u>1.784.000</u>
FUNDAÇÃO	178.400	
SUBIN	27.000	
TOTAL		<u>1.989.400</u>

6. STATE OF THE ANGOLAN FOOD INDUSTRY

A team of two experts visited Angola during the month of July 1979 with the purpose of assessing the present state of the country's Food and Beverage industry.

Follows a report of the experts' activities in Angola from the moment of their meeting with the Resident Representative of U.N.D.P. in Luanda.

6.1. Meeting with U.N.D.P. authorities - Luanda

The experts' first activity after their arrival in Angola was to present themselves at the seat of U.N.D.P. where they were received by:

Mr. Jaime Balcazar-Aranibar	- Resident Representative
Mr. Paul Van Hanswijck de Jonge	- Assistant to Resident Representative
Mr. Jaap Prins	- Assistant
Mr. Abdul Qader	- Administrative Assistant
Mr. Helder da Cruz	- Administrative Assistant

They were introduced in due course to Mr. Nicolai Krainov, representative of UNIDO in Angola, who accompanied them on their visit to the office of the National Director of Food Industry, and later on some of their visits to Food Industries in Luanda.

During these meetings there were discussed the objectives of the project and was established a plan of activities and the experts obtained informations on the general state of the country.

6.2. Meeting at D.N.I.A. National Direction of Food Industry of the Ministry of Industries and Energy - MINDEN

The experts accompanied by Messrs Nicolai Krainov and Jaap Prins were received by Mr. Justino Fernandes, Head of D.N.I.A. principally interested in the project.

Mr. Justino Fernandes, made an exposition on the present conditions of the Angolan Food Industry and in a frank and objective manner outlined the problems afflicting that section.

The experts in return informed him about the antecedents leading to the formulation of the project, about the Brazilian experience in the food processing area and about the readiness of the Brazilian institution participating in the project to collaborate with all dedication and self-denial in the realization of its objectives.

Mr. Fernandes well acquainted with the similarities between Brazil and Angola with regard to climate, agriculture, existing problems, language, culture and customs, accepted without hesitation UNIDO'S proposal to realize the project in question jointly with the Fundação Tropical de Pesquisas e Tecnologia of Campinas, Brazil. He gave the experts a complete list of Food Industries under the competence of D.N.I.A. and discussed the remaining ones pertaining to the Ministries of Agriculture and Fisheries.

With the help of these lists, a plan of visits was worked out, based on the principle of selecting at least one plant of each sub-section of the country's Food Industry.

The Director kindly appointed Mr. Mario Bento Ribas to act as guide during the industrial visits in Luanda and other provinces. In each of the provinces visited the experts were received by the Provincial Delegates: Dr. Delfim Ferreira, MINDEN, Huambo; Dr. Antonio Joaquim Russo, Min. of Agriculture, Huambo; Mr. Vasco Martinho, Min. of Fisheries, Benguela e Mr. J. J. Ribeiro, Minden, Benguela, who organized the visits in their respective districts.

The experts use this opportunity to express their most sincere thanks for the cordial reception afforded to them by Mr. Justino Fernandes and the Delegates mentioned. They are also grateful to Mr. Carlos Henrique de Graça Figueiredo of D.N.I.A, all Regional Directors, Production Managers and other functionaries of the Food Industry for their help in attaining the objectives of this Project.

6.3. During the month of July there were visited 35 industrial units, one Institute of Agronomical Research and one University of Agricultural Sciences. In this section the conditions of each of the visited units arranged in their respective sub-sections, will be presented.

The following industrial units and institutions were visited:

INDUSTRIAL UNITS, INSTITUTES AND UNIVERSITIES VISITED

A - LUANDA

- 1 - REFRIGERANTES LTDA.
- 2 - CUCA
- 3 - COVIP - CIA. VINICOLA PORTUGUESA
- 4 - INDUVE
- 5 - LIANGOL
- 6 - COMBAL - CIA. DE MASSAS E BOLACHAS
- 7 - CUCA-PROTECTOR
- 8 - FABRICA VILARES
- 9 - EPAN - EMPRESA PROVINCIAL DE PANIFICAÇÃO - LUANDA
- 10 - PANIFICADORA MONTE SINAI
- 11 - PANIFICADORA ANGOLANA
- 12 - PANIFICADORA INDEPENDÊNCIA
- 13 - F.A.L. - FÁBRICA DE ALIMENTOS LTDA

B - HUAMBO

- 14 - INDUMIL
- 15 - DINAPROPE - DISTRIB. NACIONAL DE PRODUTOS AGROPECUÁ
RIOS
- 16 - SILAL - SOCIEDADE INDUSTRIAL DE LATICÍNIOS DE ANGOLA
LTDA.

- 17 - PASSICUCA
- 18 - FACULDADE DE CIÊNCIAS AGRÁRIAS
- 19 - INSTITUTO DE INVESTIGAÇÕES AGRONÔMICAS
- 20 - CUCA

C - LOBITO - BENGUELA - CATUMBELA

- 21 - AGRÍCOLA PORTELAS
- 22 - FAZENDA PRAZERES
- 23 - INTRAFRUTOS
- 24 - EMPRESA REGIONAL DO SAL
- 25 - MAMPEZA, INDUSTRIAL S.A.R.L.
- 26 - EMBALAGENS DE ANGOLA
- 27 - AÇUCAREIRA 19 DE MAIO
- 28 - SUMANGOL
- 29 - EMPAL-EMPRESA INDUSTRIAL DE PRODUTOS ALIMENTARES LTDA.
- 30 - AAA - ALGODOEIRA AGRÍCOLA DE ANGOLA
- 31 - KANINE - SALINA J. PEDRO CORREIA
- 32 - E.F.A. - 10 DE DEZEMBRO
- 33 - JOMBA INDUSTRIAL
- 34 - SBELL - SOCIEDADE DE BEBIDAS ESPIRITUOSAS E LICORES
LTDA.
- 35 - LICORANG - LICORES DE ANGOLA
- 36 - C.A.V.L. - CIA. ANGOLANA DE VERMUTES E LICORES
- 37 - BARATA, BARATA-SABOARIA CATUMBELA

1. Soft Drinks

1.1. Refrigerantes Ltda, Luanda

The experts were received by the Director General of the Unit, Mr. Ferreira and accompanied during their visit by Mr. Miguel Castro, Technical Manager. This is a State enterprise following the nationalization of the previous concessionary Pepsi Cola and Quiky and produces 30-40.000 bottles of soft drinks per day. The factory was very well planned and consists of: Water treatment department, preparation of syrup, compressor's hall, boiler house, bottling room, storage rooms for raw materials, empty containers and finished products, and dispatching department, all properly distributed and equipped to ensure efficient functioning. After the war of liberation there was an exit of owners and of technical staff and the factory has been working during the last 4 years without any maintenance, and with technicians and operators without sufficient experience to ensure a satisfactory production. All replacement parts have been practically used up which resulted in a rapid decline of production. In addition there is lack of containers which necessitates the use of any fancy bottles as containers for soft drinks. A problem inherited from the colonial period is the preparation of the concentrate by the concessionary and under inadequate conditions.

The following specific deficiencies were observed: In the syrup preparation section, sugar of excellent quality, imported from Cuba, is being treated in the same way as sugar of low quality, using imported active carbon and diatomaceous

earth in excessive and disproportionate amounts. This is due to the continued use of colonial technology and formulae.

Faulty conservation of ingredients and additives such as citric and ascorbic acids, and sodium benzoate and citrate and others, stored in a humid environment and in damaged containers.

The tubes of the carbon dioxide gas are much too small for the bottling capacity of the plant.

The number of operators in the syrup section is exceedingly great, 11 workers being employed to produce 2-3 batches of syrup per week, while normally 3 persons could do the job.

Non-existence of quality, hygiene and sanitation control.

Faulty administration of stores as evidenced by excessive stock of lubricating soap for the transport belts and lack of materials of primary necessity.

Want of knowledge regarding methods of water treatment, syrup preparation and boiler maintenance.

Lack of communication between the directors and technical staff of the enterprises of the same subsector.

1.2. Sumangol, Benguela

1.2.1. The experts were received by Mr. Nicolau Ribeiro, Director General of the factory. The plant belongs to

Agrícola Portelas which produces concentrated fruit juices. The capacity of the plant amounts to 12.000 bottles per hour, the present production being 7.000 bottles per hour. The raw materials obtained from Agrícola Portelas situated at 120 km distance from Benguela, are orange and pineapple juices; during the colonial period passion fruit juice was also produced. The juices to be used in syrups arrive already prepared with the addition of citric acid and part of sugar. They are concentrated to 24° Brix only.

It was noticed that the citric acid to be incorporated in the concentrated juice, is ground, unnecessarily, in a colloidal mill which wears down very rapidly.

The juices are stored in freezing chambers at -3°C.

1.2.2. Preparation of simple syrups

The sugar used is of the demerara (raw cane sugar) type; it is dissolved in hot water at 85-90°C. The resulting syrup is filtered in a filterpress (Friedrich, Switzerland) without the addition of active carbon and diatomaceous earth, thus yielding a yellow product with the taste and flavour of "gара pa" (sugar cane juice).

1.2.3. The finished syrup room

The prepared syrup, simple syrups, citric acid, colouring matter and essential oils emulsion are dissolved in

stainless steel tanks. Here again was noticed that the concentrate was produced in the bottling establishment, thus repeating the mistake of the factory previously described.

1.2.4. Bottling room

The bottling is performed in an "Intermix" Ortman and Herbst with a filler with 30 nozzles, using a mixture of syrup: water in a proportion of 1:4.4. The efficiency of this sector is much superior to that of Refrigerantes Ltda. The skill of the operators is greater, hygiene and sanitation are better, the working rooms have appropriate temperature and illumination. There is lack of due care of the workers entrusted with the control of clean bottles before the filling and of full bottles.

1.2.5. Pasteurization

All products are being pasteurized for 20 minutes at 75°C and cooled down by air to room temperature. Pasteurization is effected in 4 tanks of the water-bath type, each one holding 2.800 bottles. All these operations are performed manually.

1.2.6. Washing of bottles

It was noticed that the product used in the washing apparatus was a 3% solution of "Divobrite" (Diversey) a rather costly product. The final washing is effected with non-

chlorinated water, which is incorrect.

1.2.7. Water treatment system

Water treatment is attended to by Bulgarian specialists. It is in the final stage of construction and consists of clarification, decantation and filtration using sand, active carbon and ion exchange resin.

1.2.8. Observation

In addition to the observations already made, the following is worth mentioning:

The juices are of low concentration, which renders their storage difficult, increases the volume to be refrigerated, the cost of transport and the quantity to be handled in the syrup room.

If the juices for the soft drinks were of a higher concentration (65° Brix) they could be preserved at room temperature with a simple addition of sodium benzoate (2.000 ppm)

The simple syrup prepared with "demerara" sugar should certainly obtain a bleaching and deodorizing treatment with active carbon.

When soft drinks are prepared from preserved concentrated juices, using clean bottles free from microorganisms, sterile water and filling equipment in good sanitary order, pasteurization may be dispensed with, as long as the content of the natural juice does not exceed 10%.

There is no quality control of ingredients and of intermediary and finished products.

2. Fermented Beverages

2.1. Covip (Companhia Vinícola Portuguesa), Luanda

2.1.1. Mr. Pereira Director General of the Production received the experts and introduced them during the visit to Mr. Oscar Hernander and his wife, biochemists from Cuba, and to Mr. Lapin, Sales Manager.

The enterprise was during the colonial period a bottler of imported wines and produces at present fruit wines. The present capacity of the plant is ca 2.000.000 l per year, while an expansion plan, already under way, foresees a capacity of 6.000.000 l per year. The production line consists of a fruit grinder, must pump, fermentation and storage tanks, Italian filters (Padovan) bottling machine for soft drinks with carbonation facilities, and a copper alembic for bagasse distillation. The principal raw materials are: apples, oranges, pineapples and cashew. The final alcohol content of all wines produced is kept at 10-10.5% by the addition of sugar to the must or by adding 95% alcohol to the finished wine. A fruit grinder "Bertuzzi" has been ordered to increase the productive capacity of the plant. The majority of vats is made from steel coated with epoxy resins and possess a parallelepipedic shape and 30.000 l capacity. A few vats are from stainless steel.

2.1.2. The Technology employed

The wine is produced, as a rule, based on formulas elaborated for one given type of fruit without considering the variations in its composition. The yeast is imported in dehydrated or pressed form from a Dutch company. According to one formula 30 kg of this yeast is used for each fermentation vessel instead of relying on multiplication of their own starter. In using this process the purchase of hundreds of kg of highly priced yeast is dispensed with. The wines, all of them white, should be submitted to a clarification treatment according to the type of turbidity, which is not done for not knowing this technology. The "Daubron" filters which employ filter sleeves made from canvas can not be used owing to the difficulty of replacing the sleeves damaged.

There are no presses for the bagasse nor tanks for storage of the bagasse to be distilled in the interharvest periods. Incidentally, the bagasse and the residues are apparently not utilized for distillation.

2.1.3. Laboratory for quality control

The existing laboratory is equipped adequately for quality control but not for research and development purposes. Guidance is given by a Cuban instructor assisted by an Angolan technician apparently familiar with the methods of routine control.

2.2. Intrafrutos - Indústria Transformadora de Sumos,

Benguela

2.2.1. The experts were received by Messrs Armindo de Ceita Neto, Director General of the Enterprise and Manuel de Azu lay, Technical Manager. This factory produces mainly wines and spirits from pineapple. The type of equipment is somewhat similar to that of the previous factory, but more sophisticated. There is a Dalcin (Italian) filter which works with diatomaceous earth but has never been used because of lack of knowledge of how it operates. There are dozens of tons of diatomaceous earth stored away, without anybody knowing the purpose it serves. However, there was encountered during the visit a manual describing the mode of the filter's operation in Italian, and subsequently its Portuguese translation. An "Alfa Laval" four stage plate exchange unit is also remaining idle because no one knows how to use it.

2.2.2. Technology

The enterprise is assisted by a Cuban adviser, Mr. Roberto, who follows exactly formulas left by the previous owners. Thus here also 30 kg of dehydrated or pressed yeast is used for each fermentation vat of 40.000 l. 5-8 days of fermentation are needed. The adjustment of the must with regard to its sugar content is effected with the same quantity of saccharosa independently from the original Brix value of the juice, which

necessitates a correction of the alcohol content of the wine with 95% alcohol. 20 p.p.m. of SO₂ in form of potassium meta bisulphate is employed during the fermentation, which is not sufficient to inhibit the growth of wild yeast varieties accompanying the fruit. Another technological mistake is the use of tannin in white wines to increase their dry extract.

2.2.3. The laboratory is equipped for routine analyses. It was found, however, that the results of the analyses do not ensure an adequate quality control, because the analysts do not know how to interpret them in order to recommend necessary modifications of production.

2.3. Cuca, Industria de Cervejas, Luanda and Huambo

2.3.1. The experts were received by Messrs Domingos Monteiro, Director General of Production and Anibal Arquimedes Benta Ribas, Production Chief.

The enterprise possesses two great production units, which employ identical technology and type of equipment. The larger of the two, situated in Luanda, has a productive capacity of 26.000.000 l per year, one half being filled into stainless steel drums and the remainder into bottles of 350 and 700 ml.

The factory in Huambo produces annually 9.000.000 l. Mrs Maria Celeste is manageress and the brewery succeeds in maintaining good production despite equipment deficiencies.

2.3.2. Equipment

The factory in Luanda has 3 copper cooking vessels of 25.000 l each. There are 12 fermentation vats of stainless steel, operating at 11°C; beer cellars with storage capacity of 720.000 l in stainless steel tanks of 20.000 l each; "Niagara" filters working with diatomaceous earth, and porcelain filters; a cellar for final storage at 0°C; a CO₂ recuperation system consisting of filters with activated carbon and compressors; a starter preparation room with 12 stainless steel inclinable tanks, transport pumps; a computer IBM 360 model 22 with 33.000 memories.

2.3.3. Technology

The technology employed by this enterprise is up-to-date and the product of good quality. All the raw material is imported and consists almost exclusively of barley. In addition, a good part of this barley arrives in a malted form. None of it is subjected to an analytical control as to its germination power, impurities content, grain quality and infestation by insects. The brewing system follows one unique formula since colonial times, no adaptations being made in relation to raw materials used. The recuperated CO₂ gas lacks adequate deodorization. The bottle transporting belts lack lubrication owing to the shortage of lubricating soap, a great supply of which was encountered in the factory Refrigerantes Ltda. Shortage of glass containers necessitates the use of stainless

steel drums on a large scale, which reduces the life time of the product thus diminishing its distribution radius. Lack of water was observed on the bottling line, although it was operating at one half of its capacity, only.

2.3.4. Laboratory

The laboratory of production control is well equipped, but some instruments are not in use because of the lack of knowledge on the part of the technicians and deficient maintenance. Ferments used by the brewery are imported from Belgium and the Netherlands in freeze dried form, their multiplication being carried out in the microbiological laboratory and subsequently in the preparation room of the multiplication of their own starter. The importation could be avoided if the imported pure cultures were duly multiplied and stored, maintaining them always in a pure state and in optimal activity. Following Brazilian experience Angolan breweries could replace some of the imported barley by local raw materials or by cereals of lower cost, such as maize, broken rice and, possibly, cassava.

3. Distilled Beverages and Liqueurs

3.1. SBELL, Sociedade de Bebidas Espirituosas de Lobito Ltda, Lobito

3.1.1. The experts were received by Mr. Pedro Van der Kellen, Director of the Regional Enterprise of Fermented Beve

rages. This factory produced during the colonial period neutral alcohol from maize, using acid hydrolysis at elevated temperatures, neutralization and subsequent alcoholic fermentation. Distillation was carried out in 2 stages, the first stage (capacity 8.000 l) producing alcohol with a concentration of 25% and the second (capacity 6.000 l) alcohol of 70%. The daily production capacity of 70% alcohol was 2.000 l. All this equipment has remained idle since the war of liberation.

The beverages produced during the last years are prepared with alcohol from sugar cane. This alcohol is kept in concrete vats with addition of oak shavings to simulate the effect of aging in wooden tuns. The factory is equipped with a Padovan and a Seitz filter. The various beverages here produced are artificially flavoured to impart the taste of anisette, whisky, mint liqueur, gin or drambuie. It was noticed that one unique aroma producing firm, Emil Flachsmann from Switzerland, dominates almost the whole of the Angolan food and beverage market. Incidentally, in various other factories there were found signs of the visit of that firm's representatives in the form of catalogues and price lists of essences furnished by the firm, which shows the dependence of one only source of supply. It appears advisable to investigate other sources of obtaining essences in order to diversify the beverages produced and make possible a comparison of prices and technical assistance offered.

"Sbell" has on its yard a distilling apparatus "Co distil" of Brazilian manufacture, still encased, purchased

during the colonial period. The apparatus made of stainless steel and provided with rectifying column has a capacity for 5.000 l of 96.5% alcohol in 24 hours. The mounting of the apparatus could make "Sbell" independent of the supply hitherto obtained from Usina 19 de Maio and make possible to furnish alcohol to all the units of the regional enterprise of fermented beverages.

3.1.2. Laboratory

The laboratory of this unit is inert. There are no technicians and nobody inside the unit has any idea about laboratory work. And yet this laboratory should provide suggestions for the formulation of various beverages, it should be responsible for the quality control of raw materials, for the selection of essences and aromas and for the quality of final products.

3.2. Licorang - Licores de Angola, Lobito

The experts were accompanied by Messrs Pedro Van der Kellen, Director of the Regional Enterprise and Amaral, Director General of the Unit. This firm was established at the end of the colonial period and endowed with relatively sumptuous installations. Great emphasis was given to the administrative part and to public relations. The industrial part comprises fermentation tanks and 5 alembics, all from stainless steel. It possesses a store house with all the herbs and condiments

needed for the preparation of vermouths and liqueurs, an alembic of a pot distiller type with principal recipient inclinable of stainless steel, preparation tanks and filters, all of stainless steel. The filling, sealing and labelling equipment is semi-automatic.

The laboratory is relatively well equipped, has a sumptuous room for the technical head and a library with books pertaining to the industrial field in question. However, all that is at a standstill owing to the lack of qualified operators in the factory, laboratory and administration.

3.3. CAVL - Companhia Angolana de Vermutes e Licores, Lobito

The experts were accompanied by Messrs Pedro Van der Kellen and Moraes, Director General of the unit. The unit possesses a copper steam heated alembic for alcohol and an alembic for bagasse with two interchangeable, inclinable recipients. There are various filterpresses and tanks for maceration and fermentation. The unit works with imported essences and alcohol supplied by "Usina 19 de Maio". Its installations are in poor working conditions because of lack of maintenance and for being idle for some time. It was producing: liqueurs of banana, cacao, strawberry, besides rum, brandy, anisette etc. The formulations are provided by a craftswoman who develops the products at her home. The laboratory is endowed with rather sophisticated instruments such as spectrophometer, turbidimeters, colorimeter Du Bosq and

microscope, amongst others. It has not been used for some considerable time as the industry is at a standstill. Some workers were seen idling about, as well as some administrative personnel.

4. Animal Rations

4.1. Cuca Protector, Luanda

The experts were accompanied by Messrs Pedro Alfredo, Director General of the Unit and Manoel Alfredo Santos, Chief of the technical department, who has had 2 1/2 years of training in Cuba. The unit has a productive capacity of 10 tons per hour of various formulations of animal rations. Because of the lack of maintenance and the state of machinery the production has been reduced at present to one half of the original capacity. The unit has 140 functionaries who are working in 2 shifts. 6 of them are of feminine sex. Practically all machines are from Bühler and are in operation as from May 1968. The raw materials employed are: maize, oil cakes of ground nut, sun flower, cottonseed, maize and maize germ, wheat flour, whole barley unsuitable for human consumption, fish meal, ureia and furthermore vitamin mixture, imported calcium phosphate, salt and calcium carbonate. There are produced at present 20 formulations, amongst them rations for chickens and laying hens, pigs, cattle, ducks etc. This factory is the biggest of its kind in Angola, the second largest,

also "Protector", being situated in Huambo. It is interesting to note that all analyses required by the factory are done in Belgium, because according to the information received from Mr. Manoel Alfredo Santos, these routine tests are not performed in Angola. Before the arrival of the results of the analyses from abroad there is a lapse of at least 3 weeks, sufficiently long for the rations being consumed in the mean time. The factory collects the raw materials with its own vehicles, the same happening with the deliveries of the finished products, which increases greatly the cost. Some prices of raw materials used, appear below:

Fish meal	10.0	kwanzas	per	1	kg
Maize	5.0	"	"	"	"
Ground nut cake	6.0	"	"	"	"
Cootonseed cake	4.0	"	"	"	"
Wheat flour	1.5	"	"	"	"
Maize germ cake	1.5	"	"	"	"

The containers used for packaging the end product are polyethylene bags holding 50 kg of ration, sewn, rather fragile.

Numerous damages were observed in the pneumatic transport system, in some grain cleaners, in the elevator, which serves 7 floors, etc.

All formulations are prepared based on the composition of raw materials listed in foreign literature as no analyses

are performed in Angola. The vitamin mixtures and micronu-
trients purchased abroad have never been analysed.

5. Milling of Cereals and Products derived from them

5.1. Moinho 10 de Dezembro, Lobito

The experts were received in this unit, recently inau-
gurated, by Engineer Antonio José Diamantino, the Director of
the Regional Enterprise. The milling capacity of wheat is 96
tons per day. The installation was projected and equipped by
the Swiss firm, Bühler, the final tests being carried out by
the technical staff of that firm. The degree of extraction is
regulated between 77% and 82%. The raw material owing to the
delays during the transport and custom formalities is infested
with insects, beside the impurities originally present. The
gluten is rather weak and of low extraction owing to the
wheat quality, according to the information supplied by the
Director. He showed great interest in obtaining information
and guidance concerning mixtures for bread making, such as
wheat and soya beans, wheat and lupins, wheat and maize and
other combinations. The whole factory is functioning perfectly
and it would be highly desirable to provide competent techni-
cal staff in order to maintain this state of affairs. The
establishment of a laboratory for production control and qua-
lity control of the various flours produced, would also be
advisable.

5.2. Kanine, Moinho de Milho, Lobito

This unit, also under the supervision of Mr. Antonio José Diamantino, has a Director General of Production Mr. Manoel Lopes Moraes and as Technical Director Mr. Jacinto Margarido da Cesta, who accompanied the experts during their visit. The factory produces 55 ton of maize flours per day (24 hours), 50% of the production being obtained by the maceration-fermentation process and the remainder by milling the maize in hammer mills. Numerous deficiencies were noted owing to lack of qualified technical personnel and of adequate maintenance.

Some of these deficiencies are listed below:

The machines for cleaning the grains and separation of germs are damaged. There are no transport belts for the transferring of bagged maize from the lorries to the store rooms, nor for the transport of the finished products. The present construction of fermentation tanks necessitates an excessive amount of manual labour and time of operation. Simple modifications of the existing construction could reduce the amount of labour and greatly facilitate the discharge of fermented maize. Owing to bad functioning of the air float table and other machines there is considerable waste of maize and maize flour throughout the factory. An important modification of the storage of raw material would be the adoption of silos instead of storage in bags.

The management appears to welcome technical advice,

not only regarding the present conditions of the industry but also the development of new products based of mixing maize with other cereals or legumes.

5.3. Indumil, Moinho de Milho, Huambo

The unit is rather new and produces derivatives obtained from dry milling of maize. The experts were received by the Directress of the Regional Enterprise and of the unit, Mrs Florinda dos Santos Ferreira and accompanied by the Chief of the Technical Department, Mr. Sérgio Azeleira. Raw Materials are stored in 6 metallic silos holding 750 tons each. The entire equipment for maize processing is of Italian make "Ocrin". The milling and sorting is conducted in 10 milling outfits and 4 planshisters. The maize germ obtained in the process contains 20% oil. The unit is characterized by cleanliness and good maintenance. Maize flour of fine granulation is packed automatically in polyethylene bags and sold to the public at a price of 8 kwanzas per 1 kg. The "grits" are partly sent to the enterprise "Protector", previously described, while the remainder is used in the unit's own animal rations department together with other ingredients such as pressed cakes of ground nuts and "maize germs", fish meal and cattle tankage. The formulation of these rations follows that utilized by the enterprise "Protector".

The industrialization of the "maize germs" will be treated in the subsector "Oils and Fats".

5.4. EPAN, Empresa Panificadora de Angola, Luanda

The Director of the Regional Enterprise. Mr. Armando Mendonça received the experts and accompanied them in their visits to the 3 bread producing units of the enterprise.

5.4.1. Panificadora Monte Sinai, Luanda

The unit produces daily 220.000 bread loaves of 65 g and is headed by Mr. Joaquim José de Moraes who accompanied the experts. All the wheat used for bread making in Angola is imported from the following countries: Argentine, Germany, North Korea, Canada and Cabo Verde. The ingredients are flour salt and yeast. No other additives are used. The equipment are of German (Werner and Pfleiderer) and French (Frangan) origin. There are 5 dough dividers for 65 g loaves, which satisfies the production requirements. 1.5 kg of pressed yeast is used for 50 kg of flour. If pressed yeast is not available, a dehydrated yeast of French or Dutch origin is employed in the proportion of 1.2 kg for 120 kg of flour. For 3 bags (50 kg each) of flour 3 kg of salt is used. The unit possesses 2 dough mixers and 3 continuous ovens. Of a total number of 150 functionaries 33 are women. The regional enterprise has as Director of the Technical Department Mr. Giorgio Bonotto, an Italian employed there since 1975. The Monte Sinai unit supplies 3 city districts employing for this purpose three delivery vans. Industrial mess halls and small distributors use their own supply trucks.

It was noticed that the time elapsed between dough mixing and baking is very short (1 hour). This impedes a good dough leavening resulting in heavy bread. There are no fermentation chambers, the unit using an improvised chamber which does not fulfill the necessary technical requirements. These problems are recognized by Messrs Bonotto and Mendonça whose explanation is that the immense demand of their products by the population compels them to reduce to the utmost the processing time, even to the detriment of the final quality.

5.4.2. Panificadora Angolana, Luanda

This unit, not yet in operation, was meant to produce 60.000 bread loaves of 65 g per day, but it is the intention of EPAN to manufacture "family size" loaves of 200-300 g. The unit has 5 "Boker" dough mixers of German make, which use 50 kg of flour per batch every 7 minutes. Its inauguration is envisaged for November or December 1979. Suitable additives will be used. There will be operating 3 continuous ovens each one provided with an automatic bread counter and bagger. The installation of the equipments is carried out by employees of the French furnishing firm under the direct supervision of Mr. Bonotto.

5.4.3. Panificadora Independência, Luanda

This was the smallest bread producing unit visited, with a daily production of 80-90.000 loaves in 7 1/2 hours.

This was also the only unit with 2 discontinuous ovens with 5 floors. Owing to this feature the fermentation time was longer, because the capacity of the dough mixers and bread divisors was greater than that of the baking ovens. This was without doubt the reason why the quality of bread was superior to that of other bakeries. The unit was heavily damaged during the war of independence and reconstructed and re-equipped only in 1978. It has 2 dough mixers, 3 dough divisors of German manufacture, there are no fermentation chambers and no sugar or other additives are added. It possesses appropriate conditions for the training of bakers, the reason why a construction is being under way on the upper floor to house a laboratory and a training school for the above mentioned purpose. It seems that EPAN is a rather active enterprise and one whose management is preparing itself for the expansion of the quantity and quality of its products.

5.5. COMBAL Companhia de Massas e Bolachas Ltda, Luanda

In this unit the experts were received by Messrs Emilio Ramos da Silva, Director of the Regional Enterprise, Herculano Ferreira, Chief of the Technical Department and Production of the Regional Enterprise and José Maria Coelmo, Director General of the unit. The equipment for pastas is of Italian manufacture (BRAIBANTI). There are 3 lines with a daily production of 25 tons. Almost whole raw material consists of wheat semolina imported from Germany and Greece, as there is no semolina produced in Angola. Equipment for biscuit pro-

duction is of Belgian origin (OOMS) with a capacity of 3.200 kg per hour. The flour used is of 75% extraction, supplied by the mills Kicolo and Sagrada Esperança of Luanda. The capacity of the first mill is 200 tons per day and that of the second 75 tons per day. COMBAL is installing a complete production line for filled wafers, with the possibility of producing also cones for icecream, up to 2.500 per hour. All this equipment including machines for mixing and air injection for dough development was furnished by the Austrian firm FRANZ HAAS. Owing to the great capacity of dough production and small capacity of packing machines, the wafers and the biscuits are packed in 5 kg lots.

5.6. VILARES Fábrica de Bolachas, Bolos, Drops, Wafers e Caramelos, Luanda

Messrs Garrido da Costa, Director General of the unit, Americo Ramos, Chief of the Department of Production and Daniel Jorge Lorenço, Coordinator of MPLA received and accompanied the experts during the visit. This factory had been subject of a local newspaper report, in which there was emphasized its tremendous expansion as well as the great interest of its staff members in increasing production. This was confirmed during the visit. The production during the first 6 months of 1979 was: 332 tons of biscuits, 90 tons of cakes, 35 tons of wafers and 200 tons of drops and candies. The prevision for 1980 is: 944 tons of biscuits, 191 tons of cakes, 70 tons of wafers and 200 tons of drops and candies. The expected increase of

biscuit and cakes production is due to the mounting of new automatic machines (Werner and Pfleiderer) from Western Germany now in the final stages of installation.

The unit should produce in the next year chocolates in a new equipment manufactured by the Italian firm "Carle & Montanari". The total number of operators is 290 including 60 women workers. One of the products of the unit are ground nuts coated with sugar, 17 tons of which were produced in the first 6 months of 1979, the production expected for 1980 being 34 tons. There are facilities for quince and guava jam production, not manufactured at present because of lack of raw materials. The installation of a laboratory is imminent, some technicians being trained in DNIA, Central Laboratory of the Cereals Institute of Angola.

5.7. Sociedade Massas Centro e Sul, Benguela

The experts were received and accompanied by Mr. Jorge Aurelio Carvalho, Director of the Regional Enterprise and Director General of the Unit, to whom they had been introduced formerly during their visit to Huambo. The enterprise produces pastas only in this unit, whereas in other units biscuits are produced, too. The daily production is 7 tons, the total amounting to 150 tons per month. There are 4 production lines. The first, a continuous one, produces only semolina pastas, the second can utilize maize flour or semolina, and the remaining two are discontinuous. All machines are from "Braibanti" and

apparently rather old and in need of maintenance. According to the information supplied by the Director a great quantity of replacement parts is being ordered. The unit employs 60 operators in 2 shifts. Much attention is paid to the social welfare of the employees. A well equipped refectory supplies them with two daily meals at a greatly reduced price.

6. Fruit and Vegetable Industries

6.1. Jomba Industrial, Lobito

This is a private enterprise operating with Dutch capital. The Managing Director Mr. R. C. Aardse, the Chief of the Technical Department Mr. Adelino Igreja Brecha and the Accountant Mr. Teodosio Pires received the experts and conducted them through the factory. The production of this enterprise in 1973, i.e. during the colonial period amounted to 6.000 tons of finished products. In 1978 there was a production of 2.600 tons, in 1979 it increased to 3.000 tons, the prevision for 1980 being 3.800 tons.

6.1.1. Fruits and Vegetables

The principal fruits processed by this enterprise are: pineapples, guavas, quinces, peaches, pears and cherries. The principal equipment for fruit processing is of South African manufacture (Montalaar) with a capacity of 20 tons per day. It

was developed principally for processing pineapples of Smooth Cayenne variety. It consists of: machine removing the ends, a rotary skin remover, a remover of cores, a slicer, a transport belt for cleaning selection of slices and can filling, a syruper, an exhausting tunnel, a sealer and a water bath for sterilization and subsequent cooling. In parallel to the skin and core remover there exists a system of eradicators for the utilization of the juice remaining in the peels and cores. There are further two evaporators for the concentration of the juice, and production of guava and quince marmelades beside other hard jams. The pineapples come from Monte Belo zone and guava from a region situated at 140 km distance from Lobito. However, because of the decline of Angolan agriculture, the enterprise is importing quince and guava pulp from Brazil, 300 tons of these products having been imported in 1979. 200 tons of this importation went to other state enterprises, Jomba Industrial acting in this case as intermediary for the Government.

It was noticed that for the production of sugar coated peanuts, hazelnuts and almonds are being used, perhaps in order to remit more foreign currency abroad.

6.1.2. Candies and Toffees

An important section of the enterprise deals with the production of candies and toffees.

The machinery used for the above production is mainly of Italian make (Carle & Montanari) and consists of evaporators

operating at positive pressure, mixers of colouring and aroma ingredients, homogenizers of sweet mixes, candy moulders, wrappers, etc.

The types of products manufactured are: hard candy with various flavours, bubble gum, milk candy, suckers and lollipops.

There is also a section producing candied almonds with about 12 rotary, gas heated sweetmeat formers. The imported almonds are sugar coated in three stages, the last one imparting surface polish.

6.1.3. Observations

Some of the deficiencies noticed were the following ones:

Difficulty in obtaining raw materials, the enterprise being obliged to rely almost wholly on importation.

Difficulties in the importation of replacement parts for the equipments, resulting in great reduction of the productive capacity and deterioration of the quality of the products.

Deficient quality control due to lack of competition on the market.

6.2. Agrícola Portelas - Caimbambo and Eitalala (Kubal)

This enterprise, as previously mentioned, possesses farms growing oranges, pineapples e passion fruit, part of which is processed to supply the branch firm Sumangol in Benguela.

The Director of the Regional Enterprise is Mr. Lucio

Sousa Santos who received the experts in his office in Benguela.

The main products of this enterprise are pineapple and orange juices, which are processed in a simple pasteurized form and as sweetened concentrates.

The machinery used for pineapple processing is of South African origin (Montalaar) similar to that described in Section 6.1.1 (Jomba Industrial).

The equipment for producing orange juice came from the Italian firm Bertucci.

The juices are concentrated in simple effect vacuum evaporators provided with internal stirrers.

The production estimates for 1980 are the following ones:

Pineapple	- Wine	500.000 liters
	Juice	100.000 liters
Orange	- Juice	80.000 liters
	Concentrated	320.000 liters
	Sweetened juices	

Juices produced by Agricola Portelas have the trade name Dusol as have also the soft drinks of "Sumangol".

The enterprise has carried out experiments in the production of pineapple vinegar, and pickles of onions, red pepper, carrots and eggplants. Apple squash and juice is also being produced.

It should be noted that all the juices produced by the enterprise are stored in frozen form in freezing chambers with a 400 tons capacity, at temperatures of -30°C , -15°C and -5°C .

The enterprise does not seem to know that the addition of benzoic acid to concentrated juices to be used in the soft drinks manufacture, turns their storage much more economical and reduces transport costs.

It was further noticed, that the final concentration of the juices is very low and that the use of the "Cut back" system seems to be unknown.

6.3. Fazenda Prazeres - BABAERA

This unit belongs to the Regional enterprise directed by Mr. Lucio Sousa Santos and has a technician without higher education but rather experienced, Mr. Barros.

The farm situated at 130 km South of Benguela, produces pineapples which serve as raw material for the manufacture of about 600.000 l of wine beside juices and canned jam.

For the production of sliced pineapples a South African equipment similar to that existing in Jomba is used. To obtain pineapple and orange wines, the whole fruits are ground and after adjusting their sugar content, fermented, yielding wines with 10-11% of alcohol.

The technology employed is rather empirical and there is lack of technical advice, as was emphasized by Mr. Barros.

Experiments are being carried out in order to obtain red wines from white fruit wines by the addition of tannin and enocyanine imported from Italy and Spain.

In this Prazeres farm as well in Agrícola Portelas there exists an urgent necessity of additional equipment to improve the quality of the products and to turn the processing equipment more versatile.

6.4. Passicuca - Indústria de Suco de Maracujá, Huambo.

This unit was created by the original enterprise Cuca of the Portuguese Vinhas group, now fully nationalized. After one and half years of operation the unit was closed down and is under the responsibility of Mr. Carvalho, Director General of the brewery Cuca in Huambo.

The equipment and technology were obtained from the Swiss firm PASSINA which is holder of the patents of the manufacturing process.

The unit's monthly processing capacity is 1500 tons of passion fruit, which, assuming a conservative extraction yield of 30%, could produce 450-500 tons of simple juice of 17-18° Brix per month.

The equipment possesses evaporators for juice concentration as well as cooling machines and freezing chambers. According to the informations of Mr. Carvalho the passion fruit production was never sufficient to make possible a normal and continuous operation of the processing line.

During the initial phase of the unit's activities some German and Swiss companies showed interest in growing Passiflora edulis with the promise of purchasing all the resulting production including all the juice obtained therefrom. The factory was also equipped for the production of pectin and preparation of animal rations with the by-products resulting from juice extraction.

Climatic conditions prevailing in Huambo and in Angola offer in analogy with the Brazilian states Bahia and Pernambuco, ideal prerequisites for growing passion fruit, and here is a case of a great investment with considerable economic potentialities being abandoned.

7. Oils and Fats

7.1. Induve, Oils, Fats and Soap Factory, Luanda

This is a private enterprise with Portuguese capital (Quimigal) associated with União Fabril of Portugal. The Regional Director is Mr. Rossan Brandão and the Director of Production Dr. Pedro Cunha.

The experts were received by Mr. Rogerio Silva, Chief of the Technical Department and met during the visit the Production Chief, Mr. Antonio Soares.

The enterprise possesses a plant for obtaining vegetable oils and fats consisting of cleaning, shelling and delimiting apparatus, 2 expellers of French origin with a daily

pressing capacity of 50 tons of seed each and a de Smet solvent extraction. The edible oil refinery has a capacity of processing 24 tons of crude oil per day, the neutralization, using Sharples centrifuges, being continuous and bleaching deodorizing discontinuous. The principal raw material at present are groundnuts, sunflowerseed, cottonseed and palm kernels being also used, the storage capacity being 3.000 tons of seeds. The potential production of oils is 8.200.000 l and the actual 4.200.000 l per year. The oils and fats are sold in plastic containers of PVC (1 liter) and of polyethylene (4 liters) and in metallic drums of 200 liters. The oil cakes and meals are exported. The by-products of refining are utilized in the soap department of the enterprise which produces 200 tons per month of transparent soap "Super" and 400 tons per month of second grade "Offenbach" soap. There are 630 employees of whom 361 are engaged in production controlled by 11 technical functionaries. The processing methods and the quality of the products appear reasonable, but the enterprise could employ profitably some functionaries of university and medium level with industrial experience in oils and fats.

7.2. Indumil, Huambo

This unit already mentioned in the sector dealing with cereals, uses the by-product of maize processing, described as "maize germs" which contain about 20% of fat, for the production of crude maize oil. The oil is extracted with solvents in 4 hori-

zontal extractors with a total capacity of 50 tons of seeds per day. The present production amounts to 62.000 liters of oil per month. The units intends to install an expeller for pressing seeds with a higher oil content such as groundnuts and sunflower seed and in addition a refinery with a daily capacity of 10 tons of refined oil per day. However, the present boiler with 75 m² of heating surface may prove insufficient for serving these additional plants. Furthermore, the present staff although dedicated and with the best intentions in the world knows little about the processing of oils; the acquisition of 1-2 competent technicians appears indispensable.

7.3. Algodoeira Agrícola de Angola - AAA, Lobito

The experts accompanied by the Regional Director, Mr. Elísio Gregório were received by Messrs Aguinaldo Veiga, Chief of the Technical Department and Jeremias Chieque, Laboratory Technician.

The unit has an oil extraction plant (mostly groundnuts) and an edible oil refinery. There are 5 expellers with a capacity of 10 tons per day each and 6 verticals extractors for semicontinuous solvent extraction with a capacity of 40 tons of seed per day. The refinery has 2 neutralization wessels of 8.000 liters each, 1 bleacher and 2 deodorizers. The present annual production amounts to ca 2.600 tons of refined oil. The quality of the end product is passable, but the production shows a number of deficiencies. The solvent loss during the extraction

amounts to some 60 liters per 1 ton of seed. The free fatty acid content of the refined oil is 0.4%, there are no means of measuring the vacuum during the deodorization and so on. There exists an urgent need of qualified technical personnel.

7.4. EMPAL, Empresa Industrial de Productos Alimentares Ltda,
Lobito

The experts visited the unit accompanied by Mr. Elísio Gregório, the Regional Director and were received by Messrs Pedro Beta Rana, Chief of the Technical Department, Costa Tomás, Chemist and Vaz Jorge, Chief of the Financial Department.

The units consists of an oil refinery and margarine factory. The refinery has a Neutralizer-Bleacher (6.000 kg) and a Deodorizer-Cooler (6.000 kg). Crude and hydrogenated palm oil, groundnut and sunflower oils are the raw materials.

The margarine is produced by emulsifying refined oils with fermented skim milk using 3% of salt and starch as indicator. The emulsion is cooled in a "merxator" (a kind of Votator) and the resulting product is packed in plastic containers at room temperature. The potential production is 5.000 tons per year, the actual production being about 3.000 tons per year.

The endproduct is of reasonable quality, but as in other similar units there is lack of experienced technical staff and of adequate laboratory control of production.

Hydrogenated oil is imported because of non-existence

of a hydrogenation plant and hydrogen gas production in Angola. Both deficiencies require correction.

The by-product of the neutralization of crude oils, the so called soapstock, is acidified with sulphuric acid and the resulting fatty acids (or acid oils) are sent to the nearby soap factory Saboaria Catumbela, a rather unnecessary and costly procedure considering that both sodium hydroxide and sulphuric acid need to be imported.

7.5. Saboaria Catumbela, Catumbela

The Regional Director Mr. Elisio Gregório accompanied the experts on a short visit to the state owned soap factory of Catumbela which utilizes the by-products of the oil refineries Algodoeira Agrícola de Angola and Empal, previously visited. This factory produces approx. 220 tons of the so called "Offenbach" washing soap per month. There were attempts of producing toilette soap, which remained unsuccessful owing to lack of experience. Thus, for instance, crude palm oil is submitted to a "bleaching" process at an elevated temperature, but without air blowing, which does not produce much effect. An apparatus of Spanish manufacture for toilette soap production is waiting for installation from colonial times owing to the lack of technical knowledge.

8. Industries Processing Materials of Animal Origin

8.1. DINAPROPE - Distribuidora Nacional de Produtos Pecuários,
Huambo.

This unit commenced its activities in July, 1973.

The experts were accompanied during the visit by Mr. Antonio Joaquim Russo, Provincial Delegate of the Ministry of Agriculture in Huambo, who had the opportunity of visiting Brazilian universities and research institutes in 1979. They were received by Messrs Antonio Manuel Fão de Pena, Director General of the unit and Borges, Chief of the Production Department.

The abattoir has the capacity of slaughtering 40 heads of cattle per hour and 200 pigs or goats per day. All slaughtering operations and transportation of carcasses are manual. The equipment for the removal of horns, saws for carcass cutting and other instruments are imported. The yield of cleaned carcass in relation to the live weight of the animals is in the order of 50%.

According to the information given by the Director General the price paid by Dinaprope to the breeders is 14 to 15 kwanzas per kg in the case of cattle, while the price of meat for the consumer is 40 to 90 kwanzas per kg, depending on quality.

All the by-products of the abattoir are being utilized. Blood is coagulated by steam, sterilized in digestors, cen

trifuged and dehydrated in driers. The selling price of dried blood is 17.5 kwanzas per kg.

The yield of meat is 70% for pigs and 50% for goats.

The maintenance of the machinery is deficient, especially in the case of compressors which are of South African origin, a country with which there are no commercial relations.

The unit has 350 functionaries, 120 of whom are engaged in the actual production. The qualifications of the medium level technical personnel leaves a lot to be desired.

The cattle population of Angola is approximately 5.000.000 heads and thus smaller than her human population and its usufruct is rather unsatisfactory.

Great part of meat consumed at present by the Angolan population is imported, mainly from Botswana.

Incidentally, a great part, if not the principal source of animal protein in Angola is obtained from fish, the price of which varies from 8-9 kwanzas per kg for low quality to 34 kwanzas for high quality fish.

8.2. FAL - Fabrica de Alimentos Ltda, Luanda

This is a private enterprise owned by an Austrian. The visit was realized during the absence of the directors who were travelling abroad.

The products of this small unit are sausages, salamis, hams and similar meats of the Austrian type.

The productive capacity of the plant is 6 tons per

day, reduced at present to 2 tons owing to the lack of raw materials. The number of employees is 15, all being young Angolans trained in the factory.

The equipment consists of 2 fillers, 1 cutter, 1 meat mincer, 2 automatic smoke chambers, 2 freezing chambers, a central air conditioning unit, practically all semiautomatic and of Austrian origin.

All members of the staff have the right of purchasing 3 kg of meat per week, at the firm's self cost price. The salaries are above the average paid by most Angolan industries, being between 5.000 and 11.000 kwanzas per month.

All the meat and raw materials used in this enterprise are imported.

Organization, hygiene and sanitation are rather satisfactory, a proof that competent technical management has a significant influence on the standard of food industry.

8.3. SILAL, Sociedade Industrial de Laticínios de Angola,

Huambo.

This unit belongs to the enterprise Dinaprove which is controlled by the Ministry of Agriculture. The director responsible for this unit is Mr. Fão de Pena who accompanied the experts together with the Provincial Delegate, Mr. Antonio Joaquim Russo.

This dairy products factory, very well equipped,

terminated its activities on 3rd February 1975, because of the lack of raw material. The Independence war and party struggles decimated the country's cattle stock which in addition was removed to the neighbouring Namibia.

The factory's capacity is for 70.000 liters of milk per day. There are two processing lines for liquid milk and one for butter.

The older line of Danish (PAASH) origin for the pasteurization of 1.500 liters of milk per hour, has plate exchangers, centrifuges, equilibrating tanks, sanitary pumps, and 2 fillers for polyethylene bags. In parallel there is a complete line for fermentation and cream beating for butter production, equipped with two packing units for 10 g, 250 g and 500g packets.

Another line of more recent origin, with a processing capacity for 60.000 liters of milk per day, has the following equipment: a complete system of upperization APV capable of sterilizing 500 liters of milk per hour at a temperature of up to 140°C for 3-4 seconds, cooling them aseptically to less than 20°C and to pump them to 3 aseptic packing machines "Tetra Pak", one for 1/4 liter, the second for 1/4 liter and the third for 1 liter.

The original milk with ca 4% fat content yielded three types of end product: milk with 3% of fat, milk with 1.5% of fat and skim milk.

During the short time when the aseptic line was operating, it was supervised by two technicians from "Tetra-Pak".

At present owing to the problems arising from the hiring of the "Tetra-Pak" equipment, the Swedish owner firm has suggested to the Angolans to reconstitute milk from imported milk powder and to process it in the existing equipment. This seems to involve many disadvantages such as: Transformation of a long life product, already packed and of low weight into a product less stable, weighing 7 times more and more expensive because of additional work, energy and transport costs beside the cost of hiring the equipment mentioned. Furthermore, this arrangement would necessitate an installation for water treatment and complete revision of steam generators.

The Provincial Fisheries Commission - Benguela

The Provincial Delegate for Fisheries, Mr. Vasco Martinho, representing the Ministry of Fisheries in Benguela acquainted the experts with some facts referring to the program of his department in the fisheries sector of the Benguela province.

According to his informations the waters of Benguela and Moçâmedes, in South Angola, have plenty of fish.

Statistical data of 1978 illustrate the situation in Benguela.

Plan of capture	3.500 tons per month
Plan of fish canning	222 tons per month

Cans actually produced	2.600 tons per year
Dehydrated fish (actual)	11.000 tons per year
Frozen fish (actual)	2.200 tons per year

The plan of capture for 1979 presupposes 64.880 tons of fish.

Mr. Vasco Martinho informed that 20 shrimp catching boats 18-20 m long are on order from a Brazilian shipyard and according to the contract should have been already delivered. However, because of the financial difficulties experienced by the shipyard, the delivery date has been by mutual accord postponed.

There are 2 ou 3 fish processing enterprises in the region under the authority of the Provincial Fisheries Commission. The biggest is Mampeza Industrial S.A.R.L.

8.4. Mampeza - Industrial S.A.R.L. - Benguela

This is a private enterprise with Angolan and North American capitals, Carnation being the Associated American firm.

The Director General, Mr. Manoel de Oliveira Leitão received and accompanied the experts together with the Provincial Delegate of the Ministry of Fisheries.

The enterprise has its own fishing fleet but purchases a great part of its raw material from the Ministry of Fisheries. The entire production, which is canned tuna fish is at present sold in the local market, whereas during the colonial period

80% of the production was exported.

The installed capacity is 100 tons per day with 8 working hours, but because of the precarious state of the equipment and lack of adequate raw material the actual daily production is around 15 tons. Beside the difficulties mentioned, there is also lack of cans and qualified labour.

Mampeza has purchased abroad a complete processing line for 300 cans per minute which should arrive in the port of Lobito in the next months.

The present line consists of tunnels where the entire tuna fish distributed on trays is transported with carts and cooked with steam. After cooking, the tuna slightly cooled is cleaned by hand by operators who on a transport belt, remove the head, open the fish, remove the bones and scrape the skin. Subsequently the tuna is transported by belt to the canfilling machine. All the material resulting from the cleaning operation is processed into fish meal, some species of smaller fish being also used for this purpose.

The tuna cans have a net weight of 7 ounces and should contain 40 g of oil, but actually 80 g of groundnut oil is used.

About 12-16% of the total cooked tuna is the residue converted into fish meal which contains 7-8% of moisture and 7-9% of fat.

The canned tuna is sterilized in 4 discontinuous autoclaves at 121°C during 45 minutes.

There are 2 foreign technicians, the remainder being

Angolans.

The market price for tuna is 20 kwanzas per can, the cost of the empty can being 2.65 kwanzas.

Following deficiencies were observed:

The present state of factory maintenance.

Unsatisfactory odor and flavour of the oil employed.

The salt used is of inferior quality.

The addition of salt is effected by hand and its quantity varies from can to can.

Sanitary and hygienic conditions of the whole processing are unsatisfactory.

There is lack of medium grade technicians.

There is no laboratory for quality control.

9. Sugar Industry

9.1. Açucareira 19 de Maio - Catumbela

This is the biggest sugar and alcohol factory in Angola, with a crushing capacity of 1900 tons of sugar cane per day. A private enterprise until 1976, it was nationalized last year becoming part of the Central Sugar Enterprise. Its Director General is Agr. Engineer Vitor Ribeiro and the Director of the Unit is Mr. Carlos Alberto Silva who accompanied the experts during the visit.

The same enterprise controls another factory in Dombe

Grande called Usina 4 de Fevereiro, whose Director is Mr. Arnaldo Pita Gros.

The 19 de Maio unit had its first processing line for 800 tons of cane per day, installed in 1926. This line consists of a cane washing system by spraying, a fibre remover and 4 milling outfits with cylinders 30" x 60". A second line was installed in 1956 with a capacity of 1.200 tons per day consisting of a fibre remover and three milling outfits. Both lines work according to the counter current washing system.

The machines have been imported from various countries and thus some are Meerless of England, rotary vacuum filters Dorr-Oliver, a Brown Boveri electrical generator of 2500 KWA, a German distilling apparatus of Becker.

The factory has 1300 operators working in 3 shifts.

The sugar yield is 9% based on the weight of crushed cane. The total cultivated area is 4872.7 hectares with an average production of 68.8 ton per hectare. During the colonial period, the medium production was 80 tons per hectare during the 5 last harvests.

In order to appreciate the decrease of the factory's efficiency and productivity the following statistical data are given:

In 1963-64 the total sugar production was 33.705 tons. In 1971 this production amounted to 33.252 tons. After the nationalization in 1978 the total production was 22.000 tons and for 1979-80 the prevision is 25.705 tons.

The daily capacity of 95% alcohol production is 12.000 liters. In 1974 the total alcohol production was 3.779.142 liters, whereas in 1978 this production was 2.500.000 liters.

The total sugar production in Angola is 35.000 tons per year, the internal consumption exceeding 70.000 tons. Deficiencies of local production are covered by the importation of sugar from Cuba.

The processing methods employed in the sugar and alcohol manufactured are adequate. Shortcomings in the production are due to the decrease of sugar cane productivity and lack of skilled factory personnel, as during the Independence war almost all qualified technicians left the country. There are at present 2 or 3 Portuguese and a few Cuban technicians.

This unit is the only one possessing equipment for alcohol production. The other sugar factory (Usina 4 de Fevreiro) throws molasses away, causing pollution apart from economical loss.

10. Coffee Industry

10.1. Liangol-Luanda

This unit directed by Mr. Rui Patrício specializes in the production of freeze-dried coffee.

The capacity of this plant is 1800 kg of soluble freeze-dried coffee per day and in 1972 the daily production amounted

to 1.600 kg. At present 200 kg is produced per day.

The production line consists of: 1 "Probat" automatic toaster of American manufacture, 1 battery of extraction columns "Niro" with a capacity of 180-190 kg of roasted ground coffee per column, a freeze-drying system "Atlas" consisting of 2 autoclaves with intermittent action, heat exchangers and a "De Laval" centrifuge.

The temperature range of the extraction battery is from 145°C on the most exhausted column to 100-105°C on the freshly loaded one.

The roasting loss is about 12%. Each batch of the extract obtained from 190 kg of roasted coffee amounts to 180-220 kg and contains 31% of dry matter. The total time of the freeze-drying process is 7.5-8 hour per batch. The trays with the extract congealed in the freeze-drier are between plates with the circulating oil at a temperature of 120°C. The maximum temperature of the extract at the end of drying is 55°C.

The price of the coffee (Robusta variety) is 48 kwanzas per kg and of coffee "Arabic" 54 kwanzas per kg. The extraction yield being 30%, the cost of the raw material only is 160 kwanzas per kg of the freeze-dried product.

Here are a few deficiencies of the enterprise:

The director of the unit has never visited any other factory producing soluble coffee, being responsible for the unit's production, where he has been employed for the last 8 years.

The extraction yield is low.

The loss of vacuum in the freeze-driers is so great, that only one apparatus can be used at a time.

Non-existence of a quality control laboratory.

Non-existence of humidity control in the soluble coffee discharge room and the packing room.

Total absence of research aiming at process improvements and increase of yield and quality of the product.

11. Salt Industry

11.1. Regional Salt Enterprise - Lobito

This is the biggest salt producing unit of Angola.

The Director, Mr. Cesar da Silva Valente supervises a staff of 85 in the industrial unit and 650 in the salines.

The enterprise possesses 6 salines capable of producing 3.000 tons of crude salt per month during the winter period and 5-6000 tons per month during the summer.

The production statistics of the enterprise are the following ones:

1973	-	2.109	tons
1974	-	5.776	"
1975	-	1.033	"
1976	-	3.300	"
1977	-	1.477	"
1978	-	2.614	"

The equipment for the purification of the salt consists of 7 water tanks with a total capacity of 700.000 liters of water, which is replaced after the production of 3.000 tons of salt. There are vibrating sieves of German origin ("Humboldt"), screw elevators, classifying sieves, pumps for the addition of potassium iodate and antihumidity agents and packaging machines "Rovema" of Portuguese manufacture.

The enterprise produces 60 tons of purified salt per day, the following types of products being made: industrial crude salt for cattle, and fine salt with and without iodine.

Following deficiencies may be mentioned:

The water used for removing sand from the salt should be replaced more frequently.

The equipment is obsolete and requires maintenance.

There is lack of qualified personnel.

A laboratory for quality control is needed.

The quality of the end product is unsatisfactory.

There is no filtration during the processing.

The productivity is low.

12. The packaging Industry

12.1. Embalang - Embalagens de Angola, Benguela

This is the only enterprise producing tin cans i. e. sanitary cans for foods.

Its director is Mr. Antonio Viegas Faustino - Galambas.

The producing capacity is 1.100.000 cans per month. The sizes produced are: 1/8, 1/4, 1/2, 1, 2, 2 1/2, 5 and 10 kg., being used for juices, jams, tomato paste, margarine, and meat and fish conserves.

The unit has two automatic production lines for 300 cans per minute, furnished by "Cameron" of Chicago - U.S.A., one being damaged, without adequate electric and mechanical maintenance.

The lithographic line uses normally two colours, but owing to the lack of paint, the internal coating varnish is often employed as one of the lithographic colours.

The use of white zinc oxide paste for interval coating is apparently not known. The major part of the cans is not internally varnished. All raw materials are imported.

Cans for margarine

1 kg	-	150.000 Cans
1/2 kg	-	50.000 Cans
10 kg	-	4.000 Cans

Cans for fish

1/8 kg	-	150.000 Cans
1/4 kg	-	300.000 Cans
2 1/2 kg	-	40.000 Cans

The metal shoots are imported from Japan, The Netherlands and France.

The requirements for 1980 amount to 2.800.000 tins per month and the total capacity of the factory is 3.000.000 in 3 shifts. The number of employees is 308.

The solder used is of Portuguese manufacture and is composed of 50% of tin and 50% of lead.

The prices of cans for Food Industry are the following:

Cans for margarine

- 1 kg - 6.60 kwanzas (without lithography)
- 1 kg - 8.10 kwanzas (with lithography)
- 1/2 kg - 4.00 kwanzas (without lithography)

Cans for fish

(without lithography)

- 1/8 kg - 1.95 kwanzas
- 1/4 kg - 2.45 kwanzas
- 2 1/2 kg - 9.50 kwanzas

Cans for jams

- 2 lbs - 5.25 kwanzas (without lithography)
- 2 1/2 lbs - 5.25 kwanzas (without lithography)
- 1 lb - 4.00 kwanzas (for soft jams)
- 1 lb - 3.15 kwanzas (for tomatoes)
- 5 kg - 15.92 (varnished inside)

Cans for margarine

10 kg - 34.00 kwanzas (with lithography)

Cans for juices

6 oz. - 1.60 kwanzas

The enterprise has quality control laboratory for can sealing and soldering.

Following deficiencies may be pointed out:

Lack of maintenance, especially regarding electric and electronic appliances.

Lack of qualified personnel in all sectors.

Low productivity.

Deficient quality control.

Very scarce knowledge concerning requirement for sani
tary cans.

Use of inadequate soldering for sanitary cans.

Elevated production costs.

Excessive loss of metal sheets.

Excessive manual work.

Bad distribution of lines inside the factory.

Insufficient space for the envisaged production.

13. Universities and Research Institutes

13.1. University of Agricultural Sciences - Huambo.

In order to become acquainted with the type and standard of Angolan universities, the experts visited the Faculties of Agronomy and Veterinary Sciences of Huambo, which form part of the University of Angola, situated in Luanda. They were received and accompanied by Professor Isabel Tendinha.

The University of Agronomical Sciences has only 5 semesters in operation, with a teaching staff of 22 professors, 9 of whom are Cubans. The total number of students in 5 semesters of both faculties was 95.

The Director of the University Mr. José Carlos Veiga Pinto was at that time on a study tour in Moscow.

The creation of a Faculty of Food Engineering is being planned and there is great interest in the cooperation with Brazil regarding suggestion of a suitable curriculum and assistance, in view of the fact that in Brazil there exists already this type of Faculty for over 10 years and there is no lack of professors with experience in this field.

The Faculty in Huambo possesses well equipped laboratories for carrying out analyses of animal rations and of clinical, microbiological and physico-chemical nature. However, the functioning of these laboratories is handicapped by the lack of qualified personnel.

During the colonial period the functioning of the Fa culties was better owing to the presence of Portuguese pro fessors, but as result of the war and departure of these pro fessors the University program was disrupted.

It was noticed that the number and scientific prepara tion of the potential students was deficient.

13.2. Agronomical Research Institute - I.I.A., Huambo.

The experts were received by the Director General of the Institute, Dr. Fernando Branco Marcelino.

The main activity of the Institute is the work on maize im provement beside the production of selected seeds.

The Institute has a laboratory of agricultural techno-logy with the following sectors:

Bread making, fruit wines and feed flours.

It seems that the aims of the laboratory are not attained, because there is no technical staff capable of ope rating the existing equipment and practically all the available space and some of the instruments are devoted to agricultural investigations, mainly to the seeds improvement, a specialized field of the Director.

As previously mentioned, cereals imported for the milling and animal feeds industries and the breweries are not subjected to a quality control in the phase of acquisition, reception at the harbours and during processing. It seems obvious, that in view of the above laboratory being in disuse,

its transference to Lobito, the principal receiving harbour for imported raw materials, would greatly facilitate the quality control in question.

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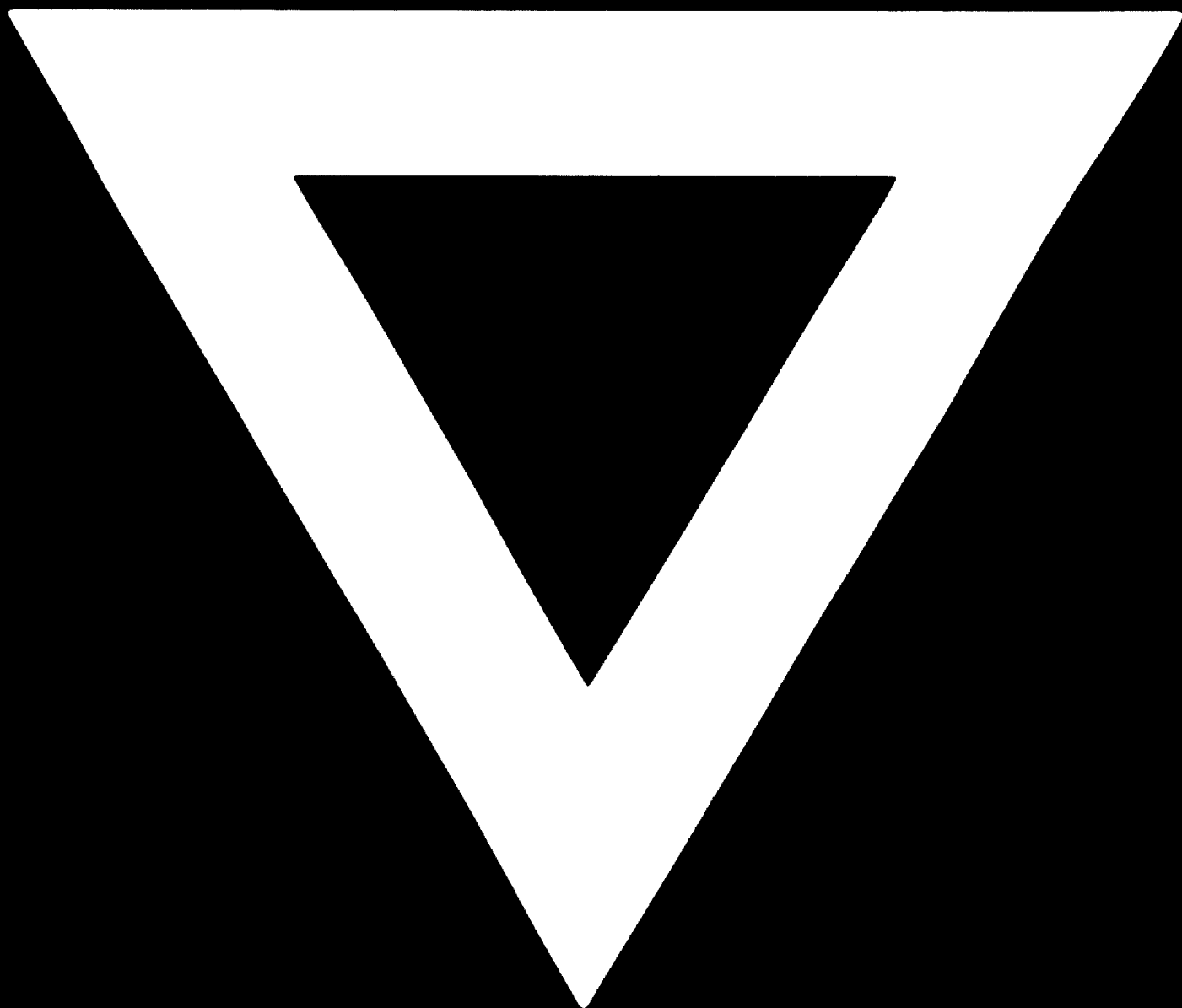
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