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UNITED NATIONS INDUSTRIAL
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ASSESSMENT OF THE NATIONALIZED INDUSTRIES WITHIN THE RESPONSIBILITY OF THE MINISTRY OF NATIONAL RESOURCES DEVELOPMENT 1/:

ETHIOPIA

(RP/ETH/75/003/11-01/06)

Project findings and recommendations

Terminal report prepared for
the Government of Ethiopia

by

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of the United Nations Industrial Development Organisation

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APPENDICES

I S MARY

The Author visited various industrial plants which are under the Ministry of National Resources Development and managed by individual Corporations for each branch of the industry. An assessment was made on their present operations with respect to processing technology, types and quality of products, quality control, labour and training requirements, organisation and management, development planning, etc.

The visits to several plants within the Iron and Steel Corporation (Chapter B, Page 5), revealed several basic shortcomings which, in order to develop further this sector of the industry, should gradually be eliminated. It was noted that there is a shortage of highly skilled personnel, and adequate recommendations were made in respect of the provision of foreign experts/consultants, and to the training of local personnel abroad. Also, suggestions were made on how to improve the marketing organisations, quality control of products, repair and maintenance, products' design, the utilization of installed capacities, etc., as well as the general economic operation of individual plants.

Of the Chemical Industries (Chapter C, Page 18), the Plants manufacturing paints, lacquers and plastic materials, were visited and an assessment made. It appears that their products are more or less of a standard quality, however, there are still some possibilities for improvement, particularly as far as repair and maintenance, supply of spare parts, marketing etc. are concerned.

Within the Food Industries Corporation (Chapter E, Page 24), a number of plants were visited and assessed, such as flour mills, macaroni, bread and biscuits plants, oil and soap plants, etc. Various suggestions were made on how to improve the operation of individual plants. Also detailed proposals were made on the activity of the Corporation itself and on the assistance which should be provided. Emphasis was placed on the elaboration of a long-range development programme for the nationalized food industry, required expert services, training (also at the University of Addis Ababa), as well as other action to be taken in order to improve the operation of the existing plants and to better utilise available raw materials and by-products.

Visits were also made to several tanneries and shoe factories which are managed by the Leather and Shoe Corporation (Chapter F, Page 38). The shortage of skilled manpower appears to be crucial in this sector and a provision for shoe designers, leather technologists, marketing experts, production managers, tanning technologists, etc. is highly recommended. The introduction of a second shift, putting into operation idle lines, improving daily production planning, collection of hides and skins, better organization of supply and transport, etc. are all mentioned.

Of the plants managed by the Beverages Corporation (Chapter G, Page 47), breweries, wine making and soft drink plants were assessed. It was indicated that the climatic and soil conditions of the country for wine grape, fruits, barley and possibly hops production, as well as the existance of mineral water resources, could indeed contribute to the further expansion of this sector. It was indicated that there is a potential for the establishment of large-scale malt production and this should be explored further. The expert services for improving fruit juice production, repair and maintenance of equipment, sanitation techniques, marketing, etc. are recommended.

In the textile sector, under the Coarse Fibre Corporation (Chapter H, Page 58), and the Textile Industry Corporation (Chapter I, Page 63), the function and activity of these, as well as the operation of several plants were reviewed. A series of recommendations are contained in relevant chapters on agro-industrial sisal and kenaf complexes, sisal, kenaf and cotton production and processing, the establishment of a central textile control and research laboratory and quality standards. Some shortcomings were noticed in individual plants and suggestions on how to eliminate them are also indicated.

II INTRODUCTION

By cable, dated 4 September 1975, the Government, through the Regional Representative's office, has requested an exploratory and preparatory mission for one month, of a high-level consultant, to assess the situation of the light industries sector and to elaborate a technical assistance programme.

Briefing in Vienna was carried out from 5 October to 9 October 1975. Upon arrival in Addis Ababa on 10 October 1975, contact was established with Mr. J.C. Phillips, Regional Representative a.i. and a meeting was held with Mr. B. Kashembuzi, Programme Officer of UNDP and Mr. V. Zerjavich, UNIDO Project Leader at the Ministry of Industry, Commerce and Tourism.

The same day, a visit was made to Ato Gebeyehu Ferrissa, Head of the Industry Department of the Ministry of National Resources Development, during which the basic issues of the project were discussed and Ato Gasemew Berhanu was appointed as steady counterpart during the mission. A programme of visits to the nationalized industry was stipulated and defined.

In the meantime, discussions were held with Mr. V. Zerjavich of the Ministry of Commerce, Industry and Tourism, Dr. [illegible] Cecez from the Yugoslav bilateral mission, Mr. [illegible] Greece, de Noury and many other UN consultants and officers in E.C.A. Mr. V. Zerjavich and Dr. Cecez participated in many visits to the factories.

On Thursday, 15 October 1975, the Permanent Secretary of the Ministry of National Resources Development, Ato Tesfaye Dinka, widened the scope of the mission by requesting the following:

1. Submit a general view on the technical and economic situation of the nationalized industry as a whole (not only light industry).

2. To give an objective judgement on people engaged in the newly created corporations and appointed as management personnel in the factories.

3. To state the impressions on present utilization of capacities; present state of repair and maintenance; supply of raw materials; present stocks and on possibilities of further

planning and programming within the industry now unified and integrated under a common national ownership.

4. Special attention should be given to the possibilities of further expansion and definitions on how to best utilize the present facilities with respect to the next tasks of economic development in agriculture, industrial development, reduction of imports and development of other national resources.

5 One should envisage the most rational ways on how to improve the ailing situation and define the terms of reference for the further investigations, technical assistance, expansions, investment proposals and improvement of sources and education of personnel for different tasks.

6. In conclusive summaries, a priority list of proposals should be given and, if possible, submitted to a larger meeting at the Ministry of National Resources Development for discussion and adoption.

III FINDINGS

VISITS TO PLANTS AND ORGANIZATIONS

A. Branch Corporations

The nationalized industries fully or partly owned by the State and managed by the Ministry of National Resources consists of approximately 120 different factories. Recently the Ministry appointed several industrial corporations to execute the further integrated planning and management of different branches of industries (See Annex 2).

Before the visits information on which basic conceptions of work and tasks the corporations should accomplish, were collected.

The corporation should not try to play the role of an additional bureaucratic link between the Ministry and the enterprise. They should instead be a commercial and business-minded partner of its enterprises in order to rationalize the integration of the factories, to specialise in the production, organize common services (raw material supply, education of personnel, repair and maintenance, financing, marketing, administration, planning of investments, research etc.

During the visits, the above approach with representatives of the different corporations with respect to their present and future set-up were discussed and surveyed.

B. Iron and Steel Corporation

General Manager : Ato Fikre Menkir
Technical Manager : Ato Tekeste Negash

Ato Fikre Menkir gave a short description of the four companies managed by his Corporation that should be visited and an introduction to the factories was made by Ato Tekeste Negash.

1. Ethiopian Iron and Steel (ETHIO-SIDER S.C.)

This factory produces steel ingots from scrap iron rolling them into bars and wires of 6 - 36 mm. Of the rolled material; wire material, springs, fences, nails, bolts etc. were produced. The factory has already been in existance for over thirty years.

The owners have partly left and there is a lack of management and skilled manpower. No metallurgical skills exist whatsoever, no list and specifications of spare parts and refractories, drawings of the furnace or of the rolling mill. The supplier company of spare parts in Italy is probably under the control of former owners.

(a) Management

The owner who was also the technical manager has left. Todays managers of the plant do not have the technical skills to maintain the necessary levels of management and maintenance of the plant. A meeting with Dr. Bottinelle, the former Commercial Manager of the plant, who is still in Ethiopia, did not take place. The young technician in action at the electric furnace tries his best. An Italian qualified worker in the machine shop was not competent enough to answer questions. It is still hoped that the former owner will eventually return.

(b) Capacity

Information was given that the nominal capacity of the mill is 12,000 tons of steel a year. The present production is lower. The rolling mill has a capacity (with medium-sized bars) of

[illegible] 30,000 t/year - the furnace being the bottleneck of production.

1 batch in the furnace used to be ready in 2 hours 30 minutes or 9.6 batches per 24 hours. The present production is batches per day or 62 per cent of the installed capacity.

(c) Quality of products

The production of steel from scrap iron consists in melting the scrap with $CaCO_3$, Ferro-manganese, SiO_2, Ferro-silicate etc. in order to get steel of a certain composition with defined contents of carbon, sulphur etc. The over consumption of these expensive inputs is quite obvious.

The impression is also that the factory produces for the stock. The storage of ready-made bars is very large. No evidence of selling machinery or auspices for marketing todays production, was obtained. The management is fully engaged in continuing the production as described above.

(d) Repair and maintenance

The quantity of non-used equipment and the declared fears of the personnel gave the impression that the former owners intentionally left the factory without any kind of specifications on refractories, dies, tools, special steels and different spare parts necessary for the repair and maintenance of the different departments and equipment.

The machine shop for repair and maintenance is poorly equipped and was highly oriented to be assisted by the import of tools, dies and spare parts from Italy. It was not possible to locate adequate personnel for repair and maintenance except for one qualified Italian worker who also supervises the adjustment of the rolling mill.

(e) Problems of personnel

It is obvious that the lack of personnel has to be replenished as soon as possible. If, because of political reasons, co-operation with the former owner is not possible, something has to be done quickly in order to obtain steel of a standardised strength, hardness, etc.

At present there is no chemical control of the iron scrap, nor an exact calculation of the deoxidation inputs. There is no analysis of the ingot's composition nor a control of mechanical strengths of the bars or wires produced. Under these circumstances the bars cannot be used for reinforced concrete constructions and the wire will not correspond with its characteristics for the production of springs, nails etc.

(f) Problems of programming and technology

In the present situation in Ethiopia, this enterprise could play an important role in producing different products for construction, housing and wide consumption, in order to reduce the dependence from imports and the increase of national income. A programme for better utilization of non-used or new (to be bought) equipment (bolts, nuts, nails, fences, springs etc.) does not exist - nor could it be conceived or materialized by the present management.

(g) Problems of marketing

No information on the marketing attitude of the management was obtained. At this moment no major problem in the supply of raw material could be observed and no service for the study of this problem exists nor any plans for the near future.

The above situation shows that quick assistance should be provided i.e.:

(i) It is necessary to bring into the factory a technical manager (engineer metallurgist) with all-round experience in the above-described programme.

(ii) It is necessary to establish a small chemical and technical laboratory using the services of an experienced metallurgical lab-technician.

(iii) It is necessary to appoint a commercial officer to manage the supply of raw materials, selling and marketing problems.

(iv) It is necessary to hire a tool maker technician in order to organise the repair and maintenance shop, initiate the production of dies and tools and organise, together with the technical manager, the storage and evidence of refractories, spare parts, dies and tools.

(h) Conclusion and proposals

The present situation needs a quick intervention in order to regulate the raw material supply, to increase the capacity of the furnace, improve the work of the rolling mill, control the inputs and the quality of semi and finished products and to create the basis for further expansion of the company and to ensure the normal repair and maintenance of the equipment.

(j) Terms of reference for assistance

(i) It is necessary to send the present general manager together with the technical manager of the Corporation to visit a factory of similar size and programme in Europe (or elsewhere) in order to obtain a general insight into his tasks and duties. Duration - fourteen days.

(ii) It is worthwhile to provide the factory, as soon as possible with an experienced iron metallurgist engineer who would be able, in a short time, to specify all necessary data: on designs of the furnace and rolling mill; specification of necessary repair and maintenance sources and quality of additional refractories and spare parts for the future, give information on prices, necessary dies and tools; give names of alternative producers; recommend foreign personnel willing to takeover duties in the factory; specify the instrumentation of the metallurgical laboratory and give a schedule of necessary quality control examinations. Duration - two years.

(iii) It is necessary to provide a tool maker technician who will takeover the task to start right away of repairing the equipment, specifying necessary dies and tools for the present production and takeover the task of becoming acquainted with repair and maintenance work for the electric steel furnace and the rolling mill. He will have the duty of educating at least four or five Ethiopian technicians. Duration - three years.

(iv) It is necessary to provide an experienced iron metallurgist technician who would takeover the duty of leading the production under the supervision of the

metallurgist engineer and have the duty to educate in cooperation with him at least six young Ethiopian metallurgist technicians for the work at the furnace and the rolling mill. Duration - two years.

(v) It is necessary to provide a marketing consultant, who will be located within the Corporation, with extensive experience in the marketing of metallurgical and metal products in order to establish the exigencies of todays and future markets and elaborating on the basis of this study, a programme of work, of production for the whole Corporation, subdividing it in good co-operation with the factories in the best balance with their equipment, capacities and individual programmes of expansion.

(vi) It will be necessary to organize for the whole Corporation, and under the supervision of the Corporation, a central machine shop for tool and dies which will eventually satisfy also the needs of some other Corporations (Food, Chemical, Beverages, etc.) and be able to organize special repair and maintenance of log wheels, special pumps, electrical and electronic registration and control instruments, thermo elements etc.

The Corporation should add to this central machine shop for tools and dies, also a central storage of commonly used spare parts (bearings, stainless steel, special alloys, repair and maintenance materials etc.) in order to organize better and cheaper supply and minimize investment of foreign currency in it.

The cost of such a central machine shop would be approximately:

Equipment	Eth. $500,000.00
Instruments	Eth. $200,000.00
Other requirements	Eth. $200,000.00
Total	Eth. $900,000.00

An experienced tool maker technician should be provided for at least four years who is able to organize the above work and to conduct a training course. At least twenty Ethiopian trainee technicians should be provided by the Corporation.

2. Sebeon Metal Works, Akaki, and Akaki Iron & Steel Works, Akaki

(a) Management

Both factories are under one management and do consist of up-to-date buildings and are equipped with different productive equipment to produce galvanised iron sheets, corrigated sheets, iron pipes, tubes, different iron profiles for windows and door frames, housing components, drums etc.

The general manager of both plants is still Ato Tokeste Negash. The plant managers have not had much experience with the exception of the leading technician on the sheet galvanization line.

(b) Raw Material Supply

For both factories, almost all raw materials are imported (sheets in rolls) from Japan. The factory continues to import also other inputs, such as NH_4Cl, HCl, Zn from former sources in Japan not having knowledge nor experience to follow-up the changes on the world markets and to request and receive comparative bids and offers.

There is, of course, a major possibility of reducing the cost of production and savings if one knows that the cost of raw material in this kind of production makes at least seventy per cent of the final costs.

(c) Capacity

It seems that the capacity of both factories is not used more than at a level of twenty to twenty-five per cent. One of two galvanizing lines is out of operation. The profile line works mostly for stock. One line for pipes produces in one shift only. The other does not work. There is a lack of orders and the stocks are growing.

The capacity of the buildings is far from being used even at full production and therefore new lines of production could be envisaged.

(d) Quality of Production

The quality of the products is apparently good and satisfies the market standards. Despite this, both factories should organise in the future, a steady service for quality control, as would be required.

(e) Programme of production, technological problems

It is obvious that the present programme of production in both factories was geared for housing and community constructions. The first idea of rationalization should be the integration of both factories by transfer of all equipment into one factory which will produce: galvanized sheets, corrugated sheets, tubes, pipes, different profiles and construction elements for transport, for housing, garage doors etc. The other factory should use these elements for the production of goods already in demand or necessary with respect to future developments. There is a possibility of producing conveyors, different cars, silos, storage bins, elevators, driers, heat exchangers, central heating systems, ventilators, tanks for liquids, different kettles for food industries, stainless steel constructions, simple equipment for food industries as globoid transporters, pneumatic transporters etc.

Such a programme could quickly materialize with the help of a partnership with an established factory abroad in order to obtain ready-made designs and introduce different products and technologies to Ethiopia.

There would be, of course, a need to hire expatriates as personnel able to receive this know-how, to adopt it to the present conditions and markets and to educate Ethiopian technicians to become independent in this kind of work.

The further organisation of agricultural co-operatives, further development of crop preprocessing and processing, further development of food industries and quick resolving of housing problems cannot be easily achieved if such domestic production would not materialise.

(f) Problems of marketing

No marketing study has been made in the sense of the above programme. The sales organization is only at the beginning stage. It is intended to propose to the management a more commercially-minded attitude. The present management does not feel that selling (with profits) is their main job.

The passive attitude in waiting on orders from above, from cities, the Ministries of Agriculture and others will take place at a very later stage only.

It is felt that this study must be a part of the Corporation marketing study described in the previous chapter.

The organization of sales will be within the duties of the Company itself.

(g) Problems of personnel

For both the integrated companies there is a most urgent need for a capable and experienced technical manager who will organize co-operation with foreign partners, re-arrange the production capacities, raise the productivity and start the adoption of a new programme in order to expand the production. His duty will be to co-operate closely with the marketing department of the Corporation and educate people for the enlarged production. His first duty should be to organise his engineering and design department to be able to produce designs and blue prints for the expanded programme.

(h) Repair and maintenance

The repair and maintenance activity is at present very restricted. The repair and maintenance shop does not work satisfactorily and some equipment for the production of tools and dies (copy mill-fraising machine) was apparently not utilised at all, because of lack of adequate personnel. The whole production at present depends on existing tools and dies. There is no sign that this situation will be changed soon.

(j) Conclusions and proposals

(i) It would be desirable to send the general manager of the plant, together with the technical manager of the Corporation overseas to visit a few plants that have a similar programme of production and particularly plants that would be intended for "know how" co-operation in the production of storage facilities for grains, storage bins, grain silos, elevators, maize driers, grain driers, seed driers, etc. It is proposed that Yugoslav bilateral assistance should organise and provide such a tour of thirty days duration.

(ii) A mechanical engineer with extensive experience in the above programme should be provided for a least three years as a technical consultant for further oranisation of rational production and for organization of the whole work with particular attention to be paid to the economic side of the production and willing to introduce two to three Ethiopian engineers into that particular field.

(iii)A technician designer should be provided with experience in designing and construction of products and assemblies of the above-described present and new programme. He should, if possible, have enough knowledge to apply adequate technology for the materialisation of his designs and be willing and able to educate fifteen to twenty designers during his stay in the country. Duration of assignment - three years.

(iv) The problem of marketing should be dealt with by the Cosporation, as discussed.

(v) A sales office for the present production in co-operation with already established sales organisations and with their own sales staff should be immediately organized for the integrated factories.

(vi) Except for everyday maintenance, the factory should closely rely on and use the central die and tool shop which will be organised under the management of the Corporation.

(vii) Raw material provision should be centralized at the Corporation also for that enterprise.

(k) Terms of reference for the assistance foreseen

(i) It was already proposed to send the general manager with the technical manager of the Corporation to Yugoslavia for one month. The organization of this information visit should be arranged and partly financed by bilateral assistance, with travel costs provided by the Ethiopian Government.

(ii) The provision of a mechanical engineer as a main consultant should be financed by the country programme. The consultant should be backstopped by UNIDO's Engineering Section.

(iii) The technical designers should be provided under the same project as (ii) above.

(iv) Six month fellowships for two teams of five designers each of Ethiopian origin, in a factory's design office in Yugoslavia should be provided by Yugoslav bilateral assistance. Travel costs to be provided by the Ethiopian Government.

3. Ethiopian Metal Tools

General Manager - Nekonnnen Hundo

(a) Management Problems

This factory was built up by Polish technical and financial co-operation on the basis of a feasibility study produced by Polish "Techno-export". There are still two Polish specialists in the factory. The first is a mechanical engineer with vast experience in foundry processing and tempering technology; the second, being an experienced tool and die maker who supervises the adjustment, repair and maintenance of the whole equipment. Both have been contracted to stay until June 1976. Replacements could possibly be obtained. No domestic people were observed who would be able to replace them. It is obvious that a replacement should be provided.

There is under consideration an Ethiopian technical manager (mechanical engineer) who should be sent abroad for at least six months to achieve the necessary insight and experience in order to be able to supervise the production and organize the further described expansion.

(b) Capacity

The capacity of the factory consists of the pressing, foundry and tempering department. The machine shop is well equipped for repair and maintenance and could possibly be used as a start (nucleus) for the central tool, die and repair and maintenance shop of the Corporation.

At the time of the visit, the factory produced shovels. The capacity of the whole factory was at this moment used at a rate of twenty to thirty per cent approximately.

(c) Quality of production

The quality of products is adequate as well as quality control.

(d) Raw material supply

It seems that here, as in previously described cases, no special attention to competitive and comparative bids and offers for raw material was paid. The provision of raw material should be centralised at the level of the Corporation.

(e) Programme of production and technology

The present programme of production consists of twenty to thirty different hand tools for agricultural production (shovels, hammers, picks, knives, rakes, hand tools for artisanal and hobby uses.). The technology is adequate but the market for this programme is at present very limited.

The factory works for the stock. It is obvious that this factory should play a major role in three directions:

(i) The expanded production should make possible the use of better and more productive hand tools for the individual farms (plows, rakes, scythes).

(ii) The expanded factory programme should keep in function the existing number of tractors and produce implements adapted to the special structure of Ethiopian soils.

(iii) The factory should provide a major part of tools and dies to the metal processing factories, to the major part of the food, chemical and plastic industry and should be the nucleus of further tool maker's education and more complicated repair and maintenance work. In fact, the central tool and die and maintenance shop should be closely attached to this factory because of already existing excellent facilities.

(f) Marketing and sales

The approach to marketing is obviously not satisfactory. There is a passive expectation of orders by the Ministry of Agriculture or by different other bodies, or co-operatives, banking organizations along a centralized planning and distribution system.

In the programme of the factory at present different door and window shutters which have been imported hitherto, were included.

The factory is aware of the fact that the already present needs for different agricultural hand tools are twenty times larger than their present production.

There is no feeling nor a commercially-minded attitude which would bring the creation of an aggressive sales organization using sales credits and co-operation with the recently established corporations.

Without this completely changed approach no further expansion will be easily realized.

(g) Problems of personnel

There is an obvious need to provide this factory with:

(i) Mechanical engineer as an action-oriented consultant for the all-round management of the factory with extensive experience in the above programme and a sense for sound economics. Duration - three years.

(ii) Mechanical engineer design with extensive experience in construction and design of above programme and particularly agricultural tools, equipment and implements. Duration - three years.

(iii) Technician - tool maker - specialized for designing and production of foundry tools and pressing dies with experience in teaching and education in that profession. He should be able to organize all necessary repair and maintenance work at the factory and for imported tractors and implements. Duration - four years.

(iv) A fellowship should be provided for the Ethiopian technical manager to stay six months in a respective factory in order to grasp the system of his duties and activities.

(h) Repair and maintenance

The present technical staff seems to be in order.

(i) Conclusion and proposals

It is clear that this particular factory is worthwhile to be the subject of special attention taking into consideration the role of agriculture and the mechanization of it in the further development of Ethiopia.

Not less important is the key role of that factory in serving as a basis for the new central tool and die maintenance shop serving a large part of the whole Ethiopian industry producing basic dies and tools and providing the more sophisticated repair and maintenance to both the industry and agriculture.

(j) Terms of reference for assistance and its financing

(i) Fellowship for the technical manager of E.M. Tools. Six months should be provided by the Yugoslav bilateral assistance. Travel costs to be provided by the Ethiopian Government.

(ii) Mechanical Engineer consultant

Duration - three years, to be provided by UNDP/UNIDO technical assistance.

(iii) Mechanical engineer constructor and designer

Duration - three years, to be provided by UNDP/UNIDO technical assistance.

(iv) Technician tool maker

Duration - four years, to be provided by UNDP/UNIDO technical assistance.

(v) Ten fellowships for technician designers and tool makers in designing office of a Yugoslav factory, to be provided by the Yugoslav Government. Travel costs to be covered by the Ethiopian Government. Duration - one year each.

C. CHEMICAL INDUSTRIES

1. Sadolin Paints A.S.

(a) Management

Manager: Ato Ilkonen Tessema

The first job of the manager was to continue the operation of this small but adequate plant producing lacquers for cars, industrial paints, nitrocellulose lacquers, plastic paints for housing, some polishes etc. At the first glance, it is obvious that the factory needs additional help in technical and operational management in order to continue to expand and satisfy future needs. After the other factory was seen and the information obtained on the third, it became clear that an integration of all of them would be the best solution, not only for the management but also because of many other problems arising at this moment.

(b) Raw Material Supply

All the three factories have more or less the same programme of production and they need similar raw materials - all imported from abroad. It is a must to organise (within the relevant Corporation) the supply and import of those raw materials as a common service.

This particular factory depends still, for instance, on its former owner in Denmark in many raw materials and spare parts.

(c) Capacity

Sadolin Paints A.S. works at a level of twenty-five per cent of its built-in capacity. This is the case almost with the other two factories as well. The present capacity is 1,200 tons/year (8 hours operation per day - 1 shift).

(d) Quality of products

This factory lacks competent technical and technological management. The whole production relies on semi-skilled workers. There is no laboratory control of quality and no possibilities whatsoever to follow the development of that particular branch or to give an economic appraisal with respect to new special requests etc.

(e) Programme of production and technology

The programme of production in all three paint factories is almost identical. All of them do not use more than a small part of their capacity. On the other hand, and at the same time, a great assortment of products are imported which could be easily produced at the three factories. For instance: glues, polishes, marine paints, different sprays, insecticides, printing inks, oil varnishes, Turkish red oil, etc.

It is obvious that the three factories could be now rearranged, specialized and rationalized by a now widened programme of production subdivided rationally among them.

(f) Problems of marketing

This factory does not have a fully organized marketing and sales department. The deliveries fully depend on orders coming spontaneously from the market and from old customers. It is obvious that the integrated new company has to organize an aggressive sales department. The nucleus of it exists already in the MEGA PAINT MANUFACTURING COMPANY.

(g) Problems of personnel

After the visit to both factories it was possible to notice the imminent need of:

(i) Chief paint and lacquer technologist

With an academic background and at least five years of experience in production of up-to-date paints and varnishes based on: PVC, PAC, polyesters, polyurethane, dehydrated castor oil, linseed varnishes, nitrocellulose and different other products of the branch as: polishes, sprays, inks, glues, arabic gums etc. This technologist should be able to materialize the above rearrangement of the programme and take over, in cooperation with the present staff, the running and control of quality in the three specialized factories. His duty would be also to train Ethiopian chemical engineers. Duration - two years.

(ii) Fellowships

Right away, three fellowships for three Ethiopian chemical engineers should be provided to spend six months in one of the training centres of BASF, BAYER & Co., ICI or another known supplier of basic imports of this branch (this could be requested as bilateral assistance from the Federal Republic of Germany).

(h) Conclusions and proposals

(i) The factory should be integrated with other varnish and paint factories to become one enterprise. (HEMIA PAINT MANUFACTURING PTY. LTD. CO. and DUROSAN PAINTS FACTORY).

(ii) An extensive marketing study should be undertaken in order to reduce imports of different chemical products which could be easily produced in one of the plants. The production of printing inks, different sprays, marine paints, shoe polish, floor polish, dehydrated castor oils, Turkish red oil for the textile industry, different glues, arabic gums, detergent and wetting agents for textile and leather industries, etc., hitherto imported, could be subdivided among the factories. The production of paints and varnishes could easily be concentrated in one of the factories - the capacity being satisfactory for the present

needs. The study should investigate these possibilities with particular attention to be paid to the existing facilities which could be used with only a few new investments to produce the above products.

(j) Terms of reference for technical assistance

(i) Chief paint technologist who will rearrange the production programme and introduce up-to-date technical management at the new integrated enterprise. Able to organize new lines of products, help to buy cheaper inputs, train Ethiopian paint and varnish technologists, organize study quality control. Duration of assignment - three years.

(ii) Chemical engineer with experience in the above enumerated new programme in order to introduce it in the production and train foreigners for it. Duration - two years.

(iii) Marketing expert specialized in investigation of chemical markets for "small" chemical products of household, office needs, textile, food and leather industry, with extensive experience in cost analysis and studies for production planning and programming. Duration - six months.

(iv) Fellowships - Four Ethiopian chemical engineers or chemical technicians should be sent abroad to factories, to obtain training: two in paint, lacquers and varnish production and two in the production of the above mentioned, still to be adapted programme of "small" chemicals for household, offices and industry.

D. PLASTIC INDUSTRY

1. Ethioplastics

General Manager : Ato Andualem Temesgen
Technical Manager : Ato Solomon Hagos

(a) Programme of production

This factory produces by extension and rolling, the following plastic products:

(i) Sheets of different thickness from poliethylene.

(ii) Wires, different dimensions isolated with PVC, and without isolation.

(iii) Shutters from soft PVC

(iv) Pipes from polyethylene

(v) Pipes (PVC hard) for higher pressures (6 atu)

(vi) Pipes (PVC soft) for low pressure

(vii) Joints for pipes (PVC hard)

(viii) Bolts (twelve sides) from PVC

(ix) Garden hoses (from soft PVC)

(x) Tubes for electrical installations (PVC)

(b) Capacity

The capacity of the factory is used only partly. The reason for that reduced production consists partly in the lack of raw materials, partly is connected to the reduced demand on the home markets.

Different tubes (PVC) for community and housing waterlines are not used because the activity in housing construction was reduced at the present. Some production problems are interconnected with difficulties of transport from Assab to Addis Ababa and some problems have a source in the lack of dies and tools which cannot easily be specified and imported.

(c) Quality of production

Apparently the quality of production corresponds to the standards in spite of the fact that it was not possible to become acquainted with a systematic quality control of the different products in an equipped laboratory.

(d) Marketing Problems

The factory has its own sales organisation and feels that after normalisation of constructional activities, there will be enough demand for the full use of the built-in capacity. There is a problem with working capital because of overstocked finished products.

(e) Repair and Maintenance

The ability of independent repair and maintenance of all sophisticated extension and printing equipment is poor. Of particular interest would be the reconstruction of the bag printing machine produced by S.C.I.M. Spa - FIRENZE, Type ST 300 2M, No. S2J172-N-1197 which would increase its capacity by 300 per cent if three photo-electric cells could be provided, which regulate the location of the stamping bags to be printed.

(f) Conclusions, proposals, terms of reference

(i) It will be of great assistance to send to the factory a packaging technician in order to prepare the reconstruction of the bag printing machine. Duration - three months.

(ii) It will be of interest to make a marketing study which will ascertain the demand in similar products and try to establish a viable programme for the factory, taking into consideration also two other Ethiopian factories producing similar products i.e. "IMPAYER PLASTIC" extruded and printed goods and "DASIN PLASTICS" producing polisthylene bags. Duration - three months.

(iii) It would be of interest to send the manager and the technical manager to Yugoslavia to inspect two factories producing on similar lines, in order to obtain an impression of expansion possibilities, to diversify the sources of raw material, to co-operate with respect to the production of new tools and possible training of Ethiopian technicians.

The factories in Yugoslavia are YUGOVINIL - SPLIT and ELKA - ZAGREB, both covering a vast field of products of interest to Ethioplastics. Duration - thirty days.

2. FOOD INDUSTRIES CORPORATION

1. Corporation problems

General Manager : Ato Gelagay Zewdie

The Corporation consists of twenty-one factories being one of the largest branches of the nationalised industries. The importance of this industry should be judged in close connection with the agricultural character of the country and its possibilities to contribute heavily to the economic development. The nationalized food industry consists of eleven flour mills, four macaroni, five vegetable oil mills and one with processing facilities. The factories are located near consumption centres and have more or less a local character (Addis Ababa, Akaki, Dire Dawa, Asmara, Lekemehare etc.).

The problems of the nationalized industry from the viewpoint of the Corporation consist in the lack of well trained technicians, its lack of management experience and, sometimes also in deficiency of raw material supply. The main raw material for the oil mills is cotton seed, castor seed, rape seed and linseed. The equipment of the oil mills is old and partly damaged. The oil content of the pressed oil cake is still too high. There is no solvent extraction plant. The quality control and sanitation technique does not satisfy the standards. There are still spare parts problems. The protein content of the oil cake is not valorised. The received value for the exported cake is far below that of the protein enrichment contribution if cake would be fed to animals as the most important component of animal feedstuffs production. There is a lack of qualified technicians and engineers in almost all levels of production, planning, sanitation and quality control.

The supply of raw material is not in the hands of the factories. They have to wait idle until wheat, oil bearing materials, flour or sugar is brought by other marketing organisations to their storages.

The views on the present state of the nationalised food industry will be explained in examples of the visited factories. Some general thoughts and ideas after this visit will be stressed.

(a) Raw Materials

It is now a generally adopted view that up-to-date food technology and food industry cannot be separated from raw material production in agriculture.

The process of food processing (because of technological, economical and management reasons) starts already in the field. The most successful food industry processing agricultural products (grains, sugar cane, vegetables, fruits, meat, milk, tobacco, vegetable oil-bearing materials) is presently integrated in different ways with agriculture in the form of agricultural combines which have the tendency to exclude all kinds of middlemen, also with respect to the direct consumer of processed food products by foundation of its own distribution network. The advantages of this integration are obvious, and have been materialized both in the capitalistic and socialistic structure of the economy. The best proof for Ethiopia is the flourishing sugar industry established and successfully managed in the Awash Valley.

Ethiopia has now a unique possibility to adopt this optimum structure of food processing in the basic level of agricultural processing, transferring this way long term planning, market-minded programming, industrial efficiency, high technical skills and experience to agricultural development - one of the rare realistic chances for fast expansion of the Ethiopian national income.

This approach is at present far from being felt and followed up by the enterprises of the Ethiopian food industry. The people there are mostly in a state of expectation that the Ministry of Agriculture, or Commerce, or the Planning Commission or somebody else will make it and bring the necessary materials to the factory's doors.

(b) Management

The newly appointed management in most cases does not have the necessary experience and depends fully upon one person who is frequently an expatriate and is responsible for all duties (from the boiler house to the distribution of

goods to customers). It is a must to fill out all these management and supervisory posts with Ethiopians who should be sent, after certain short experience, to relevant factories abroad in order to obtain the necessary skills and supervisory knowledge.

(c) Capacity

The capacities in many of the food industries are far from being exhausted. In many of the visited factories the yields are lower than necessary and in some of them the capacity is utilized at a rate of twenty to twenty-five per cent only.

The reason for this being mostly the lack of repair and maintenance skills and facilities, lack of spare parts and sometimes lack of raw materials or other inputs (bottles for instance).

(d) Programme of production

There are a number of food products still imported in spite of the fact that the domestic agriculture could provide first class raw materials.

Sometimes also some high value raw materials are processed to products of a secondary importance. The soap produced out of crude edible oil in the United Oil Mill Corporation instead of cheap imported whale oil or tallow is one of the examples and proof for the above assessment. The flour mills do produce a lot of white flour (semolina etc.) instead of producing a unified standard flour of eighty-two to eighty-five per cent yield, saving in this way a hundred thousand tons of wheat for the present scarcity of grain in the country.

The oil industry at present does not have a programme which would contribute to the fast expansion of the national economy of the country.

The already existing oil cake should be eventually solvent extracted. If one takes into consideration that the oil industry of Ethiopia processes already approximately 300,000 tons of oil seeds, producing 240,000 tons of cakes with eight per cent oil, then an additional amount of 16,000 tons of oil would be available.

If one takes into consideration that 240,000 tons of cakes could be the main component of 1,000,000 tons of animal feedstuff or an additional amount of 200,000 tons of meat, milk (dry substance), chicken or eggs, then the lack of the present programme becomes evident.

2. Agro Industry

There is another chance which should become the duty of the Ethiopian vegetable oil industry. This biggest chance consists in the materialization (in close co-operation with state-owned farms, individual farmers, farmers' co-operative and on own land) of a pro-industrial production of soya beans, of its processing and export of the largest part of the soya oil, and soya grits to the world markets. The information received from Mr. Osman Pirija (of the bilateral Yugoslav Commission) on the possibilities of soya bean planting, cultivating and harvesting in many Ethiopian provinces, promising yields of at least 2t/ha and 1-2 crops a year, could make Ethiopia become one of the largest suppliers of soya to the world market. The world market of today is highly dominated by the United States supplying Europe, Japan and the rest of the world more than eighty per cent of the consumption. Soya beans and its products were for the last fifteen to twenty years the largest export item of the United States, making animal husbandry, including the chicken industry in many countries, dependent on American soya supplies.

The first task of the Ethiopian vegetable oil processors should be the necessary examination and creation of big agro-industrial estates (of course in co-operation with different relevant bodies in the Administration and in the field) who would be able to finance, by exporting in the first phase, soya beans, and the whole expansion of soya bean storage and processing facilities.

(a) Animal feedstuffs

The production of animal feedstuffs for Ethiopia is also a national must. The present amount of cattle, sheep, goats and other domestic animals could not only survive droughts, but gain additional weight, produce far more milk and be fit for slaughtering in two to three years, instead of seven to eight

as at present. The production of meat, milk, chicken, eggs (even wool) can be doubled and tripled in the country by provision of additional animal feedstuffs produced in the integrated departments of the oil mills, who could produce the concentrates which would be then spot mixed with hay, corn cobs, different grain, straw, cotton wastes etc.

(b) Margarine production

The tradition to use hard fat instead of oil is very alive in Ethiopia. Today, industrial production of ghee consists in mixing imported refined tallow and whale oil from Denmark and refined vegetable oil. Instead of this at least one oil-hardening facility should be installed at one of the oil mills in order to produce hardened fats from the domestic cheap tallow and cheap refined vegetable oils.

(c) New facilities of the vegetable oil processing industry

Today oil mills (with few exceptions) are small, old fashioned, not productive and low yielding units. Most of them are also wrongly treated with respect to the raw material production. It is necessary, taking into consideration the predominant priority of this industry for Ethiopia, to carry out a feasibility study of further reconstruction and expansion of the vegetable oil industry taking into account the above remarks and priorities.

(d) Blackstrap molasses

Going through the programme of the present Ethiopian food industry we were not able to detect the appropriate processing use of the available blackstrap molasses. The production of the Ethiopian sugar industry jumped up to 135,000 tons of sugar. The by-production of molasses should go at a level of approximately 35,000 - 40,000 tons. It is true that at present, blackstrap molasses is in demand on the world market and can be exported easily if the transport problems were resolved. This is obviously not the case.

On the other hand, the United States' utilizes the domestically produced and imported molasses for the production of a feeding supplement for the animal husbandry.

With only modest investments would such a consumption of molasses with added urea and some free phosphoric acid contribute to a revolutionary change in animal feeding. These animal feedstuff supplements in liquid form can be easily stored, transported and added to hay, straw, dry grass, different agricultural wastes, corn cobs, leaves and successfully fed to ruminants (sheep, cattle etc.) in order to enrich the poor ration particularly in the off-raising season times. The production of alcoholic beverages and ethyl alcohol of the rest of the molasses, would contribute to the replacement of imports (whiskey, gin, rum etc.) being an excellent tax producer to the State.

(e) Marketing problems

The food industry does not have a serious marketing problem. In fact, the domestic market grows so quickly that the satisfaction of it should be the imminent task of that branch of industry.

(f) Repair and maintenance

In most factories the problem of repair and maintenance is neglected. The Saint Georg brewery being an excellent exception to that rule. The flour mills are not able (with the exception of one) to sharpen their milling rolls; the oil mills to replace the rotation snail nor the stators knives, or the extrusion mouth of the oil presses but have to order these parts from abroad. The maccaroni factories are not able to repair their simple rotating vacuum pumps, nor the thermocouple instrumentation of their driers. Many machines are out of production because of lack of bearings and other spare parts which should be specified, stored and under constant supervision of the repair and maintenance superintendent.

(g) Quality Control

In many cases there is even a lack of quantity control. The Petratos Oil Mill being an excellent exception to this rule. In this factory the technical manager has introduced continuous measuring of all inputs, of semi-finished products, by-products and finished products having the necessary control of quantities and exact data for cost analysis and calculations.

In most of the factories quality control does not exist at all. There is not one flour mill with everyday control of ash in the flour, gluten content, and of baking properties in order to give information on how to mix optimally the cheaper soft wheat and with more expensive durum wheat. In the oil mills the refinery process is not controlled by chemical analysis, the bleaching process by colour measurements and the refining by the determination of free acids.

In most factories no sanitation programme exists nor are any personnel trained to execute it.

(h) Problems of personnel

Taking into consideration the necessary expansion of the Ethiopian food industry and the lack of food technologists, food analysts, food biotechnologists, it is recommended as one of the first steps, to organize at the University of Addis Ababa, a department for food technology which could, after two to three years, produce food technicians and after four to four and a half years, food technology engineers. Without these personnel and without additional training abroad, no improvement, expansion, or big jumps in these branches of the national industry will be made.

3. Visits to food processing plants - A. MIHOS S/C

(a) Flour mill

MIHOS flour mill at the time of the visit was not working because of lack of wheat. This is a fairly old mill with a capacity of up to approximately thirty tons/day which lacks transport facilities for the storage of wheat and the transport up to the start of production. The miller superintendent is a skilled worker without technical background who manages relatively well but has not trained successors.

There is no quality control, diversification programme, nor systematic repair and maintenance.

(b) Maccaroni factory "AMBASSA"

A very up-to-date maccaroni factory with modern, fully automatic PAVAN production lines producing all kinds of short and long-size maccaroni and noodles packed on the end of the line.

The situation of this plant is not satisfactory. At the time of the visit, only two of the four lines were in working condition. One line was stopped after the third vacuum pump was replaced. The previous one not being repaired. The second line was stopped because a chain connecting the mixture of water and flour was broken. There were no prospects of starting both lines despite the high deficiency of noodles in the city of Addis Ababa. Thermocouples on the lines in action fall out of function thus reducing the drying capacity of the drier department.

(c) In the bread factory, four baking ovens were out of function because nobody was able to replace the worn-out wiring of the electrical resistance heaters. Nobody was able to repair the refractory walls of the ovens. Only one tunnel oven of a smaller capacity was in action producing rolls.

(d) <u>United Oil & Soap Factory</u>

Factory Manager : Ato Gedlu Kebede (Chemist)
Administrator : Ato Aberra Gebre

United Oil & Soap Factory is one of the biggest in Ethiopia. They produce soap as the main article on three up-to-date Italian made production lines. The quality of this soap is not first class. The process of soap cooking is old fashioned. Vegetable oil and fatty wastes are decomposed to soap by a strong caustic soda lye. The water component is separated and thrown away (pollution) and the soap is pumped to the lines of production without being washed and separated from the rest of the lye. The glycerine is not recuperated. The oil-pressing department consists of five Rosedown presses, one Skoda, one IPI press and four Andersson presses. Only a part of this process is still in function. There was nobody who was able to give information on capacities, on todays throughput, losses, oil content in the seeds or in the oil cakes. The maintenance shop is more than not satisfactory. The filling of bottles (no washing line) is done by hand. The refining of edible oil is not controlled by quantity or quality. The bleaching, deodorization (under vacuum) is performed without any analysis of the effects.

The whole factory is dirty, oily and could not be classified as a plant which has a sanitational-minded management and supervision.

It seems that up to now the young and recently appointed management does not have the full idea of what their duties should be. It is an obvious lack of experience in technology, cost analysis, sanitation and supervision of the work.

The factory has no ideas with respect to further expansion, animal foodstuff production, better yields, quantity and quality control. There is no fixed programme to follow-up another raw material source, nor to take care of the raw material supply or adapt the present or future production to the market's exigencies.

(e) Petratos Oil Mill

The visit to this factory was a nice change in comparison to the previous visits.

The technical manager of the plant takes care (expatriate Greek) of the boiler, material storage, presses, refinery station and the bottling department.

Everywhere clean surfaces and well kept equipment was noted and the capacity of the factory reaches 30,000 tons of cotton seeds a year, but the factory processes also other oil-bearing materials such as : rape seeds, castor seeds and linseeds. The three presses are well kept. The content of oil in the cake is controlled and is between six to eight per cent. These quantities are controlled from start to the end and the yields are evidenced by each batch. The manager has educated a lab-technician who supervises by analysis, all the necessary reactions and processes and the sanitation is perfect.

The only problem of this factory appears to be its dependance on one technical person.

(f) Mihos Oil Company

The technical manager of this factory is an elderly expatriate (Vasilio Vernicos aged 65 years) who has a modest educational background being more a worker skilled by experience.

The factory works at a low rate of its capacity. They have installed the following:

1 Anderson press	12 tons/day capacity
1 Rosedown press	10 tons/day capacity (working)
4 Rosedown presses (5 t)	20 tons/day capacity
Total	42 tons/day

At present only 10 tons capacity is used. The Anderson press is seriously damaged and there is a desperate need to replace the damaged cog-wheel, with a belt driving system.

The four Rosedown presses are out of business because of the above-mentioned reasons.

There is no evidence of inputs, outputs or yields. The refinery has a capacity of seven to eight tons daily and is utilized at present at a rate of thirty per cent of its installed capacity.

It has no laboratory, sanitation, nor quantity control and a very unreliable boiler house.

The best solution would be to integrate this mill with the nearby Petratos Oil Mill as soon as possible.

(g) Astron Maccaroni Factory - Addis Ababa

A relatively good impression at the first glance. The factory has two Braibanti macaroni lines, one for short the other for long noodles. The capacity of each line is up to ten tons per twenty-four hours.

There are two Pavan lines for short noodles which are out of action, each of a five tons/day capacity. The production is managed by two Italian expatriates (sixty-five and fifty years of age). They have no Ethiopian technical staff whatsoever. At least two technicians should be trained first by the present manager and superintendent and afterwards abroad for six months.

This factory has abundant room to expand.

(h) Kalita Food Products

This is a complex with a biscuit, bread, maccaroni and a flour mill factory.

(i) Biscuits

The biscuit factory consists of one small continuous line for biscuits with a capacity of only 300 kg. daily without packaging equipment. The quality of the biscuits is satisfactory.

There are two wafer lines which are not in operation (capacity at least 170 kg. daily each) because a wafer specialist (technologist) does not exist to give and change recipes for the production.

(ii) Bread

There is a dough-making (mixing) machine (in a badly maintained state) which supplies the tunnel oven.

Two hand operated double-ovens (30 m^2) are out of action as the repair and maintenance shop is not satisfactorily staffed.

For this department a feasibility study for its expansion should be prepared. There is already a demand for wafers (two tons/eight hours), for an all round biscuit line (six ton/eight hours) and for a bread production line with a capacity of ten to fifteen tons/eight hours.

(iii) Maccaroni department

The maccaroni department of this factory is really obsolete. One active production line consists of one old-fashioned Buehler mixer extruder which is still in operation and, in addition, some drying chambers which are empty because there is nothing to be dried, nor could the old boiler supply steam for them.

The whole maccaroni factory should be reconstructed as there is enough space available and equipment which could be used. No maccaroni technologist was available.

(iv) Grain milling (flour mill)

There is a flour mill installed in an up-to-date building consisting of two milling lines. There is recently installed O'Cri mill with a capacity of fifty-five tons/twenty four hours producing good quality flour.

Another line (complete with twenty-five tons/twenty four hours capacity) does not work because of two reasons. The technical manager (Italian aged sixty five years) states that the purifying department has to be replaced totally (costing $200,000) and that he is not sure if the concrete building would stand up to both lines in action.

This should be investigated. It is obvious that the factory (mill) depends fully on the presence of the superintendent miller (65 years) who is the only man able to change the diagram of milling. He has never tried to educate or train Ethiopians.

4. Conclusions, proposals of assistance

Corporation level

(a) It is obvious that the Corporation of food industries should become a highly executive body taking over the most pertinent objectives of eliminating present difficulties, taking care of the supply and further planning of raw materials with the tendency to integrate agro-industrial production.

(b) The Corporation should organise the training of managerial and technical personnel which are lacking, organise the standardisation (internal) of quality, yields and sanitation.

(c) The Corporation should elaborate on a long-range programme of product diversification, plant expansion and specialisation as a basis for the next five year plan of development. Within this programme the present necessary technical reconstructions and expansion should be realised in order to avoid mistakes which would be a burden for the future.

(d) The Corporation should take over the task of organising the direct distribution of goods to the consumers.

(e) The Corporation should concentrate on the purchase and storage of spare parts for its factories and organize the repair and maintenance services.

(f) The Corporation should organize a control laboratory for the continuous examination of food quality and super-control and as a place for the quick training of lab-assistants and technicians. This laboratory should elaborate on schemes for factory sanitation programmes and should lead to the execution and control of these programmes.

7. Proposed assistance to be provided by UNIDO

(a) Elaboration of a long range development programme for the nationalized food industry of Ethiopia. Three experts - six months each.

(b) One food-testing laboratory and sanitation equipment ($100,000) and one micro-biotechnologist for two years.

(c) One food technologist with long experience as an adviser to the general manager of the Corporation. Duration - two years.

(d) One food technologist specialist for soya processing and animal foodstuff processing. Duration - six months.

(e) One miller technologist (engineer) for the reconstruction of the flour mills and training of miller superintendents. Duration - two years.

(f) One vegetable oil consultant for the elaboration of reconstruction of oil mills and feasibility study for the central solvent extraction plant and the new vegetable oil factory. Duration - four months.

(g) One vegetable oil technologist for the introduction of better yields, higher quality, training of oil-pressing and oil-refining superintendents and introduction of quantity control in vegetable oil factories. Duration - two years.

(h) One fermentation consultant with wide experience in ethyl-alcohol production and application of molasses for animal feeding purposes (liquid supplement) to start alcohol production, alcoholic beverage production and organising the production and distribution of liquid supplements. Duration - three years.

(i) Repair and maintenance superintendent able and willing to organize a repair and maintenance shop and storage of spare parts for the member enterprises in order to repair and maintain registration and control instrumentation equipment, automatic regulation and electronic facilities. Furthermore, he should be able to organise repair of larger and more complex equipment, train repair and maintenance personnel and introduce evidence and specifications for maintenance of equipment. Duration - one year.

(j) Professor food technologist with vast industrial and teaching experience to organize a food technology department at the University of Addis Ababa, urgently needed for further economic development of the country. Duration - five years.

(k) Cracker, biscuit and wafer and bread consultant, to elaborate the programme of further expansion in this most deficient field of the food industry. He will, at the same time, put into production, the idle equipment in present plants, introduce diversification, organize training of confectionary technicians and start with the industrial production of bread.

(l) Fellowships and training trips

For the twenty-one factories, some fellowships should be provided for at least thirty technicians and engineers to be sent abroad for in-plant training in relevant up-to-date factories. Thirty fellowships for six months each.

F. THE LEATHER AND SHOE CORPORATION

Visit to National Leather and Shoe Corporation.

1. Corporation Visit.

General Manager: Ato Yoftahe Kebede.

The Corporation consists of the Darmar Shoe Factory (Addis Ababa), Darmar Tannery (Addis Ababa), Asseo Shoe Factory (Addis Ababa), Dofan Tannery (Addis Ababa), Cal, Chipolini Shoe Factory (Asmara), Conceria Baldini Tannery (Asmara), Frabi Shoe Factory (Asmara), Ethiopian Pickling + Tanning (Addis Ababa) and the new factory for tanning hides and skins in Nejo.

On 21 and 22 October 1975 visits were made to the office of the Leather + Shoe Corporation together with Mr. F.B. Buit UNIDO's Leather Technologist attached to the Corporation.

2. Personnel Requirements:

General Manager indicated the difficulty that the industry is facing is due to the shortage of manpower and he indicated the requirements of the following as an urgent need:

a) Shoe Industry:

i) Asseo Darmar - Addis Ababa:
2 Production personnel
2 Designers

ii) Chipolini/Asmara:
2 Designers

b) Leather Industry:

i) Tannery of Addis-Addis Ababa:
2 Leather Technologists to be trained

ii) Baldini - Asmara: same as above

Background information for the availability of personnel to be sent out for such training:

Personnel with high educational background and two years at the Bahir Dare Polytechnic in Industrial Chemistry.

These people could be sent for three years full-time Diploma Courses at one of the following institutions:

National Leathersellers College, London, U.K.
Northampton College of Technology, Northampton, U.K.
Reutlingen Tannery School, Federal Republic of Germany

Job Descriptions for the above qualified personnel who will eventually take over as technical managers in the tanneries will be as follows:

- Full technical and production responsibilities in operating a tannery;
- Quality control of various raw material purchases including chemicals, packing material, sundry materials, hide and skins, etc.;
- Quality control of leather produced at the finished stage or at any inter-operational stage in a tannery;
- Various stock control and co-ordination between purchases, sales department if they are separate or responsibility for all tanneries of a smaller size;
- Production planning and its control;
- Costing and its control in the production;
- General administration duties, labour relations, etc., in the tannery.

3. [illegible]

On visits to various places, no immediate need was evident and each of the plants were sufficiently equipped with manpower and equipment facilities.

4. [illegible]

General Manager of the Corporation very much wanted to receive the report regarding the survey work carried out by Troha and Ledger on the leather garment industry in Ethiopia.

He also wanted survey work to be carried out to determine the capacities of both the shoe and leather industry in Ethiopia and recommendations and expansion of the existing facilities of all the plants now within the Corporation.

5. Manpower Assistance to the Corporation.

The general manager indicated immediate needs for the Corporation as follows:

a) Tanneries:
One Leather Technologist
One Marketing Expert for leather

b) Shoe Industry:
One Shoe Technologist
One Marketing Expert for Shoes

General manager advised that the Corporation has already recruited suitable people on purchasing and there will be no immediate need in this respect.

6. Notes on visit to Addis Tannery:

Mr. N. Whatchadmian, Technical Manager, suggested that Ethiopian technical staff should be sent out on a regular basis to acquaint themselves with the latest development trends on the technical and marketing side. Visits to chemical firms in Europe, for instance, BASF, Bayer, Hoechst, Henkel in W.Germany or similarly in England, France and Holland should be strongly recommended. These firms provide both training and development work facilities for the visitors from abroad. Such visits could be combined with the yearly leather fair in Paris during September as well as some other international leather conferences in Europe during summer.

7. Dagmar Tannery:

It was felt that a need exists for tanneries to take up initiatives in the improvement of the existing quality of hides and skins, as well as on the marketing of leather which is processed as near as possible to the

finished stage, in order to achieve the best possible returns on the important raw material commodity Ethiopia has in raw hides and skins. Ato Abdulhai, Technical Manager, advised that the existing tanneries do provide salt, for example, to the collectors or pay premium on obtaining more salted raw material than dried, and this has resulted in a considerable improvement in the raw hides and skins in the last few years. It was also felt that more could be achieved on a corporation level in achieving this. It was also stressed that the leather and shoe industry should participate and exhibit in the world market fairs and constantly find suitable ways to advertise abroad where the market exists.

8. General:

a) During the visits, it was felt that considerable work could be done on the proper utilisation of by-products from slaughterhouses, tanneries and the shoe industry. The following could be listed as possible by-products where detailed feasibility studies could be carried out:

- By-products of slaughterhouses;
- Goat and sheep hair;
- Bones, horns and hoofs;
- Glue and Gelatine; *)
- Fats;
- Pharmaceuticals of animal origin, e.g. liver extract, etc.

b) The possibility of more centralized purchases, sales through the corporation for both tanneries and shoe industry could be considered.

c) In addition, the following points were discussed, reviewed and adopted:

i) Today world market situation is very favourable with respect to the Ethiopian export of semi-produced leather and leather products, if technical conditions and marketing problems could be overcome.

ii) The first condition to success in this rare possibility of quick national economy expansion is the will and activity of the Leather

*) please see annex I attached

and the Corporation with respect to its own organizations taking care of the better quality, larger quantity and better technology of collecting skins and hides in its own supply network.

iii) It is felt that a market type study would be necessary in order to establish a programme of production in the existing factories and to achieve a sound basis for further investments, particularly at higher levels of simplification. This marketing study should be conceived on the basis of domestic developments and realistic, diversified forms of export to the world markets. The possibility of close co-operation with established distribution and production companies in Europe Asia and USA should not be neglected.

iv) The possibility of producing shoes in two shifts should be examined, economically analized and quickly introduced in order to satisfy the present growing demand. The co-operation with artisanal and handicraft facilities in shoe production should be sought in order to increase production and employment.

v) The by-products of tanneries should be processed in a centrally located tannery in order to produce new products and better yields from the expensive raw materials.

vi) The start of the new tannery in Mojo should be speeded up as soon as possible, but relevant attention should be paid to the housing facilities of the staff, to train relevant Ethiopians during the introductory period of running the factory by CSSR Staff. At the same time an organization should be set up for the supply of skins and hides to the factory and a common service in the Corporation for marketing and exporting of leather and products lead by a competent leather and a shoe sales manager to be provided by UNIDO.

vii) The Corporation should organize, under its control, a modelling service for the shoe factories and the production of lasts and other inputs. At the same time the Corporation should organise its own marketing service for shoes in order to enable a rational production of shoes in larger series.

viii) A supply of data on new developments, new technologies in shoe production, garment production should be organized and applied if possible in order to keep the steady change of fashions under control.

9. Visits to the Tanneries and Shoe Factories.

a) Darmar Shoe Factory:

Administrative Manager: Mr. Somborac.

The factory has a programme of high quality leather shoe production. The impression at this first visit was positive. Mr. Somborac made the following statements:

i) They have only one modellist who also takes care of the daily dispositions (production planning).

ii) The working discipline is not the best. There are a lot of absenties and late-comers. It is difficult to introduce a bonus system in order to raise incentive and productivity.

iii) The demand of high quality shoes is high but the factory is reluctant to introduce the second shift.

iv) Today's production is 820 pairs of shoes daily. In 1972 it was 899, in 1973 776 and in 1974 888 pairs. Today this corresponds with only 2.6 pairs per employed worker in the production.

v) The authority of foremen is very low.

vi) There are raw materials in storage for one year of production and spare parts and inputs as well.

vii) The factory is not able to export because of its small capacity and high cost of production.

viii) The factory has a growing demand for shoes and they do not need their own sales organization. However, after the visit to this plant, some of the above statements do not seem to be correct because of the following:

- There is no reason whatsoever to avoid production in two shifts. With a good production programme, supervised by a capable production manager, in the present situation the factory

must go into the second shift in order to satisfy the demand. All discussions on the problem of introducing the second shift are of no purpose.

- The factory practices a complete contradiction to its rules of rational industrial planning. Twelve different shoe models are produced. The change of models causes changes in the technological process and in the disposal of operations. Each worker has to change operations and his work twelve times. This is the ideal way to reduce his efficiency. It causes a waste of time and even a waste of materials. It is impossible to supervise the quality and work this way. This painful situation is caused by everyday dispositions by the distribution shops who would like to have its shelves filled again the next day. The shoes are not distributed from a ready-product storage in the factory itself. Questions on these various subjects were answered by the statement that a larger production series would require a greater number of lasts.

- The adjustment problems of the new shoe-making equipment were not resolved. Many of the new machines are not in operation and were replaced by a party of workers who execute that operation by hand.

- The second line of production (moulded rubber shoes) was idle at the time of the visit, because of disposition mistakes and lack of survey.

- The third production line (for 250-300 sewed shoes) did not work at all.

b) Assco Shoe Factory

This is a factory which produces shoes for the army at the moment. The capacity of that line is almost 300/8 hours. The productivity is nearly 100 per cent higher than in the Darmar factory. The factory has a number of equipment idle. There is no technical manager nor modellist. The whole production will cease if the army stops its orders. The manager of the factory is well aware of that problem and would like to get at least two expatriates for the above managerial posts. The waste material of both shoe factories (scrap leather) is not being utilized.

There is no control of raw material yields nor any systematic quality control.

c) Addis Tannery

Technical Manager : Ato Chatchaturian

This is a factory processing hides and skins. The factory is located in the Akaki river valley and is installed in an old building without

any possibilities of the process being successfully surveyed and supervised. The polluted dirty water runs directly into the river.

Despite this, the factory is well managed. The quality of ready-made leather is relatively good and the production is firmly in the hands of the technical manager. He, of course, does not need such quality nor chemical controls. He does not pay too much attention to the problems of better utilization for waste hair (sheep and goats) and other solid wastes (flesh, leather scraps etc.) which could be collected for the production of linings, artificial leather. (Please refer to Annex I of this report).

d) Ethiopian Rubber and Canvas Shoe Factory

The visit to this factory was very impressive. The factory produces different types of canvas shoes with moulded rubber soles. The rubber is produced in the factory itself. The production lines are highly productive. The factory produces shoes on Japanese, German and CSSR equipment. There is no problem in the marketing of these shoes and no other problems could be detected. The supply of raw material, the repair, adjustment and maintenance of equipment, the daily making of dispositions, the control and quantity and even problems of personnel are positively resolved under the valuable and professional management of the factory. There are programmes of expansion (+ 30 per cent) which have every reason to be recommended.

e) Dofan Tannery

This is a tannery mostly processing skins. At this moment they have a market only for pickled skins and not for semi-tanned ones. The tanned skins cannot be sold.

The factory has ceased production, because the former owner (French), who was the only buyer for the blue skins, has rejected further shipments because he wanted that his shares should be paid back after nationalisation. For this and for other skins processed at the new tannery in Mojo the only way to achieve exports of ready-made leather or leather products is a joint venture contract on the basis of co-operation with an established producer or distributor on the European, American or Japanese markets.

f) Conclusions and Proposals

On the basis of the above discussions, the following assistance to be supplied is proposed.

i) Assco and Dorman Shoe Factories

Technical Managers with long and extensive experience in management of shoe production with a good educational background with willingness to train Ethiopian technicians in all kinds of technical management, i.e. elaboration of everyday planning dispositions, adjustments of equipment, organization of quality and quantity control, introduction of bonus systems for different products, production cost analysis, etc.

(ii) Designer - Shoe Modellist

The three shoe factories (incl. Chipolini-Asmara) must obtain skilled and experienced shoe designers in order to improve the quality and the assortment of shoes in Ethiopia and to train young Ethiopian technicians in order to be able to work independently, particularly for export. Duration two years - three experts.

(iii) Tannery Addis Ababa - Addis Ababa and Baldini - Asmara

Fellowships for four young technicians abroad at a six months course in England (ICI) or Germany (BASF).

(iv) Two Tanner Technologist Engineers

Fellowships for a full-time diploma course at one of the following Institutions:

a) National Leather Sellers College - London, U.K.

b) Northampton College of Technology - Northampton, U.K,

c) Reutlingen Tannery School - Federal Republic of Germany

Duration three years - three fellows.

(v) For the old and new tanneries, the following should be provided for the Corporation:

- One Leather Technologist Engineer with wide experience in supervising the work in all tanneries. One Expert - duration two years.

- A Leather and leather products marketing consultant who will analyse co-operation and, if necessary, joint ventures fo for sales and export of leather and leather products overseas.

  One Expert - Duration two years.

vi) The Corporation should obtain an experienced hide and skin consultant able to organize for the Corporation a collective network for hides and skins, supervising the technology of hides and skin conservation (selling and purchasing) and organizing the transport and flow of raw materials to the tanneries continuously in the cheapest and safest manner.
One expert - duration two years.

G. BEVERAGES CORPORATION

In the discussions held with the general manager of the Beverage Corporation and the managment staff of the visited factories the following remarks were conclusive.

1. Raw Materials

Malt and hops for breweries.

The Corporation has already made the first necessary steps to reduce the import of malt. The Corporation has, together with the breweries, contracted the growing of brewery barley with producers in agriculture and finished the construction of the first Ethiopian maltery at the St.George Brewery (Addis Abeba - A.A.).

Taking into consideration the deficiency of malt in the country and the rare opportunity Ethiopia has in being able to grow barley (unique in Africa) one must foresee the urgent need to elaborate on a complex agro-industrial programme for further quick development of this branch. A complex study is required.

Examination for the growing of hops should be suggested to the different relevent research organisations.

a) Grapes and natural wine.

Ethiopia has excellent possibilities to grow grapes. Until now, only smaller private vineyards have been planted. The growing consumption of the artificial wine in Ethiopia and natural wine all over the world shows here another important potential branch of national economy development.

Up-to-date wine grape plantation, growing and harvesting are integrated processes which are difficult to separate. It is, therefore, a must for the Corporation to take over the task to organize agro-industrial complexes for modern wine production. After relevant studies of locations, corresponding varieties and relevant cultivation, a feasibility study would be necessary to analyse markets, specify the investments and calculate all other necessary inputs in order to achieve realistic economic approach which can result in decisions.

b) Bottles.

The most deficient input at the moment in Ethiopia, particularly in the region of A.A. are bottles. Taking into account that the growing production of soft drinks, mineral water, beer, wine, will be distributed over longer and longer distances - one must conclude that bottles will become even more scarce. The time period of return will grow in geometrical proportion with the distance. In the new territories bottles will be used for other purposes as well. Possible suggestions would be that the Corporation should take over the A.A. bottle factory, which is conditional in order to ensure further development of the factories.

c) Fruits

At the moment the Corporation does not produce fruit juices. It seems that already now the citrus fruits spontaneously grown, could be used as a good raw material for citrus juices.

It would be necessary to locate and specify a citrus fruit concentration plant by a feasibility study. The concentrate could be diluted and bottled in the existing soft drink plants.

2. Management

It seems that the administrative, financial and commercial management personnel corresponds to the present task.

It is felt that technical staff is lacking. There are no domestic brew-master superintendants. There is a lack of qualified industrial wine technologists (engineers), and a lack of biotechnologists able to organise the selection, propagation of different microbiological cultures and materials, to control sanitation and to educate sanitation personnel for the steady service in the plants.

3. Maintenance and repair.

The visited repair and maintenance shop in St.George Brewery indicates a good level of repair and maintenance management. It is felt that a highly experienced bottling plant maintenance superintendant, should be provided (expatriate) that is able to bring the present bottling plants to their nominal capacity and to organize the repair and maintenance of this particularly sensitive up-to-date equipment.

4. Programme

There is no doubt that the programme and capacities of todays beverage plants should be expanded in order to reduce imports.

a) Alcohol and alcoholic beverages.

There is no reason that part of todays 40.000t molasses production, could be used for the production of ethyl-alcohol for beverages.

In the same plant it will be possible to produce wine, brandy, rum, gin, whisky, different apperitives, bitters, liquours, etc. which would not only reduce imports but increase tax revenue to the State as well.

b) Fruit juices.

There is no doubt that a feasibility study for the production of fruit juice concentrate should be elaborated on as soon as possible. The idea is to produce a syrup which could be bottled in all soft drink plants in the form of citrus squash, lemon soda, grape fruit juice, orange juice, etc. It is true that the citrus fruits are not grown in plantations nor was the fruit selected for less adherent albedo for consumption purposes. Nevertheless, the fruits are juicy enough and after size-grading, the production of juice from this could be made with quite good yields. The production of fruit concentrate could be an incentive for further development of fruit growing and even diversification of that interesting agricultural production. There is a large demand on European and East-European markets for good quality juice concentrates.

There would be a need to elaborate on a feasibility study for the first fruit juice processing plant in Ethiopia.

c) Sanitation

Todays food and beverage industry has developed high level sanitation techniques. The sanitary and hygienic pre-requisites in food and beverage industries have not only resulted in healthy and appetising products but do prevent development of non-desirable micro-organisms which reduce the quality of the product. Sanitary conditions do enable pasteurizing of milk, beer and fruit juices to have a far longer shelf-life. Sanitary conditions can highly reduce the danger of non desirable fermentation in wine cellars, beer fermentation tanks, beer ripening containers and can prevent the quick loss of clarity of bottled beer, bottled soft drinks and bottled wine.

As already mentioned above, the latest development in sanitary technique uses new very efficient equipment and very efficient chemical inputs in order to ensure good results.

Sanitation has to be systematically applied in each food or beverage plant by a specialized team who have this task exclusively as their main job.

The sanitation programme must be planned and controlled by a high quality biotechnologist who will systematically investigate the sanitary condition of floors, walls, equipment, raw materials, packaging materials in the storages and in the processing facilities.

It would be recommended to use the services of a highly qualified biotechnologist with good experience in sanitation techniques to organise a sanitation technique course for technicians and who would, for the main enterprises, develop the sanitation programmes and organise their execution and control.

d) Mineral waters.

It is felt that the development of mineral water recovery, bottling, distribution and export could become one more of the interesting fields of activity executed by the Corporation of the beverage industries.

The high quality of "Ambo" and "Babile" mineral water is highly appreciated by domestic and expatriate customers. Ethiopia, thanks to certain areas of volcanic origin, is rich in mineral water wells which hitherto have not been exploited. Africa on the other hand could become

together with the Middle East, a very interesting export market for the distribution of high quality mineral water and particularly for mineral water mixtures and low caloric drinks imported from Europe in large quantities.

The weight and the way to success in this branch of the beverage industry is not so much concentrated on production problems. The organisation of distribution, investment in transport and storage facilities, the rational promotion of the product's advantages are the predominant solutions for success. It would be recommendable to provide the Corporation with a highly qualified advisor on recovery and distribution of mineral waters, who would be able to carry out a feasibility study based on some marketing prospects in the country and abroad. On the basis of this feasibility study, further steps and a policy of development could be conceived and decided upon.

It seems that the most appropriate assistance on the above described problems could be provided through the Corporation for the beverage industry in order to orientate the Corporation already at the beginning, to become not only a planning co-operation and controlling board of the factories but also a partner who will provide assistance in the production and expansion of its factories, as its equally levelled partner.

5. Visits to some beverage industry plants.

a) St.George's Brewery - Addis Ababa.

It was noted at this factory that a responsible and knowledgeable management exists and takes care not only to offer a good first impression, and indeed, it is a food processing plant which should be used as an example in many other factories of this type.

i) Raw material

Basic raw materials which come into consideration for beer production are barley, malt, water and hops. The lack of, and high price of imported malt, has caused in many African countries, other materials than the above to be used in beer production. Large quantities of sugar (which is in Ethiopia relatively cheap) are used in addition to malt,

also in this brewery. This fact, of course, does not contribute much to the good quality of the beer but is financially convenient. The beer of St. George's brewery is therefore a little "empty", does not have the right structure of foam due to bottling problems, etc.

The factory has to be praised because of its incentive to start with its own production of malt. The newly established malt plant within the factory has a capacity of 30-40,000 t of barley processing. If one would take into consideration the fast growing market, the expansion of that brewery (from its 100,000 to 300,000 hl/year) then the capacity of the malt production would just satisfy the needs of that brewery not leaving any quantity for other breweries.

Todays overall capacity of beer production in Ethiopia goes up to 500-600,000 hl/year. It is supposed that the production of beer and the consumption will reach in the next five years at least 1,000,000 hl/ year. In this case malt production in an up-to-date continuous maltery with a capacity near to 150-200,000 t would be already viable. It is recommended to start as soon as possible, on the basis of the achieved good results with brewery barley plantations, on the elaboration of the feasibility study for that malt plant which should be located in the centre of barley cultivation area and should become the first step of possible malt export to the Middle East and all of Africa.

At the same time, the need to avoid the very old fashioned and antiquated malt producing technique applied in the recently installed St George's maltery should be emphasised. The import of malt to Ethiopia goes up to a value of Eb 2,000,000 a year.

ii) Management

As mentioned before, the excellent management of the brewery is visible all around. The only problem that exists is the possible lack of some personnel in the near future. The present Belgian technical manager does not have an adequate Ethiopian replacement. The brewery works at full capacity. Therefore three brew masters and a full time brewing engineer would be very welcome. In order to ensure the steady control of quality a microbiologist would be required who would also take care of the

of the propagation of the proper strain of the brewery yeast, but this can be done also on the level of the corporation.

iii) Bottling

The bottling plant is one of the "bottle-necks" in the brewery. The capacity of the bottling line should theoretically be 14,000 bottles per hour. Present production goes at the rate of 7-8,000 bottles an hour because of the foam and because of the lack of full knowledge in and adjustments of the already worn out bottling machinery. The process in the brewery is otherwise up-to-date. The worth is separated from the exhausted malt and hops in a separator after the boiling kettle. The worth is cooled down and cleared by a centrifugal mud separator before fermentation. The fermentation is still executed in open vats but under a controlled temperature. After fermentation, beer is centrifuged in a separator and made clear in a filter press, before being transferred into the ripening tanks. From here the beer goes to the bottling plant again through adequate clearing facilities.

It is interesting to note that the bottles can be 9-10 times returned to the factory before breakage. This good result is due to the fact that the distribution of St. George's beer was, up until now, only a local one. Later on when the average distance of distribution will be increased, it is expected that the per cent of breakage (or non return) will quickly grow as well as the average time of the bottles' return.

iv) Water control.

Water, the most important input in beer production, is not systematically controlled at the St. George's brewery. They send it from time to time to the Pasteur Institute, Addis Ababa, for analysis. The control of the grade of beer pasteurisation is not applied either.

b) Harris - Wine Plant.

General manager: Ato Musa Yassin, Ato Nasser T.M.
Technical adviser: Mr. Alipresndi

The industrial production of "wine" in Ethiopia is more an "art" than what is normally understood as wine production technology. The visit to "Sarris" gave the impression that one should, as soon as possible, stop the present production of artificial wine to undertake all the necessary efforts to make wine the greatest potentials for fast economic development in Ethiopia. It is, of course, clear that this cannot happen overnight. Nevertheless, the first steps should be started as soon as possible in a complex study of a highly mechanized up-to-date agro-industrial wine production which would, due to the growing demand for wine in many African countries offer big chances of becoming the largest supplier. The situation of the present world market is very convenient for such a development. The production of artificial wine should contribute to financing the above orientation.

The present wine is produced from some imported raisins and with more sugar which is fermented in a very primitive way with wine yeast, imported from time to time from Italy. The taste of this "wine" is relatively good but cannot be compared to the real wine taste.

i) Bottling and sanitation.

The lack of bottles is bitterly felt in this "industry". Being created by Italians, this "wine" was and is still distributed in "Chianti" bottles with a straw lining. The returned wine bottles are washed only on the inner side in this factory but in such a way that wetting of the straw cover is avoided.

This "sanitory" cleaning process should not be tolerated further. There is no reason now, when the "wine" production is under survey and supervision of the Government, that these "Chianti" bottles be further used until the production of bottles with new straw is ensured. Meanwhile wine could be distributed in normal bottles. However, the largest proportion of the produced wine is already bottled this way.

ii) Diversification of programme.

There is no reason why a diversification of alcoholic beverage production should not be started right away in order to reduce

the massive import of: whisky, gin, sweet liqueurs, bitters, brandy, anis, vermouths, dessert wines, champagne, different "grappas", etc.

At present nobody in Sarris is acquainted with this production despite its relatively simple processes, simple equipment and low investment costs. There already exists in Ethiopia a rather small production of ethyl alcohol. The large quantity of blackstrap molasses is a welcome raw material for ethyl alcohol and for most of the above alcoholic beverages.

It would be recommended to hire an experienced bio-engineer with extensive experience in the production of ethyl alcohol and alcoholic beverages, who would, in a matter of weeks, be able to introduce the production of these products.

iii) Marketing

The demand of wine (and the price) grows from day to day. There is also no problem for marketing better wine of better quality. Also the factory has taken over the other non-private wine producing plant "Makanissa" which is in a bad state. Despite the increased capacity, both plants cannot satisfy the domestic market demand.

The management of the plant is aware of the above marketing possibilities and has therefore a strong desire to expand its capacities. This effort should be primarily oriented towards starting a well planned complex agro-industry instead of increasing the capacities of the present artificial "wine" making.

c) Saba Tej Factory

The above factory is really composed of three different production facilities located at the same location. Out of "Canada dry" soft drink production, there is a Tej factory based on the fermentation of diluted honey with a specially selected yeast (cerevisiae ovalis). Tej produced pure honey would be, of course, too expensive and therefore a good portion of honey is replaced by sugar produced in the country. The third department is again an artificial wine

production more or less the same as described above with a little improved sanitation but again with the straw "Chianti" bottles.

i) Canad Dry

This is the smallest soft drink producer, in comparison to Coca-Cola or Pepsi-Cola who are also active in the market.

It is a plant which despite the old bottling plant was very well equipped by its multinational mother company. The water treatment, with active carbon and chlorination, is kept under control by a well equipped and instrumented laboratory.

ii) Tel Plan

Again a first class equipped and managed plant with use of quality controlled water and a well equipped biological laboratory to select and propagate yeasts, to control the fermentation and to provide a sanitation programme which fully satisfies all possible standards.

iii) Wine Production

The technical manager of this plant (the expropriator) is not going to remain in further service. His attitude is excellent and he is trying to educate a successor for his duties. Training and fellowships for young technicians should be recommended to become acquainted with the basic "know-how" in enological technology.

At least 6 experts for 6 months.

6. Conclusion and recommendations.

The Corporation of the beverage industry has the possibility of starting some developments for Ethiopia's economy which could create a real potential for quick results. Convenient climatic and soil conditions of the country for wine grapes, barley, possibly hops production as well as the existence of mineral water resources could contribute to this expansion. On the other hand the Corporation's present financial results and activity provide a basis for further investments which would, if professionally conceived and

materialised bring fast results in the growth of this sector of industry. For this quick growth the Corporation should be provided with:

a) A consultant for the elaboration of a feasibility study for the development of a large agro-industrial complex for malt production on the basis of good market analysis.

b) A consultant who would be able in close co-operation with the Ethiopian Agricultural Institute to identify localities for hops production, for the selection of adequate varieties and for the elaboration of a feasibility study for the extraction plant. Today, the hops are very often extracted and the extract is used in industry and exported.

c) A biotechnologist with extensive experience in sanitation techniques who would be able to organize a course for sanitation technicians for the beverage and food industries to elaborate on sanitation programmes for each factory and to control the execution of these programmes.

1 expert - duration 2 years

d) A fruit juice processing adviser with extensive experience in citrus juice processing, who would elaborate on a feasibility study (in close co-operation with the Ministry of Agriculture) for processing oranges, grape fruits, lemons and mandarins into citrus juice concentrate with utilization of by-products for essential oils, pectin, animal feedstuffs, vitamin E concentrate, pro vitamin A concentrate, segments, squashes, etc.

1 expert - duration 3 months

e) Repair and maintenance.

It is recommended to attach to the Corporation a very special consultant for repair and maintenance, who is a mechanical engineer with extensive experience in the construction of washing, bottling, closing and pasteurizing equipment and repair and maintenance of such.

1 expert - duration 3 years

f) Mineral water.

It is recommended to attach to the Corporation a mineral water consultant (geologist engineer) with a special and extensive experience in the recovery of mineral water resources and erection of mineral bottling plant facilities - who would, in close co-operation with the Ethiopian Pasteur Institute and relevant organizations, elaborate on a programme for further expansion of mineral water production and distribution within and outside of Ethiopia.

1 expert - duration 1 year

g) Bee technologist.

For the quick expansion of bee-culture and honey production, a bee-technologist should be provided to the Corporation, who is able to introduce the new bee-cultivation techniques in Ethiopia, the production of necessary inputs, honey separators and who has also extensive experience in the organization of courses, demonstrations of the new techniques and in establishing honey supply networks with adequate transport facilities.

1 expert - duration 1 year

h) Fellowships and training.

It would be necessary to provide training for: brew master, brewery engineers, malt masters, malt production engineers, enologists and fermentation superintendents, for bottling repair and maintenance technicians, for sanitation technicians in the country and abroad.

25 fellows - duration 1 year each

H. COARSE FIBRES CORPORATION.

1. Fibre Corporation of Ethiopia.

General Manager: Ato Habtemarkos Mako

Technical Manager: S.G.C.McVea

Manager of Ethiopian Fibre Factory: Ato Kassa Gashaw Bessa

The Fibre Corporation of Ethiopia consists of two factories producing bags, sacks and packaging woven materials for the use in agriculture.

a) **Raw Materials.**

At the moment the factories are using imported kenaf from Thailand; sisal grown in Ethiopia and musa (a kind of manilla hemp) from southern parts of the country which is a by-product of a food supplying (starchy) plant.

i) **Musa** does not have much future in industry for the reason that it is a by-product and can only be harvested 6-7 years after plantation and is planted only locally for food purposes. Except for its fair quality this raw material does not have the right characteristics of an industrial crop.

ii) **Sisal** is of great interest to Ethiopia and for the Fibre Corporation. The last 2-3 years the coarse fibre production has a substantive drive all over the world. The polyethylene and polypropylene bag (sacks) competition, really does not exist any more. The increased price of oil has made further production of many low-priced products impossible. A good market for coarse fibres will, therefore, most probably be a lasting one.

iii) **Sisal** is an industrial plant which is very simple and can be planted also on soils (dry and poor) where no other industrial plant would grow successfully. Ethiopia has a large area of these soils and should, therefore, try its best to develop sisal processing. For this purpose a special technique should be used which is similar, but not identical in comparison to other kinds of raw materials.

iv) **Kenaf** is for the moment imported but there is no reason to doubt possible successful kenaf cultivation in Ethiopia as well.

Cultivation of Kenaf would not only be one of the materials to prevent further growth of imports but would at the same time be a hard currency earner with a growing market all over the world.

The areas of Kenaf cultivation in Ethiopia should be identified in close co-operation with the Ministry of Agriculture and its relevant services.

v) **Flax and Lin-Fibre:** Ethiopia produces a large amount of linseeds which are only partly processed in the country for linseed oil. The biggest part is exported.

Flax and lin have a wide demand on the world market as well. If this is extended to linseed production there must be also opportunities to grow the combined variety for both seeds and fibre as in many European countries, for example F.R.G., G.D.R., CSSR, Poland, Romania, Yugoslavia, etc.

It would be of interest to ascertain this capacity, by a feasibility study in co-operation with the Ethiopian Agricultural Institute.

Both plants have a capacity of about 17.000 tons of Kenaf processing. One of them is equipped also for sisal and musa processing, but is not specially equipped for these kinds of raw materials which are quite visible with respect to the poor performance of these two fibres.

b) Repair and Maintenance:

Despite efforts, particularly in the Addis Ababa plant, a lack of repair and maintenance facilities and inefficiencies were noticeable. In one factory a group of weaving looms are completely out of production. It is obvious that some of their components have been used as spare parts for the other looms which are still in operation.

It is necessary to strongly recommend the hiring of a maintenance engineer for both plants with extensive experience in the repair and maintenance of textile machinery, who will organize in close co-operation with the corporation for textile industries, the maintenance systems and repair activity for the coarse fibre industry. It will also be necessary to educate maintenance technicians and superintendents by sending them to a well managed factory abroad.

3 experts - 5 months duration each

c) Technology of Production (Productivity).

It seems that no major problems in the processing technology of kenaf exist. This is not the case with the mixed fibre production. It is obvious that the present technical manager being an excellent equipment producer, does not have the necessary experience in mixed fibre production and particularly not in sisal blending, carding, spinning and weaving.

It is obvious that present low productivity - as observed during the visit - should not be further tolerated.

The spinning department in the first factory, having only a blend of short fibres, produces at a rate of 20 - 25 per cent utilization of the installed capacity. It is obvious that the whole carding department has to work at the same very low capacity.

The low productivity and low quality of loom department production was also observed. Approximately 2 workers are serving one weaving machine which is no doubt too much in this branch of the textile industry.

The reason for this is not only the low level of discipline but mainly in the lack of technological know-how in this subject matter.

The question was raised of why a mixture of longer fibres (kenaf) for the blend in this case, was not applied and was answered by the assurance that this was "tried" without success.

d) Conclusion and Proposals.

Despite the minor importance and size of both plants, the coarse fibre processing is for the Ethiopian economy of great importance.

It is possible to develop, on the basis of domestic agricultural development, fast expansion particularly in sisal and possibly in kenaf flax fibre production and of its export. This chance should be provided by imminent energetic, far-sighted assistance both in improving the present low productivity and capacity and studying the possibility of quick, rational movements in this branch with an expected bright future.

It is proposed:

i) to elaborate on a complex agro-industrial feasibility study for the further development of sisal growing connected to the establishment of an initial plant for sisal processing and with a network of decortication plants at the localities of the sisal plantations.

1 sisal processing expert - 6 months duration

ii) to elaborate on a complex kenaf production and processing agro-industrial feasibility study for further expansion in this field.

For this purpose a Kenaf growing and processing consultant

should be attached to the Coarse Fibre Corporation.

1 expert - 2 years' duration

iii) Elaboration, in close contact with the agricultural institute of Ethiopia, on a feasibility study on market prospectives, possible location of flax production for both fibre and seeds. The expert should be attached to the Corporation.

1 expert - 1 year duration

iv) Coarse Fibre Technologist:

A coarse fibre textile engineer, with extensive experience in kenaf and particularly sisal processing should take over the duty of the technical manager (or adviser) to the Corporation to study the necessary re-arrangement of equipment in both factories, to train technologist technicians and to improve productivity, avoiding present "bottle-necks", improving quality and economy of production.

1 expert - 3 years.

v) Repair and maintenance adviser.

A mechanical engineer with extensive experience in coarse fibre equipment, maintenance and repair. His duties would be to organize the specification, production and purchase of spare parts and utensils, to train repair and maintenance technicians and to introduce in both factories, a maintenance programme controlling its execution.

1 expert - 2 years' duration

vi) Training, fellowships.

It would be necessary to provide training and fellowships for a larger number of technicians in order to obtain a better insight and "know-how" on maintenance, technology, productivity, work-post classification, coarse fibre blending, carding, spinning and weaving techniques.

20 personnel - duration - 6 months each

vii) General managers should have the possibility of visiting Thailand's up-to-date kenaf plantations and processing plants in order to obtain a right insight into their duties.

2 personnel - Duration 2 months each

1. TEXTILE INDUSTRIES CORPORATION

The general manager and his assistant kindly received the visit to the facilities of the Corporation. It was advised that the Corporation was recently established and is still in the process of organisation. Up to now the management sees its duties in three main directions, i.e. industrial policy definitions and planning, in co-ordination of the factories' work and activities, and in control of the achieved results.

1. Policy and Planning.

The definition of textile industrial policy and planning consists in the selective and systematic analysis of domestic and foreign market trends and adaption of the textile industry to satisfy the demands of these markets by planning production for at least the next five years. This planning is comprised of the organization of raw materials, supply, financing, technical expansion, diversification of the programme and planning of personnel.

2. Co-ordination.

Co-ordination of the factory's work consists of exchange of experience, co-ordination of common services, common expansion programmes, access to marketing in personnel training programmes, spare parts production, purchase and storage, agreement on product specialization, classification of working conditions, on payment and salaries, standards and control of quality and many other activities. For that co-ordination activity, planning and for control or special engineering, a consulting organization should be established.

3. Control.

The main control activity which the Corporation should execute is in the form of evidence on satisfactory results with respect to long range and short range production programmes and on the execution of co-ordinational activities, if once agreed upon. Financial control, bookkeeping control, storage control and different other beaurocratic control activities should be left with the Ministry or other relevant bodies.

The crash programme at this present moment consists of the replenishing of personnel.

4. Management.

In the Ethio-Japanese Textile Company the whole production depends on the presence of the Japanese management staff. It is to regret that this staff will probably leave soon and that a replacement at present would not be advisable. On the other hand the Japanese have not left any written evidence of their management programmes, customers, specifications nor any kind of written technical instructions. No Ethiopian foremen, superintendents or shift leaders were trained or educated. In other factories a similar thing happened with the Indians and Italians.

The first task of the Corporation should, therefore, be to find, create, educate, train in the shortest time foremen, production assistants, maintenance group leaders, production technicians, department managers, quality controllers, laboratory technicians, etc. Over a longer period a programme for highly qualified textile engineers should be envisaged.

The Corporation is also aware of its duties with respect to the supply of graded high quality raw materials, utensils and other inputs necessary for the expanded assortment and quantity of production.

With respect to the programme as described before by the Corporation, the following observations were made on the basis of three short visits to textile industry in Ethiopia. These observations are herewith presented.

a) In many successful multinational corporations, the corporation is not a becurocratic higher-level planning, co-ordinating and controlling body or board, but is the partner organisation to which the equally-levelled partners offer to execute common services and which would be able to help each activity of the now united companies to put forward such objective proposals which will result in decisions of optimum value for the common goal.

b) The Corporation thus must be organised as a consulting and advisory body, having the commercial, financial and technical "know-how" necessary to elaborate on proposals, programmes, controlling schemes, standards, expansion, financial and marketing programmes of evident and manifested optimum for all interested parties.

For the execution of such activity the Corporation must be commercially minded and start to sell its "brainwork" to its partners in order to be adequately appreciated and paid with the purpose of accumulating again and again more and more experience which will be on service to the partner companies. This approach will enable training programmes for education of personnel, purchase of necessary instruments and equipment for common services; hiring of expatriate personnel with special knowledge and experience, and will exclude from service in the Corporation, personnel who are unable to sell the results of their intellectual efforts.

5. Expansion

The Corporation of textile industries should particularly take care of the present pressure on expansion trends stressed by the factories which are pressed by growing demands. The growing demand can be rationally met in two different ways.

a) Through re-arrangements and specialization of the present textile industry with the aim of eliminating "bottle-necks" and using the best appropriate equipment for a certain narrow programme of production.

b) By purchase and installation of additional new equipment selected according to the best requirements of the planned programme and in line with highest savings in investment and appreciation through high productivity, easy training of personnel, low cost of spare parts, low inputs of energy and low repair and maintenance costs. Here the achieved high quality of production plays a major role too.

In order to implement this step-wise expansion of the nationalized textile industry a feasibility study, in close co-operation with the relevant factories, should be elaborated on as soon as possible in order to prevent investments by individual factories which will not contribute adequately to the further economic development.

6. Raw Materials.

One of the most important duties of the Company should be the supply of raw materials and other inputs necessary for rational and high quality production.

The present world market situation is very challenging for Ethiopia's cotton growing potentials. Until now, the cotton growing was, with intent, separated from its further processing. The demand of cotton which will be a lasting one, could ensure for Ethiopia a steady flow of hard currency if the textile industry will be given the duty of increasing the added value of the exported cotton by processing to yarn (at least) and to textile fabrics. This will be very difficult if the textile industry will not take the initiative in its hands. Until cotton growing, ginning and marketing is in the hands of expatriates there will be a tendency to export cotton as such.

7. Cotton

The Corporation of textile industries should be aware of the need to start a cotton policy of its own. The first step to this should be the participation in establishing new agro-industrial cotton growing estates sending Addis Ababas' ginneries to the field where they will be far better located with respect to transport and cotton grading.

The second step should be the elaboration of Ethiopian standards for cotton grading which would correspond to the standards governing the export markets and to elaborate on the best (optimum) kind of blendings for different products, produced for domestic purposes and yarn for export production. For this purpose the Corporation should be supplied with relevant technical support and advice. The Corporation will herewith speed up not only cotton growing and increase export, but heavily contribute to the feaster political and economic development of the farmers, their co-operatives and the whole structure of life in the land.

8. Utensils and other Inputs.

Hitherto, the larger part of different utensils (tubes, spindle tapes, shuttles, etc.) and the other inputs of the textile industry were imported into the country. Previously the production for one factory was not even taken into consideration. Now, when the needs of the united textile industry have increased, one should pay particular attention to the possibility of reducing the imports by production of different articles, eventually also for export purposes to the nearby African countries.

9. Spareparts Production and Storage.

There is no reason why common production of different spare parts could not be taken into consideration in one of the best repair and maintenance shops. There are hundreds and thousands of cog-wheels, ball gear bearings, spindle heads and other materials which can now be produced in a rational series by the equipment which would not be feasible for one factory alone.

There is no reason why a common storage of spare parts (ball bearings, spindles, etc.) could not be organized in order to obtain all the advantages of better discount purchases and of less capital investment into these inputs.

10. Follow-up and Modern Technology.

The textile industry has undergone recently a terrific development in its basic techniques by the introduction of artificial and "man-made" fibres and new chemical products which have brought a complete change in some processes of textile technology. New dyes, new printing techniques, new stretching and drying equipment and processes were introduced into the finishing processes. Recently also some basic traditional textile processes entered into a new phase of better efficiency and productivity.

Open-end spinning techniques and shuttleless weaving looms after only 3-4 years have conquered the field of new investments in the industrialized countries.

It is a must for the Corporation to be able to select equipment for the further expansion of the Ethiopian textile industry on the basis of economic, technical and sociological criteria which should be essential for optimum achievements.

II. Control Laboratory.

It is necessary to attach to the Corporation a textile control and research laboratory in order to:

a) control the imported textile raw materials and other inputs;
b) control the goods for export and the achievement of proclaimed standards;

c) elaborate new common quality standards;

d) recommend standard laboratory methods for analysis of textile goods;

e) follow-up specification and addresses and qualities of different dyes and other inputs producers;

f) help the introduction of quality control methods, instruments and systems into textile factories;

g) install a blending service by investigating different sources and qualities of synthetic and artificial fibres, different blends with cotton for different articles and by this giving information to the industry the most convenient blends (both technically and economically) for their uses.

12. Visits to Factories.

a) Diabaco Cotton Company Ltd.

General Manager:	Cap. Girma Deneke
Ass. Manager:	Ato Tarekegn Sabamo
Technical Manager:	Mr. Denis Chrisicos

The factory concentrates exclusively on yarn production. The discussion with the management has revealed again the growing demand for all kind of yarns on the home market. The imbalance in yarn against weaving is characteristic for the Ethiopian textile industry.

The problems were enumerated by the management as follows:

i) There are problems with raw cotton with respect to grading.

ii) It is not easy to grade the cotton in the factory after ginning.

iii) The gimneries are far higher in capacity than the needs of the factory. They would agree that this process should be left to the cotton growers in the field.

iv) Their own workshop cannot cope with more sophisticated repair and maintenance work.

v) The factory has a lot of problems because of the sinking ground.

vi) There are some "bottle-necks" and also some excessive capacities but the utilisation of the "bottle-neck" (spindles) reaches 82 per cent which is very satisfactory.

vii) There is a lot of dust and fibres in the air.
It is impossible to control humidity.

viii) The factory has to be expanded. A new building is already under roof. The technical manager, Mr. Carrasco has visited different European countries and companies and has already made his choice of equipment and the supplier.

ix) There is a complete system of quality control in the factory ending in a well equipped laboratory.

x) There are some problems in the dying and finishing department.

Some remarks upon quickly visiting the plant are as follows:

- The ginners are really of a size which cannot be utilized under the new circumstances.
The ex-owner used this equipment for his cotton business apart from the factory. The best way to use their equipment would be to transfer it to a state farm specialised for cotton.
- The quality control could be applied and was once, but now there is a lack of adequate skilled manpower and even skilled supervision of that service.
- The sinking ground of the factory was not taken into account when a new production building was erected.
- It was not possible to locate the existance of a general project for the new expansion which would give the complete solution to the programme, specification of equipment, supply of energy project for air conditioning etc. It is supposed that the idea was that all this can be done afterwards. This is, of course, opposite to the normal flow of events and could be a source of far higher investment costs than are necessary.
- It is necessary as soon as possible to bring the programme and further expansion planning in close line with the planning of production and expansion of other factories.
- It is necessary to think about a common yarn dying facility instead of increasing these facilities in each factory.

- It would be necessary to strengthen the technical management at all levels in this factory because present diversified responsibilities are too much to be dealt with at one level.
- It would be a good idea to inspect the already erected building with respect to its static.

b) Visit to Lazaridis Cotton Factory.

General Manager: Lt. Girma Haile Selassie
Assistant Manager: Dimitrios Petratos

This factory produces cotton yarn and cotton fabrics in addition to blankets.

The discussion with the General Manager and his staff has revealed the following:

i) Ginneries.
They do not see the need to transfer the ginning equipment to the cotton growing areas. The advantages of this will be negligible.

ii) Co-operation with agriculture.
The factory has already good co-operation with agriculture and would continue to proceed this way. The factory should help the development of cotton growing in all respects by better selected cotton seeds, advanced contracts, advanced payments, etc. but not to go into cotton production on its own.

iii) The factory does not have any problems with cotton grading but there are problems with cotton storage in the field.

iv) There are problems with cotton pests. It would be necessary to start a systematic supply of pesticides and organise the fight against the pests and the degeneration of cotton;

v) They agree that valuable standards for cotton grades should be agreed upon and proclaimed as law. A well represented cotton board within the textile industry should be created.

vi) The biggest problem is the lack of personnel particularly in dyeing and finishing operations. Up to 60 per cent waste material occurs sometimes.

vii) The factory handles quite well the repair and maintenance for the normal work. For more sophisticated work a common service would be desirable.

viii) The utilization of the built-in "bottleneck" capacity (spindles) is very high and goes up to 95 per cent.

ix) Expansion is necessary particularly because of deficient yarn production. The general manager has extensively visited Europe, (CSSR, Italy, etc.) and has become acquainted with the up-to-date techniques and has already partly made his choice of the equipment supplier.

Remarks:

- It is thought that a massive enrichment of the technical managerial staff is necessary. The best way to accomplish this would be to hire a competent adviser. The present consultant, Mr. Belvis (Belgian) is not permanent in the factory and intends to leave the country.
- In addition to technical advisers a number of fellowships should be provided of all levels, foremen and technicians in carding, spinning, weaving and dyeing and finishing operations.
- The further expansion should go in line with the above mentioned general project of textile factory expansion. A final choice of an equipment supplier should be the result of the study.
- The dyeing and finishing department should obtain assistance from another factory (Indo-Ethiopian Textile Corporation Ltd.) in order to reduce the losses and improve the quality of products.

c. Indo-Ethiopian Textile Factory:

General Manager: Ato Hagos Tsehay

This is a large textile company with more than 4000 on its staff.

i) Raw materials.

The main raw material is 95 per cent cotton exclusively supplied by Ethiopian agriculture. There are no major problems other than the price. The factory expects to know the price of the new cotton crop in time in order to be able to calculate its own price for sales.

This factory imports viscose (from Japan) and there is a purchasing problem which should be solved by the Corporation. It is the identical problem as with the import of acrylic fibres from Japan.

There is no comparative bid or proposal. There are no controls, if the price of the traditional supplier is not higher than his competitors in Europe, U.S.A. or elsewhere. A purchasing service for all other factories should be established at the Corporation.

ii) Management.

There is a need for a competent technical manager for this factory for at least three years to stay until the young technical managers attached to him will be able to take over.

There is further a need for textile engineers technologists specialized in spinning, weaving, dyeing and finishing operations who will take over the job of the expatriates who may leave sometime.

iii) Control of quality.

There is quality control in the factory, but it is felt that there is a lack of systematic quality control based on the internal standards for different semi and finished products. It would be necessary to elaborate on such a study for the factory and its production programme.

iv) Payment system.

This large factory does not have an elaborate classification system which would spell out for every working post the nature, quantity and value of work to be produced and of the basic salary which should be paid.

This is the reason for the lack of satisfaction and feeling of uneasiness among the workers and makes it impossible to start a bonus system without which a serious incentive in textile industry could not be achieved.

A consultant to elaborate on this general classification that is valid for the whole textile industry should be provided as soon as possible.

v) Knitting.

Despite the fact that this factory has a knitting department in Khaliti no special planning of this sector development was hitherto taken into consideration.

It is indeed interesting that the knitting industry which is well known as labor intensive, was not particularly developed in Ethiopia. It is true that one can find a number of artisanal, private, small knitting enterprises, and that enough yarn is sold in markets for hand-knitting purposes. On the other hand a lot of imported knitwear can be seen in the markets.

It is recommended to investigate particularly on the viability of fast development of the nationalized textile industry in this direction.

13. Conclusions and Proposals.

a) The textile industry of Ethiopia should be expanded further in order to make possible export of native cotton in the form of yarn and finalised fabrics.

b) The textile industry should, therefore, be given relevant priority in technical assistance and help to organize its Corporation as an independent partner of the factories, linking together all possible common services which will be the best guaranteed for fast and rational development.

c) Largest assistance should be quickly provided to the factory:

i) by better co-operation and interchange of "know-how" and experts;

ii) by financing expatriate experts by themselves and sending young and talented technicians and engineers for training overseas.

iii) by provision of UN and bilateral assistance in the choice of adequate personnel from overseas.

d) A marketing and planning long range study should be elaborated on for the development of the textile industry in order to establish policies and the main pressure points for its execution.

1 engineering company $ 80.000

e) The Corporation should be provided with a technical and economic adviser with extensive experience who would be able and willing to help the organisation of the Corporation as a business minded engineering consultant described as above.

1 expert - 2 years' duration

f) An immediate techno-economic expansion feasibility study should be elaborated on as described above, in order to specialise the factories and to make a final choice of equipment.

1 expert - 6 months' duration

g) Cotton.

A cotton growing and pre-processing consultant should be provided to elaborate on a programme of participation of the textile industry in the development of cotton growing and pre-processing and for the elaboration of cotton grade standards for Ethiopia.

1 expert - 8 months' duration

h) A textile quality control consultant should be provided to organise the laboratory at the Corporation, the control of imported and exported goods, to set up relevant quality control services in the factories and to train qualified staff for these services and install a blending service as above.

1 expert - 2 years' duration

i) It would be necessary to provide:

- 3 technical managers

for Diabaco, Indo-Ethiopian and the Lasaridis Company.

- 1 dyeing and finishing expert

  attached to the Corporation for all factories.

  1 expert - 3 years' duration

- 1 post classification expert

  attached to the Corporation

  1 expert - 1 year's duration

- 50 fellowships for training abroad in different fields of textile operations.

  50 fellows - 6 months' duration

ANNEX I

A. MANUFACTURE OF GLUE AND GELATINE

1. Introduction

Tanneries' solid wastes are a major problem in disposing of and the cost added towards this is contributed to the production of leather. [illegible] alone will have to transport a total of about 5 tons of solid waste everyday in the form of:

- Raw trimmings
- Fleshings
- Lime trimmings
- Chrome trimmings
- Shavings
- Buffing dust
- Hair

etc...

The trimmings and cuttings of raw hides and skins as well as from limed stock form a raw material for the manufacture of gelatine and glue.

If [illegible] combined with four other existing tanneries (Darmar, Asco, Ethiopian Pickling, Tofan) in Addis and [illegible] can have a considerable quantity of raw material for the production of glue and gelatine and it is felt that this should be further investigated as a main tanner [illegible] by-product industry in Ethiopia.

2. Technical Aspects in Production of Glue and Gelatine

(a) [illegible] and Limed Stock

The raw trimmings and cuttings are soaked in water, washed, limed for a period of three to four days and hair removed. After unhairing the stock is limed for an extended period of four weeks for removing the [illegible] matters, undesirable proteins and to condition the stock for [illegible] extraction of glue or gelatine to secure [illegible] colour product. In case of limed and dried [illegible] the [illegible] in water and limed for a period [illegible] three [illegible] limed stock is washed with several [illegible] in paddle drum and [illegible] other suitable agitators. [illegible] lime is removed [illegible] mechanical agitation and the remain[illegible] dissolved by the [illegible] of small hydrochloric or sulphuric [illegible] the latter is preferred due to its antiseptic

and bleaching properties. The delimed stock should have a pH of about 4.5 and should not show a pink colour of a cross section to the phenophthalein indicator.

(b) Boiling or Extraction

Extraction of delimed stock to obtain glue or gelatine is carried out in aluminium or stainless steel vats. The vats may be heated in various ways such as by introducing a steam pipe into it, by letting in the steam through a steam coil placing the coil under a false bottom, or by placing the vat on an open fireplace. In small-scale manufacture open fire heating is cheap and quite practicable. A provision is made for tapping off the extracted liquors at the bottom.

The delimed stock is put in the vat and a quantity (between 50-100 percent) of water is added. The steam is then opened and the temperature is then raised to 60°C. The extraction is carried out at this temperature for about one hour by continuous stirring. After this first extraction, more water is added to the vat and the temperature raised to 70°C for one hour and further third and fourth extractions are done at 80°C and 99°C. The solid remaining in the vat after the fourth extraction is glue. Gelatine is manufactured from the first two extractions and the last two are kept for glue production. Concentrated jelly is dried into glue cakes and sold. There are special types of drying blocks or glue which can also be dried on a wire mesh. Before drying skin on the surface liquid should be removed otherwise this gives an uneven colour.

(c) Filtration

After extraction the glue or gelatine liquor is run into a large shallow vat and the temperature of the liquor is maintained at about 60°C when the grease rises to the surface and is skimmed off. The flocculent impurities consisting of undissolved organic matters are allowed to settle. If desired, these suspended matters may also be filtered through a filter press. This should be made either of wood or gunmetal. Cloth filter is preferred which is easy to clean. Sometimes neutral charcoal, paper pulp and cotton cellulose are used to aid filtration.

(d) Clarification

Even after filtration the glue liquor remains cloudy. It has therefore to be clarified to produce a bright and clear gelatine.

(e) The Clarification and Bleaching of Glue may be done as follows

The glue solution may be clarified by settling or press filtration. The liquor from the Boiling floor is run into large shallow vats and kept warm so that the grease rises to the surface and insoluble matters separate out. Usually, liquors are passed through the coarse filters to remove undissolved organic matters, albumin mucins lime soaps and mineral particles. Further filtration is effected by the use of press filters filled with cellulose or the liquors may be clarified by the use of potash alum or by the addition of egg albumin solution to the cool mixture. The temperature is then gradually raised until coagulation takes place. After settling for some hours the clear liquid is syphoned off and filtered.

After concentration the liquor may be bleached with sulphurous acid or hydrogen peroxide and alternatively may be treated with activated charcoal and then filtered. For clarification, the following substances are used in small quantities

- Milk of lime
- Calcium sulphate
- Albumin
- Oxalic acid

The best and oldest clarifying material is egg albumin dissolved in water. This is used for high grade gelatine manufacture.

(f) The process of clarification is as follows

The glue liquor is run into vats provided with a steam coil and some means of agitation. The temperature of the liquor is maintained at 50°C. Albumin dissolved in water is then added to the mixture and stirred. The temperature is further raised to 93°C when complete coagulation of the albumin takes place. In coagulation albumin absorbs all the insoluble matters and makes the glue liquor clear. This clear liquor is syphoned off and again filtered.

(g) Bleaching

If the glue stock is of a good quality no bleaching is required. However if bleaching is considered necessary generally sulphur dioxide is passed through the liquid glue. This helps in reducing the pH to 5.5 and also reduces the bacterial growth.

(h) Concentration

This is done in evaporators working under a vacuum.

(i) Cooling and setting:

The concentrated liquor is then taken to the cold setting chamber. Here the temperature should not go below 0°C because the glue jelly should not be allowed to be frozen. Here the glue liquor is poured into boxes of a cubical shape and made of zinc, aluminium sheets. This is allowed to stay overnight during which time jelly sets into a cake form. Jelly is removed from the moulds by slightly increasing the temperature. The blocks are cut into suitable sizes for sale.

(j) Drying:

In some places the jelly cakes are spread out on the fibre net in the drying loft which is provided with air circulating fans and a cooling apparatus to keep the temperatures of the loft below 20°C. In some cases drying is done by moving trucks loaded with frames containing wire vats on which the glue sheets are spread along the drying tunnel in which the air is cooled and circulated by a special device. The drying is done on a counter current system. Temperature of drying tunnel should not exceed 30°C. The drying of glue cakes or gelatine sheets is the most difficult operation in the whole manufacturing process. Glue and gelatine factories should preferably be located in places where temperature and relative humidity are low.

(k) Manufacture of Glue Powder / Flakes

The extraction of the glue liquor is carried out essentially as described above. The extracted liquor is concentrated in the evaporators. The concentrated liquor is emulsified with a little soap and this is fed into drum driers. Drum driers are heated and glue emulsion dries on the surface into sheets. The sheet is taken off and broken into flakes. If powdered glue is wanted the flakes are powdered by a disintegrator.

(l) Glue Manufacture on a Cottage Scale:

Delimed glue stock is taken in a small boiler which can be made of a galvanized iron sheet. It should have a cylindrical boiling pan inside and its outside should be covered by a galvanized iron sheet too.

The delimed glue stock is then put inside the boiler with some water and the whole apparatus is placed on an ordinary fire.

Fire may be made by burning coke or wooden fuel. The temperature is raised to 60°C for five to six hours stirring by a wooden stick. After this first extraction three more are repeated and liquor is finally concentrated at a temperature of 100°C and then clarified by settling and straining through the cloth.

Drying can be done either by using trays or by using wire mesh in an the open sun.

3. Useful Data for Glue Manufacture

100 kg. wet tannery fleshings will give 20 kg. dry fleshings.

Yield of glue from above will be 10 kg. or 50 percent on dry and 10 percent on wet weight.

As an estimate, five tanneries in Addis and Nojo can produce up to 10 tons of wet fleshings, trimmings etc. per day. This will give about 1000 kg. or 1 ton glue per day.

4. Estimates for Capital Expenditure for a Glue Plant with an output of 1000 kg. per day

a)	Land and Building (need not be too expensive)	Eth.$	300,000
b)	Machinery and Equipment		
	Washing Equipment		4,000
	Extraction Equipment		26,000
	Evaporation Equipment		34,000
	Refrigeration		40,000
	Filter Press and auxiliaries		8,000
	Drying chamber		5,000
	Boiler		45,000
	Laboratory		5,000
	Other expenses for erection etc.		15,000
	Vehicles		50,000
		Eth.$	232,000
c)	Working capital		50,000
	Add - a + b + c as Investment		582,000
d)	Cost of Manufacture per day: (1000 kg. of glue output per day)		
	Raw Material 10 000 kg. @		
	Eth. 100.- per 1,000 bags	Eth.$	1,000.00
	Lime 1300 kg. @ Eth. 35.- per 1,000 bags		45.50
	Other chemicals		30.00
		Eth.$	1,075.50

Steam 34,000 lb. @ $3 per 1,000 lb.	Eth.$	102.00
Power 200 kw. @ 15 cents per kw.		30.00
Water 20,000 Gal. @ 50 cents per cubic meter		45.00
Direct labour and supervision		300.00
Repairs and maintenance		20.00
	Eth.$	1,572.50

e) Overheads

Interest on capital of Eth.$ 582,000 @ 6 per cent spread over 300 days		116.40
Depreciation on plant equipment $232,000 @ 15 per cent spread over 300 days		116.00
Depreciation on building $300,000 @ 5 per cent spread over 300 days		50.00
Other overheads (rents, taxes, rates, and office overheads etc.)		25.00
	Eth.$	307.40
Add - d and e =	Eth.$	1,879.90

Cost of production per day for 1,000 kg. will be $879.90 or Eth.$ 1.88/kg.

5. Conclusion and Summary

There is an added cost paid by the tanneries for disposing the solid waste like hides and skins trimmings, fleshings which could be used for the production of glue, gelatine, as a by-product industry from the tanneries' waste.

There is a possibility of setting up a glue plant or encouraging the small-scale industries in setting up small plants for the production of glue in Ethiopia. Technically, production of glue is not too complicated and on a small scale, the investment required is not too big.

The demand for glue in Ethiopia could be investigated and also the possibilities for exports. Imported glue packed in tins costs (in Ethiopia) about $5.00/kg. and the above estimate of production costs may be a guideline for future consideration in setting up glue and gelatine manufacture in Ethiopia.

P.B. Buit, UNIDO Leather Technologist
Ethiopian Tannery S.C.
Addis Ababa

ANNEX II

TEMPORARY LIST OF NATIONALIZED INDUSTRIES AND NAME OF THE MANAGER

NO	NAME OF INDUSTRIES	MANAGERS	TELEPHONE	LOCATION
	FOOD INDUSTRIES			
1	A. Mihos S/C	Ato Bruke Kebede	448105	Addis A.
2	A. Mihos Oil Factory	Ato Bruke Kebede	444949	Akaki
3	A. Mihos Flour Mills	Ato Berhane W/Meskel	113038	Dire Dawa
4	Debre Zeit Flour Mills	Ato Berhanu Ejigu	338021	Debre Z.
5	Kaliti Flour Mills	Ato Teklu Tadesse	446254	Kaliti
6	National Flour Mills	Ato Berhanu Ejigu	117549	Addis A.
7	National Edible Oil Co.	Ato Kidane Tsige	114392	Asmara
8	Petratos Edible Oil Co.	Ato Gedlu Jarra	111982	Addis A.
9	Santi Red Sea Macaroni F.	Ato Gortom	114030	Dekemehare
10	The Red Sea Gen. Mills	Ato Gortom	111302	Dekemehare
11	United Oil Mills	Ato Fekadu Fba	122548	Addis A.
12	Belay Abati			
13	Akaki Flour Mills			
14	Astron Maccaroni Factory			
15	Amarissa Flour Mill			
16	Holotta Flour Mill			
17	Falentoza Terinoza			
18	Ethio Milk Factory			
19	Nazareth Flour Mills			
20	Ethio Flour Mills			
21	Ambassa Maccaroni F.			
	BEVERAGES			
22	Ambo Mineral Water	H.E. Ato Mebea S.	446165	Addis A.
23	Babile Mineral Water	Ato Zewge Teggnework	660064	Harar
24	Cocacola Factory	Ato Worku Wondimu	444695	Addis A.
25	Harar Soft Drinks Fact.	Ato Birhane H/M	113462	Harar
26	Meta Beer Factory	Ato Daniel Krone	118727	Addis A.
27	Melotti Beer Factory	Ato Kiflemariam	110900	Asmara
28	National Soft Drink Fac.	Ato Yoseph H/Michael	111404	Asmara
29	Pepsi Cola Factory	Ato Belaineh Gizaw	443600	Addis A.
30	Saba Bej Factory	Ato Getachew Ayele	116135	Addis A.
31	St. George Brewery	H.E. Mebeaselassie	445196	Addis A.
32	Sarris (Alexandrakis)	Ato Mussa Yassin	444790	Addis A.

No	NAME OF INDUSTRIES	MANAGERS	TELEPHONE	LOCATION
	TEXTILES			
33	Barotollo Cotton Fac.	Ato Beyene Gebauy	11[illegible]	Asmara
34	Diabaco Cotton Co.	Girma Deneke (Cap)	44[illegible]114	Addis A.
35	Ethiopian Cotton Co.	Ato Woldu G/[illegible]	447[illegible]	Addis A.
36	Ethiopian Fabrics	Ato Teka Hailu	110904	Asmara
37	Ethiopian Tex. Indu.	Ato Berhane Tesfay	112[illegible]7	Asmara
38	Ethiopian Fibre Fac.	Ato Habtemarkos Mako	1[illegible]19[illegible]	Akaki
39	Ethio-Fil	Ato Birhane Tesfaye	11[illegible]	Asmara
40	General Tex. Garment Co.	Ato [illegible]rgaw Gebre	1[illegible]729	Akaki
41	Industria Maglerie	Sr. Gg[illegible]gano	11174[illegible]	Asmara
42	Bahr Dar Textile Fac.	Ato Yusuf Ahmed	44[illegible]	Addis A.
43	Lazaridis Cotton Fac.	Lut. Girma W/Selasse	449350	Addis A.
44	Manufacura Sacchi	Ato [illegible]uenew Betewlgn	1101[illegible]4	Asmara
45	Snco Tex. S.C.	Ato Woldu G/Michael		Dire D.
46	Indo Ethiopia	Ato Hagos Tsehay	151011	Akaki
47	Unifibre Fibre Fac.	Ato [illegible]btemarkos Maco	15546[illegible]	Kaliti
	LEATHER AND SHOE FACTORIES			
48	Darmar Shoe Factory	Ato Tewdros Mebratu	443311	Addis A.
49	Darmar Tannery	Ato Tewdros Mebratu	44[illegible]3[illegible]0	Addis A.
50	Asco Shoe Factory	Ato Keflu Tefera	116110	Addis A.
51	Addis Tannery	Ato Keflu Tefera	122011	Addis A.
52	Dofan Tannery	Ato Yofitahe Kebede	155120	Addis A.
53	Cal. Cipolini Shoe Fac.	Ato Tadese W/Yohanes	110199	Asmara
54	Conciria Baldini Shoe Fac.	Ato Tadese W/Yohanes	111003	Asmara
55	Frabi Shoe Factory	Yemane Adal	1112[illegible]5	Asmara
56	Eth. Pickling & Tanning	Ato Yofitahe Kebede	152020	Addis A.
	CHEMICAL FACTORIES			
57	African Matches & Paper			
58	Eth. Electrical Indu.	Ato Fikre Minker	44[illegible]301	Addis A.
59	Eth. Canvas & Rubber	Ato Getahun Tadese	44351[illegible]	Addis A.
60	Rafaelu Bini Plastic Shoe	Ato Yemane Adal		Asmara
61	Sadolin Paints Fac.	Ato Mekonen Tesema	440722	Addis A.
62	Megga Paints Factory	Ato Berhane Gada	154338	Addis A.
63	Sape Soap Factory	Ato Alem Sebhatu	116383	Asmara
64	Durosan Paints	Ato Berhane Gada	154338	Addis A.
65	SABA Bottle & Glass	Ato Keflemariam Zerom	1109[illegible]3	Asmara

	NAME OF INDUSTRIES	MANAGERS	TELEPHONE	LOCATION
	IRON AND STEEL INDUSTRIES			
1	Akaki Iron & Steel Works	Ato Mikre Minker	155276	Akaki
2	Ethiopian Metal Tools	Ato Makonen Hunde	443446	Addis A.
3	Ethio-Tider [illegible]	Ato Mikre Minker	443060	Akaki
4	Ethiopian Metal Works	Ato Mikre Minker		
5	Sabean Metal Works	Ato Dinsa Lipsa [illegible]		

NO	CHEMICAL COMPANIES	MANAGER	TELEPHONE	LOCATION
1	Addis Dyre Co.		440648	A.A.
2	Augusta Shirt Co.		443888	A.A.
3	Ethiopian Spice Pvt.	Dr. Seloshi	153434	A.A.
4	Ethio-Japanese Syn.		150831	A.A.
5	Ethio-Foam Thermplastic		112717	A.A.
6	Ethio Plastic S.C.		440301	A.A.
7	Ethiopian Crown Cork		441236	A.A.
8	Eth. Household Utilities		111311	Asmara
9	H.V.A. Ethiopia		447280	A.A.
10	H.I.... Metehara		447299	A.A.
11	Paper & Pulp Co.		443081	A.A.

DEPARTMENT HEADS AND OTHERS

		DIRECT	EXTENSION
1	H.E. Ato Mebrate Mengestu	443826	20
2	Ato Tesfaye Dinka	157842	32
3	Ato Gebeychou Firrisa (Industry)	445074	33
4	Ato Shike Adin Yassin (Service)	444380	26
5	Ato Mehare Bela (Trade Dis.)	448940	
6	Lut. Berehe G/Georges (Management)	443828	23
7	Ato Aklilu W/Amanuel (Legal)		56
8	Ato Abdule Jilil Mohammed	446106	
9	Ato Tewdu Tekle (Movable Immov.Pro.)	123270	
10	Ato Shebele Temteme	447575	
11	Dr. Tilahun Mekonnen (Agri.)	444266	
12	Ato Gebru H/Wolde (Finance)	159530	64
13	Com. Benevam Gebr t	443829	24

		DIRECT	EXTENSION
14	Dr. Debebe Worku (Trade Distribution)	449016	-
15	Cap. Yelma Mengesha	-	30
16	Lut. Bantesmlake	-	
17	Ayale Gulte/Ato/		55
18	Ato Sheferew Tamerat	155324	27
19	Ato Seifu Awash	159171	63

OTHERS

1	Conference room	Tel. No.	Ext. 37
2	Operator		39
3	Guard		51
4	Archives		52

ANNEX III

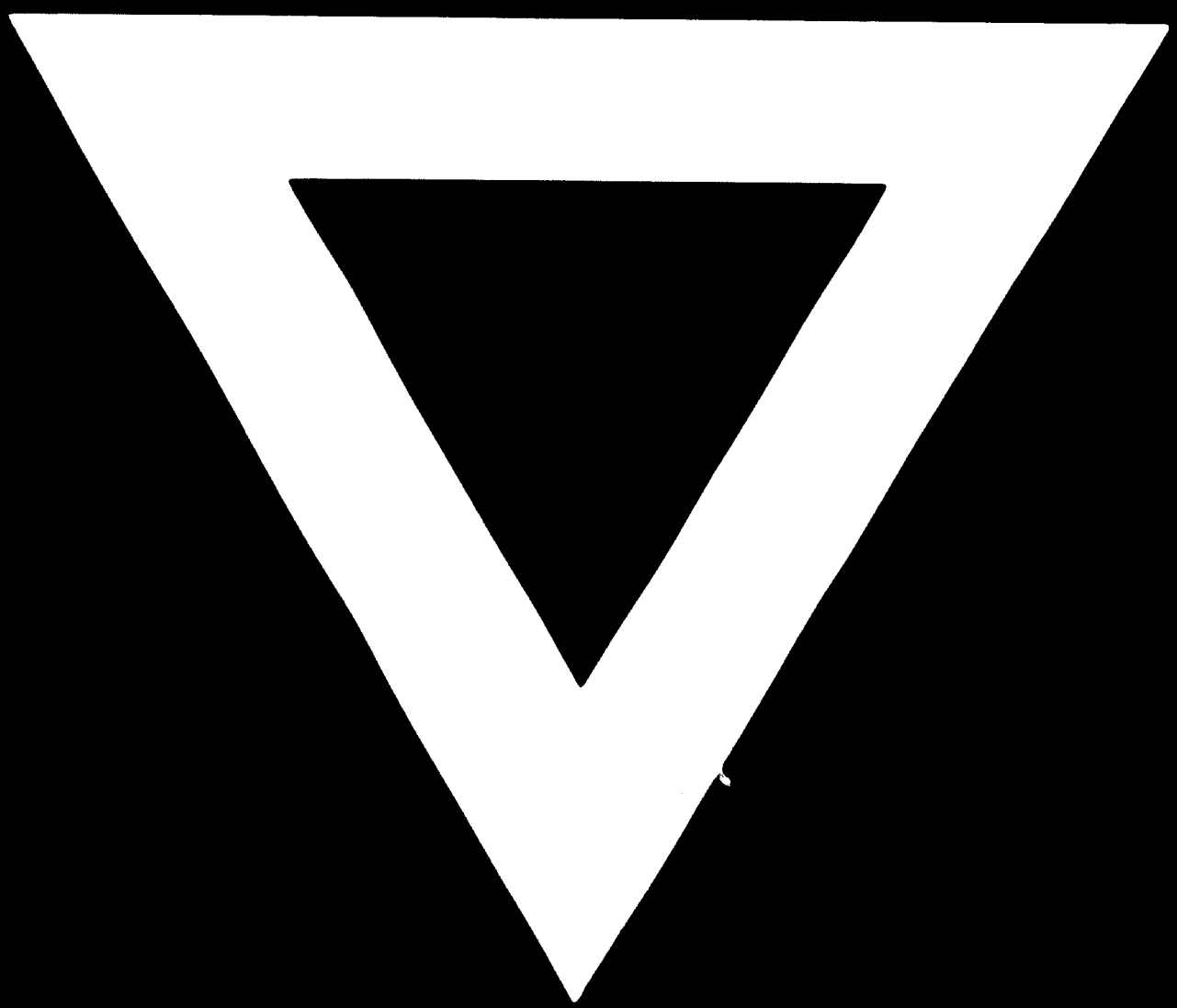
Details on the assistance to be provided to the Ethiopian Beverage Corporation

1. One Malter Expert - To co-ordinate the research and study of a new malting plant and assist with the present facility at St. George Brewery. Must have a B.Sc. in education and should have wide professional experience in the same field. English language is a must.

2. Microbiologist - To work with and closely co-ordinate the work of the breweries and wine factories in laboratory and sanitation areas. Must have at least a B.Sc. in the field and about ten years of experience in the same area. English is a must

3. Mechanical Engineer - A thoroughly trained and experienced person in bottling machinery operations, repairs, installations maintenance and upkeep. Should have a B.Sc. or M.Sc. in mechanical engineering and must be fluent both in reading and speaking the English language. Will co-ordinate the work of all bottling plants in the above and provide technical training to plant mechanics. Should be willing to travel extensively.

4. Agronologist - Must be a university graduate in the field must have worked in the same capacity for five to ten years. Experience in wine grape farms operation and distilleries are of great advantage if possible. Thorough knowledge of the English language is a necessity.



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