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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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REVIEW OF THE INDUSTRIAL SECTOR 1/

SUDAN

(SF/SUD/74/058/11-01/12)

Project Findings and Recommendations

Preparatory Assistance Report for
UNIDO High-level Mission

by

Walter Weissel
UNIDO Consultant

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Summary

The writer spent seven-and-a-half weeks in the Sudan with a view to reviewing the position of the industrial sector, to collecting information on the industrialization programme and its problems and prospects. The main objective of his mission was to identify the scope and extent of outside assistance to be provided by UNDP/UNIDO in the field of industrial development, including medium- and long-term needs of the industrial sector.

In all contacts with the Government, with financial and training institutions, with industrial enterprises and with UNDP-sponsored IBRD and ILO project teams, the writer was thoroughly briefed on the Sudan's industrial development as it has taken place up to the present time, and he also learned of the future industrialization plans. While the prospects for further build-up of industrial development seem to be good, many projects economically justified, and the Government's legislation by its promotion and encouragement of investment acts adequate, the writer also became aware of severe problems which will have to be mastered if the more ambitious plans and projects are carried out. These bottlenecks lie mainly in the physical infrastructure conditions of the Sudan, such as lack of a proper road network, poor railway transport, shortage of electric power. The writer recommends that these constraints be carefully weighed in the context of future industrialization programmes and that basic industries such as building materials and cement, are strengthened and expanded with a view to gradually improving the infrastructure conditions.

In his preparatory work for the high level review mission ("main mission") the writer drafted the mission's terms of reference, and made tentative suggestions for two UNDP/UNIDO assistance projects for the next country programme 1977-1982. The first project will assist several sectors of industry where the need for outside help is especially apparent; the second aims at strengthening the Ministry of Industry

itself. For this purpose and as an annex to the project suggestion, a comprehensive organization chart has been drafted by the writer in co-operation with the Ministry of Industry.

Acknowledgement

The writer acknowledges with thanks the assistance given to him by the Government through its Ministry of Industry, as well as through all other Ministries and Departments contacted; by the many other services and institutions concerned with industrial development; by the financial institutions; and by the managers and technicians of industrial enterprises and training centres visited. The writer's gratitude is herewith also expressed to the UNDP Resident Representative and his staff, and to all international officers of the IBRD, ILO, FAO, UNESCO and WFP teams contacted. They all were very helpful to him and they have greatly facilitated his task which is herewith gratefully acknowledged.

Mission to Sudan
Time Schedule

Arrival at Khartoum 21 February 1975, 1 a.m.

First Week: 21-28 February

Meetings with UNDP Resident Representative and staff. Visits to Ministry of Industry, Under-Secretary Abdalla Fadlalla, Abbas Attia Abu Bakr. Office room assigned in Department of Standardization and Quality Control, Khartoum 2. Visit to UNDP/IBRD planning team, Ministry of Finance. Meetings with Omar Hamour, Manager, Khartoum Foundry, Mr. Fritz, engineer, UNIDO. Visit to Commercial Department, Embassy of Austria. Study of UNIDO and IBRD reports.

Second Week: 28 February - 7 March

Ministry of Industry, counterpart and assistant assigned. Visits to Industrial Research and Consultancy Institute (IRCI), IPC, Industrial Manufacturers' Association, Sudan Chamber of Commerce, IBRD planning team, ILO Management Development and Productivity Centre. Arrival Hans Swegen, Assistant Field Adviser from Cairo on 5 March.

Third Week: 7-14 March

Visits to Khartoum Tannery, Bata Shoe Factory, Blue Nile Brewery, Khartoum Central Foundry, Sudanese Steel Mill, Ltd., ILO employment strategy mission. Attended demonstration of Chinese tractors to Ministry of Industry. Prepared Interim Report for UNIDO.

Fourth Week: 14-21 March

Visits to Khartoum Spinning and Weaving Co., Ltd., Sudan Textiles, El Guneid Sugar factory, CEWA, Geological and Mining Department,

ILO Employment Mission. Meeting with Messrs. Cappelletti and Hyland, UNDP.

Fifth Week: 21-28 March

Visits to IBRD planning team, IPC, IPC Grouped Industries Subcorporation, Sudan Oil Mills, Minister of Irrigation and Hydroelectric Power, IBRD consultants on power development, IRCI workshops and laboratory.

Sixth Week: 28 March - 4 April

Visits to IPC Food Subcorporation, IPC Leather and Plastics Subcorporation, Ministry of Industry Projects Bureau, IBRD Resident Representative, Blue Nile Packing Factory, IBRD planning team, Under-Secretary, Ministry of Industries, Meeting on draft organization chart and assistance projects. Meeting with D. Papageorgiou, IBRD, author of the report "A Survey of the Industrial Sector of Sudan", 1973. Departure Swegen 3 April 1975.

Seventh Week: 4-11 April

Visit to Industrial Bank of Sudan, Sudan Development Corporation, Vocational Training Centre, three meetings with Ministry of Industry on organization chart; preparation of report documents.

Eighth Week: 11-14 April

Final visit to Ministry of Industries; preparation of report documents. Visits to UNDP programme officer, almost daily, from 22 February - 13 April.

Departure from Khartoum 14 April 1975, 3 a.m.

Introduction

The Sudan is the largest country of Africa; its area of 2.5 million square kilometres is equal to one-third of the continental United States. The population is estimated at 15 to 16 million, growing at nearly 3 per cent per annum, thus giving a density of somewhat more than six persons per square kilometre. Partly, this low density can be explained by the fact that the northern third has extremely low rainfall; but it is stated that the number of inhabitants per unit of potentially arable land is lower in the Sudan than in any other nation of Africa. The Sudan's extensive untapped arable land resources are raising hopes that the country will, in the not too distant future, become one of the prime suppliers of agricultural products, especially to the Middle East and to the neighbouring African countries.

The Democratic Republic of the Sudan has taken major steps to accelerate its economic development with particular emphasis on the expansion of agricultural production, the diversification of its industries, and the improvement of transportation and communication systems. The Sudan's objectives are to achieve a substantial increase of foreign trade and a meaningful improvement in the economic well-being of the people. This will be achieved through a broader participation of domestic and foreign private investors, managers and technical experts in the economic growth of the country.

The economy of the Sudan is still largely based on agriculture with a per capita gross domestic product (GDP) of approximately US $120. It is the government's policy to accelerate economic growth by developing the industrial sector besides promoting agricultural expansion. The current Five-Year Economic and Social Development Plan, covering the financial years from 1970/71 to 1974/75, aims, inter alia, at an increase of industrial production volume by 57.4 per cent in terms of the GDP, introduce new types of products and meet entirely

domestic requirements through the growth of national industrial production. It is also designed to secure growth of per capita GDP up to LS. 47.6 in 1974/75. The plan aims at a reduction of imports of various commodities. More specifically, a major target of the Five-Year Plan is increasing the operation time of ginneries to 250 working days from the present 120-135 days, construction of Government heavy industries in the mining, agricultural and engineering sector, development of the public sector and growth of its profitability, constructing new enterprises and increasing raw materials production. These targets have only been partly fulfilled, e.g. production increased from 1969/70 to 1972/73 (1974/75 figures are not available yet) in cement from 194 to 201,000 tons, in sugar from 86 to 102,000 tons, in vegetable oil from 59 to 62,000 tons, and in shoes from 8.7 to 17.6 million pairs. The establishment of the next Five-Year Plan has been postponed; it is now proposed to cover the years from 1977/78 to 1981/82 by the next plan.

From 1960 on the industrial sector has been steadily growing with the exception of the first two years of the current decade. Its share of GDP is now estimated at 10-11 per cent. Since 1972, the Government has placed high priorities on the improvement of the balance of payments and on the country's international credit standing. To reach this objective, new domestic and foreign investments are encouraged. Incentives, licensing conditions and protectional measures are laid down in the "Development and Encouragement of Industrial Investment Act 1974". They were formulated with an aim to attract domestic and foreign private investors and to promote a strong private sector of industry. Also, with the establishment and strengthening of the Industrial Production Corporation (IPC), the Government has created a public sector now comprising 31 companies. The Organization of the IPC, its subdivisions and the companies are given in the chapter "Findings".

Operation of these industrial enterprises, mostly of large size, together with the many industrial companies of the private sector, numbering about 600, of various sizes with labour strength between 20

and 2,000, are unfortunately subject to major constraints. These lie mainly in the field of infrastructure, particularly transport and power supply are underdeveloped in the Sudan. That the Government has not developed its transport system to keep pace with the needs of its growing economy has various reasons. The country's vastness, the low population density, lack of a sense of unity and, of course, also financial problems have contributed to the shortcomings. The present situation is so that rail as well as road transport, and also inland waterways, are grossly inadequate to serve the economic needs of the Sudan.

The narrow gauge railway network of approximately 4,000 kilometres extends, with the exception of the South, to most provinces of the country, but the track is not adequate, and rolling stock is not sufficient, or in poor condition. Long delays and unreliable transport are the result. The recent order of fifty additional locomotives, the construction of the road from Kassala to Port Sudan, and the oil pipeline being built from Port Sudan to Khartoum with Kuwait funds are expected to alleviate the situation.

Road transport is extremely hazardous over longer distances in the Sudan. The only paved road connecting two centres is the 180 kilometre long Khartoum - Wad Medani highway. All other road connections are desert tracks, and when and where rainfall goes over a certain low limit, traffic becomes impossible. The Sudan's position in the road sector, in relation to comparable African countries, is shown in the following table on page 11.

Although the Sudan has in the River Nile a natural waterway of several thousand kilometres' length, also this mode of transport is difficult. On the main Nile transport is made impossible over longer distances by the fourth, fifth and sixth cataracts. Only when a comprehensive multi-purpose development, including irrigation, power and navigation needs, can be implemented, will water transport from Khartoum to Lake Nasser be feasible. This would be a project of enormous size and beyond the means of present-day Sudan. The White

Table 1. International Comparisons of Road Transport

Area	GDP per Capita ($)	Population Density (persons/sq.km.)	Vehicles per 1000 Persons (No.)	Total Length of roads (km/1000 sq.km.)	Length of Paved Roads (km/1000 sq.km.)
Sudan	42	6.3	3.0	8	0.15
Egypt	73	33.7	4.2	48	9.60
Kenya	52	19.6	11.3	72	5.10
Somalia	24	4.1	4.9	20	1.40
Uganda	45	42.1	4.1	104	0.30
Zaire	31	8.2	6.4	61	0.80
Brazil	90	10.0	35.8	125	9.80
Australia	-	1.6	377.0	110	20.50
Canada	-	2.2	368.0	82	10.00

Notes: 1. All data is for 1971.
2. GDP at Market Prices.

Sources: World Highway Statistics, 1971, International Road Federation; Geographia Ltd. Map Series, London; "Finance and Development", Vol. 10, No. 1, March 1973, IMF and World Bank Group.

From: D.R. of the Sudan, Roads and Bridges Corporation; Highway Design, Construction and Financing; Louis Berger International, Inc., Khartoum/East Orange, New Jersey.

Nile, now the only transport line from Kosti to Juba, is difficult to navigate because of the swampy area of the Sudd. The Jonglei Canal, by-passing the swamps, will greatly improve the situation besides increasing the discharge on the main Nile. But also this is a very large project, almost of the size of the Suez Canal (it is considerably longer), and its first phase only will cost, according to present estimates, LS 70 million. The Blue Nile does not lend itself in its present state to navigation because of great differences between flood and low water. Only additional storage basins, mainly in Ethiopia, would transform the Blue Nile into a truly navigable river.

Another major bottleneck for the development of the Sudan's industry is the power situation. Growth of power consumption has been since 1957 at an average rate of 11 per cent. Although installed capacity has been steadily expanded and the nucleus of a hydro-electric grid created, power supply is still inadequate. The "Blue Nile Grid" has now a capacity of 170 megawatts. This extends over a length of 500 kilometres, from Roseires Dam to Khartoum. The greater part of the country's industry, besides the domestic needs of the capital's population, and the large-scale agricultural development of the Gezireh are supplied by this grid. Power requirement of the industrial area of Khartoum North alone is indicated with 60 megawatts. During the irrigation season, power for electric pumps is, however, being given priority. The consequence is that power for industry has to be cut off the line. Some industrial enterprises maintain stand-by units in order to continue production, but this is costly and on the whole industrial development is hampered.

Outside the grid there exist for the time being only scattered diesel stations with a view to supplying power to industries and townships. The Sudan's cement industry, as an example, is greatly hampered in its production through power problems. The larger of the country's two cement plants, at Atbara, can produce only at 60 per cent capacity in spite of heavy demand, leading to a black market situation for cement (in Khartoum LS 80 are paid for a ton instead of the official

LS 20) and to undersirable, equally costly imports. Shortage of diesel oil is often blamed for this unfortunate situation. The oil pipeline being built from Port Sudan to Khartoum already mentioned as a measure to overcome the rail transport bottleneck should alleviate the situation in the not too distant future. However, a real improvement in electric power supply can only be expected if the Sudan is going to develop its hydro-electric potential on the main Nile. The three cataracts at Sabaloka, Shereik and Merowe, at a common capacity of at least 800 megawatts, could be developed in a phased construction schedule to meet power requirements.

The infrastructure problems have been given great attention by the World Bank in many studies, reports and recommendations. Already in 1963, a power survey was made as a UNDP (then Special Fund) project with IBRD as the executing agency. A fifteen-year forecast of power demand was made; this has been the guideline for the development until the present time. The IBRD has also financed foreign expenditure for power installations by its loans, particularly the important Roseires hydro-electric development. The Sudan, classified as one of the world's 25 least-developed countries, qualifies for low interest IDA credits. Thus a steady improvement of the infrastructure position can be expected. IBRD loans are available for rail transport, new locomotives and goods wagons. Many studies on the Sudan's transport sector, including highway and railway projects, and examinations of operating and maintenance problems, were also carried out by the IBRD.

Another problem in the Sudan is manpower. Although the labour potential of the Sudan's 16 million population is by no means exhausted there remains the question of training. The greatest part of the country's people are not yet industrially minded, that is, they are too remote from modernization and their way of life is based on tribal traditions. Migration of formerly semi-nomadic people to the cities, mainly to the capital, has taken place in the last 10 to 15 years, so that the required quantity of labourers for industries is available. This, however, does not refer to quality. Training of

skilled workers takes place on the job as well as in Government-run training institutes; also bilateral aid is active, of which the Vocational Training Centre assisted by the Federal Republic of Germany is an outstanding example of successful development assistance.

The Vocational Training Centre was established in 1965 under a bilateral aid programme by the Federal Republic of Germany. It occupies an area of three hectares, near Khartoum Airport. The training programme includes metal-working, manufacture of tools, spare parts, gears, etc., a welding shop and a forge, automobile repair shop including engine repairs and electrical department as well as a carpentry shop for training of furniture making. Each department is housed in a large shed of currugated iron originating from an industrial exhibition of West Germany held in Khartoum at the end of 1961. There are three sheds for training purposes, a fourth serving as a storeroom which have been erected to date; a fifth shed is under construction for electronic engineering.

The number of trainees is 420, the duration of training three years with 140 trainees per year who receive diplomas after satisfactory completion of training. Applications for admittance are averaging about 700 each year. It is the largest training centre in the Sudan; further centres are the ILO-assisted training centre at Wad Medani and another German-supported centre at Wau. Another centre is about to be set up by West German aid in Port Sudan. Aside from three German consultants, the entire staff of the Khartoum Centre is Sudanese, most of the teachers being trained by the centre itself.

Report D 90 "Employment implication of expected investment" of the ILO Comprehensive Employment Strategy Mission, dated 19 March 1975, indicates total employment expected in 1985/1986, provided all programmed projects are implemented, with 145,000 of which 31,000 are skilled workers and 5,000 technicians. It should not be beyond the means of a 16 million nation to fulfil this target, all the more as further international and bilateral assistance can be expected.

An urgent need exists for service industries. For instance, for the textile industry, qualified air-conditioning specialists are required. For workshop management, time studies, accessories and spare parts production, it would be important to organize additional training institutes.

The Sudan's economic development has mainly been achieved in Khartoum and its surrounding area, extending in the north to Atbara, in the east to Kassala, and in the South to Kosti. This region, a semi-circle of 300 kilometre radius, includes the important agricultural development of the Gezireh and about 90 per cent of industrial development. The potentially rich area of Equatoria and other southern provinces still awaits modernization.

Findings

The objectives of the Sudan's industrialization programme, as laid down by the enactment of the Industrial Investment Promotion Act of 1956, with revision of 1967, 1972 and 1974, are focussing on the diversification of the country's production base, by encouraging and stimulating private investment in industry, by granting concessions and facilities for new factories; and by means of creating a favourable climate to attract foreign capital.

In its revised form, the Act provides that in granting licences and concessions, no discrimination shall be made with respect to national and foreign, public or private enterprises.

The Act as amended in 1974 stipulates the conditions to be satisfied in the establishment of industries whose investment is encouraged:

(a) Defence or strategic importance;

(b) Utilization of local raw materials;

(c) Effect of dispensing with imports or contribution to export promotion;

(d) Creation of employment potential;

(e) Contribution to economic co-operation and integration with Arab and African states;

(f) Contribution to the growth of national income.

Regarding the role of the public sector, the policy statement towards encouragement of investment issued along with the 1967 Act indicates the need for public industry in projects which the private sector hesitates to undertake for the following reasons:

(a) Large capital requirement;

(b) Long pay-back period;

(c) Strategic areas.

Guarantees against nationalisation and confiscation are given in the 1974 Act, with the following exceptions:

(a) Decision of a competent court in accordance with existing laws;

(b) High interest of the country; compensation and evaluation clauses are added.

The progress made so far in the country on its industrialization programme is impressive if the comparatively short time since independence is considered: 31 industrial enterprises in the public sector, approximately 200 industrial enterprises organized in the Industrial Manufacturers' Association (IMS) and about 400 small enterprises organized in the Sudan Chamber of Commerce (SCC) have been set up.

The Industrial Production Corporation is an autonomous body attached to the Ministry of Industry. It includes four sub-corporations, i.e. Leather and Plastic Industries; Food Industries; Sugar Industries; and Grouped Industries. The latter includes various fields of industry, such as mining, cement, foundry, and also perfumeries. The Industrial Production Corporation is responsible for the operation of 31 factories; five others are under or about to begin construction. They are as follows:

Companies now in Operation

A. Sugar Corporation
1. Gunied Sugar Factory
2. Khashm El Girba Sugar Factory

B. Leather Industries Corporation
3. Khartoum Tannery
4. Omdurman Shoes and Leather Factory
5. Bata Corporation
6. Plastic Sacks Company

C. Food Industries Corporation
7. Wau Fruit and Vegetables Canning Factory
8. Karima Fruit and Vegetable Canning Factory
9. Karima Dates Factory
10. Kassala Onion Dehydration Factory
11. Babanousa Milk Products Factory
12. Flour Mills Corporation
13. Rea Sweet Factory
14. Krikab Sweets Factory
15. Ice and Lemonade Factory
16. Blue Nile Brewery

17. Aybee National Distillery Corporation
18. Watania Distillery Corporation
19. African Oil and Soap Corporation
20. Sudanese Oil Mills Corporation
21. Sudanese Soap Factory
22. Rebak Oil Mill
23. Tea Packing and Trading Company

D. Grouped Industries Corporation

24. Ingessana Hills Mining Corporation (chrome)
25. Blue Nile Packing Corporation
26. Maspio Cement Company
27. Nile Cement Company
28. Omduraman Perfumery Factory
29. Khartoum North Perfumery
30. Modern Laundry Blue
31. Khartoum Central Foundry

Companies now under or about to begin Construction

1. Sennar Sugar Factory (construction about to begin; production from December 1975)
2. New Khartoum Tannery (construction essentially completed; production from January 1975)
3. Wad Medani Tannery (construction about to begin; production from May 1975)
4. Red Sea Tannery Company, Ltd. (under construction; production from March 1975, Port Sudan)
5. El Kinnaf Factory (jute sacks) (under construction; production from July 1975)

This development is all the more surprising as severe constraints exist in the Sudan, mainly the bottlenecks in infrastructure as detailed in the introduction to this report. Other disincentives were, and partly still are, present due to local and regional development of some provinces, particularly in the South; lack of industrial mentality in most regions distant from the capital, tribal traditions, backwardness and lack of education in many remote areas.

The plans for future industrialization are ambitious. It is planned to expand sugar production to 760,000 tons per year from the present 130,000 tons; to bring the textile industry, now covering about 40 per cent of local demand, to self-sufficiency; to set up two new cement factories; to create a chemical industry with the establishment of a fertilizer factory; to expand and modernise the

food industry with a view to better utilization of available agricultural products; to set up building materials and engineering industries. Such plans will most probably be incorporated in the country's Second Five-Year Plan to be implemented 1977-1982.

The expansion of the sugar industry is now being planned as follows:

A. New Factories

1 Sennar production start December 1975, capacity 110,000 tons per year

1976 - 40,000 tons 1977 - 80,000 tons

1978 - 100,000 tons 1979 - 110,000 tons

100 per cent public, under construction

2. Asalaya under construction, 100 per cent public, production start March 1976, capacity of 110,000 tons

3. Melut under construction, 100 per cent public, production start December 1977, capacity of 110,000 tons

4. Kenana under planning, joint venture Sudan-Lonrho, production start December 1978, capacity of 300,000 tons

B. Existing Factories

5. Girba, with a capacity of 75,000 tons

6. Geneid with a capacity of 55,000 tons

Total capacity after expansion about 1980 of 760,000 tons per year.

In considering these plans, it should however be kept in mind that progress will be difficult if the severe impediments regarding the country's economic infrastructure are not removed. Also it should be considered that some of the existing industries suffer from under-utilisation due to raw materials shortage, power and transport bottlenecks, inadequate management and other diseases. Future programming should take these constraints, amply demonstrated by existing ventures, into serious consideration. Special emphasis should be given to the

promotion of industrial enterprises which could strengthen the Sudan's ability to build up the various sectors of economic infrastructure, by the country's own efforts, and with the greatest possible utilisation of domestic raw materials.

In this context, a key position is held by the building industry. At the present time this sector can be described as follows: There are two cement factories in the Sudan, Atbara and Rabak (near Kosti). Both factories suffer from under-utilization. The Atbara cement factory is designed for a capacity of 250,000 tons per year. Production in the financial year 1974/1975 will be 150,000 tons; production expected in 1975/1976 (financial year) is 180,000 tons. The Rabak cement factory has been designed for 100,000 tons per year production. The financial year 1974/1975 production is estimated to be 50,000 tons.

The German consultant Klockner is now investigating the raw material situation in the Rabak area. A geologist, a cement technologist and a kiln technologist are in the field. The main problems in Rabak are raw material and crushing technology. The main problems in Atbara are connected with power supply. There are diesel generators only and not sufficient fuel to run generators. Their capacity is 3400 KW. It is hoped that the oil pipeline from Port Sudan, now under construction, will ease the position. There is three-shift production. Earlier, the cement distribution from Atbara and Rabak were divided into two regions, but now the distribution is integrated through the office in Khartoum.

The demand of cement in the country was for 1974/1975 estimated to be 180,000 tons for industry and public organizations and 100,000 tons for private individuals, making a total of 280,000 tons. In the current year the supply will, therefore, be 80,000 tons short.

Progress in industrial development in the Sudan is checked centrally by the Projects Bureau in Khartoum. The Projects Bureau, being attached to the Under-Secretary of the Ministry of Industry, is acting after contracts signature of industry projects until the production has started.

It has an engineering department, an economy department and a follow-up department. The staff consists of 70 qualified engineers and economists and a total of 110 employees. The General Manager is Abdalla El Taher Bakr.

On each project a resident engineer is chosen to stay on site from the beginning to co-ordinate all local activities, and also to get in-plant training from the contractors. Mainly bar charts are used for the implementation planning and together with economics and technical follow-up also photographic documentation is used to a large extent.

The machinery to plan, prepare and promote new industries is vested in the Ministry of Industry. The Ministry's General Administration for Industrial Development, one of the two main divisions under the direction of the Under-Secretary, is responsible for industrial planning, study, evaluation and licensing of products; it also includes a section for the various branches of industry, such as textiles, food, sugar, leather, etc. (see organization chart, Appendix A.2). The Ministry is equally responsible for planning and promoting the public sector as well as the private sector. For the public sector, the IPC Board of Directors, its Director General and its planning department, are advising the Ministry in its planning activities. For the private sector the most important body to assist the Ministry in its planning activities is the "Advisory Committee for Industrial Development" whose functions are spelled out in the Development and Encouragement of Industrial Investment Act 1974. Although the Committee's jurisdiction is not strictly limited to the private sector by its terms of reference, its composition indicates that its prime function is the consideration of all applications submitted by entrepreneurs for the grant of licenses for new establishments (or the expansion of existing ones), and the submission of recommendations to the Minister. The Committee, under the chairmanship of the Under-Secretary, Ministry of Industry, includes among others two members of the Ministry of Finance and National Economy; the Director General,

Council of National Planning; the Governor, Bank of Sudan; the Under-Secretary, Ministry of Local Government; the Manager of CEWC (Central Electricity and Water Corporation); and a member of the Sudan Manufacturers' Association. This composition seems to indicate that the committee, in its deliberations, would co-ordinate with the National Planning Commission, and that it would consider financial and economic implications as well as infrastructure conditions. The inclusion of the Ministry of Local Government seems to guarantee the consideration of manpower and training needs, and the Sudan Manufacturers' Association would ensure the representation of the private sector.

To carry out its programme of industrial development, the country will have to make the fullest use of its natural resources. Agricultural resources are by far the most important ones in the Sudan. This refers to irrigated land use, and to rain-fed cultivation as well. The cotton plantations of the Gezireh, said to represent the largest irrigated area in the world, have for many decades been the backbone of the Sudan's economy, earning up to 90 per cent of badly needed foreign exchange through raw cotton export. Now the country has established its own textile industry, mainly based on its own cotton as raw material, with the target of fully replacing imports of yarn and cotton fabrics thus saving foreign exchange. Two textile factories are in operation, both in the private sector; they produce almost half of the domestic requirement. The ultimate aim is, of course, not only to reach self-sufficiency, but also to export cotton fabrics on the world markets. A fifteen-year tentative plan for the Sudanese cotton industry has been introduced by the Ministry of Industry, outlining their strategy. About 10 more textile mills are planned to be built in many parts of the country.

The most important by-product of the cotton industry, i.e. seed oil, is processed by a number of oil mills in both the public and private sectors. The cotton seed oil produced is mainly edible oil, but it is also used for soap production. It is fully sold on the domestic market, but the by-product, oil cakes, is exported to a large extent as qualified fodder.

Other agricultural products, such as ground nuts, fruits and vegetables, are also used as raw materials for many factories of the food industry, in both sectors. A special case is sugar cane. The expansion plans of the sugar industry will, of course, necessitate a corresponding expansion of plantation area, including land and water allocation, pumping schemes, settlement and farm development, so that the additional raw material can be provided. Similar efforts are being made for the Kenaf industry.

Hides and skins, sufficiently available on the Sudan's vast grazing areas populated by an estimated number of 30 million animals, are the important resources for the growing leather industry of the Sudan. Two tanneries in Khartoum, a third being erected in Wad Medani, and several shoe factories are based on this raw material.

Aside from the country's land and water resources, it will be necessary to fully explore the mineral wealth of the Sudan. Many studies and investigations have already been made, inter alia, the United Nations sponsored a mineral survey of three selected areas, including a photogeological survey of the Eastern area, mica prospecting in Northern Sudan, geochemical and geological reconnaissance of the copper fields of Hofrat en Nahas, mineral prospecting in Ingessana Hills; but exploitation has followed only to a very limited extent. The modest export of chromite ore from Ingessana is believed to be the prime example for utilization of the Sudan's mineral resources, for the time being; it helps to earn some foreign exchange, but expansion is impeded by transportation problems. This bottleneck is, of course, much more severe in remote areas of the Sudan's Western Provinces such as the copper field of Hofrat en Nahas in Southern Darfur, an area so far not opened up by any road or railway line. Very little has been done to process the minerals found in the Sudan; however, it is now planned to utilize asbestos found in Ingessana, to manufacture asbestos-cement products for the building industry, which is definitely a step in the right direction.

The Ministry of Mining has only recently been separated from the old Ministry of Industry and Mining. The nucleus of the Ministry is

the Geological Department. The Ministry of Mining is still in the preparatory stage and a Minister has not been nominated yet.

In the Sudan, mining is under way in three provinces:

A. Ingessana Hills (Blue Nile Province): The main activities are exploitation of chromite ore and prospecting of asbestos. The latter is being done on the recommendation of the UNOTC project.

B. Northern Province: This is, for the time being, the least important of the three areas. Mica mining has started. The activities are designed for export into Egypt.

C. Red Sea Hill Province: Aerial and ground surveys are under way for iron ore, manganese ore, and some other minerals. Due to its proximity to the sea port, this province has the best chances for mining development.

In the Ingessana Hills chromite ore has already been exploited for the last ten years. Additional resources are now being investigated with Chinese aid. Prospecting, mapping and evaluation are under way. Two companies, one of private and one of the public sector, are mining chromite ore at the present time.. The output reaches 30,000 to 35,000 tons per year. The bottleneck of the production is transport. From the mines ore is transported 80 to 90 kilometres by truck to the railway station. Rail transport to Port Sudan is difficult and irregular. Mining is mainly open cast, and only to a small extent under ground.

In the Red Sea Hills several activities are under way. Marble and limestone are being prospected for two more cement factories. Gold mining (underground) has recently been re-opened. Gypsum for the existing cement industry is also mined in the Red Sea area and brought by rail to the two existing cement factories inside Sudan. Manganese is being prospected. The most important mineral in the Red Sea Hills is iron ore, which is high grade with at least 60 per cent iron content. Mines were exploited by Yugoslavia before the closure of the Suez Canal in 1967; now exploratory drilling for additional reserves is under way.

These reserves can be estimated at 15-20 million tons. With the re-opening of the Suez Canal resumption of mining is considered. According to the Government's Five-Year Plan, an annual production capacity of 250,000 tons is planned to be reached.

The Yugoslav concern Yugometal is interested in entering a joint venture with a Sudanese partner in order to exploit the iron ore reserves.

Similarly, the Sudan's forest resources are practically untapped for industrial purposes at present. Although 38 per cent of the country is covered by forest, timber has to be imported for most building purposes, and pulp or paper manufacturing has not been started as yet. A 1963 FAO report "The utilization of Sudanese woods" gives the annual consumption figure of 93,000 cubic metres, of which 60,000 cubic metres are imported, and the local production of sleepers amounts to 21,000 cubic metres of other timber to 12,000 cubic metres per year.

Regarding the Sudan's financial resources available for industrialization, the following facts should be kept in mind. With a per capita GDP of US $120 the Sudan is one of the 25 "least-developed countries", according to United Nations statistics. GDP at factor cost in current prices was LS 632 million in 1971/1972. The growth rate of GDP was less than 5 per cent in recent years, the manufacturing sector grew 6 per cent. In 1971 the manufacturing sector contributed 10 to 11 per cent to GDP and employed about 240 000 Sudanese labour.[1/] Foreign exchange is, to an extent of more than 90 per cent, earned through exports of raw materials, and cotton exports accounted for 55 per cent of foreign exchange earnings. The value of industrial production was in 1971 according to IDCAS statistics LS 76 million, of which food processing and tobacco accounted for 47 per cent. Foreign trade statistics reveal that the balance of payments position has improved

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1/ These figures were indicated by the IBRD. The labour figure contradicts the ILO figure of 145,000 shown in the Introduction. This discrepancy stems from the lack of statistics in the Sudan.

since 1972. The country's export position, however, still shows an over-dependence on conditions in the world markets for its major export commodities. Foreign exchange reserves rose from 36 million US dollars in 1972 to 60 million US dollars in 1973, but the official debt was US $310 million at the end of 1973. A US $200 million loan agreement, signed in March 1974, will increase the country's external debt and its annual debt service. This loan represents the paid-up authorized capital stock of the Sudan Development Corporation (SDC), a financial investment corporation established by Presidential Decree in March 1974. The authorized capital of the SDC is $500 million, of which $200 million will be fully paid up by 10 October 1975. It is the prime function of SDC to promote investments which will strengthen the Sudan's trade balance and current account. The funds stem from a long-term loan agreement between the Government and a consortium of international banks, guaranteed by Saudi Arabia. An amount of nearly 100 million US dollars has so far been committed. Some projects in which SDC has taken the initiative are:

A. Infrastructure (i.e. railway carriages, locomotives, spare parts, etc.)

	Total foreign cost	SDC contribution
	$ 16 million	$ 16 million

B. Industries

Kenana Sugar project, equity 10%	$ 25 million	$ 2.5 million
Asalaya Sugar project, equity 10%	$ 40 million	$ 4.0 million
Six weaving mills	$ 45 million	$ 20 million

Industrial projects considered for investment:

Spinning mill Hay Abdallah, Gezira (Blue Nile)

Sugar factory Melut (White Nile)

Cement factory in Port Sudan area with 1 million tons capacity, partly financed by Kuwait

The Industrial Bank of Sudan (IBS) was established as a statutory corporation in 1961. The main objectives of the Bank as specified by its Act are:

(a) Providing financial assistance for the modernization and expansion of existing industries, and for the establishment of new industries;

(b) Furnishing technical assistance and advice in research, management, and marketing for industrial enterprises;

(c) Conducting research and investigating economic and technical feasibility of new industrial projects.

The authorized capital of IBS is LS 5 million, of which LS 3 million is fully paid up (by August 1974). IBS negotiated with the World Bank a 4 million dollar credit in 1973 which was committed in full within a few months. A second line of credit is under negotiation with the World Bank, probable volume 7 million dollars.

During the 12-year period from 1962 to 1973, IBS extended financial assistance to more than 130 industrial projects. Out of LS 12 million total investment, IBS contributed LS 4 million. The largest share of this sum went to the textile industry, LS 982,000, and the second largest to the building materials industry, LS 960,000. The largest single projects assisted by IBS loans were the Wad Medani Spinning and Weaving Mill, LS 600,000 representing 30 per cent of total investment, and the Khartoum Asbestos Cement Factory, LS 600,000 representing 60 per cent of total investment.

IBS has distributed its loans over all provinces of the Sudan. Even remote areas have been assisted.

Trained management and technicians, as well as skilled labour resources are, as already indicated, in the introduction to this report, rather scarce in the Sudan. University courses, vocational training institutes and technical schools established by the Government and substantially assisted under international and bilateral aid programmes, will improve the position gradually. Joint ventures of the Sudan with industrialized countries of Europe, the USA and Japan are bringing the foreign partner's experience and technology automatically into the country. These agreements usually also provide technical and managerial training of Sudanese nationals in the foreign partner's country. UNDP/UNIDO have extended technical assistance to the Sudan's industrial

development in many fields. Forty-six reports of UNIDO's experts are listed in the catalogue of the UNDP Office in Khartoum. In Appendix 8 a comprehensive list of reports concerning the Sudan's industrial sector is attached divided into 13 groups. In this list comments of the writer and his assistant, who both perused the reports, are included as "Notes". Among these reports those of international agencies other than UNIDO are also included, such as FAO, UNOTC, IBRD, and IDCAS. The largest UNDP/UNIDO project carried out in the Sudan is the Industrial Research and Consultancy Institute (IRCI). It was carried out in two phases, Phase I from 1965 to 1969, Phase II from 1970 to 1974. In both phases more than 500 man/months of experts were provided, aside from fellowships and equipment worth $226,000. The Institute has already assisted a number of Sudanese industries in advice on engineering, productivity, organization and marketing; it has begun to perform tests, analyses and investigations, to carry out consultations of industrial planning and processing as well as feasibility studies. It is thus gaining a reputation of a useful facility within the young and comparatively inexperienced industrial engineers of the Sudan. However, IRCI's activities are, for the time being, impeded by the lack of a suitable building. Although this was to be provided by the Government within the duration of United Nations assistance, it has unfortunately been delayed and is now expected to be completed in 1977.

Aside from this large project, UNDP/UNIDO provided under the current five-year country programme assistance to the Sudan in food processing, the Khartoum tannery, in textiles and agricultural machinery as well as in industrial planning and programming. Assistance has also been extended to the Ministry of Industry in strengthening of its planning and implementation units. A study on the Sudanese textile industry with a fifteen-year development plan was made, comprising three phases: first, foreign currency saving through substitution of imports by expansion of textile mills; second, foreign currency gaining through exporting cotton yarns by expansion of spinning; and third, foreign currency earning through exporting

cotton fabrics by expansion of weaving mills. Another study on the feasibility of setting up a nitrogenous fertilizer plant with analysis of raw material and market position and comparative studies for siting was made; sawmill and wood-based board material studies have been carried out. Under SIS programme, short-term consultants were provided for studies on sugar, kenaf, leather and glucose industries; for the Khartoum foundry installation and running-in period.

It was noticed, however, that some of these assistance projects, perhaps due to their ad hoc and short-term nature, did not yield the expected benefit. Some studies were too theoretical, as they did not sufficiently consider the practical needs under Sudanese conditions, let alone the local development constraints mainly caused by lack of physical infrastructure. It is, therefore, a step in the right direction to review the medium- and long-term needs of the country's entire industrial sector and to make recommendations for the 1977/1981 programme, by a strong high-level mission within the second half of 1975.

As an interim measure a project for improvement of the efficiency of public sector industries has been conceived. This project, which should become operational by mid-1975, will provide assistance to IPC through its new consultancy unit reporting directly to the Deputy Director General. Three long-term experts for a total duration of 72 man/months and special consultants for a total period of 42 man/months, are proposed to be provided by UNDP/UNIDO, also fellowships and vehicles, at a total cost of $448,000. This project, which should have its impact on the ailing public sector, is the only pending UNDP/UNIDO project in the Sudan at the present time.

Recommendations

The areas in which technical assistance will be most necessary in the future are identified by two tentatively suggested projects, i.e. "Sectoral Assistance to Selected Industries", and "Strengthening the Ministry of Industry". (See Annexes 4 and 5). It is recommended that these two project proposals, whose outline has been discussed with the Government, be reviewed and, if necessary, reformulated as part of the task of the high-level mission ("main mission") during the latter part of 1975. It can be expected that the two projects, which have been agreed by the Government and whose support has been assured, will be submitted as requests for UNDP assistance by then.

A recommendation for the terms of reference of the Review Mission (high-level or main mission) is in this report as Appendix 3.

Regarding the timing of the review mission, it is recommended that it be fielded during the last quarter of 1975. The reason for this postponement against the original schedule is mainly the necessary co-operation of the mission with the UNDP/IBRD planning team attached to the National Planning Commission. The team's industrial adviser has only now been recruited and he is expected to join the team by mid-1975. It is suggested that the review mission should make the fullest possible use of the experience gained by the IBRD advisers, and it is expected that the industrial adviser will be an important contact.

It is further recommended that the situation of the country's infrastructure be given special attention in the planning of further industrial development, and in the conception of technical assistance. It should be investigated which industries could substantially strengthen the country's ability to provide, with its own means, the necessary build-up of physical infrastructure such as roads, additional railways, waterways, power stations, mainly hydroelectric works for which the indigenous contribution could be considerable. This would

involve development of the building materials industry, especially cement, in order to avoid in future, the severe bottlenecks now affecting construction progress, particularly in public works. Also local assembly of goods wagons for the railways, of trucks for road transport, should be considered thus leading gradually to indigenous manufacture. For factory buildings, the fabrication of structural steel from the rolling of angles, double T-beams and other commonly used profiles, to the engineering and erection of factory sheds should be planned.

Appendix 1. Job Description

Request from the Government of the Democratic Republic of Sudan for Special Industrial Services

J O B D E S C R I P T I O N

SM/SUD/74/058/11-01/12

Post Title	Industrial Engineer - Consultant
Duration	Two months with possibility of extension
Date required	As soon as possible
Duty Station	Khartoum with possibility of travel in the country
Duties	The consultant will be attached to the Ministry of Industry and Mining, and will specifically be expected to:

1. Review the industrial sector of Sudan and specifically visit all Governmental offices and services concerned with the field of industry including financial and other institutions concerned with the industrial development, training institutions and industrial enterprises;
2. Collect as much information and data as possible about the industrialization programme and its problems and prospects which will be useful in identifying the scope and extent of outside assistance the country may need from UNDP and other resources in the field of industrial development assisted by (for a period of one to two weeks) a Junior Professional Officer and Assistant Field Adviser, assigned to Sudan and ARE;
3. Get thoroughly acquainted with and even participate as an observer in the work of the UNDP/ILO employment strategy mission and the UNDP/IBRD planning team attached to the National Planning Commission in Khartoum;

4. Prepare a report and submit it to UNIDO not later than the second week of April 1975.

Qualifications Academic training and experience in general field of industrial technology.

Language English

Background Information In the Sudan the industrial sector is relatively small, contributing about ten per cent to GDP at present. However, its rate of growth has been excellent in recent years with more and more emphasis placed on this sector in the current Five-Year Plan which is even expected to be increased in the next Five-Year Plan starting 1977-1978. Under utilization of installed capacity, inadequate capability for the preparation and implementation of industrial projects and shortage of trained industrial manpower are regarded as being some of the main constraints of this sector. In an effort to overcome these problems and accelerate the pace of industrial development, the Government has established a Project Planning and Implementation Unit within the Ministry of Industry and Mining; all the key issues of the industrial sector have been reviewed and the country's employment strategy is being studied. Although certain UNDP assistance has been provided to the industrial sector, this has so far been mainly of ad-hoc and short-term nature and not of the same proportion as absorbed by the other sector, namely the agriculture sector. Besides, some of the project proposals have been lying pending for quite some time, which, considering the importance attached to and the emerging needs of this sector, should be revived and/or reformulated. In addition, since such expanded industrial activities are relatively new for the country, the prospects for more and more outside assistance for this sector where substantial impact could be achieved is much better now. Accordingly, the Government has requested a high-level mission to review the entire matter and come up with specific proposals and recommendations. The outcome of this preparatory assistanc will be the basis of the further task to be undertaken by the main mission, the main objectives of which would be to:

(a) Review all pending Government requests for assistance in the industrial sector and come up with reformulated proposals as required;

(b) Review the more immediate needs for technical assistance of the industrial sector, including

small-scale industries and industrial training requirements, not yet identified by the Government and make detailed proposals for activities to be launched in the very near future under the present IPF finances;

(c) Review the medium and long-term needs of the entire industrial sector, including development of industrial skills, and make tentative suggestions for technical assistance activities to be included in the 1977/1981 programme;

(d) Make proposals and recommendations to UNIDO not later than one week following the end of the mission.

Appendix 2. Organization Chart, Ministry of Industry

The Organization Chart prepared by the author has been submitted previously to the Ministry of Industry of the Government of the Sudan.

Appendix 3. Review Mission, Terms of Reference

The Government of the Democratic Republic of the Sudan has requested a high-level mission to be fielded by UNIDO with a view to making recommendations and specific proposals for technical assistance in the industrial sector. This assistance should be granted on a long-term basis, to be effective during the period of the next Five-Year Plan beginning in 1977 and ending 1982.

The mission should stay in the Sudan for a period of three weeks during the last quarter of 1975. The mission's report and recommendations should be finalized, in consultation and with the concurrence of the Government, before the end of 1975.

Composition of the Mission

The mission will include:

One team leader: Senior economist with long standing experience in establishing industrial development programmes in developing countries;

One industrial engineer: Senior engineer with thorough experience in the general field of industrial technology with knowledge of the needs of developing countries;

One industrial economist: With experience in small-scale industries and the establishment of industrial estates in developing countries;

One manpower planner: with experience of the labour requirement of developing countries, also vocation and in-plant training for industries.

The mission will be stationed at Khartoum. It will be attached to the Ministry of Industries. It will closely co-operate with the National Planning Commission, and the UNDP Resident Representative.

Main Objectives

The main objectives of the mission will be:

A. To review all pending Government requests for assistance in the industrial sector;

B. To review the more immediate needs for technical assistance in the industrial sector, including small-scale industries and industrial training requirements;

C. To make detailed proposals for activities which could be launched in the near future;

D. To review the medium and long-term needs of the industrial sector, taking into consideration the present status and expected growth of infrastructure in the Sudan;

E. To make tentative suggestions for technical assistance activities to be included in the 1977-1982 programme;

F. To make proposals for in-plant training of manpower and the development of industrial skills;

G. To make recommendations to UNIDO not later than one week following the end of the mission.

Background Information

Although the industrial sector in the Sudan is relatively small, contributing about ten per cent of GDP at the present time, its growth has been considerable in recent years with more and more emphasis given in the current Five-Year Plan which has been extended until mid-1977. The Government intends to increase further the importance of industrial development during the next Five-Year Plan and ambitious plans for several sectors of industry are already being under discussion. They refer mainly to the sugar and the textile industry with a view to optimal utilization of the agricultural potential of the country.

However, there exist some major constraints that may impede smooth development, let alone the more vigorous expansion plans of Sudanese industry. They lie mainly in the field of infrastructure, whose development has not kept pace with the Government's modernization plans. Transportation bottlenecks are commonplace, a road network is practically non-existent, and the railways are suffering, inter alia, from lack of rolling stock. Similar problems occur in the field of electric power

generation, where hydropower is still in the beginning, and oil pipelines for supply of diesel stations are not laid as yet. Furthermore, there is a lack of skilled manpower particularly at the medium levels of technical training. All these shortcomings lead to under-utilization even of the already existing industrial capacity. The infrastructure situation is bound to create most serious problems if it is not given its proper place in relation to the Government's expansion plans in the industrial sector. These problems are now being discussed within the National Planning Commission which is being advised by a UNDP/IBRD planning team. This team includes now six experts, i.e. the team leader, a senior projects adviser, an agricultural adviser, a fiscal adviser, a transport adviser and a manpower planning adviser. An industrial adviser, who is expected to join in 3-4 months time (mid-1975) will make the team complete.

In its economic development plans the Government is promoting the public as well as the private sector of industry on an equal basis. Also prospects of outside assistance have greatly improved, finance being forthcoming through international organizations such as the IBRD and through bilateral sources. In addition to this, the recently established Sudan Development Corporation is about to commit foreign exchange on a large-scale basis, backed through Arab funds.

In preparation for the mission, a survey and fact-finding mission was fielded by UNIDO during February-April 1975. It was performed by Walter Weissel, Consulting Engineer, who was assisted during four weeks by Hans Swegen, Assistant Field Adviser, Cairo. Their report is attached as further background information. In its discussions with the Government, the preparatory mission made tentative suggestions for two long-term assistance projects to be carried out by UNIDO under UNDP funds, as follows:

A. A project for sectoral assistance to the Ministry of Industry involving a phased approach to strengthen several sectors of public and private industry; and

B. A project for strengthening the Ministry of Industries itself.

Both projects have, in principle, been agreed by the Government and their support has been assured. The tentative proposals for these projects are also attached as background information.

Appendix 4. Strengthening the Ministry of Industry

Tentative Suggestions for a UNDP/UNIDO Project

The Government of the Democratic Republic of the Sudan is likely to request assistance from UNDP for strengthening its Ministry of Industry. This ministry is comparatively new, having been established in 1966. Its reorganization is now under way. For this purpose, an organization chart has been drafted with the assistance of the UNIDO consultant, in April 1975. This chart includes, aside from the ministry proper, the Industrial Production Corporation (IPC), the Industrial Research and Consultancy Institute (IRCI), the Projects Bureau and the Advisory Committee included in the Encouragement of Investment Act 1974.

The project will aim at the strengthening of the Ministry's development administration, shown on the lower left of the organization chart.

It is proposed to attach experts to the Director General and to various sections of the industrial services department and the industrial planning department.

The expert team may be composed of:

1. One senior industrial administration expert as team leader to be attached to the Director General;
2. One industrial engineer/economist to assist the industrial follow-up division;
3. One industrial engineer/economist to assist the division of industrial planning;
4. One industrial engineer/economist to assist the section of study, evaluation and licensing of projects.

The project should also provide fellowships for training abroad of candidates to be selected by the Ministry. As equipment, the project

should make available suitable vehicles for the experts, including four-wheel drive vehicles to facilitate factory visits outside Khartoum.

The project's duration is proposed to last five years, beginning 1977. The Government's counterpart organisation will be the General Administration for Industrial Development of the Ministry of Industry.

Note: The various sectors of industry, as indicated in the organisation chart, will be given technical assistance under the proposed project of sectoral assistance to selected industries. The two projects will be executed simultaneously by UNIDO and they will be closely interrelated.

Appendix 5. Tentative Suggestions for Sectoral Assistance to Selected Industries

One important way to strengthen the industry of Sudan is to provide overall long-term plans for the sectors in most urgent need of such plans. These sectors have been found to be the sugar industry sector, the building industry sector, the food industry sector and the mechanical engineering sector. By means of such plans investment priorities may be established and guidelines may be given to private and public investors. Co-ordination of industrial activities with infrastructural and agricultural development will also be made easier. To have an impact it is essential that these plans cover both the public and the private industry.

The long-term plans should cover a time span of ten years over the years 1977-1986. They should take raw materials and markets into consideration as well as other essential inputs, mainly the infrastructure conditions. The plans should contain short-term, intermediate and long-term development strategies, which should be co-ordinated with other national development strategies. The plans should also indicate necessary investments and their suitable location in the country. From the plans should be derived the most important bottlenecks and practical UNDP assistance projects should be formulated in order to overcome these bottlenecks. When the next Country Programme is designed, reserve allocations for these detailed projects should therefore be foreseen. The detailed studies might contain, e.g. improvements of existing industry, feasibility studies for new industry, in-plant training of skilled and semi-skilled labour, engineers and management, or creation of special development or maintenance centres or industrial estates.

For each sector a specialist team should undertake full studies and establish the plan for a one-year period. In order to obtain a continuous dialogue with involved parties it is highly recommendable to create a Consultative Committee under the leadership of a Steering Committee appointed by the Ministry of Industry which should meet

preferably one a month during the whole planning period to discuss the progress and problems that have arison. The planning teams should be connected to the Ministry of Industry and they should for several reasons be given qualified counterparts. One reason is that even if a ten-year plan is created, planning is a continuous activity and qualified Government planners should be able to take over once the teams have fulfilled their tasks. Another reason is that the planning activity in itself gives good opportunities in training of industrial planners. A third reason is that the ten-year plan may have to be revised from time to time in order to meet unforeseen circumstances.

As a larger number of qualified counterparts may be difficult to find and as it may be difficult to start all three projects simultaneously, a phasing between the projects may be necessary. Hence it is recommended to begin with the sugar industry and the building sector and then after six to nine months the food industry sector and finally the mechanical engineering sector could follow.

Once a plan is finalized recruitment for the special projects may take place and these projects may then be implemented during the next two to three years.

Suitable Contents for a Ten-Year Plan

Part A: Survey and Marketing

1. Object of the work
2. Main targets of the plan
3. Summary of the plan
4. The local market
5. Potential foreign markets
6. Marketing recommendations
7. Raw materials and their pricing
8. Raw materials recommendations
9. Power and transportation
10. Labour survey, plan requirement and labour training
11. Machine selection, choice of appropriate technology
12. Maintenance requirements

13. Existing factories survey and their planned production
14. Summary of existing special development plans in the sector

Part B: Plan and Plan Evaluation

1. Planning
2. Phase I of plan, e.g. year 1-2
3. Phase II of plan, e.g. year 3-5
4. Phase III of plan, e.g. year 6-10
5. Economic evaluation and pre-investment
   - 5a. Phase I
   - 5b. Phase II
   - 5c. Phase III
6. Geographical distribution and location
7. Capital investment, total and annual
8. Income and expenditure of foreign currency
9. Project evaluation indicators
10. Research, development and standardization
11. Appendices: Project Documents for detailed UNDP assistance in the sector during year 1-4

A: The Building Industry Sector

The planning team should consist of one building industry economist, team leader; one transportation economist; one building materials engineer. The raw material study should consider, e.g. cement and its raw materials, limestones, sand and clay, natural stones, gypsum, asbestos, iron and iron ores, timber and timber resources. The plan should also consider the needed fabricated building materials and house prefabrication. Especially the present lack of cement may be covered by expansion of the cement industry but also by replacing concrete structures by steel structures to a larger extent. Therefore, a rolling mill for profiled steel bars as well as assembly of steel trusses may be taken into consideration.

The Consultative Committee may include representatives of:

- Ministry of Industry
- Ministry of Construction and Public Works

- National Planning Commission
- Ministry of Transportation and Commission
- Ministry of Irrigation and Hydroelectric Power
- IPC, Sub-Corporation for grouped industries
- Sudan Manufacturer's Association
- Private sector of building materials industry
- Building Materials Research Institute
- Planning team, team leader and counterpart

B: Sugar Industry Sector

The planning team should include one sugar industries expert, team leader; one mechanical engineer; one sugar marketing specialist. In the Consultative Committee may be represented:

- Ministry of Industry
- Ministry of Agriculture
- Ministry of Irrigation and Hydroelectric Power
- Ministry of Finance
- National Planning Commission
- IPC, Sugar Sub-Corporation
- Industrial Bank of Sudan
- Sudan Development Corporation
- Sudan Manufacturer's Association.

The Government is planning large-scale expansion of the sugar industry with a view to expanding annual production from the present 120,000 tons to a target of 780,000 tons. A major part of this volume will be exported, the remainder will cover the domestic consumption. A number of new sugar plantations, mainly on the East Bank of the White Nile, will be established. Irrigation by pumping is an essential pre-condition for the success of these plantations.

The objectives of this part of the project are the planning of the various factories, the phasing of their implementation in relation to the establishment of irrigated farms, the opening up of export markets and in-plant training of local labour.

The counterpart organization of the Government will be the Sugar Administration in the Ministry of Industries, in co-operation with the Sugar Sub-Corporation, IPC.

C: Food Industry Sector

The planning team should consist of one agro-industry market economist, team leader; one agro-industry processing engineer for livestock products; one agro-industry processing engineer for plant crop products; one agro-industry export market expert; and one packaging expert. This study should not include the sugar industry. The Consultative Committee may have representatives from:

- Ministry of Industry
- Ministry of Agriculture, Food and Natural Resources
- National Planning Commission
- Ministry of Finance and National Economy
- IPC, Food Sub-Corporation
- Sudan Manufacturers' Association
- Private sector of food industry
- Ministry of Transportation and Communications
- Food Research Centre
- Planning team, team leader and counterpart

D: Mechanical Engineering Sector

The planning team should consist of one manufacturing industries expert, team leader; one mechanical design engineer; one mechanical production engineer. The plan should include investigation of the private small-scale manufacturing industry as well as the bigger private factories in the sector.

The plan should be concentrated to various overall needs of maintenance, spare parts production, design and development facilities, etc., and not expand to consideration of such manufacturing units as e.g. car assembly factories. The plan may especially consider assistance to the private small-scale industry through up-grading activities in the

sector or by establishing special frameworks, e.g. industrial estates or design and development centres or expansion of existing activities. The Consultative Committee may include representatives of:

- Ministry of Industry
- Private sector of manufacturing industry
- IPC, Sub-Corporation of grouped industries
- Sudan Manufacturers' Association
- Private sector of small-scale engineering industry
- National Planning Commission
- Industrial Research and Consultancy Institute
- Planning team, team leader and counterpart

Appendix 6. **Projects under implementation by Projects Branch, Min. of Industry / April 1975**

Project's Name	Location	Prod. Capacity	Total costs (£S)	Labour	Cultivated area (Feddans)	Name of Contractor or Executing Unit	Start of Implementation	Finish of Construction	Date of Operation & Start of produc.
Sugar Fact.									
1) North West Sennar Sugar Factory	Sennar (White Nile Prov.)	110,000 Tons	22,730,000	5000	30,000	F.A Stanyard Co.	73/74	75/76	1976
2) Hagar Assalaya Sugar Factory	Assalaya (White Nile Prov.)	110,000 Tons	22,730,000	5000	30,000	" " "	74/75	76/77	1977
3) Kenana Sugar Factory (Joint)	Kosti (White Nile Prov.)	300,000 Tons	65,000,000	9000	81,000	Lonrho (UK)	76/77	77/78	1978
4) Mangala Sugar Factory	Mangala (Equateria Province)	50,000 Tons	15,000,000	5000	24,000	Techno Export (Tjeck)	75/76	78/79	1979
5) Malut Sugar Factory	Malut (Equateria Province)	110, 000 Tons	28,000,000	5000	24,000	Iemas (Belgium)	74/75	77/78	1978
Textile Factories									
1) Abu Hamma Kenaf Factory	Abu Hamma (R.N. Prov.)	10 million sacks 900 ton hessian (Woven Material)	6,300,000	600	30,000	Adriano Gardella(Italy)	72/73	74/75	1975
2) Tonj Kenaf Sacks Fact.	Tonj (Bahr El Ghazal Province)	10 million sacks 900 ton hessian	6,300,000	600	30,000	" " "	74/75	76/77	1977
3) Friendship Weaving Fact.	Khashoba (R.N.Prov.)	16 million metre of popular clothes	4,000,000	1950		People's Re. of China	72/73	74/75	1975
4) Japanese Joint Weaving Factory	Soba(Khartoum Prov.)	12 million metre a dying of 24 million metres	8,000,000	400		Furta (Japan)	1974	1975	1975
5) Port Sudan Spinning Factory	Port Sudan (Red Sea Prov.)	5000 ton of fine spinning for export	10,000,000	600		Alfarex (Spain)	1974	1976	1976
6) El Hag Abdalla Spinning Factory	El Hag Abdalla (R.N. Prov.)	7000 ton of spinning to cover the needs of the 6 weaving factories	10,000,000	600		Alfarex (Spain)	1974	1976	1976
7) Nyala Weaving Factory	Nyala (Southern Darfur)	10 million metre	3,800,000	433			74/75	1976	1976
8) El Dueim Weaving Factory	El Dueim(W.N.Prov.)	10 million metre	3,666,000	300		Sobori	74/75	1976	1976
9) Mangala Weaving Factory	Mangala (Eq. Prov.)	10 million metre	3,666,000	300		(Belgium)	74/75	1976	1976
10) Kosti Weaving Factory	Kosti (W.N.Prov.)	10 million metre	3,666,000	300			74/75	1976	1976
11) Shendi Weaving Factory	Shendi(Nile Prov.)	10 million metre	3,666,000	300			74/75	1976	1976
12) Kadagli Weaving Factory	Kadagli(Southern Kordofan Prov.)	10 million metre	3,666,000	300			74/75	1976	1976
Leather Industries:									
1) Khdami Tannery	Khdami (R.N.Prov.)	9,500,000 metre of different leathers	2,016,000	368		Griaga (French)	72/73	74/75	1975
2) Malakal Tannery	Malakal (Upper Nile Province)	150,000 pieces of reptiles	828,000	300/300					
3) Khartoum New Tannery	Khartoum(Khartoum Province)	1,756,850 metres of different hydes	1,320,400	400		Yugoslavia	71/72	73/74	1974

Project's Name	Location	Work Capacity	Total Costs LE.	Labor	Cultivated area (Acres)	Name of Contractor or Agent	Start of Construction	Finish of Construction	Date of Operation Start of Prod.
Different Industries									
1) White Nile Brewery Factory	Um (Sobe El Ghanil)	20 million bottles	5,000,000	25%	-	Sepetra(Belgium)	73/74	74/75	1975
*2) Khartoum Central Foundry	Khartoum(Khartoum Province)	1,500 Ton + Water Pipes	300,000	100 in the first stage	-	Unido	1974	76/77	1977
3) Port Sudan Khartoum Pipe Lines	Port Sudan - Khartoum	600,000 metric ton/ year	11,000,000	35%	-	The Kuwaiti Kotalie Pipe Manufacturing Co.	1974	1976	1976
4) Port Sudan Fertilizers Factory	Port Sudan (Red Sea Prov.)	280,000 ton of Urea	23,000,000		-				

* Started Production

Appendix 7. List of People Met

Name	Designation	Agency or Firm
Dr. L. Cappelletti	Resident Representative	UNDP
M.P. Hyland	Deputy Resident Representative	UNDP
P.R. Shima	Assistant Resident Representative (Programming)	UNDP
J.E. Kunitzberger	Assistant Resident Representative (Administration)	UNDP
J.E. Wahlberg	Programme Officer	
Capt. Abdin Ibrahim	Pilot Manager	
M.A. Bermeo-Estrella	Junior Professional Officer(UNV)	
D.T. Manson	Deputy Resident Representative	
J.P. Noblet	WFP Senior Adviser	World Food Programme
M.L. Jabi	WFP Adviser	
D.B. Tweedy	Adviser in Administrative Reform	UN Office of Technical Co-operation
H.P. Gutzwiller	Senior Topographic Expert	
D.J. O'Leary	Resource Laboratory Adviser	
I. Svarstad	Marketing Expert	ILO
A. Walton	Industrial Engineering Expert	ILO
O.D. Hoerr	Chief, Preparatory Team	ILO
Mr. Faaland	Team Leader	ILO Employment Strategy Mission
Prof. Mustafa Ahmad	Consultant	ILO
H.T. Khemchandani	Tobacco Development Adviser	FAO
H.J. Perten	Cereal Technologist	FAO
I.H.N. Grundberg	Farm Machinery Instructor	FAO
J.E. Steel	Chief Technical Adviser	UN Educational and Scientific Organization
J.V.R. Segerstrom	Civil and Building Engineering Expert	UNESCO
S. Singh	Epidemiologist	WHO
Kaji G.S.	Resident Representative	IBRD

Name	Designation	Agency or Firm
O.D.K. Norbye	Team Leader	IBRD
N.P. Constantinidis	Senior Projects Adviser	IBRD
S.M. Palia	Investment Adviser	IBRD
D. Papageorgiou	Industrial Economist	IBRD
Abdalla Fadlalla	Under-Secretary	Ministry of Industry
Hafes Sanhuri	Director	
Ahmed Al Dawi	Director	
Mr. Lufti	Specification and Quality Control Section (Group 7)	
Abbas Attia	Sugar Administration	
Idris Ali Ahmed	Head of General Affairs	
Mohamed Abdel Maged Ahmed	Chairman and Managing Director	Central Electricity and Water Authority (CEWA)
Abdel Aziz Osman	Director of Electricity	CEWA
Zein El Abdin Mustafa	Director General	CEWA
Mohamed Beshir	Director General	Industrial Production Corporation (IPC)
Ali Abd-El Hamid Ali		IPC
Mohamad Hassan Hafez	Deputy General Manager Projects Bureau	IPC
Hussein Kamal	Associate Manager, Food Industries Corporation	IPC
Salih Girgis	Commercial Division, Food Industries Corporation	IPC
Nabeelo Habib		IPC
Dafa Allah El Haj Yosib	President	Industrial Manufacturers' Assn.
Abd-El Salam Abu Elilla	President	Sudan Chamber of Commerce
Abdulatif	Director General, Geological Department	Ministry of Mines
Yusuf Suliman	Deputy Director General	Ministry of Mines
Khider Moyaman Nour	General Manager	El Guneid Sugar Factory
Sayed El Mekkawi Mustafa	Director	Khartoum Spinning and Weaving Co., Ltd.

Name	Designation	Agency or Firm
Mohamed Abdel Bagi	Financial Manager	Bata Shoe Co.
Omer El Zein	Managing Director	Blue Nile Brewery
Saeed Ayoub El Gaddal	General Manager	Blue Nile Packaging Corporation
B.M. Bukhari	General Manager	Khartoum Tannery
Munir Yousif El Hakim	Technical Director	Sudanese Steel Products, Ltd.
Abdel Rahman Abdel Halim Obeid	Director	Industrial Research and Consultancy Institute
Babiker Mohamed Ali	Director	Grouped Industries, IPC
Hassan Babiker	Chemical Engineer	Department of Standardization
Suliman Abu Damir	Assistant	Department of Industrial Planning
Omar Hamour	Manager	Khartoum Central Foundry
M.S.A. Sakran	Assistant Manager	Khartoum Central Foundry
Dr. Heinz Seitinger	Commercial Counsellor	Austrian Embassy
Dr. Walter Mayr	Commercial Attaché	Austrian Embassy
C.K. Chandran	Hydropower Consultant	IBRD
Mr. Heitner	Consultant	IBRD

Appendix 8. List of Reports

UNDP No.	Date	Author	Subject	Notes
1. Industrial Surveys				
73	4.1969	Nayat	Public Sector Industries	Organisation of nine factories
-	12.1973	Papageorgiou Thiypen	A Survey of the Industrial Sector of Sudan	IBRD Mission; good overall survey
-	8.1969-4.1970	IDCAS	Industrial Survey and industrial investment opportunities	Detailed information; basic report
2. Investment				
IBRD 400	10.1973	IBRD	Appraisal of the Industrial Bank of Sudan	
IBRD 319	6.1972	IBRD	The Economic Development and Prospects of the Sudan	Volume I, the main report
IBRD 320	6.1972	IBRD	The Economic Development and Prospects of the Sudan	Volume II, Annex I, the public enterprises
-	1974	Government of the Sudan	The Development and Encouragement of Industrial Investment Act 1974	Legislation and Organisation
UNDP 267	3.1972	Resident Representative, UNDP	Annual Report Lot 31.12.1971 Part A: Externally financed pre-investment + technical assistance Part B: Capital Assistance Activities	Gives survey of multi-lateral and bilateral assistance

UNDP No.	Date	Author	Subject	Notes
3. Regional Studies				
13	1969	D.K. Malhotra	Industry Potential of Three Areas	Deals with Wad Medani, Kosti and Kassala areas
77	1970	D.K. Malhotra	Small-Scale Industries	Five areas (estates) Omdurman, New Halfa, Kosti, Kassala and Wad Medani
288	2.1973	S. Montassir	Nzara Complex	Suggested UN assistance $706,000 exp. 111 m/m, fellows 30 m/m, equipment, $45,000, App. I Background of Zande Scheme. Govt. Ct part: Development of Nzara Complex
4. Use of Raw Materials (Minerals, Agricultural, etc.)				
FAO 106	1963	Durgunt	The Utilization of Sudanese Woods	
UNDP 245	1970	Geoterrum, Ltd.	Interpretation of Airborne Geophysical Surveys	
UNDP 256	6.1971	Resident Representative, UNDP	Mineral Survey in Three Selected Areas	Terminal assessment report
UNOTC 201	1971		Mineral Survey in Three Selected Areas	Results, conclusions and recommendations
UNOTC 420	11.1973		Copper Ore from Holraten Watria	Amenability Study
155	4.1971	Minorex, Ltd.	Asbestos Deposits Ingessana Hills Area, Southeastern Sudan	

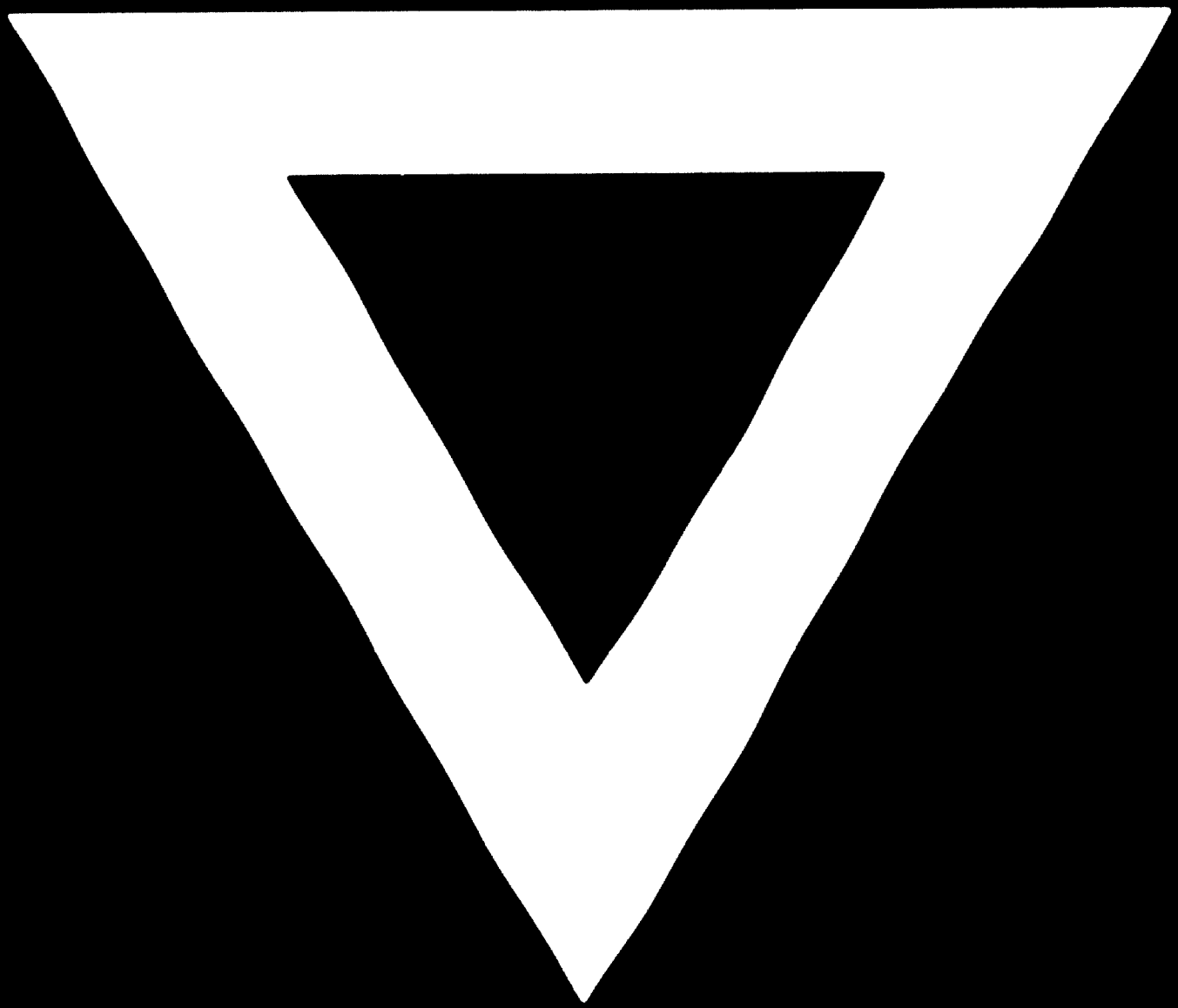
UNDP No.	Date	Author	Subject	Notes
5. Metallurgic Industry				
215	7.1972	H.J. Fritz	Foundry and Mechanical Workshop	Establishment with bilateral Yugoslav assistance
6. Building Industry				
74	1968	J. Grant	Aroma Cardboard	Performance and recommendations
409	10.1973	Asklund	Cement Factories	Atbara-satisfactory Rabak-improvement required
349	11.1972	Branch report Geneva	Cement Industry	General Survey
FAO 40	196/	Mueller-Eckehardt	Wood-based Board Materials	
FAO 89	1970	Schepotyev Krotov	Sawmill Equipment of the Sawmill Project at Wau	
	3.1972	Nakawi	Building Sector Survey	UNIDO report ID/WG. 122/11 Gives information on raw materials, industry, market prices, etc.
7. Textile Industry				
332	4.1973	M.H. Mottalib	Textile Industry	With two printed Part I Survey a Market Part II Plan an Evaluation
185	1972	Ministry of Industry and Mining	Introduction for a 15-year Tentative Plan for Sudanese Cotton Industry	

UNDP No.	Date	Author	Subject	Notes
8. Agro-industry (Implements, Fertilizers)				
12	3.1969	Hebman	Nitrogen Fertilizer Plant	Recommendations on establishment
214	1.1972	Nasrin Gohlich	Agricultural Machinery	Manufacturing feasibility study
230	9.1972	R.P. Cook	Fertilizer	Recommends urea plant at Port Sudan, 200,000 T/yr, saving foreign exchange 1 5 LS per year for 12 years, then m 28 LS/yr.
290	9.1972	R.P. Cook	Fertilizer	
291	11.1972	R.P. Cook	Fertilizer (final)	
FAO 50	1969	Hebman	Specifications of Ammonia Plant and Urea Plant, incl. technical and general facilities	
FAO 163	1971	Gohlich	Agricultural Machinery and Implement Manufacture Study Mission	
8	1968	IRI	Feasibility of Setting Up a Nitrogen Fertilizer Plant	
291	11.1972	Cook	Nitrogenous Fertilizer Project	Final Report
347		Nasir	Agricultural Machinery and Implements Industry in 6 North African Arab Countries	UNIDO/IDCAS Study
9. Agro-industry (Vegetable Oils, Leather and other non-food Products)				
119	2.1971	Cornelius	Vegetable Oil Industry	Cotton, ground nuts, sesam castor seeds as raw materials; 30 mills seen

UNDP No.	Date	Author	Subject	Notes
342 430 431	5.1973	K. Treka K. Treka K. Treka	Leather Industry Footwear Industry	Capacities, sufficient, high prices critisized, 9 experts (6 for public and 3 for private industry) recommended
331	7.1973	S. Montassir	Oil and Soap Industry Vertical	This volumnous report begins with a continuation of App. IX, ends with Arabic section-only appendices. Possibly the main report is 329, same author - not available.
FAO 52	1969	Knew	Rural Tannery Planning	
FAO 61	1969	Knew	Demonstration Marketing Research for Improved Hides, Skins and Leather Production	
FAO 68	1969	Knew	Hides, Skins and Leather Development and Training Project	Final Report
FAO 70	1968	Korn	Informal Technical Report on Leather Utilisation	
FAO 176	1969	Haas	Demonstration and Marketing for Improved Hides, Skins and Leather Production	Informal technical report on mechanical engineering
FAO 438	1974	Mahadevan	Demonstration and Marketing Research for Improved Hides, Skins and Leather Production	Draft final report

UNDP No.	Date	Author	Subject	Notes
292	3.1973	Broadbent	Standardization and Quality Control of Oil Seeds	Final report
303	10.1972	Kirby	Production of Kenaf Fibre	Report on an advisory visit
188	10.1971	IDCAS	Development, Productivity, Administration and Technology of Sudanese Vegetable Oil Industry	Brief summary
10.	Food Industry			
10	1970	H. Linder		Visited Kareima, Wau Babaneuse
212	5.1972	L. Mathew	Sugar Plants in South Sudan	5 plant 600 T/yr. recommended to cover demand of South 3000 T/yr.
195	6.1972	Ato	Sugar Industry Guneid Girba and South Sudan	Adds to description and review of Northern Sudan
194	6.1972	R. Besso	Dura Starch Glucose Project	Utilize sorghum for production
11.	Industrial Research			
99	1969	UNIDO	IRI Interim Report	For period 1965-1969 Industrial Research Institute
311	4.1973	M.N. Gupta	ICC	Industrial Consultancy Corporation. Author complains non-achievement of mission due to curtailment of assignment.
306	11.1971	UNIDO Mission	IRI	Recommendations on experts, visits, etc.

UNDP No.	Date	Author	Subject	Notes
308	12.1972	A.D. O'Dell-A.A. Tamimi Mission	IRI	Evaluation and recommendations: phasing and schedules, etc.
398	12.1973	O.D. Puri	Laboratory Instruments	Project suggestion: Central Instruments Repair Workshop. $806,000 assistance for staff; $160,000 equipment.
12.	Industrial Information and Documentation			
142	7.1970	W.T. Leroh	IDCAS Information Service	Regional information network of IDCAS organizational matters
233	9.1972	M. El Hadi	Industrial Information and Documentation	Index of libraries, "coverage unbalanced and incomplete".
13.	Management Methodology, Industrial Planning			
189	12.1971	El Hosseiny	Industrial Development Planning	Assist Government in preparing an industrial development plan
379	2.1973	Hamdy, Berg, Eldin	UNIDO Mission on Project Implementation Methodology	Training of 18 personnel re-organisation of Industrial Development Department in the Ministry of Industry, implementation system for foundry
441	2.1974	Tombach	Project Implementation Methodology	Theoretic



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