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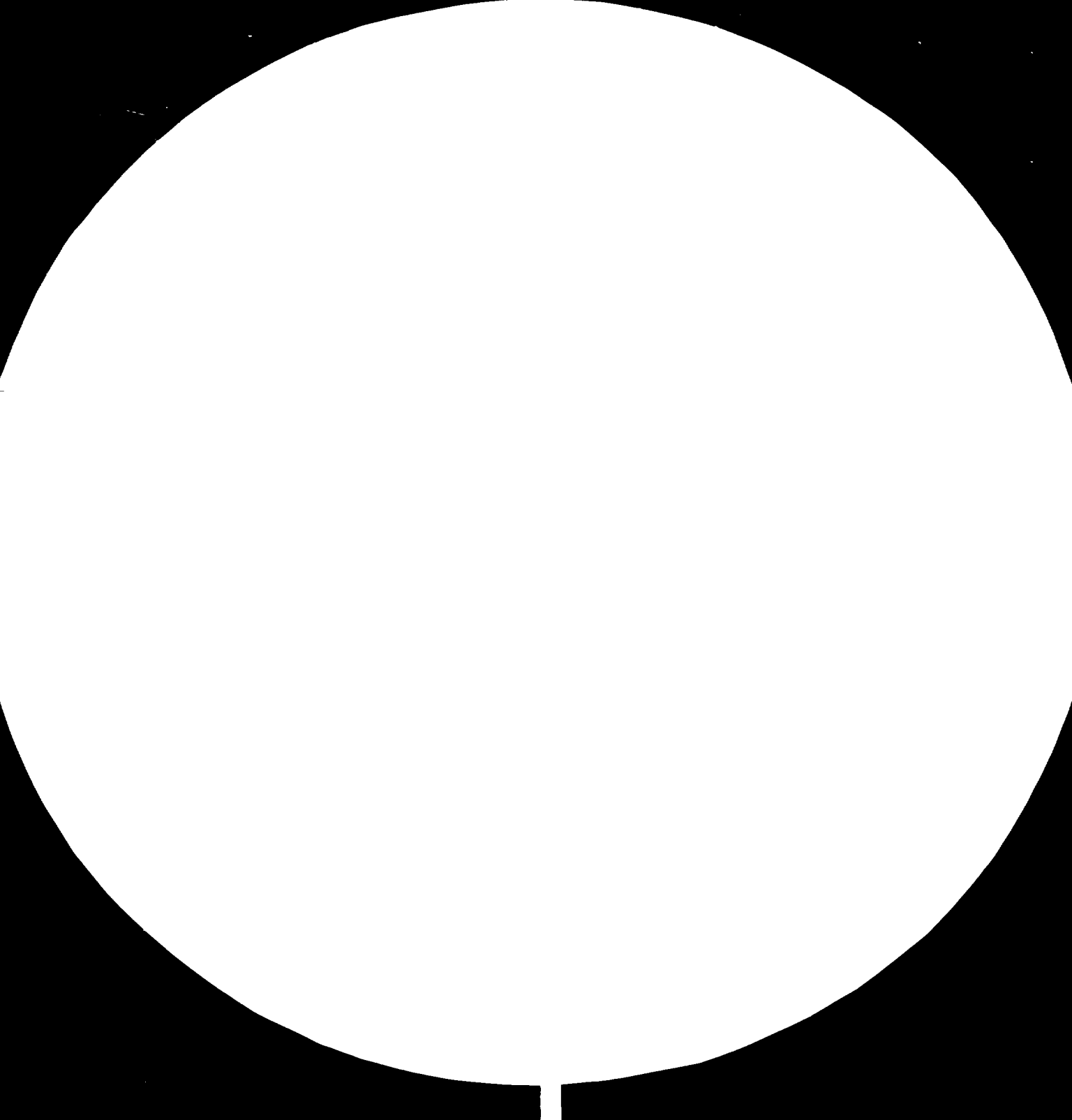
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Date 1st. Feb. 1978

" A SURVEY OF SMALL-SCALE INDUSTRY POTENTIAL IN THE
GEZIRA

(ASSISTANCE TO THE SUDANESE SAVINGS BANK)

SUDAN

(RP/SUD/77/004/11-01/31.3.D)

Project findings and recommendations

Terminal report prepared for
Democratic Republic of The Sudan

by

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This report has not been cleared with
the United Nations Industrial Development
Organization which does not therefore
necessarily share the views presented (1)

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S U M M A R Y

- 1- The Physical infrastructure in Gezira, described in Chapter I is comparatively better developed than in other provinces of the Sudan. A rich agricultural class has accumulated adequate savings, is keen to invest in modern small-scale industries; rising incomes in agriculture, have brought many consumers of industrial products for the first time in the market. This combination, of factors of industrial development, is available only in Gezira, in the whole of Sudan, most conducive for diversifying production in small industries. (refer to Gezira Scheme - pages 65-68 Appendix II). The promotion of modern small-scale industries, has, so far, been neglected; no planning in quantitative terms has been made. In the Six Year Plan, inspite of the fact, that due priority to the development of small industry has been accorded, the investments have not been spelled out; provision of machinery and equipment on hire purchase has been made, without indicating financial allocations. Unless this is done, the development programme might remain haphazard and un-coordinated. In case of traditional handicraft industries in rural areas, investment targets have been spelled out and a Rural Development Corporation (RDC) is being created.

- 2- Greater emphasis is given to dispersal of industries to rural areas, while the economic choice of suitable location pattern, would be not between centralized and dispersed pattern, but in between - Wad Medani, Hasca-Heisa, Rufaa, Banagil and Kamlin, offer adequate scope for small industries, as producers of a variety of consumer goods, parts and components for large industries (refer to paras 29-32).

- 3- There is no small-scale industry department or corporation equipped with a net work of industrial extension services in Sudan, while these industries, in all the developing countries, need help in all aspects of their planning, establishment and operation through a variety of measures of promotion and assistance - technical, financial, managerial, marketing etc.- Such assistance should be a part of an integrated programme, which can only be provided by the Government; it is the primary responsibility of the Government to provide such assistance, which is a pre-requisite for the development of a modern small industry sector. The Provincial Government of Gezira is, therefore, keen that at least a modest small industry department should be created at the earliest, on a pilot basis, in order to implement the recommendations made in this Report (Refer to paras 37-40 and pages 62-64 Appendix II paras 1-9). For institutional financing, either the Industrial Bank of Sudan (IBS) should open a branch in Wad Medani, or the Sudanese Savings Bank (SSB) should be allowed to operate, as a semi-development Industrial Bank (refer to paras 51, 73-80). The Government, ultimately, shall have to create an appropriate department exclusively responsible for the promotion of small industries or a corporation for the operation of machinery and equipment on hire purchase and for the creation of a central

marketing body, in order to implement the recommendations made in the Six Year Plan (refer to paras 59-67). The present definition of small-industry needs elaboration, so that it is not mixed up with manual processing and handicrafts (refer to para 34).

- 4- The existing capacities in the Vocational Training Centre (VTC) and Youth Training and Development Centre in Mad Medani should be increased to meet the new demand. The Management Development Productivity Centre should also add a cell in VTC for the training of managers and entrepreneurs. There is acute shortage of skilled labour and trained managers at all levels, largely due to its migration to foreign countries. Some legislative measures might be introduced to minimize migration.
- 5- In chapters 2-6 the problems of conventional industries and suggestions to improve their production processes and diversifying production in modern small-scale industries, location-wise, is discussed, according to broad industrial classification, these are summarized in paragraphs 6-10 as below :-
- 6- New Food Processing industries include in order of priority, preservation of concentrated juice of small lime, only for export, (canning of fruits and vegetables is not profitable), establishment of two modern canneries and dairy units in Mad Medani, a flour mill, an ice factory and an oil mill in Hamlin, a flour and fodder mill in Mangil, processing of animal and poultry feeds and dehydration of fruits and vegetables in rural-areas. Existing conventional bakeries in towns need modernization, mini flour mills need assistance in spare parts and "Abu Kabira Spices" conventional industry in Mangil needs modernization. (refer to paras 73-74) - Vegetable oil and cakes, animal feeds industries).
- 7- New industries, producing Agricultural Commodities, other than Food, are most important; in order of priority, they include bone meal for export, canvas, straw board, terry towel and fabrics, semi mechanized footwear and leather industries, modern saw mills, carpentry and joinery workshops, manufacture of standard size veneered flush doors, hosiery, ready-made garments, specialized handloom fabrics, cotton rug, upholstery and thread. The suitable location for bone meal is near Gezira Tannery, for straw board based on baggese in Junaid, while the rest offer suitable locations in Mad Medani and Hassa-Heisa. Improved production processes are suggested for the large conventional tannery in Mad Medani, conventional footwear, leather and carpentry workshops in all towns.
- 8- Building Materials industry, is very important; the proposed new industries, in order of priority, include a modern brick-making plant, plastic industries and glazed tiles in Mad Medani, a stone-crushing plant at Fau. The improvement of existing production processes of conventional brick industries, should be given high priority, compared to conventional cement tiles industry.

- 9- Light Engineering industry, deserves high priority; the proposed new industries in order of importance, include a small foundry for fabricating simple agricultural tools and implements and three mobile mechanical workshops, to be established by Gezira Co-operative and Tenants Union, for which financial allocation is made in the Six Year Plan; a general purpose repair and maintenance, an electrical workshop for automobile and a fuel injection pumps workshop in Mad Medani. Modernization of existing units, include Rabai and Gazali workshops in Hassa-Heissa and conventional forging, repair and maintenance workshops in all towns.
- 10- Miscellaneous new industries, include retreading of tyres, a match factory and a dry-cleaning plant in Mad Medani, prospects of producing methane gas in small towns and assistance to the existing "Blue Azure Laundry" in Mad Medani.
- 11- India has the largest promotional programme in the World, for the development of modern small-scale industries, as well as for rural industries. It has small industry corporations, both at the central and provincial levels, equipped with a net work of extension services and supporting institutions, up to the district level. Hundreds of model schemes, suitable for small industries have been prepared. Similarly, for the promotion of rural industries, there is an independent "Khadi and Village Industries Commission".
- The Government of Sudan, if it so desires, might request for technical aid from India, on a bilateral basis for expertise, especially for the operation of hire purchase machinery and equipment, promotion of rural industries and handicrafts and marketing of their products.
- 12- Most of the proposed new industries, require preparation of model schemes, except those, for which, technical know how is locally available.
- 13- For the promotion of rural and handicraft industries, the U.N. Food and Agricultural Organization's (FAO's) assistance would be required. (refer to paras 45-47).
- 14- Conclusions, which emerged from the above findings, are summarized in the form of recommendations, which include areas of UNIDO's further assistance, in chapter 7.

I N T R O D U C T I O N .Project Background :

- 15- The former Blue Nile Province was lately sub divided into three provinces and Gezira became a separate province; Wad Medani is the capital. It is the richest province in the Sudan in agricultural commodities, constitutes over 12% of the total cultivated area in the Sudan, almost the whole area is under mechanized cultivation. Electricity is available in almost all the towns, new roads are being constructed, most important of which is to Port Sudan, which, on completion, would considerably reduce the cost of imported equipment and raw materials, prospects of urbanization and industrialization would increase. (refer to Gezira Scheme pages 65-68 Appendice II).
- 16- The owners of the existing traditional enterprises and prospective entrepreneurs are groping in the dark, as there is no technical and financial institute, responsible for the promotion of small-scale industry, to guide and assist them.
- 17- The Sudanese Savings Bank, (SSB) in spite of being a comparatively new commercial bank, has accumulated about \$seven millions (IUS \$.- 3976 £s.) from tenants and small savers, has its head office in Wad Medani, and a branch office at Hassa-Heisa. The Bank is keen to reinvest a part of the savings, in financing profitable small-scale and rural industries, which would be an immediate benefit for the Province and the Sudanese economy, would be a further step towards decentralization of industry.
- 18- The Government of the Democratic Republic of the Sudan, requested United Nations Industrial Development Organization (UNIDO) to assist the Bank through an expert, for 6 man/months, in making the best use of the funds in financing some profitable small-scale or rural industry. The expert was expected to advice on Government's capacities for providing effective extension services to small-scale industries, assist and identify suitable locations for the creation of small industrial enterprises in Gezira, identify traditional industries, with potential for transformation into modern small-scale industries, advise on appropriate small-scale processing technology, improving operation and production processes, assist in the creation of new small-scale and rural industries, and undertake training of counterparts.
- 19- There are a couple of modern small-scale industries, over 200 mini flour mills; the over-whelming majority of small enterprises, consist of artisan workshops, and traditional industries. Technical and financial assistance is not available.

The International Labour Organization/ United Nations Development Programme (ILC/UNDP) Employment Mission Report 1975 - " Growth, Employment and Equity" had made strong recommendations that investment in small-scale industries should be spelled out, separate institutions should be created to provide sustained and integrated assistance. It is understood that a previous UNIDO expert had also suggested development plans for small-scale industries at Kassala and New Halfa. Food and Agricultural Organization/ United Nations Development Programme (FAO/UNDP) project in Sudan on vegetable and fruit dehydration, had demonstrated simple techniques, suitable for rural areas and small towns. A previous UNIDO/FAO expert report "Utilization of the Raw Materials of the Hides and Skins in the Development of Footwear Industry" had also touched on the advantages of small footwear industry. However, none of the recommendations, of the previous experts have been implemented especially in Gezira.

In the Six Year Plan, high priority has been accorded to small-scale industry, especially light industries in Gezira.

Summary Out-line of Official Arrangements :

20/

UNIDO accepted the request made by the Government of the Democratic Republic of the Sudan, established the project RP/SUD/76/008, which was approved by the Executive Director on 7 December 1976, for an expert for 6/m/m at a cost of US \$ 24,000. The funds earmarked lapsed, as the expert, who was originally selected withdrew at the last moment. The project was re-established RP/SUD/77/004/11-01/31.3D, was authorized by the Executive Director on 24 February 1977, at the original cost and period, Mr. Minhaj Uddin Ahmad, an economist, was selected and appointed, the Project became operational on 4 September 1977 and completed on 3 March 1978. S.S.B. acted throughout the period of the project, as co-operating agency.

Objectives of Project :

21-

The short term objectives, discussed in para 13 above, were practically achieved, with the exception of one of the main objectives i.e. assistance to the S.S.B., in financing profitable new small-scale industries or the existing traditional industries, since the Bank is not institutionalized, is non-development in purpose, to promote small-scale industries. The Bank is however, keen to institutionalize, act as a semi development industrial bank, to promote small-scale and rural industries.

Further, the short term objectives, which have been realized, are limited to the identification of problems, improvement of existing production processes and selection of new profitable industries, but their implementation, would require both technical and financial

institutes and supporting activities, in order to follow up the recommendations, for achieving both short and long term objectives.

22- The findings and conclusions were arrived at after discussions with the Ministry of Industry, Ministry of Economic Planning, Ministry of Cooperative and concerned technical and financial institutions. The counterpart of the expert was associated throughout the project activities.

23- The English version of the Six Year Plan was not available, but Dr. Shinawy, Manpower Adviser, United Nations Development Programme/ International Bank for Reconstruction and Development, (UNDP/IBRD) extended his cooperation, made available the chapter on Industry, relevant extracts, useful to the project were obtained.

Mr. Langeoire, and Mr. Awadel Mahil I.L.O. expert and Manager respectively of the Vocational Training Centre, Mad Medani extended full cooperation, assisted in identifying profitable new repair and maintenance industries, worked out the approximate cost of the machinery and equipment.

24- Findings are aimed in achieving both short and long term objectives, envisaged in the Six Year Plan, for the promotion of small-scale industries in general, with particular reference in Gezira; due emphasis has been given to the creation of appropriate small-scale industry institutes, which are economically justified. In order to facilitate reading, findings, (conclusion, results) are divided into seven chapters as below :-

25- Chapter I discusses the physical and institutional infrastructure in Gezira, such as availability of the capital, entrepreneurs, skills, growth-areas and limitations to growth. Institutional infrastructure is equally important; at present there are no institutions to provide assistance in improving existing obsolete techniques employed by the artisan workshops, or assist in the creation of new modern small-scale industries. Integrated and sustained assistance through a variety of measures is discussed in detail. The present role of the existing technical and financial institutions, their shortcomings in promoting small industry, proposals for expansion of their activities and creation of appropriate institutes, within the frame work of the Six Year Plan is discussed. The role of S.S.B. for the promotion of small-scale industries, will depend on whether it is allowed to act as a semi development bank. Effort has been made to draw the attention of the Government to linking technical assistance to financial assistance; the absence of either will meet half way the objective in the promotion of an efficient small industry sector.

Chapter 2 discusses the general nature of Food Processing Industries, considers improvement in existing traditional methods, prospects, feasibility, or otherwise, of new industries, their locations and profitability.

Chapter 3 evaluates a variety of industries producing Agricultural Commodities other than Food, which are most important to the economy of Gezira and to the economic development in Sudan. Possibilities of manufacturing non-perishable agricultural commodities are discussed in detail, together with suitable locations and profitability. The development of new products helps to keep agro-based industries dynamic. Before any new industry is established, markets for its products and raw material supplies must be ensured. Most of these industries serve the basic necessities of the consumers, who are becoming conscious about the quality and reasonability of the prices. An effort has been made to draw the attention of the Government, to improving existing technologies and diversifying production in modern small-scale industries.

Chapter 4 analyses the prevailing high cost of Building Materials Industry, which is reflected in high per-unit cost in all industries. Prospects have been explored of reducing cost and improving quality; new industries have been proposed which would satisfy consumers requirements at reasonable prices.

Chapter 5 makes an attempt to evaluate the importance of simple Light Engineering Industry, which is extremely important in order to safeguard expensive capital equipment. Creation of new efficient repair and maintenance industry is given due importance in order to serve the requirements of the consumers at reasonable prices to their satisfaction. The Six Year Plan has also accorded high priority to the effective maintenance and repair facilities of agricultural machinery, even in isolated areas. It gives an account of the existing facilities, suggests improvements and explores possibilities of fabricating simple agricultural tools and implements, which are high in demand in Gezira.

Chapter 6 discusses some of the Miscellaneous industries, which are also of importance.

Chapter 7 gives an analytical account of the Recommendations that emerged from the findings and conclusions arrived in Chapters 1-6. Recommendations have been made, keeping in view, the priorities assigned to small-scale and rural industries development in the Six Year Plan, within the suggested financial allocations. An Analytical review is made that the Government has a major role in drawing up plans and programmes for the development of small-scale industry. UNIDO's further assistance and support by P.A.O. for the promotion of rural industries is also discussed in detail.

CHAPTER IFINDINGSINFRASTRUCTURE AND INSTITUTIONS FOR THE PROMOTION
OF SMALL-SCALE INDUSTRIES IN THE GEZIRA PROVINCE.PHYSICAL INFRASTRUCTUREPopulation and Area:

- 26- The Gezira's present population is about 2.2 millions; the urban population is approximately 186,000, out of which over 106,000 is concentrated in Wad Medani and the rest is spread over in seven small towns, having a population ranging between 5-19 thousand (refer to pages 65-66 Appendice II paras 11-13). Only four small towns, namely Hassa-Beissa, Rufaa, Kamlin and Abu Ushar, are situated on the main Khartoum-Wad Medani high way, while the others are connected with rough all-weather roads.

27- Transport :

There are no proper roads within the urban limits of the small towns; roads have not been constructed even in the industrial area in Wad Medani, where most of the large industries are concentrated. Lack of adequate proper roads, make the transportation cost high, while the power supply is adequate, but is irregular. The weak infrastructure is accompanied with scarcity of trained entrepreneurs, managerial skills and skilled manpower, and leads to dependence on a very narrow range of markets.

28- Cost of Building Materials:

So far, little attention has been paid to the building materials industry. The cost of the building materials is very high, cement is scarce, and the small entrepreneurs have to purchase it at higher prices than fixed by the Government; the fittings and fixtures are mostly imported. The building cost, presently, is more than twice compared to Asiatic countries. Since the building cost constitutes roughly 50% of the total cost of the fixed capital in an industry, it is reflected in higher per-unit cost of production. Therefore, the cost of domestically-produced consumer goods, based on local raw materials, is higher compared to such Asiatic countries, as India, Pakistan and Bangla Desh, and exports would be difficult in competition with these countries.

29- Small Entrepreneurs:

The Gezira Province has a rich agricultural class, local capital does not appear shy, many people are interested in investing in suitable small-scale industries, as they have accumulated adequate savings, but the potential, which could be developed into promising entrepreneurs, is in the dark about suitable industries, small-scale industry departments or institutions, which could assist them in the selection of the machinery,

it's operation, training of personnel and marketing of the product, etc.

30- Rural Infrastructure and Limitations to Growth:

In view of the weak infrastructure, very thinly spread population, extremely narrow markets and low purchasing power in the rural areas, the development of rural industries, seems to be limited to simple fruits and vegetables preservation, production of cheap animal and poultry feeds, handloom spinning and weaving etc. and traditional handicrafts. The traditional handicrafts in rural areas, could be sustained and would require support, preferably by specialized agencies, having experts in artistic trades, so that product could be designed to modern tastes.

31- Small-Scale Industry and Growth Areas:

The present industrial structure in Gezira, consists of a few large and medium industries on the one hand, and a large number of traditional artisans workshops and handicrafts on the other, while small manufacturing enterprises, inspite of their large numbers, contribute hardly five percent in the total of the manufacturing activities and less than 1/10th, compared even to handicrafts. (refer to page 71 Appendice III paras 1-2). The promotion of modern small-scale industries, has, so far, been neglected and no planning and economic investment in quantitative and qualitative terms has been attempted, although Mad Medani and the four small towns (namely Hassa-Heisa, Rufaa, Managil and Kamlin) offer adequate scope for small-scale industries, as producers of a variety of consumer goods, building materials, repair and maintenance of agricultural machinery, light engineering, etc.

32- The present emphasis on dispersal of industries purely for socio-political reasons to rural areas, appears to be a little premature; the economic choice of suitable location pattern would be not between centralized or a dispersed pattern to rural areas, but in between, which offer worth while economic advantages. The regional plans of industrialization could be made consistent with the overall geographic distribution envisaged in the Six Year Plan, to meet both the short and long term objectives. The location of modern small-scale industries could be based on minimizing the transport costs between the industry, it's required inputs, and markets, which would ultimately lead to an economic situation where the importance of raw materials would tend to decrease, comparatively, and market orientation would tend to increase; for example Gezira Board has preferred to concentrate most of the ginning factories in Mad Medani, instead of near the sources of raw materials. Mad Medani and the four small towns offer considerable scope of urbanization economics and, for the present, "footloose" investment, might be spelled out both in quantitative and qualitative

terms, to be spread into small investments in modern profitable small-scale industries.

- 33- In the Six Year Plan, no investment targets, the mobilization of resources and savings for the small industry sector have been fixed. Unless this done, the development programme shall remain haphazard, uncoordinated and it would be difficult to link it with national priorities and objectives.

INSTITUTIONAL INFRASTRUCTURE

Definition of Small-Scale Industry :

- 34- There is no uniform definition of small-scale industry, it vary from country to country. However, there is general agreement that small-scale industry should be distinguished from large and medium industry on the one hand and from rural and handicrafts on the other and that it should be defined to include those industries, using modern technology, but in which employment and investment in fixed capital are modest.

- 35- In Sudan, at present modern small industry is being mixed up with traditional, rural and handicrafts, which employ manual processing technology. According to the existing definition " Establishments are defined as small, in case they engage ten or lesser number of workers". The present definition needs elaboration. Keeping in view the high cost of imported machinery and equipment, and building materials, it is suggested that a small industry might be defined to include manufacturing enterprises, which use modern technology, employing up to twenty workers and fixed capital investment up to \$ 150,000.

Small-Scale Industry Corporation or Department in Sudan

- 36- At present, in the whole of Sudan, there is no Small-Scale Industry Corporation, or a Department, responsible for providing the integrated assistance through industrial extension services, such as, training and stimulation of entrepreneurs, preparation of "model schemes", (requirements in capital machinery and equipment, raw materials, production processes, marketing and estimated profits) and technical and management assistance, so that financial assistance is linked to technical assistance. Such integrated assistance can only be provided by the Government through appropriate effective extension services, since guidance and support would be required for a fairly long period of time. There is not even an Industries Department, attached to any Provincial Government in the Sudan, and Gezira is no exception.

The Government might promote the establishment and expansion of small-scale industry by creating an appropriate agency of ~~broader scope~~, preferably a semi-autonomous corporation, with sub branches in the provinces for coordinating the programmes and services offered by specialized technical and financial institutions, which, include industrial credit institutions, industrial research institutes, industrial management training centres and technical and vocational training institutes. The most important wing of a small-scale industry corporation, agency or department is the industrial extension services, whose broad functions are summarized as below :-

- i) Conduct techno-economic surveys and advise prospective entrepreneurs on prospects of establishment of profitable industries.
- ii) Prepare "model schemes" for industries of priority.
- iii) Assist and advise in obtaining supporting facilities and assistance from various sources.
- iv) Advise on modern technical processes.
- v) Assist in obtaining suitable machinery, equipment, installing, operating, selecting and procuring suitable raw materials.
- vi) Assist in improved management practices, quality control, inventory control and financial accounts.
- vii) Provide advise and assistance in the marketing of the product.
- viii) Conduct training courses of the personnel, including entrepreneurs.

To carry out the above functions, the Small-Scale Industry corporation or department would require specialists in a wide variety of subjects. (Refer also to pages 62-65 - Appendice II).

37- Proposals for Small-Scale Industry Department in Gezira :

In the Gezira Province, the prosperous agriculturists have accumulated adequate savings, which are lying dormant, and are keen to invest in suitable small-scale industries. A number of large industries have already come into operation, both in the public and private sector, while many more have been proposed in the Six Year Plan.

38- The large industries would ultimately require complementary modern small-scale industries as ancillaries.

39- Since the present Project is confined to the Gezira Province, which could give a lead on a pilot basis, the Provincial Government is quite rightly keen that a modest department for the promotion of small-scale industries might be created, comprising an industrial engineer, a mechanical engineer, a food processing and agro-industries engineer, and a chemical engineer.

The Provincial Government is prepared to finance it or the Central Ministry create the proposed department in the Gezira Province. The Provincial Government has requested for four UNIDO fellowships (24 man/months) in the above fields (refer to page 64- Appendice II para 9).

- 40- In case, the proposal is supported by the Ministry of Industry, UNIDO might give favourable consideration. After the trainees return, UNIDO's further assistance would be required in the form of an expert (12 man/months) in making the proposed department operational.

Ministry of Industry and Mines :

- 41- The Ministry is exclusively responsible for the formulation of industrial policies, such as evaluating the desirability of new applications, determining the ex-factory prices of all industries, granting of fiscal and monetary concessions, and allocating foreign exchange.
- 42- The Ministry have a Technical Advisory Committee, which evaluates the feasibility of projects, and one of the criteria in giving preference is the utilization of local raw materials and willingness to locate in rural areas.
- 43- The large industries in the private sector, are in a position to comply with the requirements and have the resources to get detailed pre investment and feasibility studies prepared, but the small entrepreneurs, especially those, who have no previous experience, have neither the resources nor the knowledge of suitable small-scale industries. The Project Department in the Ministry of Industry, appears to hold the view that the Industrial Research and Consultancy Institute, (IRCI) is in the process of adding a cell for the promotion of small-scale industry and no separate department or corporation, exclusively responsible for the promotion of these industries, is necessary (refer to page 75 Appendice III para 17).

Industrial Research and Consultancy Institute (I.R.C.I)

- 44- This Institute commenced operation as a United Nations Development Programme (UNDP) Special Fund Project; UNIDO was designated as the Executing Agency 1965-69. It is an independent national, non profit making Corporate institution. The objectives of the Institute are to aid and promote development of industry and in particular to :
- 1) Perform tests, investigations analysis and research.
 - 2) Furnish advice and consultation services on problems relating to industrial planning, process engineering, production planning and market development.
 - 3) Conduct field studies in the different sectors of industry, aiming at the recognition of it's problems and drawing of effective solutions.
 - 4) Supervise the implementation of the new industrial projects.
 - 5) Conduct surveys and studies of natural resources, raw materials, and by-products of industry and to promote their economic utilization.

- 45- For new projects, its services are available for the preparation of model schemes or factory sheet data.
- 46- For existing industries, it offers services for diagnosing trouble shooting problems, such as, production planning and control, process engineering, quality, inventory and cost control, training of plant personnel in operation, etc.
- 47- The aims, objectives and functions of the Institute appear to be all-embracing, but it has no industrial extension services, has no branch in any province, offers assistance on request, and charges nominal fees. As such it appears that, so far, it has assisted only large and medium industries and has no experience of the problems of small entrepreneurs and the technical services required by them, in an integrated and sustained form, through the industrial extension services for relatively long period of time.

Proposal for Creating a Small Industry Cell in IRCI :

- 48- It contemplates establishing a cell for offering technical assistance to small entrepreneurs only on request, would charge nominal fees, and does not intend establishing a network of industrial extension services.
- 49- In most of the developing countries which have given priority to the promotion of a modern small-scale industry sector, the policy and programme, consist of carrying out preinvestment study of promising industries, preparing model schemes, carrying out extensive campaigns for inviting small entrepreneurs, their selection, training and stimulation, assisting them in the operation, training of personnel and marketing, through the industrial extension services, on a continuous basis, till they reach a stage of self-reliance. Therefore, it is considered that merely adding a small-industry cell, in the IRCI would not meet the desired objectives, and the small entrepreneurs, would keep on groping in the dark.

INDUSTRIAL BANK OF SUDAN :

- 50- It has no branch in any Province. It is largely responsible for financing small-scale industries and has a special cell for providing financial assistance for modernization or expansion of existing or new industries, providing technical advice, research and marketing services including feasibility studies. (Refer to page 75-6 Appendix III para 18)

Industrial Development Banks for Small-Scale Industry
in Developing Countries

- 51- In most of the developing countries, where Small-Scale Industry corporations or institutes exist, the industrial development banks, receive loan applications through the former, who preinsure the feasibility of the industry, based on model schemes; while the development banks, re-insure the technical and economic feasibility and credit worthiness of the applicants and follow up in the form of supervised credit.

Need for a Branch Office in Gezira :

- 52- However, till the time, a small industry institute, with extension services is established, the IBS has the trained staff and skills in financing small-scale industries, but it would not be possible for it to link financial assistance to technical assistance. IBS might open a sub-branch in Mad Medani on a pilot basis, since Gezira offers adequate opportunities to modern small-scale industry, and a large number of indigenous entrepreneurs are keen to invest the accumulated savings in suitable industries.

The Gezira Board :

- 53- The Gezira Board is the most important institute for agricultural development. It owns 14 ginning factories and two most modern maintenance and repair workshops, for its own agricultural machinery and equipment. It does not assist in the maintenance of harvesters, owned by the tenants, and the agricultural machinery, owned by private individuals, outside the Gezira Scheme. It has plans for large agro-based industries (Refer to pages 65-68 Appendix II paras 11-15).

Duplication of Proposed Projects by Gezira Board :

- 54- The Gezira Board is more or less a semi public sector corporation. In the public sector, there are now eight separate corporations, namely Sugar, Leather Industries, Food Industries, Textile Industries, Building Materials, Edible Oils, Mining, and Tourism and Hotels Corporation. Each of the above corporations is responsible for establishing new projects; the financing is generally the responsibility of the Sudanese Development Corporation. (SDC). It is therefore not clear, how the Gezira Board have plans for establishing large industries in the same fields, where the responsible corporations already exist. (refer to pages- Appendix II paras 14-15).
67-68

The Gezira Co-Operative and The Six Year Plan :

- 55- The Gezira Co-Operative owns over 100 mini flour mills, one large flour mill, mechanized agricultural cooperatives, conventional bakeries and has plans for a large oil and fodder mill. (Refer to page 72 Appendice III para 4). It is expected to play an important role in future, since a provision of Us\$ 920,393 (£.321,000) (Us \$ = 3976 £), has been made in the Six Year Plan for light industry cooperatives, which depend on the utilization of local resources and materials, maintenance of agricultural machinery and equipment in Gezira, Mobile Mechanical Workshops, at a cost of Us \$ 372,744 (£.130,000). This is discussed later under Chapter V.

Proposal for Creating a Rural Development Corporation (RDC):

- 56- The creation of the above Corporation is almost in the final stages. It is understood that RDC would also be responsible for rural industries and handicrafts. It might carry out research in establishing integrated rural industrial technology, pilot demonstration plants for the utilization of wastes and by-products of related industries, simple rural house-hold products, production of cheap animal and poultry feeds, processing of appropriate products, such as crushers, juice boiling pans, preservation of fruits and vegetables using simple dehydration technology, handloom spinning and weaving, products for rural construction, etc.

Provisions in the Six Year Plan :

- 57- General recommendations have been made to develop and consolidate traditional handicraft industries in rural areas; a provision of \$1548,324 (£.540,000) has been suggested for establishing 180 centres of traditional type. It is not known how many such centres would be established in Gezira.

Assistance from Khadi and Village Industries Commission in India

- 58- The Khadi and Village Industries Commission and the Appropriate Technology Development Unit, Government of India, have prepared over 100 model Schemes, suitable for rural industries. Many of these Schemes can be adapted, with suitable adjustments, according to the availability of local raw materials and prices prevailing in Sudan. The proposed RDC might procure these schemes through its' Embassy in India. It might also request FIC's assistance for an expert from Khadi and Village Industries Commission for 12/man/months. Simultaneously, the Government might request for technical assistance from Government of India, on bilateral basis.

Institutionalizing the Recommendations made in the Six Year Plan:

59- Three important recommendations pertaining to the development of small-scale industry have been made in the Six Year Plan (Refer to page 76-77 Appendice III para 19) :-

- 1) Establishment of suitable industries in regions where basic services are available.
- 2) Provision of machinery and equipment on hire purchase.
- 3) Creation of a Central Marketing Body for the market of the products of these industries.

The important questions to be asked are :-

- 1) What is the concept of the "availability of basic services"? Does it not include institutions and supporting services ?
- 2) What would be the institution for the operation of provision of machinery and equipment on the hire purchase and what objectives are to be attained ? What are the problems that arise in operating the scheme and how these could be overcome ? Which countries have operated such scheme and through what agencies ?
- 3) How a Central Marketing Body would function, without complementary supporting institutions ?.

Operation of Hire Purchase Scheme in India :

60- India is the first country, which originally introduced the concept of hire purchase, as an effective tool of financing small-scale industries. Purchases of machinery are financed partly through cash advances and partly through actual deliveries of machines on hire purchase basis.

61- Some of the relevant excerpts from a paper, prepared for UNIDO by Mr. Nanjappa, former Development Commissioner Small-Scale Industries, Government of India - UNIDO - (ID/WG/17/15 - August 1968) are reproduced below :-

62- " The twin objectives of accelerating modernization and rationalization of small units on the one hand and stimulating the growth of promotable proprietors into a class of small industrialists on the other underlines the imperative need for supply of credit to small industries throughout the country for financing purchases of plants and equipment. Supply of machines and equipment on hire purchase basis has several advantages compared to granting of cash loans for financing the purchases of machinery. Firstly, since hire purchaser does not receive cash, this obviates any chance of the loan being utilized for unauthorized purposes.

Secondly, hire purchaser is not required to furnish any security for receiving equipment as is often the case in respect of cash credit accommodations. Thirdly, even though hire purchaser receives the equipment, the legal ownership does not pass on to him until he has paid all the instalments. Therefore, in the event of default in repayment by hire purchaser, the leasing agency can repossess the equipment. Fourthly, supply of machines on hire purchase basis induces mobilization of both capital and entrepreneurs skill. Fifthly, the hire purchase system present the hire purchaser with the fact of capital formation as a "fait accompli". Sixthly, the disbursement of each loans for financing for purchase of machinery is not necessarily time-saving as compared to actual supply of machines on instalment credit basis.

- 63- Through this scheme the investment can be channelized to promote the desired or priority industry groups, to help the growth of viable and optimum size of small units, to achieve spatial dispersal of small industries, and to foster a proper integration between large and small industrial enterprises as well as between rural and urban industries through ancillary relationship that would complement and not cut across the efforts made in different sectors.

Supply of machines on hire-purchase basis to small industries is by and large, handled exclusively by Government Agencies like the National Small Industries Corporation and State Small Industries Corporations. It became necessary for the Government to make institutional arrangements for supply of machines on hire purchase basis."

Operation and Institutional Requirements :-

- 64- The operation of the hire purchase of machinery, assistance in marketing of the products, has been successfully adopted by many developing countries on the pattern set by India.
- 65- The operation requires careful planning well in advance :-
- 1) Model schemes of suitable industries, based on pre-investment studies for the required capacities have to be prepared
 - 2) Negotiation of bilateral loans from friendly countries, agencies of the World Bank, as well as financing a part out of own resources.
 - 3) Selection of required machinery from the cheapest sources of supply.

- 4) Launching of extensive campaigns for attracting entrepreneurs, their selection and stimulation.
- 5) Assistance in supplying designs of the buildings, so that selected entrepreneurs start construction to match up with the arrival of the imported machines and equipment, otherwise, it might lead to storage problems and unnecessary damages etc.

66- It therefore leads to the conclusion that a Corporation or Institute for the promotion of small-scale industry, both at the Central and branches in the Provinces, comprising industrial extension services, would have to be created for implementing the recommendations made in the Six Year Plan. The I.B.S. could not be expected to operate the scheme, in the absence of specialized department or corporation. The Ministry of Industry would have to take the policy decision as how it would institutionalize the operation of a hire purchase scheme ?.

UNIDO Assistance or Assistance from Government of India :

67- In case the Ministry of Industry decides that institutional arrangements would have to be made, based on the experience of many other countries, then UNIDO might consider favourably the request for an expert in organizing the creation of the institutions, procedure, framing of rules, etc, for the successful operation of the scheme. Simultaneously, the Government of Sudan might consider to make a request for an expert from Government of India as technical assistance for the operation of hire purches scheme.

Training of Personnel :

68- There are only two training institutes in Gezira of importance, namely the Vocational Training Centre and Youth Training Centre. (Refer to page 74 Appendice III paras 14-15). Generally, the technical and vocational training institutes, are concerned with the training of foremen, supervisors, industrial managers and entrepreneurs. There is extreme shortage of skilled and semi skilled manpower at all levels. Most of the artisan owners, train their own young workers on the job, which was found most unsatisfactory. A rational programme of technical training requires manpower budgetting and advance planning, but in the Six Year Plan, no attempt has been made to assess the requirements of different categories of skills, for achieving the envisaged industrial targets. Training of supervisors and instructors has been neglected, the istructors in the Youth Training Centre had no experience in industr which is considered necessary for an effective training system.

- 69- The present out-put of the two institutes in Wad Medani is much below the demand, and during discussions it revealed that it was difficult to increase the existing out-put. Some success in overcoming the present shortage is possible, if the entire training programme is coordinated at the central level, instead of uncoordinated approach by various Corporations, Gezira Board, etc, who have their own training schemes. The two training institutes would require additional funds and equipment in order to meet the increased demand, envisaged in the Six Year Plan. Lastly, it is unfortunate, that the existing skilled manpower, has been steadily migrating to foreign countries, it is apprehended, that even, if the existing capacities are increased, the migration might also increase in proportion, and the present situation of short supply of skilled labour, might remain stagnant. Some legislative measures might be required to minimize migration of the required skills.

Training of Entrepreneurs and "The Management Development
and Productivity Centre" (MDPC)

- 70- There is no institute for training and stimulation of small entrepreneurs in Gezira. Some of the talented trainees from the Vocational Training Centre could become promising entrepreneurs.

The M.D.P.C., an UNDP/ILO project, became operational in 1968 in Khartoum. It has no branch in Wad Medani. This institute too, like others, has, so far, made no attempt to reach small entrepreneurs, who require improved management guidance in all spheres of industrial management on a priority basis. The MDPC might consider adding a cell in the Vocational Training Centre, Wad Medani, for the training of selected entrepreneurs and managers for small-scale industry.

The Role of the Sudanese Savings Bank :

- 71- The SSB is a commercial bank, non development in purpose, has accumulated about US \$ seven millions; and is keen to finance any profitable venture, which would increase its own profitability, as well as help the economy of the Gezira Province and the Sudanese economy at large. It has gained adequate experience in extending short and medium term loans for trade, commerce and working capital in the industrial sector. It does not, so far, deal in foreign exchange. Financial institutions, including private commercial banks and the development banks, in many countries extend short term working capital and long-term fixed assets financing for small-scale industries.

- 72- The Bank is now keen on financing and promoting the rural and small-scale industries in the Gezira Province. At present, it is not institutionalized for achieving the above objectives, since it has neither the technical staff nor the foreign exchange, which is generally required for the fixed capital requirements.

Institutionalizing S.S.B. as a Semi Development Bank :

- 73- In case the Bank is keen, to act at least as a semi development institution in the industrial sector, it would have to change it's present charter, shall have to engage, to start with, an industrial engineer and an industrial economist for the technical and economic appraisal of the loan applications and for supervising the credit operations.

The Government would have to share the equity capital, as well as, make necessary provision in foreign exchange, either from it's own resources or through some suitable line of foreign credit. S.S.B.'s rate of interest shall have to be at par with I.B.S. The Managing Director of the Bank might also be included as one of the members of the Technical Advisory Committee of the Ministry of Industry. A suitable proforma has been prepared for receiving the loan applications and is placed as Appendice IV. (pages 79-81). Till the time a decision is taken, whether S.S.B. could act as an institutionalized bank for promoting rural and small-scale industries it's role could be divided into short and long term objectives.

Short Term Objectives :

Promotion of Rural Industries :

- 74- Most of the rural industries require simple tools, which are locally available, such as, equipment for dehydration for the preservation of fruits and vegetables, plastic bags for packing, equipment for manufacturing simple house-hold products, single spindle handlooms, sewing machines, etc. S.S.B. could work in close cooperation with the proposed R.D.C. and the traditional type centres. It could easily finance simple equipment required by the Tenants Union and the Cooperatives, such as spare parts for small flour mills etc.

Modernization of Traditional Industries :

- 75- In Gezira, most of the traditional industries, such as conventional bakeries, tannery, footwear and leather workshops, saw mills, carpentry and furniture making workshops, brick making, forging, repair and maintenance workshops, are generally owned by a single group of people, who do not appear keen to modernize, as they have the monopoly, could sell their products at higher rates, make large profits, almost pay no taxes, and face no competition from the modern small-scale industry.

Only a few of the above, have shown some interest to modernize and need balancing equipment or spare parts, but most of them did not appear short of local capital and require import licenses. S.S.B. might assist them in cooperation with I.B.S., while it can finance directly those, who require locally fabricated equipment, since most

of them have adequate security to offer.

Proposed New Industries :

- 76- Some of the new industries, which have been proposed, do not require feasibility study, and technical know-how is locally available, such as ice and cold storage, modern confectionery, small oil mill, ready made garments, and stone crushing plant. S.S.B. might identify the prospective entrepreneurs and finance them in cooperation with I.B.S.

Sharing in Equity Capital :

- 77- S.S.B. might consider sharing in equity financing with the Gezira Cooperative and Tenants Union in establishing light industries, mobile mechanical workshops, and maintenance of agricultural machinery and equipment, for which financial provision has been in the Six Year Plan.

Long Term Objective :

- 78- In the absence of any small-scale industry corporation or department, and till the time a decision is taken on creating appropriate institutions for the operation of hire purchase of machinery, I.R.C.I. and I.B.S. are the only two existing institutions, which could be entrusted with the responsibility for preparing the model schemes of the proposed new industries, except the light engineering industry or those, which require no feasibility. The Ministry of Industry might also request the Development Commissioner, Small-Scale Industry, Government of India, through its Embassy for the model schemes, since such schemes for over 100 small-scale industries are available. S.S.B. might also obtain copies of the model schemes for industries, recommended by the expert, as profitable, since many of the schemes can be adapted, with minor changes, after computing the cost of various inputs, according to the prices, prevailing in Sudan. Intensive campaigns could then be launched, inviting prospective entrepreneurs.

Involvement of Counter Part in Project Activities :

- 79- The counterpart was involved with the expert from the beginning to the end in project activities. He accompanied the expert to all the places in identifying the traditional industries, their problems and prospects and in exploring the possibilities for the creation of new small-scale industries, the institutions required for promoting them. Being a whole time public Relation Officer of the bank, he was more involved in his own work, compared to the project activities. Therefore, no material was prepared specially designed for the counterpart, but he was provided all the printed material of the UNIDO concerning all embracing policies for the promotion of small-scale industry. (Refer to page 82 Appendice V).

UNIDO Assistance :

- 80- In case, it is decided that S.S.B. could act as a semi-development industrial bank, then it might request for two UNIDO fellowships - one for an industrial engineer and one for industrial economist, in appraisal of the loan applications and supervising the credit operations.

CHAPTER 2.FOOD PROCESSING INDUSTRIES(i) Fruits and Vegetables Preservation:

81- There are no small enterprises processing perishable fruits, vegetables, juices etc., near the supply line in the small towns. Modern small-scale industries, in the above fields, for canning of the commodities, are not considered feasible, since large industries have under-utilized capacities and are facing financial losses, due to high cost of imported packing materials. Gezira Board has plans for refrigerated meat processing, mainly for export to Arab countries.

Preservation of concentrated Juice of Small Lime :

82- Small lime, because of its particular flavour, is in great demand in European and Asiatic countries, where it is not available in such commercial quantity, as in Gezira. Its juice is used as a fresh drink, added with sugar and is also popular in the form of essence for cooked food. Concentrating the juice, in bottles, in small unit, appear profitable and offer prospects for export. Pre investment and detailed feasibility might be undertaken by I.R.C.I.

Dehydration of Fruits and Vegetables in Rural Areas & Small Towns

83- In rural areas, sun drying of fruits and vegetables is practised through unhygienic and conventional methods, as a house-hold industry. F.A.O. has already made research and has evolved simple technology for sun drying and artificial dehydration for fruits and vegetables - the equipment required is simple, such as trays, dipping tanks and shelter for fumigation, or sulphur dioxide treatment. If long drying is required, trays could be stacked, for minimizing the bleaching of the dried surfaces. The proposed R.D.C., might organize sun drying, on a cooperative basis.

84- In small towns, semi mechanized dehydration technology, could be introduced. Small and medium sized driers are available, in which trolleys move in the opposite direction to airflow, entering at the cool end and emerging out at the hot end. The fruits and vegetables, should be cleaned, before processing. The product could be packed in sealed plastic bags.

85- (FAO/UNDP) Project in the Sudan, had demonstrated the above simple techniques and excellent results were obtained, through the use of inexpensive cabinet dryers, using air ventilation and with rotary dryers, made with bicycle wheels and screens. It appears that improved techniques, recommended and demonstrated by the FAO in the Sudan, have not been followed. The proposed R.D.C. through its centres, can now introduce the improved dehydration techniques,

both sun drying and semi mechanized, on a community basis, to increase their profits.

(ii) Diary Products :

86- Butter is one of the essential dietary requirements. There is not a single unit for the processing of butter and cream in Wad Medani while the demand is considered more than adequate. Further, fresh butter, and cream, would also be required, by modern confectioneries for the production of fresh biscuits, cakes and pastries.

The plant, consists of a simple electric machine, which is inexpensive and commercially available for different capacities. It was pointed out that the main problem is, that milk, is in short supply which, could not be understood, since, plenty of cheese is available, all over Gezira, therefore, it is considered, that two small units could be established, to meet the minimum requirements of the high income groups and of the two proposed modern confectioneries.

(iii) Confectioneries :

87- Like dairy products, there is no modern confectionery in Wad Medani. The demand for fresh biscuits, quality bread, cakes and pastries is fairly high. Small size electric mixers and baking plants are commercially available, at a cost of about US \$ 15,000. It is suggested that two modern confectioneries, adjacent to the two dairy units, might be established in Wad Medani. Qualified bakers are available in Khartoum. Recently, a modern bakery has been established in Rofaa. It is not making the economic use of the expensive plant. This bakery, might be encouraged to ensure hygienic production and produce limited fresh biscuits and pastries to meet the demand of Rofaa and Hass-Heisa, where it can establish a branch shop.

In Kamlin, the owner of a conventional bakery, Mr. Osman Mustafa, is keen to mechanize for producing quality products. The S.S.B. in cooperation with I.B.S., could assist, in financing the import of the plant.

Traditional Bakeries and Prospects of Improvement :

88- Traditional bakeries, exist in all the small towns, in the Gezira and are able to meet the present demand. The production is carried out manually, under unhygienic conditions and the quality of the bread is poor. All traditional bakeries, in rural areas, can not be modernized, but could improve, the basic required hygienic conditions.

89- In small towns, all the conventional bakeries, could be modernized. Quality bread production on small scale in the inexpensive rapid mechanized dough process, instead of bulk fermentation, is now being carried out in most of the developing countries. After continuous fermentation, the dough is placed into a pre mixed and extruded for obtaining the required sizes, which are placed into the baking pan on conveyor. The continuous process is more economical. Cheap mixers, are available commercially, from Asiatic countries.

(IV) Cereals Processing :

90- Beside a large flour mill in Hassa-Heisa, there are two medium sized flour mills in Mad Medani. There are more than 200 mini flour mills, spread over the Province, each, as an average, has a 20 horsepower electric motor, employs 1-2 workers and produces $\frac{1}{2}$ ton of flour of dura or mixed wheat per day. Over 100 of these, are owned by the Gezira Cooperative. There are a number of mini flour mills in Mad Medani. According to the Assistant Commissioner, Gezira Cooperative, about 15-20 percent of the small mills, were facing shortage of spare parts. S.S.B./IBS, might assist them in obtaining necessary import licenses, as well as, extend financial assistance, since adequate security, is available.

91- The consumers tastes are fast changing and they prefer wheat flour, instead of durra. The area under wheat cultivation, accordingly is being increased, to meet the consumer's demand. Managil, which is comparatively cut off, face high transportation cost in getting adequate wheat flour. The demand, both in Managil and Kamlin, require a wheat processing flour mill of 40-50 ton capacity per day. Preinvestment and feasibility, might be undertaken by I.R.C.I., since technical know-how, is locally available.

(v) Processing of Spices :

92- Processed spices for prepared food are becoming popular, as there is a ready market in the large cities. The spices are cleaned, grinded and packed in sealed plastic bags.

93- In Managil, an influential agriculturist, who owns a large farm, cultivates a variety of spices. This entrepreneur, on his own initiative, has devised an indigenous, manually operated grinder and packs the product without properly sealing it in plastic bags. He has given his own brand name "Abu Labira Spices" and has been able, to export the product, to some Arab countries. Since the plastic bags, are manually sealed, they are not air tight and this entrepreneur, might soon loose the foreign market.

- 94- He needs immediate technical assistance, such as, a modern electric grinder and a machine, for sealing the product in air tight plastic bags and marketing assistance for export. IBS/SSB, might assist in modernization.

(VI) Veget-ble Oil and Cakes :

- 95- There are three medium oil mills in Wad Medani, together with a production capacity of 8,500 tons of oil and 10,000 tons of cake, per annum. Both in Kassa-Heisa and Managil, there is an oil mill, each having a production capacity of about 1,800 tons of oil and 200 tons of cakes, per annum. The present capacities in the Sudan, exceed the seed supplies.

- 96- However, the Gezira Board, has plans, to increase the area of ground nuts cultivation and envisages establishing an oil mill, with a production capacity of 60 thousand tons of oil, only for export and 67 thousand tons of cakes, for concentrated feed. The Gezira Cooperative has identical plans, has neither worked out the proposed capacity, nor the objectives for export, or domestic consumption. It could also not be ascertained, whether the Oil Development Corporation, has made the above provisions; since it is responsible for distributing the seed, as per capacity, of each industry.

- 97- Under the above limitations, it is difficult, to propose expansion, in new small oil mills, although, Hamlin is considered as a suitable location for a three expeller unit, with a capacity of 1,200 tons per annum. The approximate cost of the complete three expeller plant, from India or Pakistan, is about US \$ 30,000. Pre investment study for the proposed mill, might wait, till the finalization of the proposals of the Gezira Board and the Gezira Cooperative, who might be able, to meet the entire local demand in the Gezira Province. (Refer to pages 69-70 excess capacities - Appendice II para 20).

(VII) Animal Feeds Industries :

- 98- Both the Gezira Board and the Gezira Cooperative, have plans for establishing concentrated animal feed industries, but the location and objectives, whether, it would be exported, or would meet the domestic consumption, could not be ascertained. Similarly, there is a proposal for a fodder mill in Rufaa, but no pre investment study has been undertaken about the capacity. Managil, also appears as a suitable location, for a small fodder mill. However, at this stage, no investment in a small fodder mill, can be recommended, till the finalization of the above proposals, which might be able to meet the whole demand, in Gezira.

99- Discussions were held with well to do agriculturists, who expressed doubts, whether, the primitive habits of the live stock breeders could be changed, since they were used to preparing their own fodder, from straw, bran and other wastes. They might not, willingly accept, paying extra price for concentrated feeds.

100- In rural areas, bran, straw, ground nut shells and other wastes, are available and the rural centres, might make concentrated efforts, in establishing animal feed industries on a priority basis. Animal feeds, offer excellent opportunities for industrial development, in the rural areas.

(VIII) P o u l t r y :

101- Modern poultry farm as an agro-industry, has gained special importance in most of the developing countries, but small units face difficulties in competing with large units, because of high cost of imported feeds. In Gezira, two large farms are being established, the larger one, financed by the Kuwait funds, would export the entire product; while the medium one is supposed to attain self sufficiency. Therefore, small mechanized farms, were not considered profitable.

However, in rural areas, the rural development centres should encourage the use of improved indigenous poultry feed and improved breeds.

(IX) Ice and Cold Storage :

102- There are two ice mills, owned by the same individual, who plans expansion of one, by another 20 tons per day for meeting the increased demand, in Mad Medani. There is an ice factory both in Rufaa and Managil and two in H-sa-Heisa. There is no ice factory in Kamlin, where the demand is considered adequate, for establishing a 20 ton capacity unit, per day. The machinery, would consist, mainly of ammonia compressor and condenser, along with other equipment and fittings. The complete plants of 20 ton capacity, per day, are available from India and Pakistan for about US \$ 60,000, including freight. No feasibility study is required, as technical know how, is locally available.

103- While concluding the suggestions on food processing industries, it might be mentioned that the FAO, has made considerable research in rural agro based industries, has evolved simple improved production processes, for the developing countries.

CHAPTER 3

INDUSTRIES PRODUCING AGRICULTURAL COMMODITIES
/OTHER THAN FOOD/

A. Cotton Textile :

- 104- Cotton textile industry, has developed rapidly and occupies a leading position in the industrial structure of the Sudan. Gezira, is the main producer of cotton, and a number of large spinning and weaving mills have been established, some more are under execution for attaining self sufficiency and export targets, envisaged in the Six Year Plan. Little attention, has, so far, been given to ancillary industries, such as, terry fabrics, ready made garments and embroidery, thread making, cotton rugs and upholstery, canvas and decentralized specialized hand-loom fabrics.
- 105- It is considered that a reasonable surplus of yarn, might be reserved for the above industries, for which, both Mad Medani and Hass-Heisa, offer good locations. All these industries, require detailed feasibility studies, in the form of model schemes. In India and Pakistan, the following industries exist side by side with large industries and manage to earn, adequate foreign exchange through exports:-
- (i) Terry Towels and Fabrics :
- 106- Terry fabrics/towels are produced on dobby looms, with terry arrangements or on jacquard looms, to form interesting patterns. The yarn is dyed, bleached or even printed. Generally 20s/2 yarn, is used as ground and pile warp and 16s yarn as weft. One loom could produce about 2,000 square metres, per annum. A small unit, comprising at least ten looms, is considered, as an economic unit.
- (ii) Thread :
- 107- Thread, which is used for sewing garments, book binding, embroidery, etc, is another industry, which has been developed on Small-Scale in India, Pakistan and Hong Kong. Beside meeting local demand, it has export potential.
- (iii) Cotton Rug, Up Holstery, Cardage and Rope :
- 108- Soft cotton waste is available in Mad Medani and Hassa-Heisa, as during spinning of cotton yarn, the recovery of soft cotton waste is in the order of about 10 percent. Beside, exporting the cotton waste, it could be utilized, in small units, for processing the above products.

(iv) Hosiery :

109- Hosiery industry, has developed rapidly in India and Pakistan on small-scale. Its chief products include jerseys, vest, underwears, socks and stockings. Due to brightness, strength, appearance and durability, mixture of nylon yarn, is increasingly used in hosiery in the mixed fabrics. Nylon yarn, would have to be imported. However, feasibility study, is considered, desirable.

(v) Canvas :

110- This is an important industry, based on low quality cotton yarn, is high in demand, for various end uses. The heaviest and strongest woven fabrics are covered under this category and are known by the trade names of canvas, tarp@line, webbing, filter cloth, tent cloth etc., depending on their end-uses, weight, counts of yarn and number of ply, used in weaving.

111- Usually 7s to 20s counts and 2 to 15 ply yarns, are used in weaving of different varieties. These are manufactured in grey state or natural condition, but are also bleached, dyed or coated with different water proof agents. Some of the fabrics, could also be made flame resistant. Caustic soda and bleaching powder is used in bleaching, dyes and chemicals in dyeing of cotton canvas.

112- A balanced canvas unit, would require 20 automatic looms with preparatory machinery, for manufacturing only grey canvas of light and medium quality. The preparatory machinery, would consist of doubling, ring twist machine, cone winder, sectional warper and finishing machine. Complete plants, from India and Pakistan are available, for about \$.70,000.

113- In case, dye jiggers, dryer, boiler, rolling and inspection machinery and stitching machine, are also added for producing heavier quality for export, the plant would have to be imported from Western European countries, China or Japan and would cost about \$.250,000. For export, heavier quality, according to international standards would be required.

114- Large and medium capacity canvas, comprise 10-24 ounces per square metre, average being 15 ounces. Canvas, is also processed or treated to make it a part of another trade, such as, tent makers, furniture, belts, imitation leather. Locally, Defence and Railways, would be the main consumers. I.R.C.I, might be requested, to carry out feasibility and prepare model schemes, of the above five cotton based industries.

(vi) Ready Made Garments and Embroidery :

- 115- Ready made garments are in high demand and have ready market. All the required raw materials, are locally available, A number of girls, who have received adequate training in tailoring, men shirts, children frocks and ladies garments, are available, in Mad Medani.
- 116- This industry could be organized, in such a way that each section specializes only in single item, i.e. men shirts, children frocks and pants and ladies garments. Each section, would have, to be divided into sub sections; one preparing the designs from latest catalogues, one specializing in cutting, one in stitching, one in sewing and one in finishing, including embroidery.
- 117- Beside the rent of a hired building and furniture, the fixed capital, would comprise about 10-15 electric multipurpose machines, including zig-zag type of sewing machines, capable of embroidering fabrics at a faster rate, without affecting the quality.
- 118- The raw materials, required, are fine material of cloth, while for embroidered cloth fabrics, the threads made of cotton, rayon, nylon etc. would be required.
- 119- This industry also uses a variety of fabrics, such as, cotton lawn, voil, cambric and shamama, polyester and nylon fabrics. The imported raw materials, might be allowed only for export, which, largely depend on designs, finishing facilities and sales promotion. Technical know how is locally available and detailed feasibility is not required. SSB/IBS, might assist in financing.

(vii) Specialized Handloom Fabrics:

- 120- This craft, has rapidly developed as handicraft industry, in India and Pakistan, specializes in handloom or hand woven fabrics and caters to individual tastes. The export of specialized fabrics from these countries, run into millions of dollars.
- 121- India has created, specialized institutions, has design centres and sales promotion offices, in many foreign countries. Special high speed inexpensive looms, have been devised. This industry does not purely depend on cotton fabrics, as beside cotton, pure silk, raw silk, art silk, polyester and nylon, crepe, georgette etc., are being increasingly utilized.

122- Since in Sudan, beside cotton, no other fabrics are locally available, a beginning could be made for producing specialized fabrics, based on the finest long staple cotton, yarn, as handicraft,

(B) Wool Spinning and Weaving :

123- It was observed that no proper shearing of the sheep is done for obtaining the wool, the quality of which, is poor. No data is available about the quantity of the wool that is obtained and used. However, it is presumed that whatever might be the quality and quantity, it could be used, as a house hold or village industry through traditional spinning and weaving for making rough blankets, rugs etc.

(C) Straw Board :

124- Some of the important packing boards, are chip board, paper board, card board and straw board. The principal raw materials for manufacture of packing boards are rice and wheat straws, baggese etc. depending on the quality of the board manufactured.

125- The demand for packing boards exceed the supply and it is expected to further increase in line with the increasing industrial and commercial activities, in Gezira.

126- The Gezira Board, has plans for a large paper mill, based on cotton stalk, while, the large quantity of baggese, at Juneid Sugar Mill, would remain surplus. The wheat and rice straw, at present, are being used as cattle fodder, or being burnt. It is considered that two economic size units, with a production capacity of 2,000 tons, per annum each; one based on wheat and rice straw and the other on baggese, in Juneid, are profitable.

127- The location and feasibility of the one, based on wheat and rice straw, would depend on, whether, it is economical to collect widely scattered wheat and rice straw at a central point, as it is possible that high transportation cost, might make it non profitable.

128- The Unit based on baggese, is feasible and profitable, the two large poultry farms, nearing completion, around Juneid, would be one of the main consumers.

129- In order to produce one ton of straw board, as an average, twice the amount of basic raw material is required. The other raw materials are, quick lime, sizing material (resin, glue etc.) and aluminium sulphate. The manufacturing process, involves cleaning and cutting, digesting and converting, pulp cleaning, mixing and sizing, refining and sheet making.

130- In India and Pakistan, straw boards are even being manufactured on cottage scale, or rural industry by manual operations with a few locally fabricated machines, hand process etc.

The I.R.C.I., might be requested, to undertake the feasibility of the one based on wheat and rice straw and prepare model scheme based on baggese, at Juneid.

(D) Tanning, Footwear and Leather Goods :

(i) Tanning and Curing :

131- Tanning, foot wear and leather, are among the most important agro-based industries. A previous UNIDO/FAO experts report, "Utilization of the Raw Materials of the Hides and Skins in the Development of Foot Wear Industry", had estimated, that out of 6.5 million animals slaughtered annually, rural tanneries, processed about 1.93 million, mechanized tanneries 1.28 million; 2.8 million was exported as raw, leaving about 0.6 million pieces, as waste. It also recommended that instead of exporting raw hides, efforts should be made, to export leather and leather products.

132- There are now three large tanneries in Sudan and the target was to produce 4 million hides and skins by 1975. One of the large tanneries namely " Gezira Tannery " is located in Wad Medani, has come into operation recently, has an annual production capacity of over one million hides and skins (2,500 skins and 1,000 hides per day). At the time of the visit of the expert, it was working at 10% of its capacity, due to a number of reasons.

133- Keeping in view, high under utilized capacity, lack of information about the annual number of animals slaughtered, in Gezira, production in modern small tanneries, is not considered feasible.

Conventional Tannery and Improved Production Processes :

134- It has been estimated, that there are over 300 rural tanneries in the Sudan, but none in Gezira could be identified, except a large conventional tannery, near " Dibaga "., within the urban limits, in Wad Medani. This tannery, is owned by ten partners, each employs 5 workers and processes 1000 hides and skins per day. The operation consists, giving the hide a straight pit liming for 6-7 days, the hide is then slit down the back into two sides by obsolete knives, followed by hard unhairing, flashing and repeated scruing. This tannery was selling leather at \$ 3 per metre, compared to \$ 8 per metre, by the mechanized tannery.

135- The most important problem is, how to improve the production processes of this large conventional tannery, since the owners did not appear keen, to adapt improved appropriate technology.

136- The improved production processes consist, use of proper knives in taking out and cleaning the skin, which should be properly framed and dried under shade, salted and dried; till moisture is taken out, then folded and framed with care. The supply of pre-automatically operated knives, would minimize faulty cuts and damages; while minerals and oil processing, improved flaying and curing techniques, would greatly improve the quality, which would be suitable for domestic market.

(ii) Foot-Wear Industry :

137- The main end use of leather is footwear. In the whole of the Sudan, there are presently, two large nationalized industries, including Bata, 18 medium ones in the private sector, none is located in Gezira. It is understood that approval for another 10 units has been accorded, one of these, is envisaged in Wad Medani, while the existing capacities are only 50-60 percent utilized. (Refer to pages 69-70 Appendix II para 20).

138- The standard and quality of the product of the existing industries is poor, compared to international standards and prices are high, compared to India, Pakistan, Bangladesh, Hong Kong etc. It is estimated that 85 percent material, in foot wear industry, is imported, such as plastic, canvas, rubber etc. and only 15% is made of locally produced leather, while; the above Asiatic countries produce almost all the raw materials locally, the price of leather is even cheaper, they specialize in latest design and styles and have been able to enter in the export market.

Semi Mechanized Footwear Industry and Prospects :

139- At present, there is no small-scale footwear industry worth the name, although, this industry is labour intensive and most suitable on small-scale, as specialization and adjustments in rapidly changing fashions are easier for adaptation. Most of the exports, from the above named Asiatic countries, are made by small footwear enterprises, which are semi mechanized, comprise modern simple equipment, such as, cutting knives, moulds, sewing and sticking machines, adequate lasts and specialize in a single line and produce latest quality goods.

140- In Gezira, like most developing countries, in the small towns, artisan workshops, meet the local demand, use manual processes, have no moulds, lasts and a few, have sewing machines. Generally, a number of workshops, are owned by one or two individuals.

141- In Mad Medani, it was found that the same ten partners, who, own the conventional tannery, own the complex of most of the footwear and leather goods workshops, use their own leather, have no knowledge about latest designs, the equipment consist, outdated stitching and sewing machines. They have no adequate lasts, moulds, peels, heels etc. and give little attention to foot measurement, size and width. They are even using imported raw materials, such as, rubber, plastic, and canvas from black market and are producing low quality shoes. The owners of the complex, resist any suggestion for adopting improved production processes, although they have adequate finances and could be induced to semi mechanize and specialize in one single line, such as, women footwear and chaplras, children footwear and gents footwear and could be assisted in producing latest styles, but in the absence of industrial extension services, it is difficult to educate them, they would only change if they are put to competition, by some new enterprises.

142- It appears difficult for the shoe industry to enter into export market, even if it improves the product designs and standard; till the time, ancillary industries are not established, such as, processing of rubber, plastic, canvas and chemicals.

(iii) Leather Goods and Prospects for Improvement :

143- Leather goods industry, is most suitable on small-scale, for producing suit and attache cases, hand bags, purses, brief cases, belts, bicycle seats etc. as complete mechanization is not necessary and specialization in one single line, offer best prospects.

144- In small towns and in Mad Medani, the owners of the footwear industry mostly own the leather goods workshops. Like the shoe industry, the present product is based on poor quality leather, low quality interior lining and low quality zips, poor fittings of locks. This industry, could be assisted in specializing in one product line, provided latest product designs, cutting and stitching machines and necessary fancy lining zips and locks are provided. Cutting of the leather, demands special attention. In short, there is no institute, responsible for educating and offering technical assistance, through demonstration methods. Since synthetic substitutes have been developed, this industry could survive, if it adapts, improved processes and product designs.

(iv) Bone Meal Industry :

- 145- This is considered as one of the important agro based industry, which is export oriented, but so far, it has received no attention. In Gazira, it could be presumed that over one and a half million animals are slaughtered annually (Gazira Tannery is based on 3500 hides and skins per day, the conventional tannery is processing 1000 hides and skins per day). Beside green bones, dried bones are scattered all over the Province and it appears feasible to collect over 8000 tons of bones per annum.
- 146- Cattle and other animal bones, which were considered a mere waste, are now being utilized, in many developing countries for the preparation of a number of useful products. Green bones, along with waste products of tanning industries, considered too low in purity for the manufacture of gelatine, are used in the manufacture of animal glues, the most popular adhesives. Along with green bones, dried bones, could be collected by poor people, if they come to know that there was a ready market.
- 147- Bone meal is one of the important source of phosphoric acid, used as fertilizer and as an important ingredient in poultry feeds.

Bone Crushing Plant :

- 148- Bones are crushed in sizes of $3/8"$, $5/8"$, $3/4"$, $7/8"$, $3/16"$ and $3/32"$, are used for extraction of gelatine, have a wide export market. Crush bone of $3/32"$, is used as bone meal and could be exported or used in poultry feeds (two poultry farms are nearing completion). Crushed bone of $3/16"$ is called grist and is exported for preparation of grease and bone charcoal.
- 149- A bone crushing plant, with an annual capacity of 7000 tons, would cost about \$ 350,000 in foreign exchange. Average export price of bones in crushed form, in different sizes, is approximately \$ 200 per ton.
- 150- Some of the industrialized countries, avoid import of crushed bones, due to unpleasant odour and prefer import of "Ossein", an intermediate product, obtained in the process of gelatine. With experience gained in crushed bones, prospects of establishing an Ossein manufacturing plant could also be explored.

The I.R.C.I., might be requested, to take up the feasibility of a Bone Crushing plant of a capacity of 7000 tons per annum.

(v) Artificial Cork :

- 151- Artificial cork, could be manufactured from ground nutshells, which are presently being burnt, or utilized as fuel by the oil mills. The Gezira Board, might request FAO's assistance in respect of the feasibility and profitability.

(E) Wood Based Industries :(i) Saw Mills, Carpentry and Joinery Workshops and prospects For Improvement :

- 152- In Mad Medani, Hassa-Heisa, Refaa, Managil and Hamlin, there are a number of conventional carpentry workshops, which use manual methods and conventional equipment, manufacture doors, windows and house holds furniture. The standard of workmanship is poor. The artisans need training, improved designs and simple improved tools.
- 153- Comparatively, there are few workshops, which have one or two electric sawing machines and simple joinery equipment. These semi mechanized enterprises, generally use sawn wood, derived from round timber, most of which is imported. Many of the articles, such as, almirahs, cupboards etc., could be neatly manufactured in improved designs, if wood based panels are used, such as, hard board, veneered ply, fibre board and particle board.
- 154- The existing designs are generally old fashioned, comprise unnecessary projections, instead of simple straight lines. This results in unnecessary waste of timber, increase in labour cost and poor finish. Generally, these mechanized workshops, exercise little care in fixing the nails, screws, polishing and finishing. In many cases, one individual owned a number of such enterprises. In most of the cases, the workers, had no formal training in any institute, while, the training standard in the Youth Training Centre, leaves much to be desired.
- 155- Only a few of semi mechanized enterprises, expressed desire to modernize and requested for balancing equipment. " Rabai Workshop" in Hassa-Heisa is keen to establish a new modern carpentry, joinery workshop for furniture making. The IBS/SSB, might assist them in procuring the balancing equipment and complete plants for new units. Technical assistance, is equally important, for improving the designs, workmanship and greater use of wood based panels.

(ii) Manufacturing of Flash Doors :

- 156- In Gezira, the local production of timber of different qualities, can not be expected to keep pace with the expanding demand for doors. At present, superior quality, round timber, is being used for manufacturing the doors.
- 157- In many developing countries, recently, standard size doors, are being manufactured, using ply for front and bottom surfaces, while the hollow is filled in, using by-products, such as, pulp of sawn residues and other pulps. Standard size doors, called "Flash Doors", are being manufactured, based on drier veneer equipped with a press, or drier and press. Such ply veneers, after varnishing and polishing, give the appearance of real teak. Exterior type ply-wood withstands exposure to moisture and the doors are sound-proof, offer greater privacy. Joinery and efficient pressing machines, are the most important equipment for keeping the exterior ply intact. Joinery for manufacturing doors and windows is most suitable in small workshops, which use simple technology. New skills required for wood based sheets could be quickly learned on the job. Inexpensive plants, are available from India and Pakistan. Model scheme for one unit, in Wad Medani, might be prepared by IBS/IRCI.

CHAPTER 4.BUILDING MATERIALS INDUSTRY.

- 158- Building materials, components, fittings and fixtures roughly constitute 50 percent of the total cost of fixed assets in an industry, in Sudan. The cost of building materials is more than twice, compared to such Asiatic countries, as India, Pakistan, Bangladesh, etc.
- 159- The high cost of the building materials is reflected in higher per unit cost of the product. Trade statistics show that import of building materials, represent a high percentage of total imports, in Sudan.
- 160- In Gezira, at present, the only building material industries are, conventional burnt clay bricks and processing of cement tiles, while gravel has to be transported from Khartoum. Crushed stones and gravel in required grades, could be made available locally, while prospects of new plastic industries on small-scale is considered feasible. Manufacturing of electrical appliances and fittings in small enterprises, is not considered feasible, for the time being.
- (i) Conventional Burnt Clay Bricks Industry :
- 161- Burnt clay bricks, are being used for foundation and walling structure. These are produced, using primitive technology. A number of units owned by a few individuals, situated in the bank of the Nile near the vicinity of Wad Medani, were visited. Each unit, employed 5 workers, each worker, as an average processed 1000 clay bricks per day. The mixture, without any measurement, comprising wet clay, cow dung and a proportion of sand, is prepared manually. It is then poured in a wooden mould, which is sub-divided into two equal sizes. These moulds are put in a tray and carried to the bank, running in a harrow; lot of mixture drops out from the moulds. These moulds are emptied on rough ground, after pressing the mixture with a wooden plank. After one day of sun drying, the clay bricks are placed in layers, in the form of a wall structure, leaving gaps every one yard, so that, a sort of a tunnel is formed, from one end to the other. The resultant tunnel, forms the kiln, in which wood fuel is used for firing. The lower layers get more heat and colour, are graded as first quality and the upper ones as second quality. The size and shape of the bricks is uneven, the strength is poor. It is estimated that damages in processing are 15 percent and in loading and unloading of the finished bricks might be around 20 percent.

Improved Operation and Production Processes :

- 162- The existing traditional industry, could greatly improve it's present quality, if a little more care is paid by the brick layers and instead of manual preparation of the mixture, manually operated mixing machines are used :
- a) The mixture might be prepared in manually operated machines, using measured proportions of clay, sand and cow dung.
 - b) Wet clay in the moulds, might be tightly pressed and concrete platform is built in steps, from the river bed to the bank, for carrying the moulds with care.
 - c) The mixture might be placed on cement platform, instead of rough ground, so that, the bricks remain even and smooth.

163- The above improvements, might reduce production per unit by man hours, but would be compensated, in saving the breakage and losses. It was ascertained that the present production cost is \$ 12 per thousand and the selling price is \$ 25-30 per thousand.

164- The existing entrepreneurs, did not appear at all keen, in improving the present production processes, unless they meet competition with modern brick making industry. It is, however, presumed that even after establishing a few modern brick making plants, the traditional and modernize sectors could continue to exist side by side, for some time.

For rural areas, the present sun dried clay bricks are considered satisfactory material.

Modern Burnt Clay Brick Industry :

165- There is need for selecting an appropriate size of clay product to the advantage of modular coordination. The use of continuous kilns would greatly improve the quality and output. The brick layers would need training in planning of the clay building process in standardization of the modular system i.e. a moulding machine, slop moulding or box mould processes. The type and capacity of the continuous kiln would have to be determined, based on a feasibility report. UNIDO's assistance might be required.

I.R.C.I., might carry out feasibility of a modern brick making plant.

(ii) Cement Tiles :

- 166- There are a few traditional tile units in Wad Medani and Hassa-Heisa, use manually operated machines for producing tiles, which are used for ground flooring. The process comprise, preparation of cement and sand mixture, which is pressed in manually operated machine in standard size moulds. After one day sun drying, the tiles are cured in a water tank. Various colours are added on the top of the mixture, containing half cement mixture and half coloured mixture, the other process is the same.

Prospects of Modernization and New Industry :

- 167- The present manually operated pressing and mixing machines, could be mechanized for increasing the output and the quality. At the same time, there is adequate demand for glazed tiles and a few entrepreneurs are interested to invest in this industry. It requires feasibility study. I.R.C.I. might explore the prospects.

(iii) Stone Crushing Plant :

- 168- Chipped stones, in various sizes and gravel in different standards, is required for the construction of roads, foundation of the buildings etc. At present, gravel in a few standards, is transported from Khartoum, where it is available in its natural form.
- 169- About 75 kilo metres from Wad Medani, there is a mountain at "Fou" where stones could be obtained, in commercial quantity. It is understood that the Chinese had brought their own stone crushers for building the road and the bridge and used the stones from "Fou". The electricity would be available at FAU within the next few months, the road construction activities, in Gezira, are expected to increase many fold.
- 170- An electric stone crushing plant of 20 horse power with a capacity of 20 cubic metre per day, for crushing various grades, is available in India and Pakistan for about \$ 6,000. At least, one stone crushing plant might be imported, with experience gained, this industry could be expanded according to the demand. It is a simple operated machine and the technical know how is locally available. SSB/IBS, might select an entrepreneur and assist in financing.

(iv) Plastic Goods Industry :

171- Plastics of various kinds are now a very important engineering material and are used for numerous structural parts in many line of manufacture. It is available in practically all colours and could be used as a substitute for metal for almost all purposes, except where a very high degree of strength is required. In India and Pakistan the majority of the plastic goods manufacturing units are operating on small-scale for manufacturing, all kinds of house hold utensils, pots, pans, toys etc. At present, aluminium utensils are being used, which are far more costly. A number of small plastic manufacturing units, could be established, model schemes could be obtained from India. IBS/I.R.C.I., might take the initiative and prepare model schemes.

CHAPTER 5.LIGHT ENGINEERING INDUSTRY

- 172- Gezira Board, has workshops for its own agricultural machinery and equipment, does not deal in the maintenance of harvestors. Further, about 40 thousand feddans (one feddan = 1.060 acres) in Rahad is out side the Gezira Scheme and the agriculturists, face great difficulties, in the maintenance of the agricultural machinery, in securing spare parts.
- 173- The number of automobiles, including heavy trucks has also increased considerably, the expensive capital equipment is presently being repaired by a few half-equipped general purpose repair and maintenance workshops in Wad Medani, Managil and Hassa-Heisa; while the majority of the owners, use the services of road side mechanics, who have no precision instruments, necessary even for manual technology. Prospects of improving their technology are not bright, because such mechanics and fitters, in most of the developing countries, are numerous; it is difficult to change their attitudes.

Semi-Mechanized Workshops :

- 174- There are more than half a dozen forging workshops in Wad Medani, a couple, in Hassa-Heisa and Managil. Most of these, except the two in Hassa-Heisa are comparatively better equipped, have a small general purpose lathe, grinding, welding and electroplating facilities. None have complete equipment, such as, milling machine, shaping machine, hydraulic press, etc., Generally, the mechanics and fitters have received no formal training from any institute, the artisan managers have themselves trained the young boys. None of the workshops, in Wad Medani and Managil expressed any keenness in modernizing and balancing; yet better results would have been achieved, if the present skills were up graded, had there been an industrial extension service.

" Rabai" and "Gizoli" Workshops in Hassa-Heisa :

- 175- "Rabai" and "Gizoli" are better equipped, compared to forging and repair workshops in Wad Medani. "Rabai" specializes only in repair of harvestors, has one expensive large general purpose lathe and accessories, the skills are satisfactory, the firm is keen to modernize and requires balancing equipment. IBS/SSB, might assist this firm, under hire purchase scheme.

176- "Gizoli" specializes in the repair of spare parts of tractors and heavy trucks, has a modern general purpose lathe, a crankshaft grinder, has devised it's own heat treatment facility. This workshop has potential of modernization and could become a full fledged general purpose repair workshop, if additional equipment is added, such as, shaping machine, universal milling machine, hydraulic press etc. This firm could be financed, under the hire purchase scheme. IBS/SSB, might give due attention.

New Modern Industries :

177- In many cases, maintenance and repair services, especially of tractors, harvestors and auto cars were provided by foreign firms, who had initially supplied these items.

178- Now, the stage has reached for the creation of domestic repair and maintenance facilities, manufacturing of simple tools, that would allow cheaper services to the customers. There is need for stimulating local technology. Technical and economic feasibility of the following industries in Wad Medani, offer prospects, in achieving the objectives, envisaged in the Six Year Plan for Gezira:-

(i) Small Foundry :

179- In the Six Year Plan, a provision of \$ 920,393 has been made for light industry cooperatives for the maintenance of agricultural machinery and equipment in Gezira. Lot of scrap is lying as waste all over the Province, could be reclaimed, for fabricating spare parts and simple agricultural tools and implements. S.S.B., might cooperate, with the Gezira Cooperative and Tenants Union, in establishing a small foundry equipped with cupala and a moulding section, together with the required machinery and equipment for fabricating spare parts, simple agricultural tools and implements, such as, spades, weeding hoes, plant pullers, paddy threshers disk ploughs, hullers and decorators.

180- Gezira Board is the appropriate institution for the preparation of the detailed model scheme. S.S.B. might take the initiative in close cooperation with the Gezira Cooperative and Tenants Union, who will ultimately execute the project.

(ii) Mobile Mechanical Workshop :

- 181- A provision of US.\$372,744, has been made in the Six Year Plan for mobile mechanical workshops, in order to provide on the spot maintenance facilities in isolated areas.
- 182- The Gezira Cooperative and Tenants Union, might cooperate in establishing at least three workshops in the Province. S.S.B. might like to participate in the equity capital.
- 183- The Gezira Board is the most suitable institution for the preparation of the model scheme.

(iii) General Purpose Repair and Maintenance Workshop :

- 184- A number of entrepreneurs, are keen to invest, as the demand and profitability is assured; there is no modern workshop in Wad-Medani. The machinery and equipment, would comprise two lathes, one universal milling machine, one shaping machine, one hack sawing machine, one drilling machine, one hydraulic press, one cylinder boring, one grinding machine, tools and accessories.
- 185- The imported cost of the above complete plant, would be approximately \$120,000.
- 186- Beside a manager, 5 skilled and 5 unskilled workers would be required. The selected entrepreneurs, could be financed, under the hire purchase scheme. IES/SSB/ might request the Vocational Training Centre for preparing the model scheme, as it has already worked out the cost estimates.

(iv) Electrical Workshop for Automobile :

- 187- There is no efficient workshop in Wad Medani and the electrical defects are common occurrence. A modern workshop would comprise, one universal testing machine for automatic electric components, battery charging room, portable testing tools, armature rewinding equipment, welding and electroplating facilities. The approximate cost of the machinery and equipment, would be \$30,000.
- 188- One manager, 2 skilled and 3 unskilled workers would be required. The selected entrepreneur, might be financed, under the hire purchase scheme. IES/SSB, might request the Vocational Training Centre, for preparing the model scheme.

(v) Fuel Injection Pumps Workshop :

- 189- It is estimated that there is an annual demand for repair of about 2000-3000 injectors and 500 pumps. The machinery and equipment would comprise, one universal injection pump testing bench with full set of accessories, one injection nozzle, testing and repairing equipment, diesel engine checking equipment, drilling machine, grinder and tools. The approximate cost of the above machinery, would be \$25,000, could be financed, under the hire purchase scheme. IBS/SSB, might request the Vocational Training Centre, for preparing the model scheme.

CHAPTER 6.

MISCELLANEOUS INDUSTRIES(i) Blue Nile Azure Laundry :

190- This is an existing modern small-scale industry, produces blue for use in laundries. It has two electric crushing and one mixing machine. All the raw materials, such as, sodium and altramine are imported, the value of which, according to the owner, is \$.260,500, per annum. Previously, two crushing machines were imported from India, are lying idle; as these were found unsuitable for crushing wet material. The packing plant was imported from Germany and is not working, due to lack of some spare parts. As a result, the firm has been forced to employ, 30 women workers for manual packing. The per unit cost, therefore has increased.

191- It could not be understood that when the Government allows import of raw material, worth \$.260,500, why the import license for spare parts or for a new packing machine has not been made available ?.

192- It is suggested that I.B.S., might assist this industry, as well as advise, as to, what alternative use can be made of the two new crushing machines, lying idle.

(ii) Retreading of Tyres :

193- The roads generally are rough and the life of the tyres is short, the cost of new tyres, which are imported is high. Retreading of tyres, in most of the developing countries has become increasingly popular, as it gives a second life to the old tyres.

194- Rubber could be reclaimed from old tyres and mixed with new rubber. The machinery is simple, inexpensive, commercially available and easy to operate. One small plant in Wad Medani would be profitable, considerable foreign exchange would be saved. Inexpensive plants from India and Pakistan are available. IES/SSB/, procure model scheme and arrange financing.

(iii) M a t c h e s :

195- Matches, are one of the most essential items of every house hold and its demand would keep on growing. There is no match factory in Gezira, while the present installed capacity is almost fully utilized.

196- A small plant, with a capacity of 50 - gross of 50's per day, is considered profitable in Wad Medani. Model scheme for the above capacity might be procured by IES from India for adaptation.

(iv) Methane Gas Plant :

197- The appropriate Technology Organization, Government of India, has devised cow dung methane gas plant, which subjects organic wastes, like night soil, cattle refuses, agricultural bye products, grass, shrubs and other wastes to fermentation in the absence of air. After the plant has been installed, waste materials and water in the ratio of one to one are fed into the digester for producing methane gas. Plants up to 2500 cu. ft. are said to be available commercially.

198- It is suggested that I.R.C.I. obtain necessary literature from Khadi and Village Industries Commission, Irla Road, Bombay, India and explore the possibilities, whether such plants could be commercially useful in small towns.

(v) Dry Cleaning Plant :

199- The present population of Wad Medani is more than 110,000 and is steadily growing. The number of rich and high middle class is fairly adequate, while there is no automatic laundry. Small automatic plant, with dry cleaning facilities is considered profitable. Inexpensive machines of various capacities, are commercially available. Technical know how is locally available, no feasibility is required. SSE/IBS., might select an entrepreneur and arrange financing of a small plant.

CHAPTER 7R E C O M M E N D A T I O N S

200- The recommendations that resulted from the findings, discussed in chapters 1-6, are constituted for the Government to create appropriate institutions for the promotion of small-scale industry, for existing owners of the traditional or conventional industries to modernize, for the prospective entrepreneurs to select profitable industries, through Government assistance, and for UNIDO, to extend technical assistance. The following is the summary of the recommendations.

(A) Recommendations to the Government :

201- It is recommended that :-

- 1/ Wad Medani, Hassa-Heisa, Rufaa, and Kamlin in Gezira offer reasonable scope of urbanization economies, small investments should be spelled out and spread over a multitude of suitable modern industries, rising incomes in agriculture have produced a high middle class, who is keen to invest in small industry, while the increased incomes, have brought many consumers of industrial products for the first time in the market. The inexperienced prospective entrepreneurs are groping in the dark, as there is no institute or department of industry to assist them in the selection of profitable industries, in the selection of appropriate machinery and equipment, its operation, in training of the personnel and marketing of the products.
- 2/ Give due consideration, both at the national and provincial level to create specialized department, preferably a corporation for providing sustained and integrated assistance, through a variety of measure, which is required for relatively a long period of time, for the promotion of small-scale industry. In most of the developing countries, Government has taken this primary responsibility.
- 3/ Give top priority to the proposal of the Provincial Government of Gezira for the creation of a modest small-scale industry department on a pilot basis, comprising an industrial engineer, a mechanical engineer, an agro-industries engineer and a chemical engineer, in order to follow up the recommendations made in this Report.

- 4/ Government shall have to institutionalize the recommendations made in the Six Year Plan for Hire Purchase Loans for mechanization of small-scale industries and creation of a Central Marketing Body for the market of their products. For the implementation of the above recommendations, Government should create a central Corporation, with sub-branches in the Provinces. For the successful operation of the scheme, entrepreneurs will have to be selected and stimulated well in advance, suitable machinery of required capacities based on model schemes, shall have to be imported and its efficient operation should be insured so that, financial assistance is linked to technical assistance. Most of the developing countries, who have identical schemes, have created special corporation or institutes.
- 5/ Give due consideration to make a request for an expert from Government of India as technical assistance, on bilateral basis, for the operation of machinery and equipment, on hire purchase basis.
- 6/ Recognize that I.B.S. can not be expected to operate the hire purchase scheme and marketing of their products, without supporting industrial extension services in all the Provinces.
- 7/ Ensure that financial allocation for machinery on hire purchase is spelled out, as has been for handicraft centre projects, otherwise advance planning will not be practical.
- 8/ Recognize that I.R.C.I. is not a specialized institute, designed for the promotion of small-scale industry, is not equipped with industrial extension services, has no branches in any province. The addition of a small-industry cell, will not serve the objectives. Till the time a small industry corporation or a modest department is created in Gezira, IRCI., is considered one of the appropriate institutes, which can prepare the model schemes and feasibility reports, in cooperation with IBS/SSB for the recommended new industries.
- 9/ Give serious consideration and support to S.S.B., to convert into a semi development industries bank for the promotion of small-scale industries, complement the activities of the I.B.S., in Gezira, as there is no industrial development bank, to provide technical and financial assistance to the prospective entrepreneurs. I.B.S., should also give due consideration to establish a branch office in Wad Medani.

- 10/ Provide adequate equity capital and foreign exchange to S.S.B., to enable it, to attain its objectives of institutional financing of new small-scale industries, promotion of traditional industries, with potential of transformation into modern ones.
- 11/ S.S.B., on its part, should engage an industrial economist and an industrial engineer for the appraisal of the loan applications and for supervising the credit. Its rate of interest should be at par with I.B.S.
- 12/ Give due consideration that the definition of small-scale industry is not mixed up with manual processing enterprises and the handicrafts. It should be defined as to include manufacturing enterprises, which ^{use} modern technology, employing up to twenty workers and fixed capital investment up to \$ 150,000.
- 13/ Procure model schemes from the office of the Development Commissioner, small-scale Industries, Government of India, through its Embassy, as many of the schemes can be adapted with adjustments, according to the cost and prices prevailing in Sudan.
- 14/ Procure model schemes for rural industries, specialized handloom fabrics and handicrafts from Khadi and Village Industries Commission Government of India, so that the proposed R.D.C., is able to adapt those, which are considered suitable in Sudan.
- 15/ Give due consideration, for an expert, in handicrafts, and rural industries, from Government of India, as technical assistance on bilateral basis.
- 16/ Give special attention to the training and upgrading of technical and skilled personnel at all levels, increase the existing capacities of the Vocational Training Centre and Youth Development Centre in Wad Medani, the standard of the instructors in the latter should be upgraded.
- 17- Give due consideration that Management Development and Productivity Centre, establishes a cell in Wad Medani, for the training and stimulation of small entrepreneurs.
- 18/ Give due consideration to legislative measures, prohibiting the migration of skilled labour to foreign countries.

202- For the action and guidance of the Government, concerned technical and financial institutions, existing and prospective entrepreneurs, recommendations have been made, according to broad industrial classification of the industries. Although recommendations have been ^{made} in respect of traditional and conventional industries for improving the existing production processes, but there is no institution to follow up the recommendations.

(B) Recommendation for Food Processing Industries.

203- It is recommended that :-

1/ Canning of fruits, vegetables and juices in small industry is not profitable, large industries have underutilized capacities, cost of packing material is high. Bottling of concentrated juice of small lime, which has its own particular ^{features}, is scarce in other countries, high in demand, can be profitable, requires preinvestment and feasibility study, which should be carried out by I.R.C.I.

Sun drying and artificial dehydration of fruits and vegetables in rural areas, on community basis and semi mechanized dehydration in small towns, as already demonstrated by F.A.O., in Sudan, is profitable. The proposed R.D.C. should follow the simple technology.

2/ Establish two small dairy units for processing of butter and cream and two modern confectioneries for producing fresh biscuits and cakes in Wad Medani. Technical know how is locally available, IBS/SSB arrange financing.

3/ I.B.S., should provide immediate assistance to the conventional bakery in Kamlin, namely "Osman Mustafa", who is keen to modernize and produce quality products.

4/ Modernize conventional bakeries in small towns, where instead of bulk fermentation, quality bread should be produced in inexpensive rapid mechanized dough process.

5/ Proposed R.D.C., and Gezira Cooperative should promote and ensure hygienic conditions in traditional bakeries in rural areas.

6/ Give due consideration to the establishment of two wheat flour mills, one in Managil and one in Kamlin with a capacity of 40-50 ton per day. I.R.C.I., should carry out preinvestment study, in cooperation with Gezira Board.

- 7/ S.S.B. should assist mini flour mills in procuring spare parts.
- 8/ IBS/SSB., should immediately assist "Abu Kabira Spices" in Managil to mechanize the processing of prepared spices for export.
- 9/ Give due attention to building up of production over-capacity in large oil and fodder mills, which are proposed both by the Gezira Board and the Gezira Cooperative, beside a fodder mill in Rufaa, without ensuring adequate seed supply, the present capacities in the Sudan exceed the seed supplies. Proposal to establish a three-expeller oil mill in Kamlin and a fodder mill in Managil should wait, till the proposals for establishing large industries are not finalized.
- 10/ Proposed R.D.C. and the rural cooperatives should make concentrated efforts in simple processing of animal and poultry feeds from agricultural wastes, etc. in rural areas.
- 11/ IBS/SSE/ should give immediate attention to select an entrepreneurs to establish an ice factory of 20 ton capacity per day in Kamlin. Technical know how is available, profitability is assured.

(C) Recommendations for Industries Producing Agricultural Commodities other than Food

204- It is recommended that :-

- 1/ Government give serious consideration and support to the establishment of new cotton based modern small-scale industries, which are listed in order of priority as below :
- a) Canvas
 - b) Terry Towels and Fabric
 - c) Hosiery
 - d) Ready made Garments, Embroidery and specialized Handloom Fabrics
 - e) Cotton Rug, Up-Holstery, Rope etc.
 - f) Thread.

A balanced canvas unit with 20 automatic looms to produce light and medium varieties costs about \$.70,000 from Pakistan or India, while an improved plant to produce heavy varieties according to international standards costs about \$.250,000 from industrialized countries. This industry is important, offers prospects of import substitution and exports.

With the exception of Ready Made Garments, specialized Handloom Fabrics, all the above proposed industries require preparation of model schemes. Most of the information is available from India and Pakistan. IBS/IRCI., should give priority. Wad Medani and Massa-Meisa are suitable locations. Ready-made Garments and Embroidery in Wad Medani are profitable, S.S.B., should take the initiative, insure specialization for each line of production, i.e. ladies garments, children frocks, pants and men's shirts. Product designs should be adapted from latest catalogues from western countries on a continued basis.

Specialized Handloom Fabrics have export potential, sales promotion and latest product designs are of great importance. Proposed R.D.C., should give high priority.

2/ Wool Spinning and Weaving as a house hold and rural industry should be encouraged by rural cooperatives and proposed rural centres.

3/ Straw Board is an important industry, Government should give special attention to the establishment of two units, with a capacity of 2000 tons per annum each, one based on wheat and rice straws and the other on baggese in Junaid. The one based on wheat and rice straw require feasibility study, but the one based on baggese require preparation of model scheme. Straw board is the cheapest packing material. IBS/IRCI. should give priority.

4/ Recognize that under-utilized capacities exist in large tanneries, production in modern small units is not profitable.

The large conventional tannery, which produces 1000 hides and skins per day near "Dibaga" in Wad Medani is of importance, should be encouraged to improve its production processes. IBS/SSB., should induce this tannery to use pneumatically operated knives, mineral and oil processing, improved flaying and curing techniques.

5/ Organize semi-mechanized footwear industry, it is most suitable on small-scale, as specialization and adjustments in rapidly changing fashions, is easier for adaptation. Standard product designs and quality require the use of modern simple equipment, such as, cutting knives, moulds, sewing and stitching machines, adequate lasts and specialization in a single line, i.e. ladies, children and gents footwear.

The existing conventional footwear workshops resist the suggestions to modernize, new enterprises should be established. IBS/SSB., should give priority.

- 6/ Recognize that leather constitutes only 15-20% of the raw materials in the footwear industry, it can not enter into export market till the time ancillary industries such as processing of rubber, plastic, canvas and chemicals are established.
- 7/ Give due attention to leather goods workshops, which like the footwear, use poor quality leather, inferior interior lining, zips, locks etc., have no proper stitching, sewing machines and knowledge of latest product designs. Government should encourage new enterprises or arrange to improve present production processes, otherwise this industry will not be able to survive against synthetic substitutes.
- 8/ Bone meal is one of the most important export-oriented industry. A bone crushing plant for crushed bones in various sizes with a capacity of 7,000 tons per annum should be located near the Gezira Tannery. The cost of the imported machinery is approximately \$350,000, average export price of crushed bones is \$ 200 per ton. Government should give high priority, direct I.R.C.I., to prepare detailed feasibility report.
- 9/ Ensure that with experience gained in bone crushing, prospects should be explored for manufacturing of "Ossein", an intermediate product, obtained in the process of gelatine.
- 10/ Artificial cork can be manufactured from ground nut shells. The Gezira Board should request F.A.O.'s assistance concerning the feasibility.
- 11/ Promote and support the existing saw-mills and joinery workshops to improve the existing old fashion products designs, encourage modernization, provide modern saw-machines, joinery and furniture making equipment, encourage greater use of wood based panels, instead of round timber. IBS/SSB/ should support modernization.
- 12/ IBS, should provide immediate assistance in Hassa-Heisa to "Rabai Workshop" which is keen to establish a modern plant, comprising saw machines, carpentry, joinery and furniture making equipment.
- 13/ Give special attention to manufacturing of standard size "Flush Doors", which use drier veneer, equipped with a press or drier and press, are moisture and sound proof. Inexpensive plants are available from Pakistan. IBS/SSB/ should give due attention to establish a small plant in Wad Medani.

(D) Recommendation for Building Materials Industry.

- 205- The cost of building materials, components, fittings and fixtures is high in Sudan compared to Asiatic countries. The cost of the building in an industry is reflected in higher per unit cost of the products. This industry should be given high priority.
- 206- It is recommended that :-
- 1/ Electrical appliances and fittings can not be profitably manufactured on small-scale for the present.
 - 2/ Conventional burnt clay brick industry is of great importance, should be induced through all possible measures to improve its production processes, which are primitive, size and shape is uneven, strength is poor, losses and damages in processing, loading and unloading of the finished product are high. The present owners have monopoly, make 100% profit, resist suggestions for simple improved production processes, which comprise preparation of the mixture in measured proportion of clay, sand and cow dung in manually operated machine, wet clay in moulds should be tightly pressed, carried with care to the bank of the river, prepared mixture from moulds should be placed on cement platform instead of rough ground. These simple improved production processes shall greatly improve the present quality of the product.
 - 3/ Give high priority to the establishment of a modern brick-making industry based on modular coordination and continuous kiln. IRCI, should be directed to prepare feasibility report.
 - 4/ Traditional cement tile manufacturing technology should be improved, manually operated mixing and pressing machines should be mechanized. IBS/SSB, should give due attention and support.
 - 5/ Explore prospects to manufacture glazed tiles, which are high in demand. IRCI, should give due attention.
 - 6/ Recognize that chipped stones and gravel in different standards are required for the construction of roads and buildings. A stone crushing plant near the Fau mountain should be established. An electric stone crushing plant of 20 horse power with a capacity of 20 cubic meter per day for crushing various grades is available for about \$5,000. IBS/SSB, should select an entrepreneur, profitability is assured, technical know how is locally available.

- 7/ Plastic industry on small-scale offers great prospects, deserves high priority. IBS, should give immediate attention to the preparation of model schemes.

(E) Recommendations for Light Engineering Industry.

207- Previously, maintenance and repair facilities of agricultural machinery and automobiles etc. were provided by foreign suppliers. Gezira now offers ample opportunities for manufacturing of simple agricultural tools and implements, creation of domestic repair and maintenance facilities. High priority should be given to this industry to safeguard capital equipment as envisaged in the Six Year Plan.

208- It is recommended that :-

- 1/ IBS/SSB, should cooperate with the Gezira Cooperative, Tenants Union in establishing a small foundry equipped with cupala, moulding section, required machinery and accessories for fabricating simple agricultural tools and implements in Wad Medani. Lot of scrap is available, should be reclaimed. SSB should request the Gezira Board to prepare the model scheme, provision of \$920,393 has been made in the Six Year Plan for light industry cooperatives for the maintenance of agricultural machinery in Gezira.
- 2/ Gezira Cooperative and Tenants Union should cooperate in establishing three mobile mechanical workshops to provide on the spot maintenance services in isolated areas. A provision of \$372,744 has been made in the Six Year Plan for such workshops. IBS/SSB, should request the Gezira Board to prepare the model scheme.
- 3/ Establish a general purpose repair and maintenance workshop in Wad Medani, the imported cost of the complete equipment is about \$120,000. The profitability is assured. IBS/SSB, should request the Vocational Training Centre to prepare the model scheme, select an entrepreneur and arrange financing under the hire purchase scheme.
- 4/ An electrical workshop for automobiles in Wad Medani is profitable, the approximate cost of the imported machinery and equipment is \$30,000. IBS/SSB should request the Vocational Training Centre to prepare the model scheme, select an entrepreneur and arrange financing under the hire purchase scheme.

- 5/ Fuel Injection Pumps workshop in Wad Medani is profitable, the demand for repair and maintenance is high, approximate cost of machinery and equipment is \$25,000. IBS/SSB, should request the Vocational Training Centre to prepare the model scheme, select an entrepreneur and arrange financing under the hire purchase scheme.
- 6/ Rabai and Gizoli workshops in Hossa-Heisa are of importance, have potential of modernization into full fledged repair and maintenance workshops. IBS/SSB, should give due attention, arrange financing under hire purchase scheme.
- 7/ Give due attention to semi mechanized forging and repair workshops in Wad Medani, Hossa-Heisa and Managil. I.B.S., should provide technical and financial assistance.

(F) Recommendations for Miscellaneous Industries.

~~209-~~ A few industries under this group should be given due consideration and are of importance.

~~210-~~ It is recommended that :-

- 1/ Blue Nile Azure Laundry in Wad Medani imported two new expensive machines, which were found unsuitable, the packing machines is out of order. IBS, should give due attention to make some alternative use of the two unsuitable machines, provide immediate assistance in replacing the packing machine.
- 2/ Retreading of tyres is highly profitable, offers prospects of import substitution. One unit should be established in Wad Medani. Inexpensive plants from India and Pakistan are commercially available. IBS, should prepare model scheme and provide financial and technical assistance.
- 3/ A small match factory of 50 gross of 50 sticks per day is profitable in Wad Medani or Hossa-Heisa. IBS, should procure the model scheme of the above capacity from India, with due adjustments, select an entrepreneur and arrange financing.
- 4/ Methane gas based on cow dung has been developed in India. Plants of different capacities are available. I.R.C.I, should procure the necessary literature, explore in cooperation with IBS and proposed R.D.C, whether identical plants will be profitable and economically feasible in small towns.

- 5/ A dry cleaning plant in Wad Medani is profitable. Inexpensive plants of various capacities are commercially available. ISS/SSB., should select an entrepreneur, provide technical and financial assistance.

(G) Recommendations to Proposed R.D.C. for F.A.O.'s Assistance.

211- The rural population is too thinly spread, markets are isolated and narrow. The future of rural industries, at present is limited to the utilization of wastes and by-products of related industries, simple rural house hold products, production of cheap animal and poultry feed preservation of fruits and vegetables, handloom spinning and weaving and artistic handicrafts, etc. F.A.O. has already done considerable research in the above fields.

212- It is recommended that :-

- 1/ Proposed R.D.C., should carry out research in establishing integrated rural industrial technology, arrange pilot demonstration plants, promote traditional handicrafts including specialized handloom fabrics and follow up the recommendations of F.A.O. for the preservation of fruits and vegetables, using dehydration technology.
- 2/ Request F.A.O.'s assistance for an expert from Khadi and Village Industries Commission, India.
- 3/ Request F.A.O.'s assistance, concerning the feasibility to manufacture artificial cork from ground nut shells.

(H) Recommendations to UNIDO.

213- It is recommended that :-

- 1/ Give due consideration to the request of the Provincial Government of Gezira for four fellowships, required for the creation of a modest small-scale industry department. The request should be supported by the Ministry of Industry. (The details of the request, proposed fields etc. are contained in Appendice II para 9).
- 2/ Give favourable consideration, if further assistance is requested for an expert in industrial extension services and in coordinating the activities of the proposed small industry department in Gezira.

- 3/ Expand assistance on request from the Ministries of Industry and Finance, in the operation and institutionalization of the schemes Supply of Machinery and Equipment on hire purchase and creation of a Central Marketing Body for the market of the small industry products.
- 4/ Give due consideration to the request of the S.S.B., for two fellowships - an industrial economist and an industrial engineer for the appraisal of the loan applications and supervised credit, in case it is allowed to function ~~as~~ semi-development industrial bank.
- 5/ Give due consideration to the request for an expert in modern burnt clay brick industry.

UNITED NATIONS

United Nations Industrial Development Organization

UNIDO 28 January 1977

PROJECT IN THE DEMOCRATIC REPUBLIC OF THE SUDAN

INTERNAL

JOB DESCRIPTION

RP/SUD/77/CO4/11-01/31.3.D

TITLE	Economist
DURATION	Six months
DATE REQUIRED	As soon as possible
DUTY STATION	Wad Medani, with travel within the country
PURPOSE OF PROJECT	To assist the Government through the Sudanese Savings Bank in identifying small-scale and agro industries in the Gezira.
DUTIES	<p>The adviser will be attached to the Sudanese Savings Bank and will specifically be expected to :</p> <ol style="list-style-type: none"> 1) Advise on Government's capacities for providing effective extension services to small-scale industries. 2) Assist and identify suitable locations within the Gezira region offering perspective for the creation of small industrial enterprises. 3) Identify traditional industries with potential for transformation into modern small-scale industries. 4) Assist in the creation of new small-scale and rural industries in Wad Medani city and the Gezira. 5) Advise on appropriate small-scale processing technology, particularly for utilization of available local raw material manpower and potential markets. 6) Assist in improving operation, production process and organization of new and existing enterprises. 7) Undertake training of counterparts.

The expert will also be expected to prepare a final report, setting out the findings of his mission and his recommendations to the Government on further actions which might be taken.

QUALIFICATIONS

Industrial economist or engineer with practical experience in small-scale and rural industries in developing countries.

LANGUAGE

English

BACKGROUND INFORMATION

The Sudanese Savings Bank has its office in Wad Medani, in the Gezira. The city is about 180 kilometers South of Khartoum and is connected by a good road with Khartoum as well as with Port Sudan. The Gezira is a development pole in the Sudanese economy at large. The Sudanese Government has now asked UNIDO to assist them in making the best use of funds accumulated by the Sudanese Savings Bank from the savings of their customers. The Bank intends to re-invest the money in some projects of small-scale or rural industry nature. By encouraging the Bank in this direction, the funds could be utilized for investment in the area. This would be an immediate benefit for the Gezira and for the Sudanese economy.

ABSTRACTS OF THE PRELIMINARY REPORT.Need For a Small-Scale Industry Organization - Policies and Programmes
/ For Promotion and Development/

- 1- The International Labour Organization/ United Nations Development Programme (ILO/UNDP) employment Mission Report 1975 - "Growth, Employment and Equity" in Chapter IV and the Technical paper on Industry, made strong recommendations for the development and promotion of small-scale industry. Their recommendations are summarized below :-
- 2- " Very little work been done to establish as what products could be produced economically and with social advantages in small dispersed units. A number of considerations apply to a variety of industrial processes, where alternative techniques for oil extraction, preservation of fruits and vegetables, saw milling, paper manufacturing, tanneries, shoe-making etc. are labour intensive and economic to operate as small-scale. The promotion of small sized industries would be facilitated by a small Industry Development Organization, which, besides providing technical advice, could provide assistance in dealing with government agencies, their administrative procedures and with the formulation of projects proposals, provision of fixed and working capital.
- 3- Planning can help to ensure that profitable industries are established provided institutional support is provided in the form of technical assistance, assured supply of inputs, and markets for the product. Not all industries are suitable for dispersion, because of specific locational requirements or competition from large, but to the extent to which latter is the case, has a bearing on the choice of techniques. Techniques can be varied, suitable for small and geographically dispersed units. Knowledge of such techniques and processes to reach rural areas would require a small Industry Development Organization, equipped for rendering technical, financial and marketing advice through industrial extension centres, Small Industry Service Institutes etc. to facilitate assistance in selecting viable projects, securing machinery and equipment, imported raw materials, technical know-how, production technology, marketing etc.
- 4- No detailed programme exists except for investment in large units. £S. sixty million (US \$ = 3976 £S) for other industries, could be spread into small investments, spread over a multitude of industrial activities in different parts of the country - in handicrafts as well as in modern small-scale industry. Large investments in industries at present are only quantified, while investment in small-scale is spontaneous. This needs also better planning and economic investment

in quantitative terms, as rising incomes in agriculture will bring many consumers of industrial products into the market for the first time and their needs will often be met by small industry. Planning for small-scale operations as ancillaries as well as producers of common goods, simple agricultural implements etc. consists mainly in ensuring that conditions exist in which small industry can flourish and the various promotional and development activities required by it are supplied. If benefits of industrialization are to be wide and, small entrepreneurs should be encouraged, assisted with supporting activities."

- 5- The Government also in policy decisions has repeatedly emphasised that agro-industries using local raw materials, specially small and rural industries should be dispersed and encouraged. This policy has also been reiterated in the "Development and Encouragement of the Industrial Investment Act 1974". The recently approved Six Year Plan (1977-1983) has also assigned priority to the development of cottage and light industry.

- 6- It is therefore unfortunate that almost no steps have been taken in creating institutions responsible for the promotional activities, which is a pre-requisite to enable small industry to flourish. A separate Rural Development Corporation (R.D.C) is being established. Its objectives could not be ascertained whether it would also be responsible for the promotion and development of handicrafts and rural industries. However, there is no institution responsible for the promotion and development of small-scale industry.

- 7- Institutional financing is only one of the components of the integrated part of the package of measures for the development and promotion of modern small-scale industry.

Shortage of financial resources, especially the difficulties in obtaining foreign exchange component for capital goods as well as raw materials, insufficient technological and entrepreneurial knowledge, inadequate skill of human resources, outdated and primitive equipment, use of low quality raw materials, inadequate knowledge of suitable lines of industry and the requirements of machinery and equipment, lack of information on markets etc. are more pronounced in the Sudan, where most of the large industries in general are facing great difficulties, because of scarce resources - capital, skilled labour, weak infrastructure, narrow markets etc. Production in smaller units might be more economical in the case of relatively isolated markets and small urban towns.

8- Small-scale industries require assistance in all spheres of their planning, establishment and operation. Isolated actions would not be of much use without support by a variety of integrated assistance, for example financial assistance might remain dormant if steps are not taken to train managers and prospective entrepreneurs. Machinery and equipment might remain idle if not properly selected according to the size of the market and without ensuring raw material supplies. Technical training of the required skilled workers would not contribute to efficiency and productivity, if industrial extension services, service centres or institutes are not made available for rendering integrated and sustained assistance. Such integrated assistance and guidance would be required for a long period of time and it is only the Government, which is in a position to undertake the programme for promotional activities, which are indirectly productive and take a long time in catching the roots.

9- The pre-requisite of an action programme by the Government is to establish a separate and specialized organization, exclusively responsible for the promotion and development of small-scale industry. Such an organization might be a Department in the Ministry of Industry or a Corporation, the latter would be more effective. In Sudan at present there are a number of Corporations responsible for the development of specific large industries, but no attention has been given to the promotion of small-scale industry. The industrial programme for small-scale industries should have been spelled out in the Six Year Plan in the form of proposed promotional and developmental measures, institutions responsible for implementing them, investment guidance to the private sector industrywise and the physical and financial targets to be achieved on a priority basis.

The Provincial Government of the Gezira is keen to give a lead that a separate specialized organization or department exclusively responsible for assisting and promoting small-scale industry might be created as early as possible, provided UNIDO grant at least four fellowships in the following fields :

1. Industrial Engineer (Team Leader) :-

He would need training in the preparation of feasibility studies or model schemes for the recommended industries, which might be considered economically viable. He would also need extensive and practical training in organizing industrial extension services, service institutes, marketing surveys and detailed plan coordination.

2. Mechanical Engineer :

He would need training in appropriate technology used in producing simple agricultural tools and implements, diagnosis of the production problems, selection of appropriate machinery and equipment, its installation and operation for the new industries or for modernization of the existing units.

3. Food Processing and Agro-Industries Engineer :-

He would need training in appropriate technology such as simple methods and processes used in fruit and vegetable canning, vegetable seed oil extraction, dairy products, confectioneries, simple process of dehydration of fruits and vegetables, specialized handloom fabrics, flour and rice husking mills, simple sugar processing technology etc.

4. Chemical Engineer :-

He would need training in improving village tanneries, leather goods, shoe making, soap, match, ink and small pencil manufacturing plants, making of bricks from clay and general purpose cement, which could be produced in small plants. Six months extensive courses could be organized in India, which had a network of small industry extension services and institutes.

10-

It is understood that in the Six Year Plan, serious attention has been paid to the problem of underutilized capacity in the existing units and it has been recommended that no further capacity should be created till the existing capacity was fully utilized. New capacity has been recommended in modern textile mills, oil extraction, sugar and cement, which offer ample opportunities for import substitute and exports. However, still there are possibilities, where small plants could provide opportunities for dispersal and employment, till optimum capacity was reached in the existing units.

11-

The Gezira Scheme :

Gezira is the richest province in Agriculture in the whole of the Sudan. It lies between the Blue and White Niles. Over two million feddans (One feddan = 1.06 acres) have been brought under cultivation. The Gezira Scheme constitutes the largest farm under one management in the World. It constitutes over 12 percent of the total area cultivated in the Sudan.

The scheme is a unique experiment in partnership between three partners viz : The Tenants, the Government and the Board. The Government provides the land, looks after its irrigation, the tenants undertake the production of the crops. The whole area is under mechanized cultivation. The Board coordinate all the activities from the preparation of the soil to the marketing of the produce. It carries out mechanized cultivation, aerial spray of insecticides, supplies necessary fertilizers, expertise services, cleaning and processing operations. Income from groundnuts, durra, wheat etc. belongs to the tenants alone and they are free to sell it in the open market at a fair price fixed by the board; while the gross proceeds from cotton seeds are subjected to deduction of all the expenses, till the marketing of the produce. The net proceeds of the cotton are distributed as follows :-

36 percent to the Government
 49 percent to Tenants
 2 percent to the Local Government
 3 percent to the Social Development Department
 and
 10 percent to the Gezira Board.

During 1976-77, cotton was grown in half a million feddans. The Scheme provides 75 percent of the country's extra long staple cotton, 12 percent of durra and 60 percent of the production of groundnuts and 80 percent of Sudan's production of wheat. Recently cultivation of Soya Bean has been tried successfully.

12- Beside the Gezira Scheme, another 0.40 million feddans under "Rahad Scheme" also belong to the Gezira Province, which means a total of 2.40 million feddans of irrigated land, producing cash crops.

13- Population and Small Towns

The population of the Gezira Province is about 21,35,000. The following are the urban towns and their population :-

<u>T o w n</u>	<u>Population</u>
1- Wad Medani	106,000
2- Hassa-Heisa	19,000
3- Rufaa	16,000
4- Managil	16,000
5- Hilalia	9,000
6- Abu Ushar	8,000
7- Kamlin	7,000
8- Messellania	<u>5,000</u>
T o t a l	= 186,000 =====

Wad Medani offers urbanization economics and has the advantage of good communications - there is an excellent road to Khartoum, fair communications towards South, roads are under construction to Sennar and Gedarif. Various tractor and implement supply companies including Gezira Board Engineering Development Centre have set workshops.

14- Industrial Development Programme of the Gezira Board :

The Gezira Board which started purely to manage and coordinate the agricultural development, has added an industrial section and has fairly an ambitious programme in the following fields :-

1) C o t t o n.

- a) Ginning - Production
- b) Ginning - Preparation
- c) Ginning - Modernization
- d) Spinning and Weaving
- e) Cotton Stalks - Chip Board and Paper industry.

Till now, cotton stalks were being burnt. It is proposed to establish a Chip Board industry at a cost of £s.8 million to produce 30 thousand tons of chip board. A large paper mill is also envisaged at a cost of £s.12 million to produce 15 thousand tons of paper, which would make Sudan self-sufficient. During discussions it could not be ascertained as what use would be made of the bagasses, which is available in the Guniad Sugar mill and could sustain another paper factory.

2) G r o u n d n u t s.

- a) Decortication and preparation - Projects
- b) Decortication and preparation - Production
- c) Oil pressing and projects
- d) Oil pressing and production

At present 5 hullers are under construction, each has 6 units for attaining self-sufficiency in ground-nuts.

The future plan is setting of an oil mill at a cost of £s.5 million with a capacity of 60 thousand tons of oil only for export and 67 thousand tons of cakes.

3) R i c e

- a) Hulling and whitening - Projects
- b) Hulling and whitening - Production

The present capacity of the two lines is 15 thousand tons per season. A third line is proposed to bring the capacity to 20 thousand tons.

4- Vegetables and Fruits .

- a) Tomato Paste - Projects
- b) Tomato Paste - Production

There is no concrete programme as concentrate is imported and this industry in Wau is already running at a loss and has abundance of unutilized capacity.

5- F o d d e r .

- a) Fodder Mills
- b) Meat and Milk Production

Plans are being prepared to establish a fodder mill from groundnuts shells for concentrated feed and oil cakes, while refrigerated meat would be exported to the Arab Countries. Gezira Board has also a small foundry namely Wad Medani Irrigation Workshop. It has two oil fired furnaces of 130 kg. capacity for production of spare parts.

- 15- Gezira Board apparently has plans for establishing some large industries, where subsidiary corporations under the Industrial Production corporation already exist, such as Textiles, Edible oil, Fruits and Vegetable canning and preservation. It could not be ascertained as how Gezira Board had taken the responsibility for establishing industries in the semi-public sector in the same fields, where corporations were already functioning. The duplication of functions and responsibilities has already resulted in bad planning and excess capacity.

Training of Personnel.

- 16- Both skilled and semi-skilled manpower is in short supply even in the existing industries. This could also be one of the main reasons of inefficiency and underutilized capacity. Further, the existing skilled labour is continuously migrating to oil rich Arab countries, making the existing situation of short supply of skilled labour all the more worse. Intensified efforts are required for manpower budgetting and increasing the capacities of the training institutions accordingly. Consideration might also be given to enact some law prohibiting the migration of certain class of skilled labour.

- 17- The Government's training programme for industrial skills is administered by the Department of Labour. Out of the five Vocational Training Centres, one is located in Wad Medani, the training programme is of three years duration, two years of which are spent in the Centre's Workshop and the third year for the selected trainees is devoted to "on the job training" in some factory, being a part of apprenticeship training. Skill up-grading courses are also organized.
- 18- Out of the 8 centres for the training of operators and semi-skilled workers known as "Youth Training and Development Centres" one is located in Wad Medani, offering one year course in masonry, carpentry leather works, plumbing, fisheries, metal work, electricity and handicrafts. The Gezira Board has its own training programme.
- 19- The Management Development Production Centre - a UNDP/ILO project became operational in 1968 in Khartoum. No attempt has been made by the Centre to reach small entrepreneurs, employing less than ten workers, while the number of such establishments according to the Department of Statistics was 3012 out of 3157.

20- Excess Capacity :

Some of the selected industries working below capacity are mentioned below : (Source - World Bank Survey of the Industrial Sector of Sudan 1973) :-

<u>No.</u>	<u>I t e m s</u>	<u>Maximum Capacity</u>	<u>Actual Production</u>
1-	Textiles (Dabalan, Damoria and Willaya)	1106,300	102,700
2-	Lanterns (from yarn)	12 million units	487,000 units
3-	Knitware (underwear)	689,500 dozens	320,395 dozens
4-	Ready made shirts	1215,000 units	555,000 units
5-	Vegetable oils	654,000 tons	500,000 tons
6-	Tomato Paste (canned)	64,880,000 cans	47,557,526 cans
7-	Tanned Leather		
	a) Cow	360,700 kilos	300,000
	b) Sheep	250,000 sq.meter	187,250
	c) Goats	200,000 pieces	100,000

<u>No.</u>	<u>I t e m s</u>	<u>Maximum Capacity</u>	<u>Actual Production</u>
8-	Macroni and varmicelli	40,000 tons	16,000
9-	Juices (from fruits)	2,000,000 cartons	1,519,200
10-	Canned Fruits & Vegetables	650 tons	546
11-	Particle Board	360,000 sheets	280,000
12-	Cigarettes	720 million	1,2 million
13-	S h o e s (a) Plastic	18,489,975 pairs	2,690,080
	(b) Canvas	1,819,000 pairs	78,767
14-	C e m e n t	360,000 tons	270,000
15-	Ball Pens (ordinary)	380,000 Dozens	160,000
16-	Packing and Packaging materials	15,640 tons	7,500
17-	Stationery (ink, chalk)	515 tons	175 tons
18-	S o a p	51,160 tons	37,325
19-	Perfumeries	422,184 litres	207,940
20-	Batteries (for cars)	155,000 units	50,000
21-	Air Coolers	4,500 units	2,060
22-	Air Conditioners.	500 units	68
23-	Zinc sheets	25,000 tons	7,000 tons

SUMMARY OF THE QUARTERLY PROGRESS REPORTNumber of Small Enterprises in Gezira :

1- According to the Department of Statistics, there were 3,200 Units in the Sudan in the manufacturing sector in 1971/72; 2766 employed 1-4 workers, 246 employed 5-9 workers. In other wards, about 3012 units were classified as small enterprises out of the total of 3,200. It was also reported during the same year that the contribution of the manufacturing sector to the gross domestic product was £s.23,126^{million} (US \$ = 3976 \$s) while 20,000 handicrafts contributed £s.16.490 millions (contribution of total manufacturing sector was £s.49.616 million). According to the latest survey in 1974, it was reported that establishments employing over 30 workers contributed 90 percent of the total of £s.23,126 million. It could therefore be presumed that the contribution of small enterprises employing less than 10 workers have been hardly 5 percent or £s.one million.

2- There is no industries Department in any Provincial Government in the Sudan. Since the former Blue Nile Province has been sub divided into three provinces, one of which is Gezira, the number of small manufacturing industries is difficult to ascertain. Further, no Government Department or Agency is involved with the activities of the expert. Efforts had to be made through contacting the private sector in identifying the number of small enterprises and their line of production. It was assumed that out of the total of about 3012 small enterprises in the whole of the Sudan, there might be about 250 such units in Gezira. According to the Manpower Survey 1975, establishments employing more than 10 workers, it was noted that in Gezira, there were 30 manufacturing units, which employed more than 10 workers.)7 employed 10-14; 9 employed 15-19; 5 employed 20-29; 3 employed 30-39, one employed 50-100 and 5 over 100).

Mechanical Small-Scale Enterprises in Wad Medani.

3- The experts' counterpart, who is a public Relation Officer in the Bank, contacted the Department of Customs, which had a record of about 20 manufacturing units located in Wad Medani. These include two ice mills, two spaghetti and Macroni units, one mineral water factory, a few carpentry workshops, which have one electric sawing machine, three forging workshops which had out dated small lathe machines, one steel doors, windows and bed manufacturing unit, one laundry blue and one manually operated cement tiles manufacturing unit. Personal visits were paid to all the above units, their problems were discussed and technological improvements suggested. The steel door and window manufacturing and the two spaghetti units were closed due to the lack of raw materials.

One carpentry workshop expressed keenness to modernize and it was suggested that it would require balancing machinery for joinery and furniture making. The cement tile manufacturing unit is keen to mechanize the product and is also interested in establishing a modern bakery. The laundry had imported from India two unsuitable machines, which were new, but were idle, while the packing machine was out of order due to non-availability of the spare parts. None of the forging workshops expressed any desire to modernize. They had no precision instruments and forged expensive parts using outdated technology.

The Gezira Co-operative :

- 4- The Gezira Co-operative is the second important agency after the Gezira Board. It has 430 Co-operative units engaged in different economic activities and has a total membership of 190,598. It owns a large flour mill "Goz Cabaro Corporation Flour Mill". It has plans to establish a large oil mill based on ground nuts and a large fodder mill. There are about 200 mechanized flour mills in the whole province, 102 belong to the cooperative. Each flour mill as an average has a 20 horse power electric motor, employ two workers and produce $\frac{1}{2}$ ton of flour per day. The Assistant Commissioner of the Co-operative informed that the 200 flour mills covered almost all the rural areas, but about 15-20 percent were facing shortage of spare parts.

Traditional Industries :

- 5- A number of traditional industries were identified in Wad Medani, the most important of which with prospects of modernization are burnt clay brick manufacturing, conventional tanneries, footwear, leather, carpentry, furniture making, auto repair, electric repair workshops and conventional bakeries. Visits were made to all these traditional manufacturing units and improved production processes were suggested. If they exercised a little care and add inexpensive simple tools, the product could be improved. Most of them did not appear keen to adapt improved production processes. Promotional measures are required to induce the artisan, to adapt the newly emerging simple technologies. The mechanized artisan sector could be aided in servicing and repairing and in processing of articles adjusted to modern needs and tastes.

Small Towns and Prospects :

- 6- The other important town after Wad Medani is Hassa-Heisa. It lies on the main Khartoum-Wad Medani high way and is about 40 Km. from Wad Medani. Beside the large Chinese aided textile mill, there is a medium sized oil mill, based on ground nuts, produces 1800 tons of oil and 2100 tons of cakes per annum, two ice mills, and two modern small-scale repair and maintenance workshops namely "Rabai" and "Gizoli".

- 7- Rabai has agency of German made "Class" and Swiss made "New Holland" tractors. It has an expensive general purpose lathe machine and specializes in the repair and servicing of harvestors. There are hundreds of harvestors owned by the tenants Co-operatives and private individuals. The demand for repairing and servicing is large and the firm is keen to further modernize and import balancing machinery and equipment. It also contemplates adding a modern carpentry and joinery workshop.
- 8- The Gizoli repair and maintenance workshop specializes in the repair of spare parts of tractors and heavy trucks. It has a modern general purpose lathe, crankshaft grinder, galvanizing and electroplating equipment. It has devised its own indigenous heat treatment facility and is successfully operating. This small-scale unit has potential for expanding into a modern general purpose repair and maintenance workshop, if balancing machinery, such as cylinder boring and milling machines are added.
- 9- Hassa-Heisa has also a complex of traditional auto repair and carpentry workshops owned by the artisans. The auto repair workshops were found repairing expensive parts, even reborring of the auto engines through outdated manual methods, without proper gages and simple precision instruments, which are necessary even for manual operations.
- 10- The other important town situated just opposite to Hassa-Heisa on the bank of the Nile is Rufaa. Unlike Hassa-Heisa, it has no mechanized small enterprises, except an ice mill and a modern auto bakery, which has been recently established. This bakery is producing only low quality bread and in spite of the expensive equipment has not cared to ensure hygienic production. This bakery should have been located in Wad Medani instead of Rufaa, where there is limited demand for high quality confectionery products. The Assistant Commissioner Rofaa informed that a fodder and a flour mill is envisaged, but he had no idea about the capacities of the two proposed projects
- 11- Kamlin is another town half way between Khartoum and Wad Medani on the main high way. There are no mechanized industries except the traditional workshops. Possibilities of establishing some profitable small-scale industries are being explored. Not far away from this town, a large complex of poultry farm financed by the Joint Arab Fund is under construction. So far, it could not be ascertained whether the entire product would be exported or a balance would be reserved for meeting the local demand.

12- Managil is another important small town. It has an oil mill, an ice factory and an industrial area. Prospects of establishing some new industries in the industrial area and the improvement of the artisan activities are being explored.

13- The problems of all the manufacturing small enterprises both mechanized and traditional were discussed on the spot, advice on improved production processes was made available to the traditional industries, some of which have potential for modernization. Except a few, most of the owners of the traditional industries do not appear to be keen to improve their product or technology. Many of them can improve their products if technical advice is made available through extension services and simple inexpensive tools are made available.

Vocational Training Centre and Youth Training
and Development Centre

14- The most important training institute in the Gezira is the International Labour Organization (ILO) assisted Vocational Training Centre. Both the general Manager Mr. Awadel Karim Mahil and the ILO expert Mr. Langeoire extended full cooperation to the expert and made valuable suggestions on the modernization of the existing repair and maintenance workshops and prospects of new small-scale units in the above lines.

The duration of the training is 3 years in this Institute, two years in the centre including theoretical and practical in the workshop and one year in plant training in industry only on demand as apprentice. The present vocations include agricultural heavy earth moving machinery, auto, fuel injection pumps, general purpose and diesel engine machines, pipe and machine tools fitters, welding, electricians, blacksmiths and sheet metal.

A number of visits were made to this centre and discussions were held whether it was possible for this institute to impart training to small entrepreneurs, managers and in the skills required for upgrading the traditional industry. Both the General Manager and the ILO expert expressed keenness, but regretted that even the present output was much below the demand.

15- The other training institute is "Youth Training Centre". It imparts one year theoretical and practical training to students from higher technical schools. The trades include leather, electric, carpentry, blacksmithy, radio and television and home economics to

Prospects of Diversifying Production in
New Small-Scale Industries

16- After a sample survey of the market, demand and availability of the new materials, prospects of diversifying production in modern small-scale industries are being explored and work on their economic feasibility is in hand.

It is however presumed that in the near future, the Government would create institutions, especially industrial extension services for the preparation of model schemes or factory sheet data so that technical assistance is linked to financial assistance, which is considered a prerequisite for the promotion modern small-scale industries. Further, the present definition of small enterprises would be elaborated so as to distinguish handicrafts and manufacturing enterprises. The definition might be based on modest capital and modest employment according to the socio-economic conditions in the Sudan.

Discussions with the Ministry of Industry
and other concerned Agencies.

17- The expert along with his counter part visited Khartoum from November 5 to 9 and met Mr. Sanhori, Under Secretary Projects. The objectives of the Project were explained to him and it was suggested that merely providing credit facilities without linking it to promotional measures, it was difficult to achieve the objectives. The Under Secretary however, did not appear to favour the proposal that there should be a separate Department or Institute exclusively responsible for the promotion of small-scale industries. He said that for the present there was no such proposal in the pipe-line, but there was an Industrial Research Consultancy Institute, which was going to add a cell to prepare feasibility studies and provide technical assistance to small-scale industries, but the cell was not yet operative. He arranged a meeting with the above Institute and also advised to contact the Industrial Bank of Sudan, which is responsible for financing the small-scale industry.

The Industrial Bank of Sudan.

18- A meeting was arranged with Mr. Ahmed Alshagi, the Deputy General Manager of the Bank. He was of the opinion that the financing of small-scale and rural industries was the responsibility of his Bank, which had a special cell for providing financial assistance for modernization or expansion of existing or new small industries, providing technical advice, research and marketing services and conducting research and investigation including feasibility studies of new projects. The Deputy General Manager informed that he was

expecting fairly adequate credit lines for financing small-scale and rural industries during the Six Year Plan and the Bank's policy to encourage rural development was reflected in its contribution to the establishment of 5 projects in rural areas by granting them financial assistance of Es.369,000 equivalent to 17% of the total amount of loans during 1976.

During discussions it emerged that the activities of the Bank were mainly confined in Khartoum. The expert also suggested that in most of the developing countries, the Industrial Development Banks receive applications through the technical department in the Ministry of Industry or Institute, responsible for the promotion of small-scale industry, since the latter carry pre investment studies and follow the credit through extension services so that financial assistance was linked to technical assistance. It emerged that no such built in structure was available in the Bank and it could not be ascertained as how it could carry out technical appraisal of the applications of small entrepreneurs, who had no knowledge about the profitability of suitable small-scale industry and had no idea about the selection of the machinery and its operation.

The Six Year Plan.

19-

The English version of the Six Year Plan is still under print. However, the expert contacted Dr. Shinawy, Manpower Adviser, United Nations Development Programme/International Bank for Reconstruction and Development (UNDP/IBRD) who extended his full cooperation and made available a draft copy for taking necessary notes. Some of the important extracts on policy measures are reproduced below :-

Development of Small-Scale and Rural Industries (Page 72 Vol.2)

- 1) Establishment of suitable industries in regions where basic services are available.
- 2) Provision of machinery and equipment on hire purchase.
- 3) Creation of a Central Marketing Body for the market of the products of these industries.

In an attempt to modernize the traditional sector, which is a large part of the national economy the following is proposed :-

- 1) Expansion of industrial credit to finance high priority projects, which have satisfactory feasibility studies completed.
- 2) Improvement of industrial legislations and adaptations of new laws and measures necessary for the participation of the private sector in the industrial development taking place in the country.
- 3) Provision of material incentives to national industries through customs and taxation exemption for machines and equipment and of protection for the national industries.

Suggestions have also been made in the Six Year Plan for production of cheap animal and poultry feeds, utilization of products of oil mills, sugar refineries, facilities for processing of wastes of other related products, encouragement of wood based industries such as sawn wood and furniture making, development of small-scale industries based on local raw materials, packaging materials from bagasse, animal feed, develop and consolidate traditional handicraft industries in rural areas. It has been mentioned to establish handicraft centre Projects - 180 centres of traditional shape, for which an allocation of \$1,548,324 (£s.540,000) has been suggested.

Regarding the co-operatives, suggestion has been made for the creation of light industry cooperatives, which depend on the utilization of local resources and materials, maintenance of agricultural machinery and equipment in Gezira for which a provision of \$920,393 (£s.321,000) has been made, mobile mechanical workshops at a cost of \$372,744 (£s.130,000) and building material industries.

Sudanese Development Corporation (S.D.C.)

20- The expert met Mr. Yousif Adam, Manager Research Section S.D.C. The expert pointed out during discussions that in an attempt to have vertical integration of the industries, no place was being accorded to modern small-scale industries, since rural industries were being mixed up with the former. It was also pointed out that at present rural areas in the Sudan lacked even the basic minimum infrastructure facilities, the markets were too narrow and the possibilities of establishing industries in rural areas were very limited except some kind of food processing and improvement of artisans craft. Food and Agriculture Organization (FAO) had already carried out research in rural development in the Sudan and FAO might be requested to assist the proposed Rural Development Corporation (RDC), since UNIDO generally does not deal with the development of handicrafts and indigenous rural industries.

Mr. Yousif Adam was of the opinion that Khartoum and Gezira Provinces were considered industrialized and might be kept outside the purview of RDC. He also did not favour the idea of specialized institution for the promotion of small-scale industry.

SUDANESE SAVINGS BANK

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PROJECT PROFORMA

PART I

- 1- Name of the Project
- 2- Individual or
Partners
- 3- If Partners, Give Name
and Addresses
- 4- Type of Industry
- 5- New or Existing/Expansion
- 6- Capacity
- 7- Annual Value of Existing
or Proposed Sales
- 8- Location
- 9- Fixed Assets
 - a) Cost of Land and Building
 - b) Cost of Machinery and Equipment
 - i) Imported
 - ii) Local
 - c) Working Capital
- Total Investment
- 10- Required Foreign Exchange Loan
 - Required Local Loan
 - Country of Import
- 11- Annual Foreign Exchange
 - Requirements of Raw Materials
and Spares including cost
Freight and Duty.
- 12- Source - Country
- 13- Annual Local Raw Material Requirements
- 14- Requirement of Personnel
 - i) Managerial
 - ii) Technical
 - iii) Skilled
 - iv) Unskilled
 - Total
- 15- Utility Requirements
 - i) Electric Energy (KW)
 - ii) Fuel Oil (Gallons)
 - iii) Fuel/Coke or Wood (Tons)
 - iv) Water (Gallons)
- 16- Total Salary Wages

- 17- i) Start of Production if New
- ii) Start of Production if Balancing
And Modernization.

- 18- Exports if Any
Value

- 19- Estimated Gross Profit
Estimated Net Profit (After Taxes etc.)

- 20- i) Owners Equity
- ii) Partners Capital
(Give Break Down)

- 21- Any Previous Loan

- 22- Debt Equity Ratio
(Fixed Cost)

.....

- 1- Description of the Project
(If New/Expansion) Annexure I
- 2- Facilities
 - i) Land (Cost) (If New)
 - ii) Building (Attach Plan) and Cost Estimate
 - iii) Estimated Time of Construction (If Applicable)
- 3- Break Down of Machinery
and Equipment Together with
Cost Separately For Imported Attach Annexure (II)
and Local
- 4- Raw Materials - Give Breakdown
Together with Cost Annexure III
- 5- Over Head Services Annexure IV
 - i) Power
 - ii) Water
 - iii) Transport
 - iv) Personnel
- 6- Technical Know How Annexure V
- 7- Technical and Economic Feasibility Together with Cost Break Down
(In Case of New Project).
 - i) State If Self Prepared
 - ii) If Prepared by Any Institute (Attach Copy).
 - iii) If Prepared by Any Consultant Give Annexure VI
Name and Address
- 8- Marketing Arrangements Annexure VII
 - i) Present Supply
 - ii) Present Demand
 - iii) Prospects of Future Demand
- 9- Profitability Yearwise For Five Years Annexure VIII
 - i) Sales
 - ii) Gross Profit
 - iii) New Operating Profit After Depreciation
 - iv) Profit After Taxes
- 10- PROFIT DEBT SERVICE COVERAGE Annexure IX
 - i) Net Profit After Taxes
 - ii) Add Interest on Loan
 - iii) Add Depreciation
 - iv) Profit After Liabilities

LIABILITIES

 - i) Instalment Of Loan
 - ii) Add Interest
 - iii) Any Other Liability

Total Liability
- 11- Give Break Even Point Annexure X

TRAINING OF THE COUNTERPART.

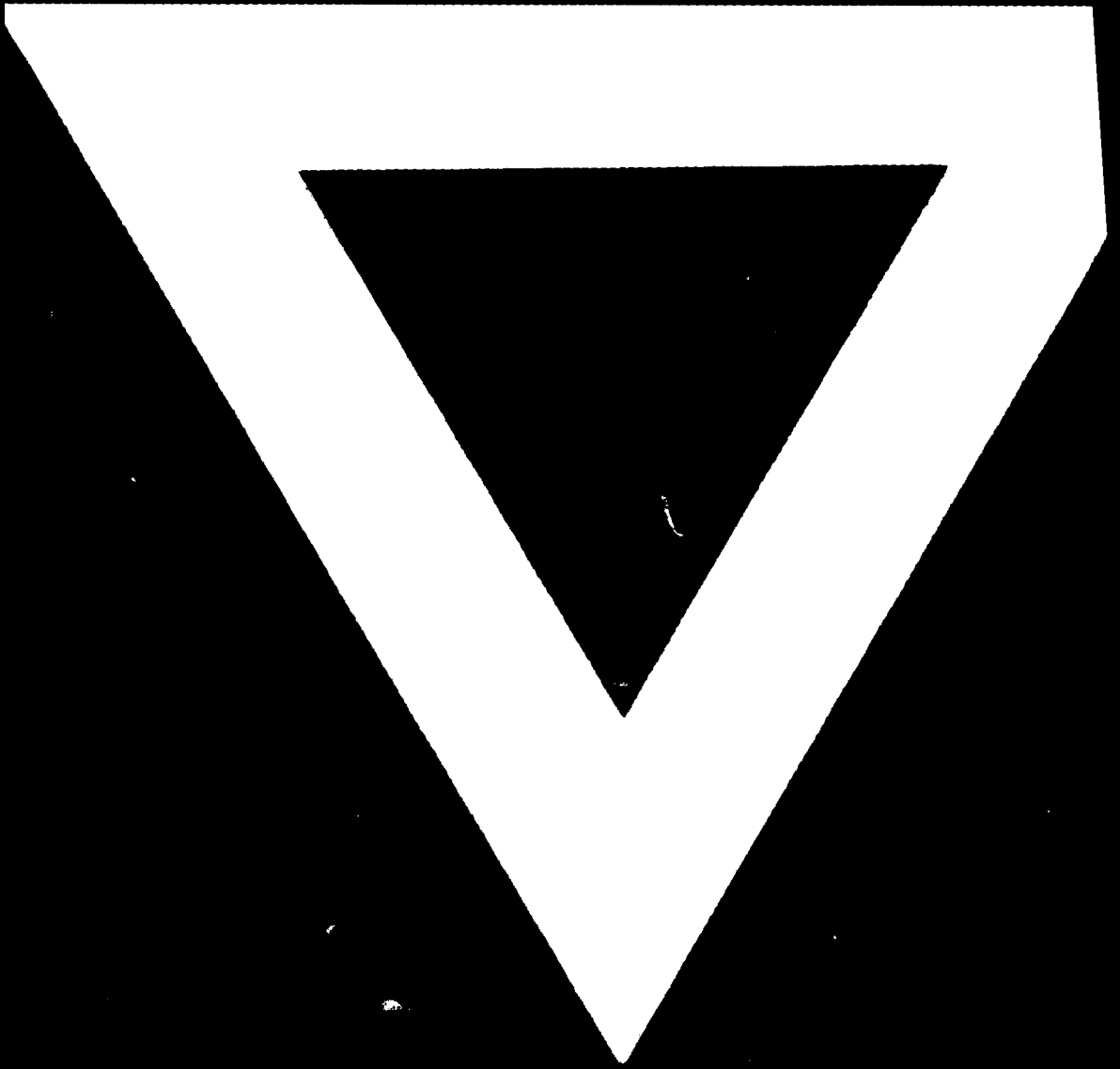
Mr. Salah Adam, a graduate in social sciences and international economics from the Prague University, is working as a Public Relation Office in the Bank. He was nominated by the Managing Director as counter-part of the expert.

The counter-part was involved with the expert from the beginning to the end in the Project activities. He accompanied the expert to all the places in identifying traditional industries, their problems and prospects and in exploring the possibilities for the creation of new small-scale industries. He was given on-the-job training and was also associated in all in all the meetings and discussions, held with concerned Government agencies and institutions.

He was provided the following UNIDO documents as reading material :-

- 1- Small Scale Industry (UNIDO MONOGRAPHS ON INDUSTRIAL DEVELOPMENT II).
 - 2- Hire Purchase Loans for the Mechanization of small-scale industries. The Experience in India (ID/WG.17/15 August 1968).
 - 3- Industrial Extension Services for Small-Scale Industries. (ID/WG/17/11 July 1968).
 - 4- Extension Services and Development Finance for Small- Industry :- An International Comparative Analysis (ID/WG/17/14 August 1968).
 - 5- Industrial States: Policies, Plans and Progress (CID/VI/Background Paper No.14).
 - 6- Public and Private Financing of Industrial Estate Projects and stimulation of Private Projects by Government Authorities, with special Reference to India's Experience (CID/IE.1/9 August 1966).
 - 7- Report of Seminar on Financing of Small-Scale Industry in Asia and the Far East (ID/WG/93/23 June 1971).
 - 8- Small-Scale Industries in Arab countries of the Middle East
(Report of the Expert Group Meeting 1970)
 - 9- General Issue of Industrial Policy (UNIDO MONOGRAPH 20, 1969).
- The above documents were provided as reading material, and were explained to him.

Beside, the policies and programmes for small-scale industry development in India and Pakistan were also explained to him. He was requested to hold discussions after reading the above documents. However, he was too busy with his own work and could not find time for any discussions.



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