



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org



**INDUSTRIAL
CONSULTANCY
UNIT**

18824

S/P
faded
trajhu

**F E A S I B I L I T Y S T U D Y F O R
T H E R E H A B I L I T A T I O N O F S A L T P R O D U C T I O N
I N J E S I R A (M o g a d i s h u) , S O M A L I A**

Prepared by

DJORDJE M. LAJSIC

Advisory Consultant

ICU NATIONAL CONSULTANTS:

MR. MOHAMED ADEN AHMED, MBS.ENG.MINING

MR. ALI DUALE ABDULLE, MA. ECC.

Mogadishu , March 1989

2/

BC III (continued)

A C K N O W L E D G M E N T

THE JESIRA SALT WORKS EXPANSION PROJECT

This Investment Project has been prepared along the lines set in the UNIDO "Manual for Preparation of Industrial Feasibility Studies" and Project Analysis Tools from the WORLD BANK

This Feasibility Study has been prepared also within the framework of the UNDP Project for Establishment of Industrial Consultancy Unit (ICU - SOM / 86 / 34 - ext. FS) in Somalia and fulfills the task of on job training of local consultants

Local consultants from ICU involved in the Feasibility Study preparation :

Mr Mohammed Aden Ahmed , MBA ,Eng.Mining

Mr Ali Duale Abdulle , MSc .Ecc.

C O N T E N T S

CHAPTER I	EXECUTIVE SUMMARY
CHAPTER II	PROJECT BACKGROUND AND HISTORY
2.1	<u>INTRODUCTION</u>
2.2	<u>PROJECT BACKGROUND</u>
2.3	<u>PROJECT PROMOTER</u>
2.4	<u>PROJECT HISTORY</u>
CHAPTER III	MARKET AND PLANT CAPACITY
3.1	<u>GENERAL DESCRIPTION OF PRODUCTS</u>
3.2	<u>GENERAL AND SPECIFIC MARKETING ENVIRONMENT IN SOMALIA</u>
3.2.1	<u>Demand and Market Study</u>
3.2.1.1	Data and alternative projection methods
3.2.1.2	Forces and Factors shaping Consumer Behavior for Salt
3.2.1.3	The main market segments for salt consumption
3.2.1.3.1	Territorial/ Customer-User segmentation
3.2.1.3.1.1.	Salt for Human Use
3.2.1.3.1.1.1	Salt for Human Use/Per Capita Consumption
3.2.1.3.1.1.2	Salt for Animal Use
3.2.1.3.1.1.3	Salt for Industrial Use
3.2.1.3.1.1.4	Salt for Export
3.2.2	<u>Supply</u>
3.2.3	<u>Sales Forecast and Plant Capacity</u>
3.2.3.1	Marketing strategy
3.2.3.2	Product pricing
3.2.3.3	Distribution channels
3.2.3.4	Trade promotion and commercial practice
3.2.5	<u>Estimate of Sales Revenue</u>
CHAPTER IV	MATERIALS AND INPUTS
4.1	<u>CHARACTERISTICS OF MATERIALS AND INPUTS</u>
4.1.1	<u>Sea Water</u>
4.1.2	<u>Auxiliary Materials</u>
4.1.3	<u>Utilities</u>
4.2	<u>SUPPLY PROGRAMME</u>

CHAPTER V

LOCATION AND SITE

- 5.1 LOCATION
- 5.2 SITE
- 5.2.1 Transport
- 5.2.2 Local condition
- 5.2.3 Utilities
- 5.2.4 Manpower
- 5.2.5 Fiscal and Legal Regulations
- 5.2.6 Construction, Erection, Maintenance
- 5.2.7 Environmental Impacts
- 5.2.8 Cost Estimate

CHAPTER VI

PROJECT ENGINEERING

- 6.1 PRODUCTION PROGRAMME AND PLANT CAPACITY
- 6.2 MANUFACTURING TECHNOLOGY
- 6.3 MACHINERY AND EQUIPMENT
- 6.4 MATERIAL STANDARDS
- 6.5 CIVIL ENGINEERING WORKS
- 6.6 COST ESTIMATES

CHAPTER VII

PLANT ORGANIZATION AND OVERHEAD COSTS

- 7.1 FACTORY AND ADMINISTRATIVE OVERHEADS

CHAPTER VIII

MANPOWER

CHAPTER IX

IMPLEMENTATION SCHEDULING

- 9.1 DATA AND ACTIVITIES
- 9.1.1 Feasibility Study completion
- 9.1.2 Tendering and contracting
- 9.1.3 Detailed Engineering Design
- 9.1.4 Delivery of Equipment and Execution of Civil Engineering Works
- 9.1.5 Training
- 9.1.6 Trial Run and Plant Commissioning
- 9.2 SELECTION OF PROJECT IMPLEMENTATION PROGRAMME AND TIME SCHEDULE
- 9.3 COST ESTIMATE AND PROJECT IMPLEMENTATION

CHAPTER X

FINANCIAL AND ECONOMIC EVALUATION

- 10.1 TOTAL INVESTMENT COSTS
- 10.1.1 Fixed Capital
- 10.1.2 Net Working Capital
- 10.2 SOURCES OF FINANCING
- 10.3 FINANCIAL STATEMENTS
- 10.3.1 Income statement
- 10.3.2 Cash Flow for Financial Planning
- 10.3.3 Projected Balance Sheet
- 10.3.4 Ratios for Financial Analysis
- 10.4 FINANCIAL EVALUATION
- 10.4.1 Net Present Value
- 10.4.2 Internal Rate of Return
- 10.4.3 Sensitivity Analysis

APPENDIXES

A P P E N D I X I.

1. CONTOUR PLAN AND SCHEMATIC GEOLOGICAL MAP OF THE JESIRA SALTERNS , Scale 1 : 5,000 , Ministry of Mineral and Water Resources - SOMALI DR
2. TOPOGRAPHIC PLAN OF THE JESIRA SALTERNS , Scale 1 : 1,000 , Ministry of Mineral and Water Resources - SOMALI DR

A P P E N D I X II.

1. TOTAL SALT CONTENT IN JESIRA SALT WORKS PER LITER , Bulgargeomin , Bulgaria , Ministry of Mineral and Water Resources - SOMALI DR
2. TOTAL SALT CONTENT IN JESIRA SALT WORKS PER Be , Bulgargeomin Bulgaria , Ministry of Mineral and Water Resources - SOMALIA

A P P E N D I X III.

1. JOB DESCRIPTION FOR INDUSTRIAL TECHNOLOGY SPECIALIST FOR NATURAL SALT PRODUCTION

A P P E N D I X IV.

.....

.....
Literature

A P P E N D I X V.

1. INDUSTRIAL INVESTMENT OPPORTUNITIES

PROJECT BACKGROUND AND HISTORYProject Promoter

Project promoter is a sea-salt producing small-scale private enterprise Jesira Salt Works (JSW) from Jesira village nearby Mogadishu.

Project Orientation

Further expansion of existing sea-salt production is based on a renewable raw material resource - sea water. No other inputs , local or imported , are needed. Utilities , like Diesel oil and other , are available locally , as well as the cheap labor force.

Market Orientation

Planned expansion of crude sea-salt production and annual sales of average 7,500 tons , when in full operation , are completely locally oriented for the human use of urban people in area of Banadir (Mogadishu) and other gravitating regions.

Economic and Industrial Policy supporting the Project

Private sector has played very marginal role over the last fifteen years in manufacturing , which itself plays marginal role in the Gross Domestic Product , amounting less than 5 %. Since the Somali Government moved towards the liberalization and private small scale industry has become one of the major hopes for future development of the industry , climate for the private sector has improved. Short term and long term financing is more readily available. All efforts are done to set up institutional financial and other infrastructure which can provide support services on an integrated basis for the growth and development of Small Scale Private Industry (SSPI).

Since JSW expansion of salt production fulfills all these requirements of small scale private industry development it is expected that the stimulative financial support through the soft loans would be provided from the local (Somali Development Bank - SDB) and foreign sources (WB , IFC).

PROJECT BACKGROUND

The JSW existing sea-salt production is in operation more that thirty years and its production was mainly sold at the local market for the human use. Basic idea is to expand existing

production and satisfy existing demand for the cheap crude grounded sea-salt for human use in urban and partly rural households. Since purchase power of consumers, even for basic needs is limited, lowest production costs thus enabling lowest possible prices producer's price is a development strategy. Many studies for export oriented sea-salt production have been performed but none of these realized due to the fact that joint venture foreign partners responsible for the market and partly for financing have never been found. Nevertheless, JSW, as a small producer, was never seen in all these research activities, as location for such type of huge investment due to the various location constraints.

MARKET AND PLANT CAPACITY

Demand/Projected Net Sales/Production Programme/ Plant Capacity

After Market research following sales programme is determined :

Sales Revenue for JSW CRUDE WASHED GROUNDED SEA-SALT

Year	Description	Plant capacity		Unit price So.Sh. per Ton	Sales Revenue	
		Full	Actual % Tons			
1990	Salt-Human Use	7,500	77%	5,766	6,000	34,596,000
1991	"	7,500	80%	5,994	6,000	35,964,000
1992	"	7,500	82%	6,138	6,000	36,828,000
1993	"	7,500	85%	6,342	6,000	38,052,000
1994	"	7,500	87%	6,534	6,000	39,204,000
1995	"	7,500	89%	6,708	6,000	40,248,000
1996	"	7,500	91%	6,852	6,000	41,112,000
1997	"	7,500	95%	7,128	6,000	42,768,000
1998	"	7,500	100%	7,500	6,000	45,000,000
1999	"	7,500	100%	7,500	6,000	45,000,000

Source : Own estimate

MATERIALS AND INPUTS

The only raw material needed for the production of crude grounded sea-salt is sea water. To produce 7,500 tons of crude washed grounded sea salt per year ca 412,500 cubic meters of sea-water at 3.5 Be is needed. The cost of sea-water is zero and this is naturally renewable resource. Since the technological part of the feasibility study will be undertaken by the natural salt evaporation expert more precise data explaining properties of Jesira sea-water will be included. He auxiliary materials are

needed to produce the 7,500 tons of crude washed grounded sea-salt to be sold to the local wholesalers in bulk. If decided that the sea-salt will be sold out in bags this could be purchased at the local Mogadishu market since the packing materials are produced by a local producers. For regular production only electric power is needed to pump the water from the sea. Electric power must be generated locally since the Mogadishu power plant, which is in the near vicinity of Jesira Salt Works is too small even for the town requirements and breakdowns due to the overloads in the network are often. The Diesel oil needed to fuel the engines driving the generator sets, the salt harvesting equipment and other consumers of the power will be supplied from the refinery outside the Mogadishu and also in close vicinity of JSW. The price of the Diesel oil is cca 50 So.Sh. per liter. Quantity needed will be calculated in the engineering part of the feasibility study when technological expert submits his final report. Estimated consumption could be in a range of 10-20 tons per year.

LOCATION AND SITE

Land requirements

Land extension for additional salt gardens is not possible without significant initial investment which are overcoming the potential benefits of JSW market potential.

Location

Location of JSW is very convenient concerning the market for crude sea-salt for human use and needed inputs. Vicinity of Mogadishu, major urban area in Somalia, and road connection is advantageous for project implementation as well as for the business operation.

Site

The layout of JSW shows very little possibilities for land reclamation and extensions of salt gardens at low initial investment costs. Vicinity of the sea-water and established existing operation is advantageous for the implementation of production expansion.

PROJECT ENGINEERING

This entire important chapter should be provided by the UNIDO expert for salt production, as envisaged in the Terms of References for the completion of the Feasibility Study for JSW expansion. When Final Report on engineering submitted then Feasibility study can be finalized and investment appraisal done.

PLANT ORGANIZATION AND OVERHEAD COSTS

When Project Engineering provided by the UNIDO expert for salt production, as envisaged in the Terms of References for the completion of the Feasibility Study for JSW expansion then this chapter and whole Feasibility study can be finalized and investment appraisal done.

MANPOWER

When Project Engineering provided by the UNIDO expert for salt production, as envisaged in the Terms of References for the completion of the Feasibility Study for JSW expansion then this chapter and whole Feasibility study can be finalized and investment appraisal done.

IMPLEMENTATION SCHEDULE

A C T I V I T Y	T i m e s c h e d u l e
	_____12 months_____
- Feasibility Study completion	*****
- Investment decision of the board and shareholders	*
- Application and Approval of Government/Bank loans	**
- Tendering equipment and civil engineering works (local and foreign), selection and contracting	****
- Detailed design (civil engineering and technological)	***
- Delivery of equipment (local and foreign) and execution of civil engineering works	****
- Assembling the equipment (local and foreign)	***
- Training of key personnel	****
- Purchase of trial run inputs	***
- Trial run and plant commissioning	**
Start of commercial operations	+..

FINANCIAL AND ECONOMIC EVALUATION

When Project Engineering provided by the UNIDO expert for salt production, as envisaged in the Terms of References for the completion of the Feasibility Study for JSW expansion then this chapter and whole Feasibility study can be finalized and investment appraisal done.

CONCLUSIONS AND RECOMMENDATIONS

When Feasibility Study completed conclusions and recommendations will be given.

CHAPTER II PROJECT BACKGROUND AND HISTORY

2.1 INTRODUCTION

This Introduction part of the Market Study for the Rehabilitation of Salt Production in Jesira is rather detailed picture of the Somali Democratic Republic with a purpose to provide information for potential foreign partners , to be used as a handy reference source for international financial , aid and other organizations. The presentation of information is based on the national and international sources , which are regularly quoted , and partly constrained by incomplete data.

The SOMALI DEMOCRATIC REPUBLIC comprises the former British Somaliland and the United Nations Trusteeship of Somalia which united on 1st July 1960. It is a constitutionally Socialist Republic with one party (Socialist Revolutionary Party) founded on 1st July 1976. The Somali Democratic Republic is a member of the United Nations , Non-Aligned Organization , Organization of African Unity and the Arab League. Somalia is also the associate member of the European Economic Community.

Location of the Somali Democratic Republic is in East Africa in the , so called , horn of Africa. It lies between Latitudes 12-0 North and 1-35 South , and between Longitudes 41-0 East and 51-25 West. It is bordered by Kenya , Ethiopia , Republic of Djibouti and by the Gulf of Aden to the North and the Indian Ocean to the East.

Somalia covers a total surface area of approximately 637,657 square kilometers (246,201 square miles). The country extends about 1,000 miles along the Indian Ocean , 600 miles along the Gulf of Aden and an average 200 miles inland. The coastline is largely rock bound with few , if any , natural harbours . In the North along the Gulf of Aden , a coastal plain runs between the sea and escarpment which in places rises as high as 2,153 meters (7,000 feet) and which bounds a plateau sloping to the south. The north-east of the country is a dry plateau with maximum elevation of 2,215 meters (7,200 feet) ; the central area is a barren plateau rising to 584 meters (1,900 feet). Large areas are suitable for arable or pasture use. The southern area enclosed by the two main rivers , the Shabelli and the Juba , has the most fertile soil. South of Juba the land is covered with thick bush and has many seasonal water-courses. Out of total area 8.2 million hectares are suitable for cultivation , 28.8 million hectares for livestock rising and the rest is non-agricultural land.

The Shabelle and the Juba rivers are the only two rivers which flow most of the year , but only Juba flows into the Indian Ocean throughout the year. The length of Juba is 800 km ,

the average annual flow 6 billion cubic meters and the catchment area is 275,000 sq.km. The length of Shabelle is 1,100 km, the average annual flow 2 billion cubic meters and the catchment area 300,000 km.

The climate of Somalia is arid/semi arid and influenced by monsoons. The north-east monsoon goes from December to March bringing high temperature of more than 30 degrees C, while the south-west monsoon, going between June and October brings cooler temperatures below 30 degrees C, in the mountain even below 20 degrees C. During the "tangabili" periods, i.e. the periods between the monsoons, climate is tropical with high temperature of around 35 degrees C. In general, the climate in Somalia is hot tropical along the coast combined with high humidity.

The average annual rainfall is less than 600 mm in most of the country. Only the inter-riverain areas receive more than 600 mm. There are two rainy seasons, namely Gu' (April-June) and Der (October-November). In addition, the country's southern coast gets rain also during Haga (July-August). The wettest month is June with an average precipitation of 97 mm. Precipitation fluctuates from year to year and from area to area, varying from 450 to 800 mm a year in the central area along the coastal land between the Shabelle and Juba rivers, to a 18 mm in the driest areas. The unreliability of the rainfall in many parts often provokes drought conditions. Rains usually come at the beginning of each monsoon period and in these periods it usually rains several times a week in brief but hard pours.

The humidity in the country varies from 63 % in the dry season to 82 % in the wet season.

The Administrative subdivision divides the country into 18 administrative regions which are sub-divided into 87 districts. The capital of the Somali Democratic Republic is Mogadishu with an estimated population of approximately one million persons. Other principal towns are Hargeisa, Burao, Erigavo, Galkaio, Belet-Weyna, Jowhar, Baidaba, and the ports of Kismayo, Brava, Marka, Bosaso and Berbera.

The population of the Somali Democratic Republic in mid-1986, estimated by the Directorate of Statistics (Ministry of National Planning)*, was around 8.5 million. The alternative source, SOMALIA - Industrial revitalization through privatization (Industrial Development Review Series)**,

* Somalia in figures, 9th Edition, June 1987, Ministry of National planning

** PPD.91, UNIDO, Regional and Country Studies Branch, October 1988

estimates the population of Somalia at 5.5 million in mid-1986 , of which 44.4 % are nomads , 31.3 % are settled people (mostly farmers) in rural areas , and the rest 24.3 % are urban dwellers. The average crude birth rate is 4.4 % while the crude death rate is 1.3 % . That gives an estimate of average population growth rate of 3.1 % . Annual average growth rate of population during the latest period 1980-1986 is estimated to 2.9 % . Density of population in mid-1986 is 9 persons per square kilometer. The Somali Democratic Republic is an islamic state and the Somalis are all Muslims. The official languages of the country are Somali and Arabic , but English and Italian are also widely spoken.

The estimated labour force in 1983 was 1.9 million. There has been notable migration of the labour force from the nomadic areas to Mogadishu and other urban centers. However , migration is estimated to be much less than the natural growth in the labour force in nomadic areas of the country. Sizeable number of nomadic workers are engaged in marketing of milk and other products and trading of livestock moving between the urban centers and nomadic areas . In some coastal areas grazing of sheep and goats continues to occupy the local labour force adequately. Fishing , which has the potential to absorb a larger labour force , has yet to become important as a source of employment. Fish as a part of the diet is foreign to the nomadic cultural background of a large part of the people. Hence , low consumption and the resultant small local market for fish means a low income rate for fishermen and new workers are not attracted into the sector. Agriculture has the best potential to absorb the natural growth of the labour force , but there is also some doubt that enough land can be developed for agriculture to absorb the estimated 20,000 annual addition to the agricultural labour force. It was estimated that in 1982/83 there were 90,000-100,000 workers employed in the modern sector (excluding the military , police and para-military units) , and there has been no significant change in the ensuing five years. The stagnation in the growth of manufacturing employment is due to the termination of the policy in 1983 to absorb all secondary school graduates in public employment and the low productivity of public enterprises. During the period 1982-1986 employment in public sector manufacturing enterprises was constant at about 12,000-16,000 workers , although some of the public enterprises appear to have reduced their work force. The initial investment required to create one job in these establishments is estimated at 37,000 \$, which is manifestly capital intensive.(*). For example , the

* Comment: Some of the initial investments in public enterprises seemed to be overestimated (detailed analysis required) what increased this indicator (initial investment / per job).

pharmaceutical industry was set up with an initial investment of 17 million \$ for a maximum employment capacity of 200 administrative and production workers, or an average cost per job of 85,000 \$. In small-scale manufacturing enterprises, the investment required to create one job is estimated to be 20,000 \$. For Mogadishu and other towns the estimated unemployment rate is 10 - 15 % compared to 3 - 5 % for the entire population. The informal sector, which includes small establishments and market stalls (trade, commerce, service, small scale manufacturing, construction and transport), although the information on this sector is sketchy, has significant and increasing effects on the economy. Significant outflow of the trained manpower (qualified managerial and administrative personnel) to the more remunerative occupation in Saudi Arabia and other Gulf States amounted the number of Somalis working abroad to 100,000. The supply of labour has been increasing at an estimated annual rate of 3 % or 95,000 net additions to the labour force each year. The rate of economic growth needed to absorb this number and to reduce the number of presently unemployed people is estimated to be at least 10 % per year, in contrast to the average 3 % annual growth that took place during the 1982 - 1986 period.

Mineral resources as sepolite (meerschaum) and sand, gravel, coastal coral limestone, gypsum and clays (industrial minerals), mainly because of their application as construction materials, constitute the only mining activity in the country. Quarrying and cutting marble has been initiated in the private sector. Previous exploration efforts have been established the existence of iron ore deposits in El Bur area, uranium deposits in the Galgaduud region, tin deposits in the Northeast (Bosaso) and piezo-quartz occurrences in the Northwest (Daarbug and Lafarug). Recent investigations have established the existence of rare-earths in the Northeast and gold, lead-zinc and poly-metallic deposits in the Northwest.

The agricultural sector is dominant in the Somali economy. The bulk of the manufacturing activity is agro-based. The share of the broad agriculture sector (including livestock and livestock products) in the GDP at market prices averaged 55.5 % over the period 1984-86. Due to this high share, the general performance of the national economy is greatly influenced by the performance of the agricultural sector, as exemplified in the following table :

(million So.Sh.)

	1981	1982	1983	1984	1985	1986
1.GDP(market prices)	6648	6827	5971	6285	6702	6755
2.Agriculture	3626	3650	2905	3477	3777	3707
2./1.	(54.5%)	(53.4%)	(48.6%)	(55.3%)	(56.3%)	(54.8%)
2.1 Livestock and the livestock * products **	2583 (38.8%) /71.2%/	2552 (37.3%) /69.9%/	1838 (30.7%) /63.2%/	2317 (36.8%) /66.6%/	2520 (37.6%) /66.7%/	2372 (35.1%) /63.9%/

Source : Ministry of National Planning

* 2.1/1. , ** 2.1/2.

Within the agricultural sector , in 1986 , the share of livestock and livestock products in the total agricultural GDP , in current price , was 63.9 % while the contribution of the crop production sector was 28.4 % . Analyzing the growth rates in real prices the importance of the agricultural sector is even more significant what is presented in the following table :

(in %)

	1981	1982	1983	1984	1985	1986
Growth of GDP (constant prices)	6.4 %	6.4 %	2.4 %	-1.5 %	7.6 %	6.0 %

Source : Ministry of National Planning

Distribution of real GDP by sector of origin (in %)

	1981	1982	1983	1984	1985	1986
Agriculture	59.6%	52.6%	53.7%	57.6%	58.9%	58.1%
- Livestock and the livestock products	42.5%	40.5%	33.9%	38.4%	39.3%	37.2%

Source : Ministry of National Planning

The livestock sub-sector experienced over the three year period 1984-1986 very high average rate of growth of real GDP amounting to 3.9 % (1*). According to the most recent estimates the livestock sector accounted for the 64 % of the GDP of Somali agriculture in 1986 and 37.2 % of the national GDP in 1986.

Estimate of livestock population in Somalia (million heads)

	1981	1982	1983	1984	1985
Goats	17.8	18.3	18.7	19.1	18.5
Sheep	10.4	10.6	10.8	11.0	11.1
Camels	5.8	5.9	5.9	6.0	6.0
Cattle	4.1	4.1	4.1	4.2	4.4

Source : Government of Somalia , Ministry of Livestock

With 10.4 million heads of cattle and camels in relation to total population of 5.5 million , Somalia ranks among the countries with the highest per capita availability of this economic resource. Approximately two-thirds of Somali population is engaged in livestock rearing. Particularly important is the role of the livestock sector in foreign trade. This sector accounts for 70% of the value of Somali exports (average for 1985 and 1986) and represents the most important source of foreign exchange earnings in the economy. However , the structure of exports clearly indicates a low efficiency of utilization of this most important national economic resource. Exports of hides and skins account very small proportion of the value of total livestock exports (up to the 5% for most of the past 1981-1986 period) , while the products of higher stages of processing of hides , like finished leather or leather products , even do not figure in the list of export commodity groups in Somalia. Crop production absorbs about 20 % of the working population , for the most part subsistence farmers in rainfed areas engaged in the cultivation of sorghum , maize and oilseeds for domestic consumption. In the Shebelle river basin , a small but fairly dynamic commercial sector is working on irrigated land to produce

(1*) Performance of the Somali Economy in 1985 and 1986 , Somali Democratic Republic , Ministry of National Planning and Juba Valley Development , Mogadishu , March 1988

bananas (an important export crop) , grapefruit , maize , sugar cane , cotton and other crops. Crop yields are currently very low for both rainfed and irrigated agriculture , mainly due to the shortage of farm inputs. Irrigated agriculture is especially adversely affected by periodic shortages of fuel for water pumping. It is estimated that yields on irrigated land could be tripled if normal supply of irrigation water could be assumed. Production figures for major crops are given in the statistical appendix.

The contribution of the manufacturing sector to GDP is relatively small , accounting for around 5 % in 1986. The share of manufacturing sector in GDP was expected to be 5.3 % in 1987 , but is projected to raise to 8 % during the 1987-1991 plan period. This is due to the high priority being accorded to the rehabilitation of existing enterprises and due to two major factories having come into production in that period , namely , Berbera Cement and a Pharmaceutical Industry. Installed capacity , estimated domestic needs and industrial production for selected (major) industrial enterprises for the period 1979-1986 are given in statistical appendix.

The economy of Somalia rebounded well in 1985 with real GDP growing at 7.6 % , compared with a growth rate of 2 % in 1983 and a negative growth rate of 1.5 % in 1984. Good weather , prudent government policies and donor assistance helped the economy to sustain the recovery at around 6 % in 1986. Still with GNP per capita of 280 \$ in 1986 , Somalia is classified as a least developed country. Despite the potential for promoting exports of local resource-based products like processed fruit , vegetables , meat , fish and leather products Somali manufacturing sector hardly exports anything in processed form. Livestock is the main resource of the country. Following the significant increase in 1979 (8.4 mil. \$) export earnings of hides and skins stagnated in 1980 (6.7 mil. \$) and fell sharply to a meager 0.4 mil. \$ in 1981. The situation improved in 1984 with export earnings of hides and skins reaching 3.2 mil \$, and stagnated at 3.5 mil. \$ during 1985-1986. The planned export earnings from hides and skins stood at 4.5 mil. \$ in 1987. Detailed information on value of export by major commodities in the period 1975-1985 is given in statistical appendix.

The Industrial Policy environment in Somalia is marked by a shift in emphasis from state control of industrial enterprises to private sector incentives and relaxation of controls. Small scale and cottage level industries are to be developed based on local raw-material. The Somali Development Bank will give preference to requests for loans to private entrepreneurs for small-scale industries. The basic policy of the government is that private and public sectors should co-exist and mutually support each other for the overall development of the country. There is definite change from a state controlled

economy to a market-oriented economy. Policies are being pursued to attract private foreign investment in the exploitation of national resources. A unit in the Ministry of Industry has been established to promote private investment in the manufacturing sector. The Somali Development Bank and the Commercial and Savings Bank give preference to requests for loans to private entrepreneurs for small-productive enterprises. The 1987-1991 Five-Year Development Plan spells out the steps for promoting viable industrial projects, particularly small-scale manufacturing enterprises. Preference will be given to resource-based enterprises, import substituting and labour-intensive industries. The Somali Development Bank (SDB) is the main source of loan capital for private sector productive enterprises. It is expected that the SDB will be able to provide local and foreign currency for investment of 7.5 mil.\$ per year during the 1987-1991 period. Equity capital of 2.5 mil.\$ per year will be provided by the private sector. Incentives for foreign investors provided under the existing legislation include tax holiday up to five years, waiver of duties on imported machinery and raw materials and protection through tariff barriers.

Feasibility Studies should identify agricultural and mineral products on which existing industries or new industries can be expanded including new product lines. The estimated potential for private sector processing of locally available raw materials is considerable (see Appendix - Industrial Investment Opportunities).

2.2 PROJECT BACKGROUND

The basic project idea is to examine possibilities of JESIRA SALT WORKS to rehabilitate and extend present production based on obsolete and depreciated equipment. JESIRA SALT WORKS (JSW) is small privately owned enterprise based on local resource, SEA SALT, which covers the demand of Banaadir (Mogadishu) region in salt for human use.

Availability of raw material (sea salt) and non-satisfied local demand of salt for human use were major guiding project parameters. This labour-intensive production based on the use of domestic resource is supposed to be supported by social, economic, industrial, financial, aid and other policies.

The project coverage is local (Banaadir - Mogadishu) market. This project does not cover the marketing and production aspects of all existing or potential salt works in Somalia, but development of one small-scale private enterprise - the JESIRA SALT WORKS (JSW).

2.3 PROJECT PROMOTER

The local private company JESIRA SALT WORKS (JSW) is a promoter and shareholder in the project.

JSW which is supposed to be extended is located near Jesira lagoon , 22 km south of Mogadishu along the coast. It is at the bottom of a small valley , running parallel some 200 m from the sea shore , from which it is separated by a sandy hill , where there is a fishermen's village , and it is surrounded by a very rough country. The bottom of the valley is approximately 1.5 km long and 250 m wide.

The sea water is pumped at high tide from the end of Jesira lagoon into a feeding canal , which is lower than the evaporation and crystallizing basins level. Therefore , the sea water must be pumped a second time to reach them. The evaporating and crystallizing basins , with levee made by mortar bonded stones , arranged in rows of four are of following size :

12 basins x 50 m long x 50 m wide	=	30,000 m2
2 basins x 50 m long x 25 m wide	=	2,500 m2
	=====	
Total		32,500 m2

Some crystallizing basins have stone paved bottoms. The salt work has only one service road , running lengthwise on its western side , divided by the crossing road going to the village. There is no canal for discharging the bitterns' water from the crystallizing basins and that explains why all produced salt has typical brownish colour. The salt is harvested by hand and hauled by wheel-barrow. The product is crude , unwashed and unground , salt paid 600 So.Sh per quintal (100 kg) at the salt work what is equivalent to 22 \$ per ton (1 US \$ = 271,26 So.Sh. at 24/01/1989). Production at the JSW has significant annual variations due to the weather conditions (rain) but can be safely estimated in range 2,000 - 3,000 ton per year.

2.4 PROJECT HISTORY

Idea of JSW production extension appeared long ago. It has always been related to big projects of salt production export oriented (like production of 90,000 m.tons per year on 500 hectares). None of these projects has been realized up to now due to different reasons. Major reason is the lack of interest of potential foreign partners who could take responsibility for equipment supply , production management and above all , the export marketing of proposed huge production capacities. This project has completely different strategy and scope since the Government has announced the development support.

to small-scale and cottage level industries based on local raw-material. Also, the Somali Development Bank is supposed to give preference to requests for loans to private entrepreneurs for small-scale industries. That is just in time for JSW Rehabilitation and Expansion Project.

The plan is to analyze existing facilities, estimate possibilities for expansion of crude salt production up to 7,000 - 8,000 m.tons per year, improve the production quality by proposing minor changes in basins' disposition and introduce the appropriate technology and technical improvements at reasonable level of initial investment costs.

Market study for the JSW Rehabilitation and Expansion Project is done by the local consulting company Industrial Consultancy Unit (ICU), Mogadishu and represents the first step for Feasibility Study preparation on basis of which the appraisal could be done and financing approved.

The fact that the average purchase power of people in Somali Democratic Republic , as Least Developed Country (LDC) , is very low (GNP per capita in 1986 = 280 US \$) , cause the orientation of consumers' demand toward the satisfaction of basic needs and wants. This fact should not be taken as an argument for neglecting of marketing approach in JSW Rehabilitation and Expansion Project. Before examining the present situation of salt production and its consumption levels in Somalia some necessary premises about the salt in general will be given.

3.1 GENERAL DESCRIPTION OF PRODUCTS

Sodium chloride (NaCl) called simply salt is essential element for human organic functions as well as for the manufacturing of chemical products which contain chloride and sodium. There are very few other sodium compounds containing the salt in natural state. In nature salt can be found at solid state like mine or rock salt and at liquid state into sea water and some springs (sea salt). Mine salt deposits , which are one of the main salt sources for industry , have been constituted by the evaporation of original brackish water ponds. Mine salt can be found in more or less deep strata as well as in superficial deposits. The deep deposits derive from sea water evaporation in closed ponds ; the superficial deposits , much less important than the first ones , derive from continental water evaporation in desert areas or from the evaporation of salt lakes. Mine salt deposits are accompanied by gypsum and anhydrite and are enclosed between clayish rocks , scarcely permeable to underground waters. Sea salt at solution state , beside its presence in some spring waters , is found , above all , in sea water. In this water the sodium chloride content differ scarcely in large Oceans , where it exists at 3.5 % , while it presents important differences in smaller basins ; e.g. 0.7 % in the Baltic Sea , 1.8 % in the Black Sea , 3.8 % in the Mediterranean , 3.9 % in the Red Sea.

Salt production processes cover mainly three methods solar evaporation , extraction from mines , mine salt solution and artificial evaporation. In Somalia , as country with high temperature , salt is obtained in , so called , salterns , by the natural solar evaporation of sea water through the action of solar heat and wind. Sea water is introduced in series of basins (evaporating basins) where it deposits its salt in suspension as well as the less soluble salts , such as calcium carbonate and gypsum. Further , the water is brought into concentrating basins (salt gathering basins) , where , sun and wind originated natural evaporation starts the crystallized salt deposit , and whenever the solution has reached high concentration degree ,

another quantity of sodium chloride mixed with magnesium sulphate is deposited. At last water is returned to the sea or even used (mother waters) to extract other salts (potassium bromide and iodide , potassium and magnesium chloride). The obtained salt is then collected in large heaps and exposed to rainfalls which remove magnesium salts and make , so called , crude wash salt. Salt mine exploitation consists in opening galleries into saline deposits with interposition of few supports left in the rocks , in order to bring solid crude salt to the surface. Mine salt deposits exploitation , which require excavation works , is convenient only where salt exists in large quantities with little impurities. Impurity degree differs from deposit to deposit even in the same deposit from point to point. The purest salt is usually found in the middle of the stratum vertical section , and the less pure one on the edges. The artificial evaporation process for production of refined salt assumes the industrial compound consisted of the salt work , the crude salt washing and stockpiling plant , the salt refining and packing plant and infrastructure.

The crude washed salt has the following composition :

- NaCl	not less than	98.5 % on dry basis
- SO ₄	max.	0.5 % on dry basis
- Mg	max.	0.3 % on dry basis
- Ca	max	0.5 % on dry basis
- Insolubles	max.	0.2 % on dry basis
- Moisture	approximately	5.0 %

This is composition of natural , washed sea water salt (universally accepted by salt refining industries) which has a better quality (purity) and selling price than most of the rock salts.

The refined salt would have the following composition :

- NaCl	not less then	99.00 % on dry basis
- MgSO ₄	max.	0.30 % on dry basis
- CaSO ₄	max.	0.45 % on dry basis
- Insolubles	max.	0.05 % on dry basis
- Steadfast "J" a free flowing and iodizing agent		0.00% %
- Moisture	max.	0.50 %

This composition would be better than the worldwide accepted standards.

The sodium chloride and its derivatives uses can be divided in alimentary and industrial ones. Almost one third of the world's sodium chloride production is oriented to alimentary uses , because salt is an essential element for human organic functions. Besides its domestic alimentary use , salt is

utilized for vegetables, fish and meat preservation, cheese, butter and even for animal feeding. In medicine sodium chloride is used, among others, to prevent insulations, prepare blood isotonic solutions to be used in hypodermoclysis, etc. More than half the sodium chloride production is used to prepare chemical substances, like: metallic sodium, sodium carbonate, caustic soda, chlorine, hydrochloric acid, hypochlorites, chlorates, sodium sulphates and sulphite, etc. Among the numerous industrial uses it should be mentioned: Skin Tanning, Water Depuration, Regeneration of Sodium Permanganate and Zeolite, Brine Preparation in Refrigeration Plants and Refrigerating Mixtures with Ice, Preparation of Synthetic Rubber, Uses in Metallurgical - Ceramic - Soap Industries. Salt components such as Chlorine (Cl) and Sodium (Na) are never found free in the nature. Therefore, not only sodium chloride (NaCl), but also its separate components find a very wide use field. Chlorine in fact is the most important among the halogens and has remarkable decoloration and disinfection properties. In particular it is used to whiten yarns, fabrics and paper; to manufacture many of its compounds such as hypochlorites and bleaching powder; to prepare organic substances (chloroform), insecticides and the two halogens (bromine and iodine); to sterilize waters; in plastic materials and synthetic resins manufacturing. An important chlorine derivative is hydrochloric acid (commercially called - muriatic acid) used in numerous industries, among which, manufacture of many chlorides and the carbonic anhydride. Hydrochloric and nitric acid mixture, known as "aqua regia", develops chlorine at nascent state and is used to dissolve platinum and gold. The hypochloric acid salts (HClO) are important too, i.e. hypochlorites, used as decolorants and disinfectants. Some chlorates, i.e. chloric acid salts, find also a wide use field. The best known is potassium chlorate (KClO_3) used for oxygen preparation, explosives and fire-works manufacture and, in medicine, as antiseptic and light astringent. Equally important is the other salt component, Sodium, which is the most diffused alkaline metal and, like chlorine, never found free in the nature. Sodium is used in chemical fertilizers production. Among sodium components it must be particularly noted sodium chlorate (NaHO) and sodium carbonate (NaCO_3). Sodium hydrate or sodium hydroxide called also caustic soda is obtained industrially, electrolyzing sodium chloride in aqueous solution. It is used to manufacture artificial silk (rayon), soaps, sodium carbonate and mineral oils purification. Sodium carbonate (commercially called soda) is found in nature dissolved in some mineral waters and, at solid state, it constitutes the mineral called natron widely used in soap, paper and colour industries. It is also to underline at last that sea water concentrated for sodium chloride extraction, when it has reached 30 o Be ("mother waters") and is drained from salt gathering basins, contains yet about 134 grams of sodium chloride, 139 grams of magnesium chloride, 40 grams of potassium chloride and 64 grams of magnesium sulphate

per liter. These salts could be extracted as well as bromine and other minor ones and used for some chemical-pharmaceutical products manufacturing.

3.2 GENERAL AND SPECIFIC MARKETING ENVIRONMENT IN SOMALIA

The total estimated population of Somali Democratic Republic (according to the international sources) is estimated at around 6 millions (beginning of 1989) with average annual growth of 3 %. Projections of the population to the year 1997 are based on average annual increase of 3.0 % and amount to the 7.7 millions.

It is well known that presumed average consumptions differ highly according to the industrialization level of the country. It must be considered that alimentary salt consumption per each inhabitant of Developed Countries (DC) can be estimated in a range from 6 to 8 kg per year. Yet in the four African Regions (North Africa , West Africa , Central Africa and East Africa) , as it appears from report elaborated from the UNECA (United Nations Economic Commission for Africa) , yearly average salt consumption for alimentary use should be between 4.5 - 6.8 kg/per inhabitant what is considered necessary for adequate nutrition. Consumption for human and animal dietary purposes accounts for some 70 % of total demand in Africa. However , in the forecasting of salt production and consumption in Africa , in the next period , UNECA , cautiously , has taken an average index of 5 kg/per inhabitant per year. In many countries consumption level of 4 kilos and less per inhabitant per year are normal. Increase of human salt consumption , at conservative assumption , will at least keep pace with the growth in population (estimated for Somalia at some 3.0 % per annum). Animal salt consumption is harder to estimate although it is clear that the amount of salt fed per head of cattle will greatly increase as improved animal husbandry techniques are introduced. The optimal level of feed is estimated at some 10 kg per adult animal and 5 kg per annum for young animals. In countries starting their industrialization phase , what is the Somalian case , total salt consumption for the industrial use could be roughly estimated up to 10 - 20 kg per inhabitant per annum.

3.2.1 Demand and Market Study

3.2.1.1 Data and alternative projection methods

To foresee , with a good approximation , salt demand and supply in Somalia in the future period is rather difficult because of the fact that production (quantity , unit prices ,

value) and consumption data are missing. Also , important information on capacities , time of realization and starting of operations for new salterns or the enlargement of already existing ones are not available at all. The lack of reliable statistical data made it an extremely difficult task to forecast , within the reasonable margin of certainty , the current and potential demand for salt. Theoretically , the great quantity of data are needed , such as :

- per capita consumption of salt in the various geographical areas of Somalia according to their economic development degree ;
- average annual increase index concerning the population of each area ;
- average annual increase index of salt production , new capacities , enlargement of existing ones ;
- economic development and industrialization of Somalia and volume of productive investments realized with particular attention to chemical industry development and expansion.

Since the foresaid elements are only partly available present analysis , specifically designed for the needs of a small-scale industry private enterprise - JSW , is limited to the fundamental data of population increase and the variations of demand compared to consumption increase. Official statistics (see appendix - statistical data) registered value of the production of one private saltern in 1986 for the first time in Industrial Production Survey published in June 1988. There are no other official statistics on the domestic production , export , import and consumption of salt. Since the lack of official statistical data is evident the interviews with the producers , traders and consumers have been held. Based on "best estimates", method used for the projection of the population growth is TREND ANALYSIS (Mechanical extrapolation quantitative technique). For the projection of the local salt consumption/demand SIMPLK REGRESSION method (Causal model - quantitative technique) was combined with experts' interviews and estimates. Apart of the small household survey in Mogadishu , the interviews , the major method of collecting information was DESK RESEARCH (Internal sources available in the Ministries , associations , UNDP enterprises).

3.2.1.2 Forces and Factors shaping Consumer Behavior for Salt.

As the satisfaction of consumers is in focus of any market and marketing oriented enterprise , the understanding of consumers , their wants and needs , is of utmost importance. Consumers' behavior and their pattern of demand is shaped under

simultaneous influence of a set of factors and forces. The JSW salt production, at present, is entirely oriented to the consumers of Banadir (Mogadishu). Demographically, salt, as basic and essential element for human body, is interesting for all population and all types of households no matter in which stage of family life cycle they are (singles young, newly married couples without children, married couples with children in pre-school age, married couples with school-age children, families adults only, married couples old, singles old). Cultural system, climate, education level, socio-economic stratification, psychological elements are of very little influence in salt consumption since this product satisfy very basic needs. Economic factor expressed through the level of overall economic development, level of the industrialization (especially chemical and related industries) and disposable income can strongly influence salt consumption for industrial use, which is at present rather low in Somalia.

The major factor for salt demand forecast relevant for JSW are demographic parameters.

3.2.1.3 The main market segments for salt consumption

3.2.1.3.1 Territorial/ Customer-User segmentation

In the broadest terms, the national market for salt covers all inhabited areas, when considering the salt for human use, and the areas where the manufacturing industry (using salt as input) exists. The preliminary examination of the available statistics on population distribution and location of industrial units shows that both, the population and industry, are unevenly distributed region-wise.

3.2.1.3.1.1. Salt for Human Use

Compact presentation of the relevant statistics (see Somalia in figures, Ministry of National Planning, January 1989) clearly indicate that there exists a high territorial concentration of urban and rural population (potential buyers of salt) in the, so called, inter-riverain national territory (Middle Shabelle, Banadir, Lower Shabelle, Middle Juba, Lower Juba Regions). This part of the Somali territory is placed along the coast where salt is produced in a rather primitive way what can satisfy only small portion of the needs. The nomadic population find the salt they and their animals need outcropping up rock-salt and in salt water wells while migrating throughout the country after grass and water. JSW, located in Jcsira, could count on potential local salt demand from Banadir area (Mogadishu), and gravitating regions like Bakool, Bay,

Gedo , Lower Shabelle , Middle Juba and Lower Juba. Regional distribution of the population (last available data taken from the 1975 Census) and percent of urban , rural and nomadic people for selected regions might help differentiation between geographical areas and type of consumers . This data gives a following distribution (published in Somalia in figures , Ministry of National Planning , January 1989) :

(in %)

Region (*)	Percentage of Regional Population reported as			Percentage of Total Population
	Urban	Rural	Nomadic	
1. Banadir (Mogadishu)	100.0	-	-	10.7
2. Bakool	13.9	27.5	60.6	3.1
3. Bay	14.9	54.4	31.0	9.1
4. Gedo	11.6	26.4	62.0	5.9
5. Lower Shabelle	15.5	63.8	20.7	11.4
6. Lower Juba	22.3	38.6	39.1	7.3
Total				47.5

(*) Middle Juba is not particularly indicated but it is somehow included in the statistical breakdown either within the Lower Shabelle or Lower Juba.

These preliminary considerations suggest that the local market analysis for the JSW salt should concentrate on above selected regions which also represent the geographically closest in-land area to Mogadishu where JSW is located. Quoted data are taken from the 1975 Census. In the meantime , migration , as an important component of distributional aspects of the population , affected present situation. Out of the total surveyed population

(1980-81) 21 % of the people were born outside the region of residence. If the inter-regional distribution of migrants is analyzed by the region of residence it is seen that over half of those who had moved across the regions have settled in and around Mogadishu , the capital and the largest urban center in Somalia. Banadir region (Mogadishu) received nearly 80 % of the net loss occurring to the losing regions , while Lower Shabelle absorbed 9%. The other gaining areas , like Lower Juba , Middle Juba and Gedo , together absorbed remaining 10 % . All other regions experienced net loss of population due to the internal migrations. Also , there is a heavy concentration of professionals , administrators and clerical workers in Mogadishu. As with occupation , Mogadishu has experienced a very heavy concentration of those engaged in service industries and trade and commerce. Manufacturing absorbs only a very small proportion of the total labour force and even in Mogadishu the proportion of those engaged in manufacturing is only 3.1 % . Concerning the employment status , the proportion of employees is highest in Mogadishu , around 60 % . Self-employed in Mogadishu constitute around 35 % , what is the lowest in Somalia. Those who reported herding are also included(1*). Since the official statistics of the population size for the past period are not available certain estimates are given in the following table :

(1*) National Survey of Population 1980-1981 , Report on Findings
Central Statistical Department , Ministry of National
Planning , May 1986

Estimate of present population in gravitating area for JSW salt
(million)

	mid-1986	1987	1988	1989	Rate
A. Somalia	5.50	5.74	5.90	6.08	2.9 % p.a.
1. Banadir					
- Mogadishu	1.04	1.08	1.11	1.14	
-- natural (*)	0.99	1.03	1.06	1.09	2.9 % p.a.
-- mechanical	0.05	0.05	0.05	0.05	(**)
2. Bakool (***)	0.14	0.14	0.15	0.15	2.5 % of A.
- urban	0.02	0.02	0.02	0.02	13.9 % of 2.
- rural	0.04	0.04	0.04	0.04	27.5 % of 2.
3. Bay (****)	0.45	0.47	0.48	0.50	8.2 % of A.
- urban	0.07	0.07	0.07	0.07	14.9 % of 3.
- rural	0.25	0.26	0.26	0.27	54.4 % of 3.
4. Gedo (*****)	0.36	0.37	0.38	0.40	6.5 % of A.
- urban	0.04	0.04	0.04	0.05	11.6 % of 4.
- rural	0.09	0.10	0.10	0.10	26.4 % of 4.
5. L.Shabelle(*****)	0.72	0.75	0.77	0.80	13.1 % of A.
- urban	0.11	0.12	0.12	0.12	15.5 % of 5.
- rural	0.46	0.48	0.49	0.51	63.8 % of 5.
6. L.Juba (*****)	0.44	0.46	0.47	0.49	8.0 % of A.
- urban	0.10	0.10	0.11	0.11	22.3 % of 6.
- rural	0.17	0.18	0.18	0.19	38.6 % of 6.
Total	2.59	2.49	2.54	2.62	
- Mogadishu	1.04	1.08	1.11	1.14	
- Other	1.35	1.41	1.43	1.48	
-- urban	0.34	0.35	0.36	0.37	
-- rural	1.01	1.06	1.07	1.11	

Source: Own estimates

- * Mogadishu population estimated as 18 % of total Somali population (1975 Census cca 10,7 %), heavily gaining region (cca 25 %)
- ** Rough estimate according to local planners opinion
- *** Moderately losing region (cca 25 %)
- **** Slightly losing region (cca 15 %)
- ***** Slightly gaining region (cca 10 %)
- ***** Moderately gaining region (cca 15 %)
- Remark : Middle Juba is also gravitating region but the data about the population are included either in the Lower Juba or Lower Shabelle (statistical inconsistency)

Based on the foresaid data and opinion of UN experts working on 1986 Census data processing, Somali population in mid-1986 was amounting up to 5,500,000 persons. At the end of 1990 same population is estimated to increase up to 6,080,000 persons, with annual growth rate of 2.9 %. According to the previous indications, expected reduced mortality and constant fertility rate, estimated population annual growth rate in Somalia in the period 1990 - 1997 will amount 3.0 %. Inter regional migrations are estimated at the total level of 20 %, with Banadir (Mogadishu), Lower Shabelle, Middle Juba and Lower Juba as gaining regions and Bakool and Bay as losing regions. Structural breakdown among the urban, rural and nomadic groups is kept constant. From the following prospect it is moreover possible to notice that, consequently to approximate estimates, as reliable as they can be, Somali population in the year 1997 should reach 7,700.000 persons. Also detailed breakdown of estimated future increase in population for the interesting gravitating regions is given. Breakdown by urban, rural and nomadic groups of population is given since this group have different attitude and behavior concerning the salt consumption. To dispose some preliminary directing elements, concerning the salt consumption in the next years, some statistic data, among the most recent ones, are integrated and compared with different sources.

From the mentioned presumptions next year forecasting have been made with reference to the various geographical areas and structural breakdown of the population. This projections examine closely interrelated aspects in the process of arriving at the estimation of future sales potential for the JSW. If the more recent and precise data and estimates become available it will be easy to adjust all the subsequent calculations accordingly. In the following tables population forecasts are given for the period 1990 - 1997 :

Population forecasts in gravitating area for JSW salt (million)

	1990	1991	1992	1993	Rates
A. Somalia	6.26	6.45	6.64	6.84	3.0 % p.a.
1. Banadir					
- Mogadishu	1.17	1.21	1.24	1.28	
-- natural (*)	1.12	1.16	1.19	1.23	3.0 % p.a.
-- mechanical	0.05	0.05	0.05	0.05	(**)
2. Bakool (***)	0.13	0.13	0.13	0.14	2.0 % of A.
- urban	0.02	0.02	0.02	0.02	13.9 % of 2.
- rural	0.03	0.04	0.04	0.04	27.5 % of 2.
3. Bay (****)	0.46	0.48	0.49	0.51	7.4 % of A.
- urban	0.07	0.07	0.07	0.08	14.9 % of 3.
- rural	0.25	0.26	0.27	0.28	54.4 % of 3.
4. Gedo (*****)	0.44	0.46	0.47	0.49	7.1 % of A.
- urban	0.05	0.05	0.05	0.06	11.6 % of 4.
- rural	0.12	0.12	0.12	0.13	26.4 % of 4.
5. L.Shabelle(*****)	0.98	1.01	1.04	1.07	15.7 % of A.
- urban	0.15	0.16	0.16	0.17	15.5 % of 5.
- rural	0.63	0.65	0.66	0.69	63.8 % of 5.
6. L.Juba (*****)	0.55	0.57	0.58	0.60	8.8 % of A.
- urban	0.12	0.13	0.13	0.13	22.3 % of 6.
- rural	0.21	0.22	0.23	0.23	38.6 % of 6.
Total	2.82	2.93	2.99	3.11	
- Mogadishu	1.17	1.21	1.24	1.28	
- Other	1.65	1.72	1.75	1.83	
-- urban	0.44	0.43	0.43	0.46	
-- rural	1.24	1.29	1.32	1.37	

Source: Own estimates

- * Mogadishu population estimated as 18 % of total Somali population (1975 Census cca 10,7 %), heavily gaining region (cca 25 %)
- ** Rough estimate according to local planners opinion
- *** Moderately losing region (cca 25 %)
- **** Slightly losing region (cca 15 %)
- ***** Slightly gaining region (cca 10 %)
- ***** Moderately gaining region (cca 15 %)
- Remark Middle Juba is also gravitating region but the data about the population are included either in the Lower Juba or Lower Shabelle (statistical inconsistency).

Population forecasts in gravitating area for JSW salt (million)

	1994	1995	1996	1997	Rates
A. Somalia	7.05	7.26	7.47	7.70	3.0 % p.a.
1. Banadir					
- Mogadishu	1.32	1.36	1.39	1.44	
-- natural (*)	1.27	1.31	1.34	1.39	3.0 % p.a.
-- mechanical	0.05	0.05	0.05	0.05	(**)
2. Bakool (***)	0.14	0.15	0.15	0.15	2.0 % of A.
- urban	0.02	0.02	0.02	0.02	13.9 % of 2.
- rural	0.04	0.04	0.04	0.04	27.5 % of 2.
3. Bay (****)	0.52	0.54	0.55	0.57	7.4 % of A.
- urban	0.08	0.08	0.08	0.09	14.9 % of 3.
- rural	0.28	0.29	0.30	0.31	54.4 % of 3.
4. Gedo (*****)	0.50	0.52	0.53	0.57	7.1 % of A.
- urban	0.06	0.06	0.06	0.06	11.6 % of 4.
- rural	0.13	0.14	0.14	0.14	26.4 % of 4.
5. L.Shabelle(*****)	1.11	1.14	1.17	1.21	15.7 % of A.
- urban	0.17	0.18	0.18	0.19	15.5 % of 5.
- rural	0.71	0.73	0.75	0.77	63.8 % of 5.
6. L.Juba (*****)	0.62	0.64	0.66	0.68	8.8 % of A.
- urban	0.14	0.14	0.15	0.15	22.3 % of 6.
- rural	0.24	0.25	0.25	0.26	38.6 % of 6.
Total	3.19	3.29	3.36	3.47	
Mogadishu	1.32	1.36	1.39	1.44	
Other	1.87	1.93	1.97	2.03	
- urban	0.47	0.48	0.49	0.51	
- rural	1.40	1.45	1.48	1.52	

Source: Own estimates

- * Mogadishu population estimated as 18 % of total Somali population (1975 Census cca 10,7 %), heavily gaining region (cca 25 %)
- ** Rough estimate according to local planners opinion
- *** Moderately losing region (cca 25 %)
- **** Slightly losing region (cca 15 %)
- ***** Slightly gaining region (cca 10 %)
- ***** Moderately gaining region (cca 15 %)
- Remark : Middle Juba is also gravitating region but the data about the population are included either in the Lower Juba or Lower Shabelle (statistical inconsistency)

3.2.1.3.1.1.1 Salt for Human Use/Per Capita Consumption

Consumption for human and animal dietary purposes currently accounts for some 70 % of total demand in Africa. However, due to the number of surveys done it is apparent that the per capita consumption level for both humans and animals is below the optimal level. Thus for human (alimentary) use, a consumption of between 4.5 to 6.8 kg, according to some estimates of health research institutions, is considered necessary for adequate nutrition. In many African countries, consumption levels of 4 kilos per annum and less are normal.

Average annual per capita salt consumption for human use in Somalia in many previously done studies (early 80-ies)* was estimated at the reliable minimum level of 5 kg for the period of 1989 - 1990 what has not been reached yet according to the present indications. For more realistic and "down to the earth" assessment of the market potential and sales prospects of JSW salt in the future period very thorough analysis and conservative assumptions are needed.

Based on the Mogadishu Family Budget Survey held in 1977 (1 % sample size, 670 households interviewed) and statistical data expressing wholesale and retail prices in Mogadishu certain estimates about quantity of salt consumed for the alimentary purposes could be elaborated. According to the available data Average Annual SALT Consumption in Mogadishu was in 1977 3.9 kg/per person.

The data from the most recent Family Budget Survey held in Mogadishu in 1986 are not completely processed and also are subject to certain restrictions for public use. Preliminary estimates of quantity of salt consumed for the alimentary purposes in the average Mogadishu family of 7 persons are 3.1 kg per month. Converted to annual consumption it amounts to the 5.3 kg of salt per capita per annum what could be considered as a rather high level.

* Hordio Hafun Saltern, Part II Economic Study and Master plan with Executive Elements, S.T.I. Studio Tecnico Ingegneria, Roma, 1973

Extension of an Existing Salt Work for the Production of Salt by Solar Evaporation, Feasibility Study / Draft Final Report, CENTER FOR INDUSTRIAL DEVELOPMENT, Brussels, SALTEC, Rome, 1980

Market Study for Crude and Refined Salt in East and Central Africa, Coopers & Lybrand Associates, Management and Consulting Services Kenya, February 1980

Estimated SALT consumption in Mogadishu , 1977 *

Size of Household	Share of Household per Monthly Expenditure (%)**	Monthly Household Expenditure for S A L T (So.Sh.)	Monthly Household Expenditure for SALT weighted by Size of Monthly Expenditure (So.Sh.)
0 < 100	1.8 %	0.10	0.0018
100 < 200	5.5 %	1.01	0.0556
200 < 300	9.3 %	1.54	0.1432
300 < 400	16.4 %	1.95	0.3198
400 < 500	16.7 %	2.66	0.4442
500 < 600	7.6 %	2.94	0.2234
600 < 700	10.1 %	3.34	0.3373
700 < 800	5.8 %	3.58	0.2076
800 < 900	3.9 %	4.63	0.1806
900 < 1000	3.6 %	4.32	0.1555
1000 +	16.3 %	6.63	1.0807
unknown	3.0 %	3.00***	0.0900
Total Monthly Household Consumption for SALT			3.2397 So.Sh.
Average Size of Household			6.9 persons
Monthly SALT Consumption per person			0.4695 So.Sh.
Annual Average Retail Price for SALT (1977)**			1.44 So.Sh/kg
Average Monthly SALT Consumption (1977)			0.325 kg/p.person
Average Annual SALT Consumption (1977)			3.912 kg/p.person

* Based on Mogadishu Family Budget Survey 1977 , Central Statistical Department (CSE) , State Planning Commission (SPC) , October 1978

** Statistical Abstracts 1977 , CSD , SPC , October 1978

*** Own estimated average

Apart of all presented data based on the official statistics , the small informal interview of Mogadishu households was done in the February 1989. Only 10 families were questioned, predominantly from the group where the employed members are engaged in the administrative and service activities. The findings could be considered as very globally informative but still interesting as a forecast element. Indicated average annual salt consumption for alimentary purposes was 3.9 kg per person. The detailed results of the interview with the structural breakdown by the household size and salt consumption are presented in the following tables :

Estimated SALT consumption in February 1989 *

Size of Household (persons)	Household SALT Consumption (kg)	Retail Unit Price (SoSh./kg)	SALT Consumption/per capita Monthly (kg)	Annually (kg)
2	0.4 kg monthly	50	0.2000	2.40
3	0.8 kg monthly	50	0.2667	3.20
4	1/4 kg per 8 days	20	0.2344	2.81
5	1.2 kg monthly	50	0.2400	2.88
6	1.875 kg monthly	40	0.3125	3.75
7	2.4 kg monthly	50	0.3429	4.12
7	0.5 kg weekly	10	0.3061	3.67
9	3.0 kg monthly	40	0.3333	4.00
10	0.6 kg weekly	10	0.2571	3.09
15	1/4 kg per 2 days	20	0.2500	3.00

 Simple arithmetic mean 3.29

* Informal interview of Mogadishu households

All presented data for Mogadishu are related to the consumption of crude grounded washed sea-salt for human use. From the presented information it can be very conservatively presumed that the average annual salt consumption in Mogadishu will be in the future period 1990 - 1997 at the minimum base level of 3.6 kg per capita. It also estimated that JSW, as a market leader and the only salt producer in Banadir region, could count on the 90 % of the demand. Other 10 % of the estimated demand could be covered by the rock-salt from the Mudug in the periods when JSW could have seasonal decrease in supply even if the rock-salt is considered as non-appropriate for human use and more suitable for animal use. This scenario of the Banadir market is likely to be easily achieved.

Other regions gravitating to the JSW are Bakool, Bay, Lower Shabelle, Middle Juba and Lower Juba. The JSW estimated supply of the forecasted demand in these regions could amount to 70 % for the urban part of the population and 50 % for the rural people. Nomadic population is not considered as potential buyer at the regular market since they cover their needs for salt from the salt rock mines and salt wells during the migration after the water and grass. Expected average annual salt consumption for in- continent and interriverine regions is lower than for Mogadishu consumers and estimated for urban people at the level of 3.0 kg per capita and for rural people at the level of 1.8 kg per capita. The Northern regions are far from the JSW and could be hardly reached because of insufficient road connections and high transportation costs. Also in that part of the country small artisan salterns are supplying existing needs. Concerning these assumptions and expected population growth assessment of the

market potential and sales prospective for the JSW grounded washed sea-salt is presented in the following tables :

Forecasting potential salt consumption for the human use in:
Banadir and gravitating regions

	1990	1991	1992	1993	Rates
TOTAL					
Population (million)					
Salt consumption (t)	5766	5994	6138	6342	
- MOGADISHU					
Population (million)	1.17	1.21	1.24	1.28	
-- Fair share of population demanding					
JSW salt (90 %)	1.05	1.09	1.12	1.15	
Kg salt/per capita	3.60	3.60	3.60	3.60	
Salt consumption (t)	3780	3924	4032	4140	
- OTHER					
Population (million)					
Salt consumption (t)	1986	2070	2106	2202	
-- Urban					
Population (million)	0.41	0.43	0.43	0.46	
-- Fair share of population demanding					
JSW salt (70 %)	0.29	0.30	0.30	0.32	
Kg salt/per capita	3.00	3.00	3.00	3.00	
Salt consumption (t)	870	900	900	960	
-- Rural					
Population (million)	1.24	1.29	1.32	1.37	
-- Fair share of population demanding					
JSW salt (50 %)	0.62	0.65	0.67	0.69	
Kg salt/per capita	1.80	1.80	1.80	1.80	
Salt consumption (t)	1116	1170	1206	1242	

Source : Own estimate

Forecasting potential salt consumption for the human use in
Banadir and gravitating regions

	1994	1995	1996	1997	Rates
TOTAL					
Population (million)					
Salt consumption (t)	6534	6708	6852	7128	
- MOGADISHU					
Population (million)	1.32	1.36	1.39	1.44	
-- Fair share of population demanding					
JSW salt (90 %)	1.19	1.22	1.25	1.30	
Kg salt/per capita	3.60	3.60	3.60	3.60	
Salt consumption (t)	4284	4392	4500	4680	
- OTHER					
Population (million)					
Salt consumption (t)	2250	2316	2352	2448	
-- Urban					
Population (million)	0.47	0.48	0.49	0.51	
-- Fair share of population demanding					
JSW salt (70 %)	0.33	0.34	0.34	0.36	
Kg salt/per capita	3.00	3.00	3.00	3.00	
Salt consumption (t)	990	1020	1020	1080	
-- Rural					
Population (million)	1.40	1.45	1.48	1.52	
-- Fair share of population demanding					
JSW salt (50 %)	0.70	0.72	0.74	0.76	
Kg salt/per capita	1.80	1.80	1.80	1.80	
Salt consumption (t)	1260	1296	1332	1368	

Source : Own estimate

According to the presented forecasts for Banadir (Mogadishu) and other gravitating regions, market potential for the crude washed sea-salt produced in JSW in the period 1990-1997 will be around 6,000 - 7,000 tons per annum. It is also envisaged

that other suppliers (i.e. rock-salt from Mudug) satisfy 10 % of the expected demand in Mogadishu. Rather conservative expectations are foreseen for the demand in urban parts of the gravitating regions where annual consumption (and demand) of 3.0 kg per person is calculated while 70 % of the consumers are supplied from JSW. Rural population is considered as low market oriented , consuming only 1.8 kg per person annually out of which JSW salt is supposed to satisfy 50 %. Rest will be supplied from the various sources like small artisan saltworks along the coast , salty wells and small rock-mines. According to the foresaid cautious assessments , present JSW crude salt production of 2.000 - 2.500 tons per annum should be technologically examined for the potential expansion.

3.2.1.3.1.1.2 Salt for Animal Use

Animal salt consumption is hard to forecast as estimates of the numbers of cattle ranches have varied widely. Estimate of livestock population in Somalia in million heads for the 1985 were as follows : Goats 18.5 , Sheep 11.1 , Camels 6.0 and Cattle 4.4. If the optimal level of feed is estimated at some 10 kg per adult animal per annum and 5 kg per annum for the young animals consumption would theoretically amount to the enormous 300.000 tons per annum. However , the present system of nomadic cattle herds which account for the majority of the livestock in the country is not conducive to salt feeding. It is more advisable to assume that animal salt consumption at present is very low in proportion to human consumption and could amount between 0.5 - 1.0 kg of salt per head. That assumption leads to more realistic estimate of salt consumption for animal use of 30,000 tons per annum for entire Somalia which is satisfied predominantly not from the market but during the nomadic migrations after grass and water , from the salted wells , lake and rock-mines.

Assessing potential market for JSW crude sea-salt for the animal use in rural households in gravitating regions and certain number of urban households in Banadir and other regions results are negative. JSW salt is not convenient for the animal use because of certain higher humidity and mineral contents. Interviews of Mogadishu wholesalers indicated that rock salt from Mudug , when available and when bought for animals , is more required. Practically this market segment is out of the long term business operations planning as a JSW sales potential.

3.2.1.3.1.1.3 Salt for Industrial Use

Salt is basic raw material for various industries such as production of soap , preservation of hides and skins and the

manufacture of vital chemicals like caustic soda and chlorine from which many other chemical products (like polyvinyl chloride - PVC) are derived. The present structure and size of industrial enterprises in Somalia indicate that the demand for industrial salt is only realistic in tanning industry. Also , industrial investment opportunities (given in the appendix) are not based on the extensive use of industrial salt.

TANNING INDUSTRY

When estimating potential use of industrial salt for preservation of hides and skins data about present and future possible developments are taken into the consideration.

Kismayo Tannery has processing capacity of 500 hides per day. Actual performance is 240 hides per day , expected to operate 300 days per annum. Average weight of hide is 18 kg with standard utilization of salt for preservation purposes at 6 % of the total weight.

$$240 \text{ hides/day} \times 300 \text{ days} \times 18 \text{ kg/hide} \times 0.06 = 77,760 \text{ kg salt/ya.}$$

Tannery km 7, Mogadishu has actual performance of 300 hides per day and expected to operate 300 days per annum. Average weight of hide is 18 kg and standard salt use is 6 % of total weight. Also existing capacity for skins processing is 2,500 per day what is equivalent to approximately 400 hides a day. Envisaged capacity of the new part of the tannery should process 4,000 skins per day what is equivalent of approximately additional 640 hides a day.

Actual Hides

$$300 \text{ hides/day} \times 300 \text{ days} \times 18 \text{ kg/hide} \times 0.06 = 97,200 \text{ kg salt/ya.}$$

Actual Skins converted to Hides (2,500 skins = 400 hides)

$$400 \text{ hides/day} \times 300 \text{ days} \times 18 \text{ kg/hide} \times 0.06 = 129,600 \text{ kg salt/ya.}$$

New Skins converted to Hides (4,000 skins = 640 hides)

$$640 \text{ hides/day} \times 300 \text{ days} \times 18 \text{ kg/hide} \times 0.06 = 207,360 \text{ kg salt/ya.}$$

Burao Tannery has capacity of 1,200 skins per day and is expected to operate 300 days per annum.

Actual Skins converted to Hides (1,200 skins = 200 hides)
200 hides/day x 300 days x 18 kg/hide x 0.06 = 54,000 kg salt/ya.

Hargeisa Tannery has capacity of of 100 hides and 1,000 skins per day and is expected to operate 300 days per annum.

Actual Skins converted to Hides (1,000 skins = 150 hides)
250 hides/day x 300 days x 18 kg/hide x 0.06 = 81,000 kg salt/ya.

Batoon Tanning Factory private enterprise from Hargeisa has capacity of 150 hides per day and is expected to operate 300 days per annum.

150 hides/day x 300 days x 18 kg/hide x 0.06 = 48,600 kg salt/ya.

Missionary Tannery private enterprise from Mogadishu has capacity of 300 hides per day and is expected to operate 300 days per annum.

300 hides/day x 300 days x 18 kg/hide x 0.06 = 97,200 kg salt/ya.

Also , first preservation phase in Regional Abattoirs is applied for camel and cattle hides in following total quantities :

Camel Hides

9.700 hides/per annum x 1.5 kg salt/hide = 14,550 kg salt/ya.

Cattle Hides

60.000 hides/per annum x 1.5 kg salt/hide = 90,000 kg salt/ya.

In Brava exists 30 small manual tanneries (without drums) and two new tanneries are being established.

30 small tanneries

30 tanneries x 200 camel hides/per month x
x 12 months x 22 kg/hide x 0.06 = 95,040 kg salt/ya.

Two new tanneries with total capacity of 500 hides/per day

500 hides/day x 300 days x 18 kg/hide x 0.06=162,000 kg salt/ya.

Total salt consumption for industrial use in the tanning industry would amount around 1,300 tons per annum if the capacities are fully utilized what is not a case (cca 50 % of installed capacities is used). New capacities are also taken into the consideration. This major industrial sector , tanning industry prefers to buy salt from the rock-mines than from the sea-salters due to the fact that the moisture of rock-salt is much lower making rock-salt more convenient for the preservation of hides and skins. Other industrial sectors , present consumers of industrial salt are almost non-existent and also , potential industrial opportunities are not based on this input as could be seen from the list of projects given in the appendix. Therefore , it is obvious that the big local market for the industrial use of the sea-salt does not exist at the moment and that any significant need in the near future is not evident . Especially , from the point of view of JSW (for which this Feasibility Study is done) , producer of the crude wash sea-salt , this market is practically non-existent. Also , export possibilities without having joint venture partners responsible for the marketing are not viable alternative for plant capacity expansions.

3.2.1.3.1.1.4 Salt for Export

Several studies and surveys have been done for the assessment of East and Central African market for crude and refined salt with a view to determine viability of a salt production project located in Somalia. The Italian firm SALTEC have completed , at the request of the Government of Somalia , a Feasibility Study for the Extension of an Existing Salt Work for the Production of Salt by Solar Evaporation. The results of the study indicated that in the near vicinity of Kismayo port exists location for production of 80,000 - 90,000 tones of crude washed salt while 95 % of the produced should be exported to the African , Caribbean and Pacific (ACP) countries. Accordingly , request for total orientation on export , resulted in market study for the Kenya , Tanzania , Uganda , Zambia , Malawi , Zaire , Mauritius , Rwanda and Burundi , Malagasy.* In the conclusions on the market potential in East and Central Africa at the very beginning major constraints are given:

- general shortage of foreign exchange in these countries and , what is more important , very low priority afforded by Governments to salt importation.
- lack of awareness of the benefits of the use of salt licks for animal husbandry

- very small and low need for industrial use of salt

After these very serious constrains all quantitative scenarios of demand development, shipping expenses, fluctuations of landed prices, competition of small local salterns and development of salt production in Tanzania lead to the conclusion that any large production of salt in Somalia especially oriented to export requires a foreign partner in a form of a joint venture where the responsibility for the marketing of these huge quantities at the beginning of the operations is his major input. Otherwise, many research work, market and feasibility studies will remain paper work never implemented.

Concerning the JSW expansion it is obvious that such small capacity is completely oriented on existent and not saturated local demand and that the export could be realized only by chance and in very limited quantities. That is why this alternative for sales possibilities is not taken into account at all.

3.2.2

Supply

The present position of salt industry in Somalia is the same as when the Second World War ended producing the disastrous effect of destroying the biggest salt industry of the country and probably one of the biggest in the world. Since the shutting down of Hordio-Hafun saltworks no other salt industry was constructed, country relays on artisan method of salt producing by natural solar evaporation. Therefore, no sensible variation of salt producing is recorded. The salt sources in Somalia may be divided into four genetic types :

- (1) Evaporated salt from the sea-water in Hordio, Jesira, Bakal and Zeila
- (2) Salt lakes in Obbia district and Agherrar
- (3) Salt springs in Dagah Der, Tarraboh, Heis
- (4) Rock salt in Mudug.

All existing economic analysis were oriented to the big capacities oriented to the export and related to the exploitation of salt sources from the first group. (*)

(*) Market Study for Crude and Refined Salt in East and Central Africa, Coopers and Lybrand associates, Management and economic consulting services, Kenya, February 1980

One of the world's largest plants for salt production by solar evaporation was established at HORDIO in the bay of Hafun prior to the World War II. This plant was created by "Societa Saline Somale" company. Its capacity was 250,000-300,000 tones of slat per annum. The first production started in 1931. The production was ceased during the British occupation. Mechanical equipment was dismantled and much of it was removed from the country. What was left has deteriorated to such an extent that any attempt to reopen the works would require entirely new operating equipment. At the time of the operation the salt was sold to Japan and other parts of Asia and to some neighboring countries in East Africa. The excellent climatic conditions and the high grade of evaporated salt makes Hordio still interesting site for salt industry. The re-establishment of these works has been engaging the attention of Government. In the year 1972 study of the Hordio-Hafun area has been carried by STL - Studio Technico Ingegneria Progettazione Coordinata, an Italian firm to set up salt works there. One of the advantages of the reopening Hordio-Hafun are limited civil works for the salt work since the evaporating basins and crystallizing pans are still there and require only repair works. However, to this advantage, rather important disadvantages are opposed, concerning the investment cost involved by construction of all infrastructures, including the pier for docking the ships. The extreme shallowness of the bay impose serious problems in transportation of the produced salt by ocean going ships. This would cause the development of an elaborate transport and loading system. This place is approximately over 1,000 km away from the Mogadishu to which is connected by rough and very bad road. Above all drawbacks, the most important is that export market is not ensured by the joint venture with foreign partners. These partners should completely resolve export marketing and significantly participate in the financing of the Hordio-Hafun reopening. For the time-being this potential capacity can not be considered as competitor for JSW in supply of crude washed sea-salt for the human use at Banadir and gravitating regions.

In the Somalia salt is being produced in the co-operative sector. BAKAAL Salt Cooperative is utilizing 800 hectares with nominal capacity for production of 2,000 tons of the natural salt per year. This cooperative is located 75 km from Kismayo port employing 300 people. Possible greater extensions of the existing production capacity are first of all connected with the realistic estimates of possible market demand, especially export markets, what is not yet proven. Other very big drawback of this site is connection with Kismayo only by bush track which becomes impracticable when it rains. If expansion realized proper paved road should be built involving a disproportionate investment costs. This cooperative supplied its crude unwashed salt to the Kismayo Meat Canning industry. Possible user of this salt is Kismayo tannery but sea-salt containing rather high degree of moisture is not considered as convenient for hides and

skins preservation. This Bakaal Salt Cooperative is not considered as competitor to JSW salt in the Banadir region. In other regions gravitating to Mogadishu there is a room for supply of 30 % of the market demand for salt for human use caused by urban population and 50 % of the demand for salt caused by the rural population.

The third capacity for natural sea salt production is in ZEILA at the extreme north-west point of Somalia close to Djibouti border. The nominal production capacity is estimated at 3,000 tons per year. This location is over 1,500 away from the Banadir region and completely out of reach of JSW potential buyers due to the extreme transportation costs caused by the distance and problematic road connections.

The only potential supplier and competitor to JSW in Banadir region (Mogadishu) is cooperative for rock salt works from MUDUG called "Mudug Hoby iyo Xaradheere". Quality wise and for alimentary purposes JSW table salt is considered to be the best salt available at the market , due to the statements of wholesalers and retailers. However , it has disadvantages of being little bit more wet than rock-salt and not suitable for the industrial use in tanning industry for hides and skins preservation. Also , rock-salt , when available , is preferable for animal use. Also , rock-salt from Mudug costs 8,500 So.Sh per ton at the wholesaler's store. JSW salt costs 6,000 So.Sh. per ton at the Jesira site 25 km away from the Mogadishu causing to the wholesalers transport costs thus being little bit more expensive. Drawback of the mudug rock-salt supply is the fact that rock-salt is not appropriate for the human use containing some crystallized minerals. Also , unstable availability of the rock-salt at Mogadishu wholesalers' market is caused by the fluctuating and sometimes very high transportation costs from the Mudug. Often inappropriate weight of the delivered salt caused by the imperfect protection of the truck load during the transport increases unit price. All these reasons and interviews of wholesalers indicated that possible supply of the Mudug rock-salt could dominantly satisfy the needs for industrial salt in tanning industry in Mogadishu and gravitating regions , needs for limited animal use and approximately 10 % of demand caused by urban population in Mogadishu. That is considered to be a fair share at the market which JSW serves.

3.2.3 Sales Forecast and Plant Capacity

After demand and supply market research for crude washed salt for human use in Banadir and gravitating areas JSW market share is projected. Based on these estimates JSW sales forecast of salt quantities is done and plant capacity for the

expansion of existing production is determined at the level of 7,500 tons per year.

Sales Forecast for JSW CRUDE WASHED GROUNDED SEA-SALT

Year	Description	Full plant capacity(t)	Actual sales (t)	%
1990	Salt for Human Use	cca 7,500	5,766	77 %
1991	"	7,500	5,994	80 %
1992	"	7,500	6,133	82 %
1993	"	7,500	6,342	85 %
1994	"	7,500	6,534	87 %
1995	"	7,500	6,708	89 %
1996	"	7,500	6,852	91 %
1997	"	7,500	7,128	95 %

Source : Own estimate

3.2.3.1 Marketing strategy

Marketing strategy for the JSW expansion is orientation on local big market for salt for human use in Mogadishu and Banadir inhabited almost completely by urban people. Certain market share is envisaged also for satisfying demand for the salt for human use in gravitating regions like Bakool , Bay , Gedo , Lower Shabelle , Middle and Lower Juba , caused only by the urban and to smaller extent rural population. It should be stated that the possibilities for the sea-salt export from Somalia are almost for a few decades only in sphere of wishes not based on joint venture contracts with marketing and engineering firms from abroad. Also , Jesira Salt Works , as a producer and site for huge export oriented capacity , in all research studies done by the international consultants , are declared inconvenient. Therefore in adopted marketing strategy of JSW , at present small private enterprise , it seemed reasonable to cover the local demand in the biggest city in Somalia , Mogadishu , with high population density and urban way of living. Also orientation is to supply the population with the cheap crude grounded washed sea-salt which perfectly satisfies human basic needs for this essential nutrition element and has very competitive price what

is extremely important for the country where GDP is among the lowest in the world. Any idea about refined salt for human use and high retail price is out sense. JSW marketing strategy is also based on the minimal possible initial investment and better utilization of existing salt gardens without very expensive additional land reclamation and site preparation. The supply of JSW salt should satisfy the basic needs of all types of urban and partly rural households from lowest to highest income and expenditures. That is possible only in a case if JSW salt is of reasonable quality and sold at cheap producer's price giving wholesalers and retailers enough room for distribution profit what is actual development strategy in the first phase of JSW expansion.

3.2.3.2 Product pricing

JSW sells at present crude ungrounded naturally washed salt at the price of 6,000 So.Sh. per ton or 22.14 US \$ at official exchange rate of 271 So.Sh. for 1 US \$ (23.01.1989). It is advisable to notice that at the parallel market 1 US \$ is exchanged for 440 So.Sh. During the interview at the JSW headquarters increase of this producer's price was envisaged. This is the price at JSW site 25 km from Mogadishu. Transport is paid by the wholesalers. It should be examined that certain small transportation trucks in limited number are provided thus enabling increase in price but also better supply of wholesalers. Other suppliers like Mudug Salt Cooperative sell the salt when ensuring competitive transport price at the price of 7,000 So.Sh. per ton or 25.53 US \$ at official exchange rate inclusive transport to the wholesaler's warehouse. This is competitive price but unstable supply prevent salt wholesalers to undertake the risk of orientation on such type of suppliers.

Wholesalers are selling the sea-salt for human use, which they ground themselves, to the retailers at the price of 8,000 So.Sh. per ton or 29.52 US \$ at official exchange rate. These prices are fluctuating according to the variations in regular supply from JSW which may be influenced by seasonality and by availability and costs of truck transport from Mudug.

Retailers are selling salt by measuring the quantity in cans of 200 grams, half kilogram and one kilogram. As a result of a very brief survey of retail shops and interviews with several households, depending at which city market you by sea-salt 1 kg of grounded sea-salt for human use is priced in a range of 10 - 50 So.Sh. For a better idea about price fluctuations following table shows the average annual wholesale and retail prices for a longer period :

Mogadishu Average RETAIL and WHOLESALR Prices for SALT *

Year	Unit	Average WHOLESALR Price (So.Sh.) (US \$)	Average Price (US \$)	Average RETAIL Price (So.Sh.) (US \$)	Average annual exchange rate 1 US\$/1 So.Sh	
1976	kg	0.3045	0.0483	1.16	0.1841	6.3 6.3 **
1977	kg	0.3440	0.0546	1.44	0.2285	6.3 cca 7
1978	kg	0.4250	0.0674	2.00	0.3174	6.3 9
1979	kg	0.4680	0.0742	2.02	0.3206	6.3 11
1980	kg	0.8000	0.1269	3.00	0.4762	6.3 13
1981	kg	1.1500	0.1217	4.75	0.5029	9.4 20
1982	kg	1.5100	0.1085	5.07	0.3645	14 24
1983	kg	n.a.	n.a.	7.26	0.4184	17.3 50-95
1984	kg	n.a.	n.a.	7.00	0.3229	21.7 95-105
1985	kg	n.a.	n.a.	9.00	0.1452	62 105-120
1986	kg					90.5
1987	kg					100
1988	kg					252
1989	kg	8.0000	0.0295	20.00	0.0738	271 440

* Source : Statistical Abstracts , CSD , STP

** Parallel market from Somalia : Understanding an Unconventional Economy , Vali Jamal , Development and Change , 1988

International Financial Statistics , Volume XLI - No II , November 1988 , IMF , Washington DC.

It is obvious that the prices significantly fluctuate due to the unstable conditions in the economy as whole. Strong inflation effects the business operations but JSW as a small private enterprise is for sure more adaptive than a big plants. Since the salt for human use is basic need with low price elasticity and completely renewable local raw-materials certain flexibility and easier adaptation to the inflation is feasible.

3.2.3.3 Distribution channels

The present practice of the JSW crude ungrounded washed sea-salt is the ex-factory selling. Selling is made to the wholesalers who are grounding , stocking and selling grounded crude sea-salt to the retailers. The wholesalers are paying the transportation costs and stocking the sea-salt at their small storehouses where they sell smaller quantities to the retailers who again pay transportation costs to the retail shops.

3.2.3.4 Trade promotion and commercial practice

JSW should , through expansion of the existing capacity , add operation of sea-salt grounding and if possible delivering certain quantities by small truck to the site of wholesalers at

the Mogadishu markets. Thus , JSW can increase producer's price for transportation costs , but also offer a higher level of stability to traders. This transportation services might not be introduced at the very beginning of expansion.

3.2.5 Estimate of Sales Revenue

Sales Revenue is estimated on a basis of constant prices and envisaged utilization of capacity in the period of the business operation (199-1997). This revenue is based on a ex-factory sales price of JSW for crude ungrounded sea-salt which is valid at the moment of the feasibility study preparation (March 1989) and amounts to 6,000 So.Sh. per m.ton of sea-salt.

Sales Revenue for JSW CRUDE WASHED GROUNDED SEA-SALT

Year	Description	Plant capacity		Actual	Unit price	Sales
		Full	%			
1990	Salt-Human Use	7,500	77%	5,766	6,000	34,596,000
1991	"	7,500	80%	5,994	6,000	35,964,000
1992	"	7,500	82%	6,138	6,000	36,828,000
1993	"	7,500	85%	6,342	6,000	38,052,000
1994	"	7,500	87%	6,534	6,000	39,204,000
1995	"	7,500	89%	6,708	6,000	40,248,000
1996	"	7,500	91%	6,852	6,000	41,112,000
1997	"	7,500	95%	7,128	6,000	42,768,000
1998	"	7,500	100%	7,500	6,000	45,000,000
1999	"	7,500	100%	7,500	6,000	45,000,000

Source : Own estimate

Definition of annual plant capacity at cca 7,500 tons of crude grounded wash sea-salt, location at Jesira, selection of natural solar technology and choice of equipment are closely related with definition of input requirements.

4.1 CHARACTERISTICS OF MATERIALS AND INPUTS

The only raw material needed for the production of crude grounded sea-salt is sea water.

4.1.1 Sea Water

To produce 7,500 tons of crude washed grounded sea-salt per year cca 412,500 cubic meters of sea-water at 3.5 Be is needed. The cost of sea-water is zero and this is naturally renewable resource.

Investigations of the sea-water quality in Jesira location and its changes in the composition during the evaporation in natural conditions is performed by Bulgargeomin experts from Bulgaria for the Ministry of Mineral and Water Resources. Detailed results covering geological investigations with physical-geographical information; maps with ground outlines; topographical plan; temperature, density and level observations in Jesira salt gardens; water sampling and solid mineral salts sampling are given in the study. Also results of investigations of changes in the composition and properties of Jesira sea-water at evaporation in natural conditions are presented in the study. At the conditions of natural sunny evaporation in Jesira salterns the best quality salt is obtained at the crystallization between 26-28.9 Be. Total salt content in different stages of crystallization (Be indicator) are given in the appendix. A greater concentration of the bitters is not desirable as the salt quality worsened because of the Epsom salt separation which appears during the night cooling of the bittern. The prompt utilization of the bitters with 29 Be density, obtained as waste products after sea-salt manufacturing, may result in preparing of the following additional products (i.e. at the production capacity of 7,500 tons per year):

- Crystal Magnesium Chloride (seven-hydrate) 1,500 tons per year
- Crystal Magnesium Chloride (six-hydrate) 400 tons per year
- Potassium Chloride 100 tons per year
- Gypsum 300 tons per year

Since the technological part of the feasibility study is to be undertaken by the natural salt evaporation expert more precise data explaining properties of Jesira sea-water will be included.

4.1.2 Auxiliary Materials

No auxiliary materials are needed to produce the 7,500 tons of crude washed grounded sea-salt to be sold to the local wholesalers in bulk. If decided that the sea-salt will be sold out in bags this could be purchased at the local Mogadishu market since the packing materials are produced by a local producer.

4.1.3 Utilities

For regular production only electric power is needed to pump the water from the sea. Electric power must be generated locally since the Mogadishu power plant, which is in the near vicinity of Jesira Salt Works is too small even for the town requirements and breakdowns due to the overloads in the network are often. The Diesel oil needed to fuel the engines driving the generator sets, the salt harvesting equipment and other consumers of the power will be supplied from the refinery outside the Mogadishu and also in close vicinity of JSW.

The price of the Diesel oil is cca 50 So.Sh. per liter. Quantity needed will be calculated in the engineering part of the feasibility study when technological expert submits his final report. Estimated consumption could be in a range of 10-20 tons per year.

4.2 SUPPLY PROGRAMME

For the envisaged production of 7,500 tons per year of crude grounded washed salt all manufacturing inputs are domestic and locally available in Mogadishu.

CHAPTER V

LOCATION AND SITE

5.1 LOCATION

The Jesira salterns are situated 18 km to the south-east of Mogadishu on the Indian-ocean coast. They cover a 0.3 km² area, lengthened to the northeast-southwest direction (see map in the Appendix). The plant location enjoy the following advantages :

- Availability of the basic raw material (sea-water) which is renewable ,
- Road connection with the capital Mogadishu ,
- Vicinity of the oil refinery (3-4 km) for the Diesel oil supply ,
- Vicinity of the power plant which could be advantageous if electric power , other than from own generating unit , needed
- Availability of the labor in the Jesira village ,
- Mogadishu as excellent market for the crude grounded sea-salt for human use and for other services needed for the normal business operation (transportation , maintenance , banking services , etc.)

5.2 SITE

Regarding the morphology of the site , Jesira salterns are situated in an lengthened valley-like lagoon , parallel to the ocean shore and separated from it by narrow elongated hill about ten meters high. The lagoon is connected with ocean by a neck where a dam 's built. During the high tide the dam is open an ocean water passés through the neck filling the lagoon and it goes back into the ocean during the low tide. Extension of the JSW salterns would require significant land reclamation and site preparation thus determining the concept of expansions only to beater utilization of existing gardens and possible minor rearrangements.

The three draw wells , situated immediately on both sides of the salterns are the basic source of drinking water and water for daily needs. The climate is equatorial monsoon type with two dry and two rainy periods. The dry periods include January , February , March , July , August and September and rainy periods in April , May , June , October , November and December. The minimum average annual temperature is around 23 Celsius centigrade and the maximum average annual temperature is around 30 Celsius centigrade. The weather is the honest and

driest , without any clouds , in January , February and March. The average air humidity varies from 72-78 %

Detailed geological findings with maps showing outlines of the ground ; topographical plan ; temperature , density and level observations of salt gardens in Jesira saltworks , water samples and solid mineral salts samples are presented in the study of Bulgargeomin (research institute from Bulgaria) done for the Ministry of Mineral and Water Resources. Also , investigations of the ocean water composition changes at evaporation in natural conditions and composition of the salt obtained in Jesira salt production are presented and available for the technology expertise.

5.2.1 Transport

Access to the major market , 18 km distant Mogadishu , is possible by the regional asphalt road which is in a relatively acceptable conditions since it is not busy at all. If the international connections are needed airport is placed between the JSW and Mogadishu , alongside the regional road.

5.2.2 Local condition

Data on climatic conditions are provided in the support study done by the Bulgargeomin.

5.2.3 Utilities

Service and potable water is supplied from own wells. Electricity , since rather low requirements are envisaged , will be supplied from the own generating unit driven on Diesel oil. It should be noted that the Mogadishu power station is in a very close vicinity of JSW , but of insufficient capacity for regular supply. For safety reasons own generating unit is advisable.

5.2.4 Manpower

Manpower for the JSW operation are at the moment and will be in a future inhabitants of a Jesira village employed in fishing , cattle breeding and in JSW saltern. This is a safe and cheap source of locally available labor force for non-skilled and semi skilled jobs. Also , Mogadishu is close enough for selection and employment of educated graduated specialist at the post where they are needed.

5.2.5 Fiscal and Legal Regulations

All regulations for this location and site should be advantageous since the expansion of JSW could fit into the Somalia development priorities - support of development of small-scale private industry based on local resources and labor intensive. Significant sources of financial funds for this type of small scale industrial projects are declared to be disbursed through the Somali Development Bank (National Development Plan 1987 - 1991).

5.2.6 Construction , Erection , Maintenance

To implement the proposed expansion in Jesira it should be noted that vicinity of Mogadishu is advantageous concerning the existence of building construction private enterprises , relatively equipped small maintenance workshops , design bureaus , etc.

5.2.7 Environmental Impacts

Expansion of the JSW sea-salt production has no negative impacts on environment.

5.2.8 Cost Estimate

The expansion of the JSW will be situated at the site of existing JSW sea-salt production. Certain limits in the geological structure of Jesira lagoon are limiting additional land reclamations and no extra purchases are expected. Small costs for the land preparation are possible covering the necessary changes of existing site. Proposed cost estimates will be provided by the technological experts.

CHAPTER VI

PROJECT ENGINEERING

6.1 PRODUCTION PROGRAMME AND PLANT CAPACITY

Identified production programme and plant capacity determine the appropriate technological process to be employed, the type and extent of machinery and equipment required and the cost of technology, equipment and production. After that, various structures and civil works, such as production buildings, auxiliary structures and infrastructure facilities are defined with relevant cost estimates. Production programme and plant capacity determined in the Marketing are as follows :

JSW Production Capacity for CRUDE WASHED GROUNDED SEA-SALT

Year	Description	Full plant capacity(t)	Actual utilizat. (t)	%
1990	Salt for Human Use	cca 7,500	5,766	77 %
1991	"	7,500	5,994	80 %
1992	"	7,500	6,138	82 %
1993	"	7,500	6,342	85 %
1994	"	7,500	6,534	87 %
1991	"	7,500	6,708	89 %
1991	"	7,500	6,852	91 %
1992	"	7,500	7,128	95 %
1993	"	7,500	7,500	100 %
1994	"	7,500	7,500	100 %

Source : Own estimate

6.2 MANUFACTURING TECHNOLOGY

The major stages of crude sea-salt production by natural evaporation are the following :

Intake of sea-water through the electrical centrifugal pumps into evaporation basins. To produce 1b kg of crude sea-salt it is necessary to evaporate 1 m³ of sea water. Therefore, the quantity of sea-water to be pumped to the evaporation basins is :

7,500 tons per year/ 0.018 tons per 1m³ = 416,667 m³ per year

The evaporating basins will have a depth of one meter with all surrounding embankments compacted properly according to the soil characteristics. Top of the embankment is arranged for easy inspection and repair.

Pumping of saturated sea-water from the evaporating basins into the crystallizing pans. It is confirmed as a proven fact, except for rare, very unfavorable meteorological

conditions , that 50 kg of crude salt per 1 m² can be obtained twice a year. For the capacity of 7,500 tons of crude sea-salt the area of crystallizing pans should be 75,000 m² or 0.075 km². The evaporation basins according to the ratio of 10.2 of evaporating area to crystallizing pans should be 0.765 km². Two salt harvesting campaigns per year , 35 days each , will take place when the salt crystals deposit into the crystallizing pans will have reached a thickness of 10 centimeters. The crystallizing pans have two sides serviced by canals in order to have an efficient discharge of bitterns during the harvesting. Usually , the canals are lined with mason and cement.

Crude salt harvesting is at present done manually. It could be also performed by mechanical harvester if estimated as necessary. In case of the profitable effects and if the nature of the soil is such that it can bear the load of small trucks the salt harvester could charge salt directly into the dump trucks moving along it. Otherwise some self propelled belt conveyors will receive and transport the salt where needed. Also , if estimated that present manual salt harvesting and transportation is enough efficient it should be kept since does not cause any initial investment costs.

Crude salt washing and stockpiling should be done immediately after harvesting since the impurities have not the time to consolidate around the salt crystals and are , therefore , more easily removed by the washing process. This part of the technological process is to be decided in the simplest possible way to reduce investment costs.

All foresaid statements concerning technological process are at the moment purely theoretical based on standard relations among these categories and should be , by technological expertise , adopted and estimated for JSW. At the first view JSW with area of 0.3 km² has insufficient space for production of 7,500 tons per year as estimated market potential. The definite findings on technical part of this Industrial Investment Project should be provided by the UNIDO expert for salt production , as envisaged in the Terms of References for the completion of the Feasibility Study for JSW expansion.

6.3 MACHINERY AND EQUIPMENT

This part of the study is devoted to the description of machinery and equipment used in the process in terms of characteristics. Since the expansion of existing production is planned analysis of the balance between additional and present machinery and equipment is essential. Distinction of foreign and local origin is also required.

Centrifugal pumps , driven either by electric motors or

Diesel engines , according to their actual distance from the power generation plant , should be installed , one as a stand by , in the sea-water pumping station. Also centrifugal brine circulating pumps from evaporating basins to crystallizing pans should be installed with one as a stand by.

The Diesel electric generating set with transformers and cables for distribution should be installed based on calculated needs of production equipment and lightning and general service requirements.

Mobile equipment for salt harvesting and stockpiling is also needed.

Crude salt washing equipment should be included if found viable from the profitability point of view.

The definite proposal of necessary equipment for this Industrial Investment Project should be provided by the UNIDO expert for salt production , as envisaged in the Terms of References for the completion of the Feasibility Study for JSW expansion.

6.4 MATERIAL STANDARDS

Based on the proposed technology and selected equipment material standard for production of one kg of crude washed sea-salt as well as annual material quantity , unit price and value balance should be provided. This should be provided by one UNIDO expert for salt production , as envisaged in the Terms of References for the completion of the Feasibility Study for JSW expansion.

6.5 CIVIL ENGINEERING WORKS

Planned JSW expansion of existing production with proposed technology and selected equipment will cause civil engineering works with installations to the certain limited extent. These estimates should be provided by the UNIDO expert for salt production , as envisaged in the Terms of References for the completion of the Feasibility Study for JSW expansion.

6.6 COST ESTIMATES

Based on the preliminary technological and civil engineering works design and preliminary bids of potential suppliers of equipments and services cost estimated should be provided by the UNIDO expert for salt production , as envisaged in the Terms of References for the completion of the Feasibility Study for JSW expansion.

CHAPTER VII

PLANT ORGANIZATION AND OVERHEAD COSTS

Organization of business operations is based on the existing production practice. JSW has the small office in the center of Mogadishu and warehouse at the road close to the airport in direction to Jesira. Since the JSW is small scale private business enterprise general manager covers a lot of responsibilities concerning sales , procurement , maintenance and personnel.

7.1 FACTORY AND ADMINISTRATIVE OVERHEADS

Various tools and maintenance services are major overheads. Administrative overheads are covering meals and transportation for workers.

Depreciation rate are determined by experience and amount 10 % for equipment and 2 % for civil engineering works.

CHAPTER VIII

MANPOWER

Some working posts in JSW expanded operations will be occupied by the presently employed people. Number of new workers will be determined by the technological requirements and all working posts will be covered by Somali nationals. Since the JSW is small scale private business enterprise role of the general manager is very important and covers a lot of duties and activities. Concerning the type of organization and ownership staffing and manning personnel could be the following :

Management

- General Manager covering the sales , procurement and production operations in general.
- Technical Manager managing daily production process , utilities , maintenance , labor force.
- Accountant doing all transactions and financial operations
- Secretary

Salt Harvesting

- Foreman
- Workers
- Electrician/Mechanic

Salt Washing and Stockpiling

- Foreman
- Machine operators

Electric Power Generation , General Services and Maintenance

- Electricians , Mechanics

Detailed number of labor force involved in the production process , qualifications , skills needed , estimates of stimulating wages and salaries (for the annual full capacity utilization) , additional employment and increase of existing labor force should be provided by the UNIDO expert for salt production , as envisaged in the Terms of References for the completion of the Feasibility Study for JSW expansion.

CHAPTER IX

IMPLEMENTATION SCHEDULING

Total project cycle is estimated on 11 years out which one year is the project implementation and 10 years are period of JSW business operation. project implementation covers the period from the feasibility study contracting to the commercial production what is estimated on 12 months. If not properly planned and monitored this phase usually overruns the budgeted time and costs and often endanger profitability of investment project. Implementation planning, apart from the planning of physical work and assets, determines the financial efforts in securing sufficient funds (equity, local and foreign loans) which help avoiding delays. Time schedule shows activities and their timing.

Essential stages of JSW salt production expansion investment project comprise several major activities :

Feasibility Study completion

- Investment decision of the board and shareholders
- Application for Government/Bank loans
- Tendering equipment and civil engineering works (local and foreign) , selection and contracting
- Detailed design (civil engineering and technological)
- Delivery of equipment (local and foreign) and execution of civil engineering works
- Assembling the equipment (local and foreign)
- Training of key personnel
- Purchase of trial run inputs
- Trial run and plant commissioning
- Start of commercial operations

9.1 DATA AND ACTIVITIES

9.1.1 Feasibility Study completion

This task is performed by the international consultants with involvement of ICU, Mogadichu. Result should be basis for the JSW management and shareholders decision to implement expansion of existing production in order to satisfy existing

local demand for the crude ground sea-salt for human use. This study is also the basis for the Somali Development Bank appraisal and approval of investment loan which practically supports development of the small scale private industry in Somalia.

9.1.2 Tendering and contracting

After JSW decision on salt production expansion, approvals and permissions from the Government/Bank authorities, establishment of project manager the tender conditions of equipment and services delivery will be set up. Since the JSW salt production expansion investment project should be partly financed from the loans or aid of international institutions, formal procedure for international and domestic bidding is advisable. Consultants will prepare tender documents together with JSW people and evaluation committee should evaluate presented bids and propose the most appropriate contractor (for civil engineering works, local and foreign equipment).

The contracts with selected suppliers of equipment and services will be drafted, negotiated and signed. Certain down payments are to be paid at the beginning and certain remaining amount will be disbursed after successful commissioning. No technology is expected. Consultancy and engineering charges should be paid on a monthly basis.

9.1.3 Detailed Engineering Design

On a basis of selected suppliers which are obliged to submit detailed technical specifications designers' bureau should perform a detailed design of buildings with installations, detailed design for machinery and equipment.

9.1.4 Delivery of Equipment and Execution of Civil Engineering Works

Execution of civil engineering works will be carried out at the existing site coordinated with the equipment delivery and assembling.

9.1.5 Training

Part of the operating staff will be trained before the trial run period at the similar facilities at the suppliers expense.

9.1.6 Trial Run and Plant Commissioning

Prior to the trial run all needed production inputs should be purchased and delivered and machinery and equipment will be launched gradually. After the trial run has been successfully accomplished and equipment commissioned the JSW production will start up with regular commercial production. Achievement of full production will be gradually achieved due to the seasonal variations, equipment start up and market potential.

9.2 SELECTION OF PROJECT IMPLEMENTATION PROGRAMME AND TIME SCHEDULE

Implementation time schedule is global and presented in sequential form with monthly time breakdown. Very sophisticated daily schedules are planned but usually done at the contracting phase.

Civil engineering works could be carried out by local contractors based on the layouts of suppliers of foreign equipment and technical specifications which determine civil engineering works. Existing auxiliary buildings will be used as contemporary site amenities.

9.3 COST ESTIMATE OF PROJECT IMPLEMENTATION

The incidental costs incurred between start of feasibility preparation and completion and commissioning of the plant are treated as pre-production capital expenditures. These expenditures cover costs of feasibility study, various designers' and consultants' fees, training, trial run, recruitment of management and labor, primary inputs for the start up, etc.

Interest during construction (IDC) is also included in the pre-production capital expenditures whether paid or not during the construction period.

Majority of cost estimates for pre-production capital expenditures since of technical and technological nature, except for the IDC, should be provided by the UNIDO expert for salt production, as envisaged in the Terms of References for the completion of the Feasibility Study for JSW expansion.

I M P L E M E N T A T I O N S C H E D U L E

A C T I V I T Y	T i m e s c h e d u l e ** _____ 12 months _____ **
- Feasibility Study completion	*****
- Investment decision of the board and shareholders	*
- Application and Approval of Government/Bank loans	**
- Tendering equipment and civil engineering works (local and foreign), selection and contracting	****
Detailed design (civil engineering and technological)	***
- Delivery of equipment (local and foreign) and execution of civil engineering works	****
- Assembling the equipment (local and foreign)	***
- Training of key personnel	****
- Purchase of trial run inputs	***
- Trial run and plant commissioning	**
<hr/>	
- Start of commercial operations	+..

CHAPTER X

FINANCIAL AND ECONOMIC EVALUATION

10.1 TOTAL INVESTMENT COSTS10.1.1 Fixed Capital

Investment costs are the sum of fixed capital (fixed investments plus pre-production expenditures) and net working capital. Fixed investments include Land , Infrastructure , Buildings , Civil Engineering Works , Machinery and Equipment. Apart from the fixed investments expansion of JSW production incurs other expenditures prior to the commercial production covering the costs of preparatory studies , training , interest during construction , trial run , start up and commissioning. All these investments and costs are primarily related with the information provided by the industrial specialist/technologist for the salt production and should be provided by the UNIDO expert for salt production , as envisaged in the Terms of References for the completion of the Feasibility Study for JSW expansion.

10.1.2 Net Working Capital

Net working capital (NWC) indicates financial means required for normal business operation of expanded JSW salt production. Net working capital is defined as current assets minus current liabilities. Current assets comprise receivables , inventories (inputs , spare parts , small tools) , work in progress , finished goods and cash. Current liabilities are consisted mainly of accounts payable (creditors) , depreciation , taxes , etc. Since major account of NWC are inventories which in this case are determined predominantly by the technologists the NWC calculation is to be done after production and operation data are provided by the UNIDO expert for salt production , as envisaged in the Terms of References for the completion of the Feasibility Study for JSW expansion.

10.2 SOURCES OF FINANCING

Private sector has played very marginal role over the last fifteen years in manufacturing , which itself plays marginal role in the Gross Domestic Product , amounting less than 5 %. Since the Somali Government moved towards the liberalization and private small scale industry has become one of the major hopes for future development of the industry , climate for the private sector has improved. Short term and long term financing is more readily available. All efforts are done to set up institutional financial and other infrastructure which can provide support

services on an integrated basis for the growth and development of Small Scale Private Industry (SSPI).

Since JSW expansion of salt production fulfills all these requirements of small scale private industry development it is expected that the stimulative financial support through the soft loans would be provided from the local (Somali Development Bank - SDB) and foreign sources (WB , IFC). All conditions of financing are not yet developed but when total initial investment costs calculated on the basis of data provided by the UNIDO expert for salt production , as envisaged in the Terms of References for the completion of the Feasibility Study for JSW expansion , the negotiations with the SDB and WB will clarify conditions of financing.

10.3 FINANCIAL STATEMENTS

10.3.1 Income statement

This statement is used to compute net income or deficit of the project during the period of project cycle when rehabilitation or expansion is done.

The value of Net Sales for the producer , JSW , are brought from the Market Analysis.

Sales Revenue for JSW CRUDE WASHED GROUNDED SEA-SALT

Year	Description	Plant capacity		Unit price So.Sh. per Ton	Sales Revenue	
		Full	Actual % Tons			
1990	Salt-Human Use	7,500	77%	5,766	6,000	34,596,000
1991	"	7,500	80%	5,994	6,000	35,964,000
1992	"	7,500	82%	6,138	6,000	36,828,000
1993	"	7,500	85%	6,342	6,000	38,052,000
1994	"	7,500	87%	6,534	6,000	39,204,000
1991	"	7,500	89%	6,708	6,000	40,248,000
1991	"	7,500	91%	6,852	6,000	41,112,000
1992	"	7,500	95%	7,128	6,000	42,768,000
1993	"	7,500	100%	7,500	6,000	45,000,000
1994	"	7,500	100%	7,500	6,000	45,000,000

Source : Own estimate

Production costs are calculated on the basis of material standards for production which should be provided by the UNIDO expert for salt production , as envisaged in the Terms of References for the completion of the Feasibility Study for JSW

expansion , the negotiations with the SBB and WB will clarify conditions of financing.

The difference between the sales and production costs is the value of Gross or taxable profit.

During the reviewing the present operations of JSW following figures are given as a actual results of operation in 1988 :

SALES

20,000 quintalsx 600 So.Sh/per quintal 12,000,000 So Sh.

COSTS

6,600.000 So.Sh.

1. Wages 50,000 So.Sh./per week x 52 weeks - 2,600,000 So.Sh.

2. Maintenance and repair 2,500,000 So.Sh.

3. Other costs 500,000 So.Sh.

4. Taxation 1,000,000 So.Sh.

VALUE ADDED

5,400,000 So.Sh.

10.3.2 Cash Flow for Financial Planning

10.3.3 Projected Balance Sheet

10.3.4 Ratios for Financial Analysis

10.4 FINANCIAL EVALUATION

10.4.1 Net Present Value

10.4.2 Internal Rate of Return

10.4.3 Sensitivity Analysis

A P P E N D I X I.

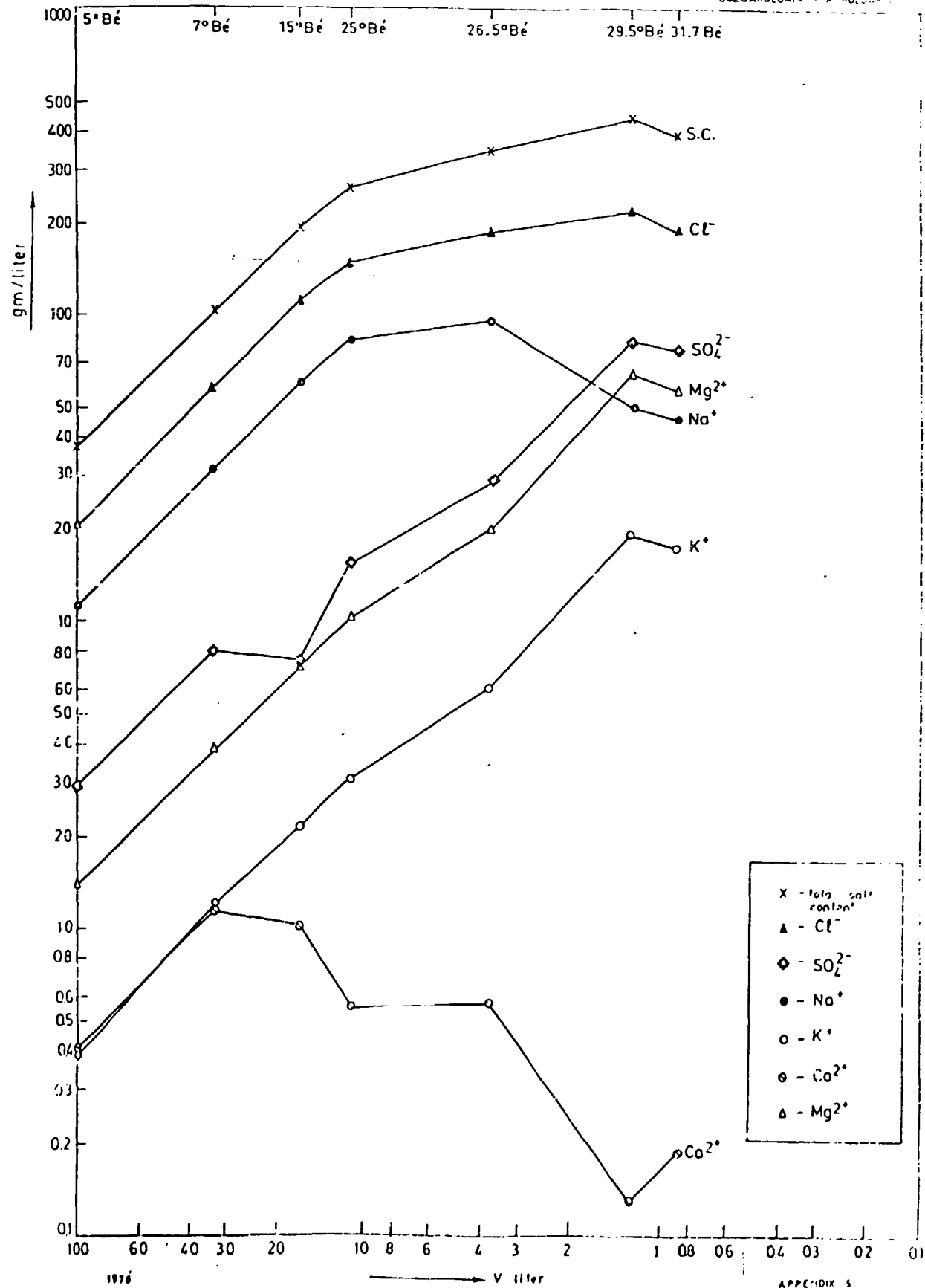
1. CONTOUR PLAN AND SCHEMATIC GEOLOGICAL MAP OF THE JESIRA
SALTERNS , Scale 1 : 5,000 , Ministry of Mineral and Water
Resources - SOMALI DR

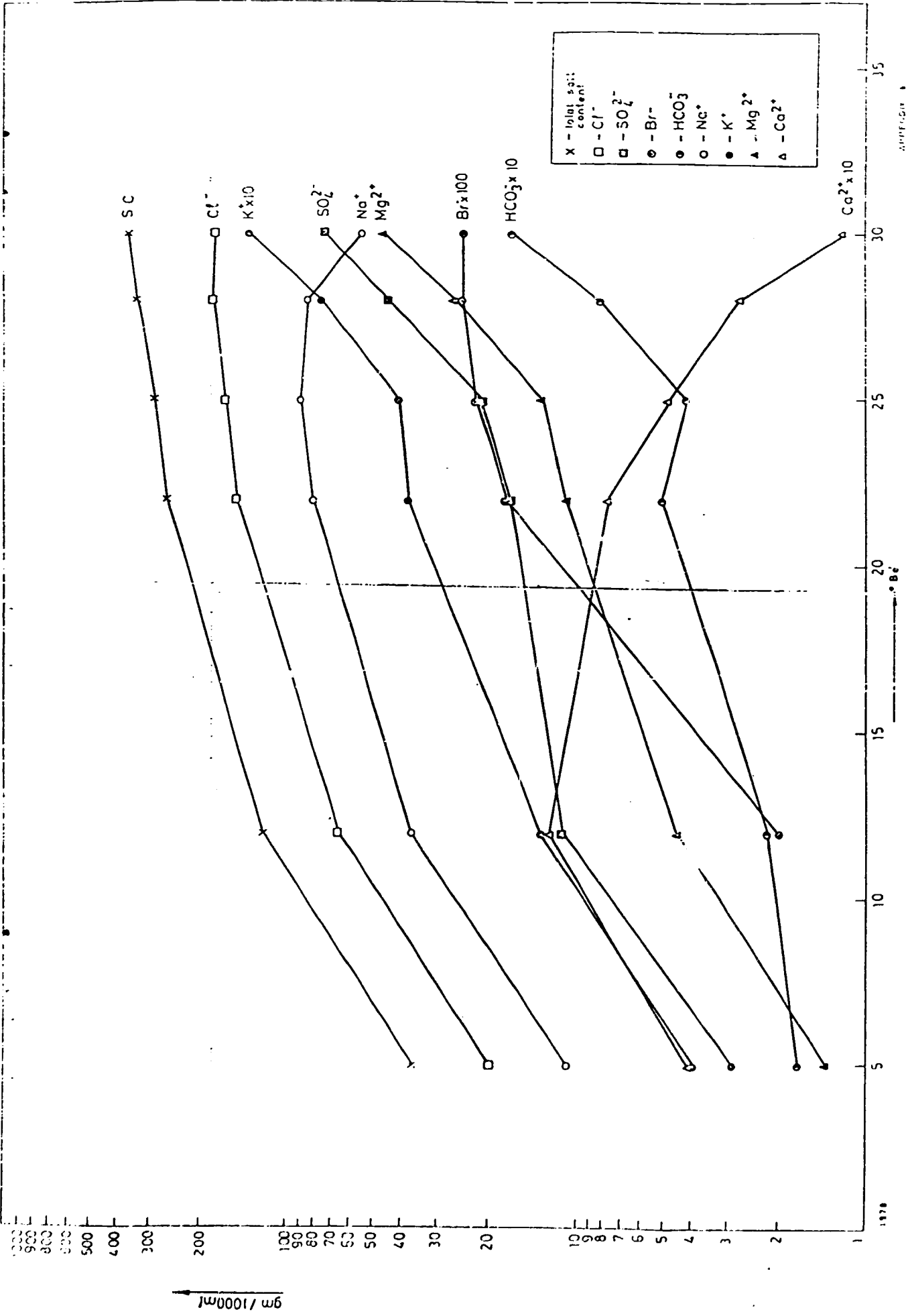
2. TOPOGRAPHIC PLAN OF THE JESIRA SALTERNNS , Scale 1 : 1,000 ,
Ministry of Mineral and Water Resources - SOMALI DR

A P P E N D I X II.

1. TOTAL SALT CONTENT IN JESIRA SALT WORKS PER LITER ,
Bulgargeomin , Bulgaria , Ministry of Mineral and Water
Resources - SOMALI DR

2. TOTAL SALT CONTENT IN JESIRA SALT WORKS PER Be ,Bulgargeomin
Bulgaria , Ministry of Mineral and Water Resources - SOMALI
DR





A P P E N D I X I I I .

1. JOB DESCRIPTION FOR INDUSTRIAL TECHNOLOGY SPECIALIST FOR
 NATURAL SALT PRODUCTION

PROJECT IN THE SOMALI DEMOCRATIC REPUBLIC

Establishment of Industrial Consultancy Unit

JOB DESCRIPTION

SOM / 86 / 34 - ext. ES

Post Title Industrial Technologists for the Salt Production

Duration Three weeks

Date required March , 1989 , as soon as possible

Duty Station Mogadishu , DR Somalia

Purpose of project To provide Project Engineering data for the completion of Feasibility Study for Jcsira Salt Works (JSW) expansion.

Duties Based on Market Analysis for the crude grounded sea-salt , examine technological and technical conditions for the expansion of Jcsira Salt Works production from 2,000 3,000 tons to 7,000 - 8,000 tons per annum.

1. Evaluate the present status of crude sea-salt production and equipment based on the existing number and size of basins (salt gardens) for solar , natural evaporation.
2. Examine possibilities to increase utilization of existing basins for solar evaporation without major reclamation and preparation of additional land (site limits , limits for initial investment costs in fixed assets , market limits)
3. Asses the present value of fixed assets (obsolete , written off) , standard full absorption price per kg of produced crude sea-salt (quantities , unit prices and values of all INPUTS).
4. Evaluate Location and Site of JSW concerning possible cheap and easy expansion.

5. Propose a technological and technical process to increase existing crude sea-salt production by natural evaporation to the level of 7,000 - 8,000 tons per annum (estimated market potential).
6. Propose Initial Investment Costs (local and foreign origin) for production and auxiliary equipment , service equipment , utilities , primary stock of spare parts (for biannual needs). Estimate investment costs of minor site preparation , buildings , civil works and outdoor works.
7. Estimate implementation period for the JSW expansion (activities , duration , Gantt-chart , years and months).
8. Estimate Production Costs (Materials and Inputs , Utilities) per kg of crude sea-salt and for total annual capacity (quantities , unit prices , values) and propose Supply Programme.
9. Estimate required number of workers in production , maintenance , utilities by qualifications and calculate wages per qualification (basic and variable).
10. Present all limitations influencing production process (seasonality of salt crop due to the weather , low energy oriented equipment due to the lack of regular electric current , etc.) and describe proposed " adapted " technology for the JSW production expansion.
11. Prepare Final Report on Project Engineering (Investment Costs , Production Costs , Implementation Scheduling , Manning , Energy , Draft sketches of layouts).

A. Outputs

- 1a. Final Report on Project Engineering for the expansion of Jemira Salt Works with Initial Investment Costs (list and specification of equipment and other investment goods needed for the production process with quantities , unit prices and values) , Implementation Schedule , Production Costs , Location and Site

Evaluation , Manpower . All expressed by origin (local and foreign) , in terms of quantity , unit prices and value quoting the data source reference.

B. Inputs

1b. Market Study for the Jesira Salt Works expansion (ICU , 1989) with :

Market Potential 7,000-8,000 tons of crude , grounded washed sea-salt at low price. Refined salt with higher prices for local market not competitive.

- Product : CRUDE WASHED SEA-SALT FOR THE HUMAN USE packed in big bags for the wholesalers.

2b. Technological and Technical Study for the JSW expansion with Geology , Topography , Temperature , Density and Level Observations in JSW Salt Gardens , Sampling of Water and Solid Mineral Salts, Investigations of the ocean water composition changes at evaporation in laboratory and natural conditions and composition of the salt obtained at Jesira Salt Works (done by the Bulgarian experts).

3b. Extension of an existing salt work for the production of salt by solar evaporation , Feasibility study / Draft Final report , Center for Industrial Development , Brussels and SALTEC,S.p.A., Rome.

REMARKS : Final Report on Investment Costs , Project Engineering , Materials and Inputs , Implementation Scheduling and Manpower should be prepared along the lines of UNIDO Manual for the Preparation of Industrial Feasibility Studies , ID/206 , (above mentioned sections related to the industrial technology specialist for the sea-salt production by natural evaporation).

Only CRUDE WASHED SEA-SALT at very low retail price is acceptable for the JSW gravitating local market.

Export market for JSW salt does not exists , even if it is at the quality of refined salt (other locations are more attractive if any chance for joint venture appears).

All values should be expressed in local currency (Somali Shillings) and in US \$ with stated applied exchange rates. All quantitative data presented in the constant prices and in the form of UNIDO Manual Schedules.

Completion End of March , 1989
Date

APPENDIX IV

Persons contacted

Mr Mohamed Aden	JESIRA SALT WORKS , General Manager
Mr Siad Ahmed Abbidon	SALT WHOLESALER , Mogadishu
Mr Isa Adam Farrah	HASA , Association of Tanneries , Mogadishu Technology expert
Mr Abukar Moallin Mursal	Ministry of National Planning , Central Statistical Department Deputy Director
Mr Cleas Norrlof	Ministry of National Planning , Central Statistical Department Swedish statistical expert for Household Surveys
Mr Lars Sorensen	Ministry of National Planning , Central Statistical Department Swedish statistical expert for Population Census

A P P E N D I X V.

Literature

1. Hordio-Hafun Saltern , Economic Study and Master Plan with Executive Elements , Part II, Studio Tecnico Ingegneria , S.T.I. , Roma , Italia , 1972.
2. Extension of an Existing Salt Work for the Production of Salt by Solar Evaporation , Feasibility Study / Draft Final Report. Center for Industrial Development , Brussels , Belgium and SALTEC , Rome , Italy.
3. Feasibility Study Ceel Axmed Saltworks , Geomatec Consultants Mogadishu , Somalia.
4. Market Study for Crude and Refined Salt in East and Central Africa , Coopers & Lybrand associates , Management and economic consulting services Kenya , February 1980.
5. Fact Finding Mission on the Possibility of Establishing a Sea Salt Production Unit in the Peninsula of Ras Hafun , Final Report by Un Expert Mr Sahni , 1987.
6. Salt , Compiled Report by S.S. Trashliev , Mogadishu , February 1976.
7. SOMALIA - Industrial revitalization through privatization , Industrial Development Review Series , UNIDO , Regional and Country Studies Branch , PPD.91 , October 1988.
8. Industrial Production Surveys 1983 , 1984 , 1985 , 1986 Central Statistical Department , Ministry of National Planning
9. Foreign Trade Returns 1984 , 1985 , 1986 , Central Statistical Department , Ministry of National Planning.
10. Mogadishu Family Budget Survey 1977 , State Planning Commission , Mogadishu 1978.

A P P E N D I X VI.

INDUSTRIAL INVESTMENT OPPORTUNITIES

Additional industrial opportunities

Serial No.	Industrial opportunities
1.	Bakery for bread, biscuits, etc.
2.	Chocolate and Sweets
3.	Leather Tanning
4.	Shoes, footwear, leather goods, bolts
5.	Carbon paper
6.	Abrasives, sand paper
7.	Formulation of disinfectants, insecticides, pesticides, fungicides, herbicides and fumigants.
8.	Fertilizer formulation
9.	Paints, varnishes, polishes
10.	Inks
11.	Perfumes, essences
12.	Caustic soda and chlorine
13.	Steel water supply and sanitary fittings
14.	Pins, clips, clamps
15.	Agricultural implements
16.	Water pumps
17.	Electric fans, cooking stoves
18.	Cast iron foundry
19.	Cutlery, knives, spoons, forks
20.	Wire and wire products
21.	Brass sanitary fittings
22.	Locks and padlocks
23.	Electric fans assembly plant
24.	Accumulators
25.	Stamp pads
26.	Pencil sharpeners
27.	Pencil making plant
28.	Gum processing plant
29.	Dry cells and batteries
30.	Extruding mild steel bars utilizing scrap
31.	Cold storage combined with ice manufacture
32.	Light engineering workshop for general purposes
33.	Body building of buses, trucks and rickshaws
34.	Industrial estate for private sector (to be organized by the Government)

Serial No.	Item	Estimated investment US \$ (000)	Description	Approximate Output
<u>FOOD</u>				
1.	Salt manufacture and packing	500	A large quantity of refined table salt is imported at present. Raw material is there and a low technology plant can supply the internal market.	
2.	Small scale sugar plants (Khandsari sugar)	25	Present production of sugar in Somalia covers only about 20% of the internal demand which can be placed at 120,000 tonnes in 1985. Sugarcane supply is at the moment very limited so there is need to put new areas under cultivation and instal Khandsari sugar factories at village level.	2 tonnes/day
3.	Oil Milling Plant		There is room for private people to invest in this sector. The plant can process different kinds of seed such as sesame, peanut, cotton, sunflower which are all available in the Country. The resulting oil cake can also be used effectively as feed and fertilizer.	6 tonnes/day
4.	Packaging of food items, gums and cardamons	1,000	Packaging of peanuts, salt, pepper, gums, etc. offers a good opportunity. At present, these items are sold in open sacks. In packaged form, these could be exported or consumed in the local market.	
5.	Fruit juice making plant	270	This plant has great potential demand in the Country. All over the world, this industry is prospering, using indigenous raw material. Mango and grapefruit juice are very much in demand. However, ITOP Afgoi should first be revived with private sector participation.	8 tonnes/day
6.	Alcohol from molasses	2,000	Molasses is produced as a by-product at Juba and SNAI sugar factories. Private entrepreneurs can set up alcohol production.	

S. No.	Item	Estimated investment US \$ (000)	Description	Approximate output
<u>TEXTILES</u>				
7.	Hosiery & knitted fabrics	300	In 1985 imports were over 20 tonnes. Somaltex has 52.5 tonnes/yr manufacturing capacity but cannot meet the full demands of the country for the civil and military population. The plant will make socks and under garments. Part of the yarn will be supplied by Somaltex and the balance will be imported.	
<u>Paper & Paper Board</u>				
8.	Waste paper recycling plant	1,300	Packing board is imported by INCAS Jamama for making corrugated containers used for export of fruit and packing of local industrial goods. Waste paper is available in the country for a 5-10 T/day recycling plant.	10,000 tons day
9.	Particle Board	2,000	Particle board can be manufactured using bagasse from the sugar mills. At present, bagasse is burned in the sugar mills. Particle board is used in the building and furniture industries. Formaldehyde glue will have to be imported.	
10.	Printing & Notebooks	100 to 1,000	There is an urgent need to print books, publications, copybooks, etc. in the country. The State Printing Agency seems to be overloaded. The investment is variable according to the sophistication of the technology, quality and output.	
<u>PLASTICS</u>				
11.	Rigid PVC Pipe making Plant	2,500	In the near future, this technology will be in great demand in the Country especially for modern irrigation systems and water supply.	30 tons/ month
<u>GLASS, POTTERY & MINERALS</u>				
12.	Tableware production Plant	400	Investigations have confirmed that raw materials are available in the Country. Technology is available from Europe	300 tons/ year

	Item	Estimated investment US \$ (000)	Description	Approximate output
3.	Glass bottles & glassware production	4,000	Market and raw material resources for a glass production unit have been identified and established. Present internal demand is around 4,500 tonnes/year. Recorded yearly import is about 700 tonnes.	10,000 tons year
4.	Brick making Plant	400	Raw material (clay) is available in the Country. The final product to be used as building material is in great demand.	
5.	Concrete block making Plant	450	The principal raw materials such as cement and aggregates are available in the Country. The blocks are used as building material (walls for houses). Technology is very simple. A concrete block manufacturing plant should be built on a site near the area of consumption, where it is easy to obtain the required raw materials.	
16.	Cement pipe Plant	500	Raw material is available in the Country from the Berbera Cement Plant. Demand will increase in the near future for waterworks, sewerage works and house construction. It is the right time to establish reinforced spun-pipe plant.	
<u>IRON & STEEL</u>				
17.	Bolts, screws, nuts, hinges and hardware for housing	300	Demand seems to be very high and the technology used seems to be appropriate for this Country. Raw material such as coil drawn round wire, flat wire and hexagonal bars must be imported.	8 million pieces
18.	Light engineering workshop	200	There is great demand in the Country for a workshop in the private sector to fabricate steel, carry out repairs and service other industries.	
<u>MISCELLANEOUS</u>				
19.	Mosquito coil making plant	35	Raw material is pyrethrum (available in Somalia) in which the effective component for killing mosquitos is pyrethrine. It is also effective against insects, flies, etc. The estimated investment refers to plant of 3 million spirals per month capacity.	

Serial No.	Item	Estimated investment US \$ (000)	Description	Approximate output
20.	Feed Mill	250	Somalia is a livestock-exporting Country. It is necessary to provide animal nutrition, especially during the dry seasons, to maintain healthy animals. A feed mill processing currently available raw materials like molasses, rice bran, sesame, seed cake, cotton seed cake, will find a good market for its products.	
21.	Fish meal making plant	150	Somalia has huge potential in fisheries. Private and public investments will strengthen this sector in the near future. A fairly large portion of fish, such as bones, internal organs, heads, tails, etc. is cast away without being utilized as food. This portion could be utilized to manufacture fish meal for poultry farming, as well as for cattle breeding because of its high protein content. The factory could be located in the vicinity of a fish processing plant.	
22.	Bone meal making plant		Similar to item 10, using animal bones. In fact, crushed bones collected from slaughter houses and from skeletons scattered in the countryside can be exported to earn foreign exchange.	

Cottage level industries investment opportunities

<u>Serial No.</u>	<u>Industrial opportunities</u>
1.	Jams and squashes
2.	Bee keeping
3.	Co-operative milk societies
4.	Grinding cereals with light diesel driven engine
5.	Bread making
6.	Coconut and coir products
7.	Rope and twine
8.	Leather boxes for travel
9.	Livestock harnesses
10.	Mats using tree fibres
11.	Furniture
12.	Weaving fabrics and cloth
13.	Dyeing and stamping
14.	Garment tailoring
15.	Shoes
16.	Plaster of Paris souvenirs
17.	Steel boxes
18.	Small machine repair shops
19.	Children's toys
20.	Umbrellas
21.	Brushes
22.	Donkey carts
23.	Camel carts
24.	Embroidery and knitting co-operatives
25.	Sea-shell arrangement as tourist souvenirs
26.	East African indigenous art wood carvings
27.	Bone collecting and crushing
28.	Soap
29.	Artificial jewelry
30.	Musical instruments
31.	Sports goods, footballs

Source: Ministry of National Planning.