



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

CONSULTANCY
UNIT

ICU

**INDUSTRIAL
CONSULTANCY
UNIT**

18825

58 p.
tables

**F E A S I B I L I T Y S T U D Y F O R
T H E E S T A B L I S H M E N T O F L I M E P R O D U C T I O N
I N 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, MBA. ENG . MINING

MR. ALI DUALE ABDULLE , MA. ECC.

Mogadishu , March 1989

2/2

BO: Mr. Constantini

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

THE LIME CALCINING PROJECT

This Investment Project has been prepared along the lines set out 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 Somali DR 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 , MA .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 Line
3.2.1.3	The main market segments for line consumption
3.2.1.3.1	Territorial/ Customer-User segmentation
3.2.1.3.1.1.	Line for Human Use
3.2.1.3.1.1.1	Line for Human Use/Per Capita Consumption
3.2.1.3.1.1.2	Line for Animal Use
3.2.1.3.1.1.3	Line for Industrial Use
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>Raw Materials</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

APPENDIX I.

1. JOB DESCRIPTION FOR INDUSTRIAL TECHNOLOGY SPECIALIST FOR
LIME PRODUCTION

APPENDIX II.

Persons contacted

APPENDIX III.

Literature

APPENDIX IV.

1. INDUSTRIAL INVESTMENT OPPORTUNITIES

PROJECT BACKGROUND AND HISTORYProject Promoter

Project promoter is not yet determined but could be medium-size private enterprise, share-holding company, like it was established in 1981 by several private Arabic and Somali individuals (the "Horn of Africa Lime Factory Ltd.").

Project Orientation

Establishment of industrial plant for lime production should be based on a locally available raw material - coral lime stone deposits. Among the other inputs, local or imported, utilities, like Diesel oil, are needed, for electric power as well as water. Cheap labor force is locally available.

Market Orientation

Planned industrial lime production and annual sales are at the beginning of operation completely locally oriented. Utilization for house construction, plastering, repair and painting in the area of Banadir (Mogadishu) and other gravitating regions will be major use. Industrial use might arise slowly as industry utilizing good quality lime develops. Starting capacity for project viability should be between 10,000 - 20,000 tons of slacked lime per year. After the project engineering is done by the industrial technology expert for lime, potential capacity of Lime Calcining Plant will be determined assuming that producer's price is competitive with existing private suppliers.

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 privatization, small scale industry has become one of the major hopes for future development of the industry and 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 the establishment of industrial plant for lime production could fulfill all 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 existing lime production is in operation for many years and its production coming from small artisan private kilns and pits was mainly sold at the local market for the private house construction , plastering , repair and painting. Basic idea for establishment of industrial Lime Calcining Plant is to produce efficiently better quality lime preserving rare wood which is , at the moment , uncontrollably used causing the expansion of desert area in Somali land. Existing artisan production satisfy existing demand for the cheap lime for private house construction , plastering , repair and painting in urban and partly rural households. Since purchase power of consumers , even for basic needs is limited , lowest production costs thus enabling lowest possible producer's price is a must in development strategy. Some studies for lime production have been performed before , but none of these realized due to the fact that market and partly financing were never been well proven for establishment of industrial lime plant.

MARKET AND PLANT CAPACITY

Demand/Projected Net Sales/Production Programme/ Plant Capacity

After Market research and for the purpose of producer's price determination following sales programme is proposed :

Expected Sales for LIME

Year	Description	Plant capacity		Unit price So.Sh. per Ton	Sales Revenue
		Full	Actual % Tons		
1990	Lime-slacked	10,000	77%	7,700	
1991	"	10,000	80%	8,000	
1992	"	10,000	82%	8,200	
1993	"	10,000	85%	8,500	
1994	"	10,000	87%	8,700	
1991	"	10,000	89%	8,900	
1991	"	10,000	91%	9,100	
1992	"	10,000	95%	9,500	
1993-94	"	10,000	100%	10,000	

Source : Own estimate

MATERIALS AND INPUTS

The only raw material needed for the production of industrial lime is coral limestone which is available in natural deposits along the coast. Since the technological part of the feasibility study will be undertaken by the technology expert, more precise data explaining properties of locally available coral limestone will be included. Among the auxiliary materials needed for production only electric power is needed for burning process. Electric power must be generated at the beginning at the site since the electric power from the power plants is scarce. The Diesel oil needed to fuel the engines driving the generator sets, the coral limestone burning equipment and other consumers of the power will be supplied from the refinery outside the Mogadishu and also in close vicinity of potential site for Lime Calcining plant. 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.

LOCATION AND SITE

Land requirements

Land requirements for the proposed capacity are estimated at maximum of four hectares with possibility for future extensions.

Location

Location of Lime Calcining Plant is not yet determined but concerning the market for lime used either for private building construction or potential industrial use; vicinity of major deposits of coral limestone; other inputs like Diesel oil or even electric power, Mogadishu, as major urban and present and potential consumers area in Somalia with road and other connections is advantageous for project implementation as well as for the business operation.

Site

There are several potential sites for Lime Calcining Plant and final decision has to be taken by the investor when all quantitative data related for plant operation are available. Minimizing the transportation costs and using existing infrastructural facilities a site south-west of Mogadishu, next to the coral limestone deposits EL UREGO, AVEI DAXAN and the Oil

Refinery should be prepared. The site could have the size of 200 m x 200 m in order to allow future expansion. The site is close to public regional road. To determine final building and plant design, a survey should be made of soil conditions, the tide level. Costs of buying or leasing the land should be included in initial fixed investments or operating expenses.

PROJECT ENGINEERING

This entire important chapter should be provided by the UNIDO expert for industrial line production, as envisaged in the Terms of References for the completion of the Feasibility Study for LCP establishment. 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 industrial line production, as envisaged in the Terms of References for the completion of the Feasibility Study for LCP establishment then this chapter and whole Feasibility study can be finalized and investment appraisal done.

MANPOWER

When Project Engineering provided by the UNIDO expert for industrial line production, as envisaged in the Terms of References for the completion of the Feasibility Study for LCP establishment 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 industrial line production , as envisaged in the Terms of References for the completion of the Feasibility Study for LCP establishment 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 Lime Calcining Plant in Mogadishu 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 harbors . 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 Shabelle 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, Krigavo, 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, 9 th 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 pharmaceutical industry was set up with an initial investment of 17 million \$ for a maximum employment capacity of 200

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

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 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 prices , 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 :

	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%
Mining	0.4%	0.3%	0.3%	0.3%	0.3%	0.5%
Manufacturing	4.9%	5.9%	5.5%	4.6%	4.7%	4.9%
Construction	4.8%	4.2%	4.4%	4.5%	4.7%	4.9%

Source : Ministry of National Planning

The contribution of Manufacturing to GDP is relatively small, accounting for around 5 % in 1986.(1*) The share of Manufacturing sector in GDP was expected to be 5.3 % in 1987 but it 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 1987, namely, Berbera Cement and a Pharmaceutical Industry. Share of mining in GDP is of marginal significance in Somalia, accounting for 0.5 % of GDP in 1986, while Construction has similar position as Manufacturing accounting to 5 % of GDP in 1986. 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

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

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 LIME CALCINING PLANT ESTABLISHMENT. Existing LIME production is small privately owned business based on the local resource, CORAL LIMESTONE, which covers the demand of Banaadir (Mogadishu) region and other gravitating regions for lime used in a building construction and house painting.

Availability of raw material (coral limestone) and preservation of wood which is, at present, burning material for lime production, are 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 if proved as viable.

The project coverage is supposed to be local (Banaadir - Mogadishu and gravitating regions) market for private building construction and painting as well as industrial use in manufacturing (sugar production, tanning, etc.). This project does not cover the marketing and production aspects for export, but only development of one medium-scale private industrial (not artisan) enterprise - the LIME CALCINING PLANT.

2.3 PROJECT PROMOTER

The local private company , share-holding company , as a promoter is not yet defined , but in 1981 "Horn of Africa Lime Factory Ltd." , Mogadishu were established by several private Somali and Arabic individuals.

2.4 PROJECT HISTORY

Idea of lime production appeared long ago. It has always been related to big manufacturing projects which should develop the need for lime in industry production. Unfortunately , none of these projects came to full operation up to now due to the different reasons. Major reason is lack of potential foreign partners who could take responsibility for equipment supply , production management and above all , the export marketing of proposed huge production capacities. Industrial lime production should fully approve the local market for industrial and other uses as well as its economic viability before applying for the Government development support to small-scale and cottage level industries based on local raw-material. If so , Somali Development Bank (SDB) is supposed to give preference to requests for loans to private entrepreneurs for small-scale industries , like Lime Calcining plant could be.

The major task is to analyze existing artisan lime production , estimate consumer and industrial market potentials for establishment of industrial lime production with minimal technological capacity of 25 tons per day at reasonable production price which can compete with existing small and very cheap artisan production in kilns and pits. If market findings show positive results , appropriate technology and technical conditions at reasonable level of initial investment costs are to be taken into the calculation of project feasibility.

Market study for the Lime Calcining 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 Lime Calcining Project. Before examining the present situation of lime production and its consumption levels in Somalia some necessary premises about the lime in general will be given.

3.1 GENERAL DESCRIPTION OF PRODUCTS

A number of known derivatives of burnt lime are found on markets in developing countries which meet the requirements of local consumers in view of their customs and habits.

Calcium Hydroxide may be regarded as the best known derivative and as an end product which can be stored. In industrial production the ground burnt lime (CaO) is converted in a dry slacking process to calcium hydroxide Ca(OH)_2 ; water is absorbed in accordance with the progress of the process in a well-balanced manner to permit immediate subsequent air separation. The separated grits are ground in a suitable grit mill to about cement fineness and fed continuously to the separating/grinding cycle. Since equipment is scarce in Somalia , hydrating process is done manually by which the lime being piled up not too high is carefully sprayed with water. With increased volume and developing temperatures a fairly moist finished product is obtained which is transported in containers and which can be stored. A reconversion (recarbonisation) of this product and thus development of appropriate power in mortar for masonry or plasterwork is assured. After processing is finished calcium hydroxide might be packed into paper bags.

Burnt lime (CaO) , ground and screened , is specially marked in some countries and usually packed in bags either with plastic lining or made entirely of plastics because of the atmospheric moisture affecting the product , while calcium hydroxide is resistant.

A third derivative and marketable product is the so-called French chalk or Vienna polishing chalk. Burnt lime is converted in a wet slacking process to lime milk which turns into French chalk after several weeks of aging in slacking pits.

3.2.1 Demand and Market Study

3.2.1.1 Data and alternative projection methods

To foresee , with a good approximation , lime 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 lime producing kilns and pits 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 lime. Theoretically , the great quantity of data are needed , such as :

- per household/capita consumption of lime in the various geographical areas of Somalia according to their urbanization level ;
- average annual increase index concerning the population of each area ;
- average annual increase index of lime production , new capacities , enlargement of existing ones ;
- economic development and industrialization of Somalia and volume of productive investments realized with particular attention to construction industries , production of building materials , chemical and agro-industries development , agriculture and soil stabilization , production and processing of steel and metals.

Since the foresaid elements are only partly available present analysis , specifically designed for the needs of a small-scale industry enterprise , is limited to the fundamental data of population and industry increase and the variations of demand compared to consumption increase. Official statistics registered value of the lime production in the period 1976-1979 in Statistical Abstracts published by Ministry of National Planning , Central Statistical Department. There are no other official statistics on the domestic production , export , import and consumption of lime. 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 lime consumption/demand SIMPLE 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 in the Ministries , associations , UNDP , enterprises).

3.2.1.2 Forces and Factors shaping Consumer Behavior for Lime

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 lime production for house building, plastering and painting, at present, is predominantly oriented to the inhabitants of Banadir (Mogadishu) and gravitating regions. Demographically, lime, as basic material for new house construction, is interesting for population with higher economic power and certain types of households in some stages of family life cycle (married couples with children in pre-school age, married couples with school-age children, families adults only, etc.). Cultural system, climate, education level, socio-economic stratification, psychological elements are also of influence in lime consumption for house building, plastering and painting but not very much since this product satisfy very basic needs for shelter. Economic factor expressed through the level of overall economic development, level of the industrialization (especially construction, agro and chemical industries, agriculture and soil stabilization) and disposable income can strongly influence lime consumption for industrial use, which is at present rather low in Somalia.

The major factor for lime demand forecast relevant for house building, plastering and painting use are demographic parameters.

3.2.1.3 The main market segments for lime consumption

3.2.1.3.1 Territorial/ Customer-User segmentation

In the broadest terms, the national market for lime covers all inhabited areas, when considering the lime for house building and painting, and the areas where the manufacturing industry (using lime 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. Lime for House Building and Painting

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

lime) in the, so called, inter-riverain national territory (Middle Shabelle, Banadir, Lower Shabelle, Middle Juba, Lower Juba Regions). The existing lime burning enterprises are located in Mogadishu, Hiraan, Lower Shabelle, Bay, Bakool, Gedo, Lower Juba and they count on potential lime 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)	100.6	-	-	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 Lime should concentrate on above selected regions which also represent the geographically closest in-land area to Mogadishu where new Lime Calcining industrial plant might be 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 LCP
(million)

	mid-1986	1987	1988	1989	Rates
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	2.39	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 1989 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 house building and thus lime consumption. To dispose some preliminary directing elements , concerning the lime consumption in the next years for the purposes of house building and painting , 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 Lime Calcining Plant. 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 lime
consumption in house building and painting (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 lime
consumption in house building and painting (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 Lime for House Building and Painting / Per Household Consumption

Consumption of lime for house construction and painting is estimated based on the interviews with civil engineering private entrepreneurs from Mogadishu (Urban Construction Company , Mogadishu). Two types of lime are basically used . A rough , unrefined and thus cheaper lime is used in two stages of construction , building process and plastering process. The other type of lime , pure lime , is utilized in preparation for paint work , i.e. , smoothing the walls and lime washing. It is estimated by the construction engineers that an average house takes three loads of lime for construction and one load for lime washing. Other estimates are at the level of five loads. One truck load in average is 4 m³ or approximately 4,000 kg. Estimated number of houses newly constructed in Mogadishu every year is very different according to the sources of information. Numbers provided by the Urban Construction Company are as following :

- Small houses	400 x 4 truck loads	=	1,600 truck loads
	1,600 loads x 4 m ³ /load	=	6,400 m ³
	1 m ³ slacked hydrated lime cca	=	1,000 kg
	Total lime consumption per year	=	<u>6,400 tons/per annum</u>
- Large houses	150 x 4 truck loads	=	600 truck loads
	600 loads x 4 m ³ /load	=	2,400 m ³
	1 m ³ slacked hydrated lime cca	=	1,000 kg
	Total lime consumption per year	=	<u>2,400 tons/per annum</u>
- House repair	200 x 4 truck loads	=	800 truck loads
	800 loads x 4 m ³ /load	=	3,200 m ³
	1 m ³ slacked hydrated lime cca	=	1,000 kg
	Total lime consumption per year	=	<u>3,200 tons/per annum</u>

Interview held in Mogadishu Lime Production Association indicates that the average daily sales are around 90 trucks of lime for Banadir and gravitating regions. Calculated in volume it is 360 m³ or approximately 360 tons per day what amounts annual consumption for house building , plastering , repair and painting

to the approximate level of 100,000 tons per annum.

Comparing the opinion of one private building construction entrepreneur about annual lime consumption in Mogadishu at the level of 12,000 tons per year for the housing and the data from lime association which indicates 8 times higher consumption, but inclusive gravitating regions, cause certain insecurities in real estimates.

Also, local municipality of Mogadishu maintain the file for new houses permissions and according to the four year annual records an average number of approximately 1,500 permissions per year is issued for the new houses construction. If we consider that 5 truck loads of lime are needed for building, plastering and painting or house washing, it could bring the total quantity of lime for this use to the following amounts:

- Mogadishu new houses 1,500 x 4 truck loads = 6,000 truck loads
 6,000 loads x 4 m³/load = 24,000 m³
 1 m³ slacked hydrated lime cca = 1,000 kg
 Total lime consumption per year = 24,000 tons/per annum

The above data for Mogadishu and gravitating regions are related to the consumption of lime for private housing. From the presented information it can be very conservatively presumed that the average annual lime consumption for private housing in Mogadishu and gravitating regions will be in the future period 1990 - 1997 at the minimum base level of achieved 100,000 tons per year. It is also estimated that the new industrial Lime Calcining Plant, as a potential market leader and the only industrial lime producer in Banadir region, could be established only if producing at the very competitive production price. Concerning the quantity for lime used in private housing, the demand is sufficient for establishment of industrial enterprise, but concerning the price competitiveness there is almost negligible chance, in near future, that good quality, pure lime at higher price produced in Lime Calcining Plant can conquer the market. Purchasing power of the households, potential investors in private houses is so low that preferential are given to the lower quality purchased at very basic price. The major research should be devoted to the reduction of investment and production costs of industrial Lime Calcining Plant thus enabling price competitiveness.

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.

According to the presented estimates for Banadir (Mogadishu) and other gravitating regions, market potential for the lime used in building construction, plastering, repair and painting in the future period 1990-1997 will be around 100,000 tons per annum. It is also envisaged that existent small artisan suppliers producing lime in kilns (60 in Mogadishu) and pits (200 in Mogadishu) satisfy at the present moment estimated demand of 90,000 tons in Mogadishu and gravitating regions. Rather conservative expectations are foreseen for the demand increase in a future period in urban parts of the gravitating regions. Existent cheap supply from the small artisan lime producers will be hardly exchanged if industrial lime is not of better quality and almost same price. Production in a range of 10,000 - 20,000 tons of industrial lime per annum should be technologically and economically examined as the potential capacity of industrial Lime Calcining Plant if basic consumption is building construction, plastering, repair and painting of private houses. This consumption is estimated as safe scenario since industry consumption is, at the moment, pure theory. Industrial development is very slow, structure of even existent industrial enterprises is not convenient as indirect user of good quality lime. Only small quantities are required in sugar processing (which is utilized at low capacity rate), tanning (cca less than 300 tons per annum) and other chemical industry based on lime components is not existent at all.

3.2.1.3.1.1.2 Lime for Industrial Use

Burnt lime and burnt lime products are basic raw material for various industries such as Construction industries and Production of Building Materials; Chemical and Agro-industries; Agriculture and Soil Stabilization; Production and Processing of Steel and Metals.

CONSTRUCTION AND BUILDING MATERIAL INDUSTRIES

According to the official estimates there is shortage of building material, in particular, binding material in Somalia. The market potential for burnt lime products as binding agent must be seen in the complementary role to cement. Burnt lime products (slacked lime) are used as an economic substitute to cement on one hand, lime mortar, on the other hand is used additionally to cement for plastering walls, etc. So, demand for burnt lime products by construction industries usually goes simultaneously with consumption of cement and other construction materials, i.e., sand-lime-bricks which are under discussion too. Also, purchase power of the people, or consumers segment constructing private houses, as a consequence of urbanization and increasing settling rate, must be taken into consideration since lower income cause negative price elasticity, no matter how good quality of products - lime products - is offered. At

present , strong price competition of small artisan lime producers using kilns and even primitive pits might be expected for industrially produced higher quality lime.

CHEMICAL AND AGRO-INDUSTRIES

Burnt lime and burnt lime products are important raw material for :

- Waterworks (treatment of drinking and waste waters)
- Glass and Paper factories
- Sugar factories
- Tanning and Leather factories (preservation of hides and skins)
- Animal feed mills (mineral feeds)
- Large chemical processes (fertilizer production , etc.)

Major problem of forecasting lime consumption in industry is unreliable operation and very low capacity utilization of these factories. Also , majority of investment ideas planned 7-8 years ago have not been realized up to now. Looking at the future investment opportunities (presented in the five year development plan) lime as essential or significant input for industry has not been envisaged as well. These are indications which are not supporting optimistic expectations in the segment of lime consumption for industrial purposes in the next few years. Existing sugar factories are operating at low capacity and even in full capacity they could use at maximum 1,000 tons of lime.

The present structure and size of industrial enterprises in Somalia indicates that the demand for industrial lime is realistic only in tanning industry. Other industrial investment opportunities (given in the appendix) , as said before , are not based on the extensive use of industrial lime.

Total lime consumption for industrial use in the tanning industry would amount around 400 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. Other industrial sectors , potential consumers of industrial lime 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 pure , good quality lime does not exist at the moment and that any significant need in the near future is not evident. Also , export possibilities without having joint

venture partners responsible for the marketing are not viable alternative for industrial Lime Calcining plant capacity establishment.

AGRICULTURE . SOIL STABILIZATION . STEEL AND METAL INDUSTRIES

These sectors are at the moment solving basic problems of production and operation. Use of industrial lime in soil stabilization is a matter of a future and not a presumption for new plant establishment. Small foundry complex in Somalia uses only very small quantities of burnt lime and can not be envisaged as stable and significant consumer in near future.

3.2.1.3.1.1.3 Lime for Export

Few surveys have been done for the assessment of East and Central African market for lime. 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 lime importation.
- lack of awareness of the benefits of the use of lime licks for animal husbandry
- very small and low need for industrial use of lime

After these very serious constrains all quantitative scenarios of demand development , shipping expenses , fluctuations of landed prices , competition of small local kiln and pits lead to the conclusion that any large production of lime in Somalia especially oriented to export would require a foreign partner in a form of a joint venture where the responsibility for the marketing of big 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. That is why alternative for sales possibilities at export markets is not taken into account at all.

3.2.2 Supply

At present lime is being produced in the co-operative sector. Mogadishu Lime Association unifies 60 small private producers with artisan kiln of capacity 4 m³ of burnt lime per day producing at least 300 days per year thus amounting 72,000

m³ of burnt lime or approximately 100,000 m³ of hydrated lime per year. These volumes are approximately same quantities in tons for hydrated lime since the specific weight of lime is close to one. There are also other smaller producers, using 200 pits, with capacity of eight truck loads per month for each pit. Truck capacity is approximately 4m³ of hydrated lime and total annual production is around 76,000 m³ of hydrated lime or same quantity expressed in tons. Altogether, annual small artisan lime production in Mogadishu (Banadir) area is around 180,000 tons of lime of different quality and different type (burnt, slacked, etc). This lime is mostly oriented for building construction, plastering, repair and painting and very rarely for some industrial use. The prices of these products are very competitive and will make major competitive advantage in comparison to good quality industrially produced lime which might be more expensive. There is enough room in demanded quantities, but sales prices have negative elasticity.

3.2.3 Sales Forecast and Plant Capacity

After demand and supply market research for lime for building construction and industrial use in Banadir and gravitating areas estimates of lime sales can be proposed thus giving the idea of plant capacity to the project engineering for calculation of producer's price which will determine at the end real possibilities of Industrial Lime Calcining plant at the market.

Expected Plant Capacity and Sales for LIME

Year	Description	Plant capacity		Unit price So.Sh. per Ton	Sales Revenue
		Full	Actual % Tons		
1990	Lime-slacked	10,000	77%	7,700	
1991	"	10,000	80%	8,000	
1992	"	10,000	82%	8,200	
1993	"	10,000	85%	8,500	
1994	"	10,000	87%	8,700	
1991	"	10,000	89%	8,900	
1991	"	10,000	91%	9,100	
1992	"	10,000	95%	9,500	
1993-94	"	10,000	100%	10,000	

Source : Own estimate

3.2.3.1 Marketing strategy

Marketing strategy for the potential Lime Calcining industrial plant is orientation on local present big market for lime in building construction, plastering, repair and painting in Mogadishu and Banadir inhabited almost completely by urban people. Certain market share is envisaged also for satisfying demand for the lime for same 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. Also, beside the incomparable better quality offered the sales price must be very close to present price offered by small artisan lime producers. If not, the advantageous quality will not be prevailing factor for the industrially produced lime.

It should be stated that the possibilities for the lime export from Somalia could be, at this moment and near future, only in sphere of wishes not based on joint venture contracts with marketing and engineering firms from abroad. Therefore, adopted marketing strategy of potential Lime Calcining plant at present seemed to be reasonable to cover the local demand in the biggest city in Somalia, Mogadishu, with high settling rate of population and urban way of living. Also orientation is to supply the population with the cheap lime of better quality which perfectly satisfies urban need for this normal shelter - house and has very competitive price. That is extremely important for the country where GDP is among the lowest in the world. Any idea about very good quality lime for housing with higher retail price will not prove marketable. In other development phases when industrial demand for good quality lime is developed other marketing strategies could be designed for Lime Calcining plant.

3.2.3.2 Product pricing

Lime producers sell at present one truck of hydrated lime (average 4 m³) at the kiln site at the price of 12,500 So.Sh or 46.13 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. This is the price at kiln site 5 km from Mogadishu. Transport is paid by customers and amounts to 3,000 So.Sh. per one truck. Also, tax per truck is 2,500 So.Sh. For a better idea about price structure, due to the findings of the interview in the lime association in Mogadishu average calculation of one kiln production is given :

Line Price Structure for One Kiln

1. One truck (4m ³) of Coral limestone	5,000 So.Sh.
2. One truck (4m ³) of charcoal costs \ 30,000 So.Sh., but for one kiln batch only 1/7 is needed	4,286 So.Sh.
3. Labor	1,200 So.Sh.
4. Water	600 So.Sh.

Total costs of one kiln Burnt Lime 11,086 So.Sh.

Total production of Slacked Lime is
 4 m³ Burnt Lime x 1,25 = 5 m³ Slacked lime

One truck of Slacked Lime (4m³) = 10,000 So.Sh.

1,25 trucks of Slacked Lime x 10,000 So.Sh./truck 12,500 So.Sh.

Transport Costs 3,000 So.Sh.

Tax per truck 2,500 So.Sh.
 =====

Retail Price of Slacked Lime per truck at site 15,500 Sc.Sh.
 =====

Fluctuations of the retail price for a previous period may indicate market position :

Mogadishu Average RETAIL Prices/ per Truck of LIME *

Year	Unit	Average WHOLESALE Price (So.Sh.) (US \$)	Average RETAIL Price (So.Sh.) (US \$)	Average annual exchange rate 1 US\$/1 So.Sh
1977	truck			6.3 cca 7
1978	truck			6.3 9
1979	truck			6.3 11
1980	truck			6.3 13
1981	truck			9.4 20
1982	truck			14 24
1983	truck			17.7 50-95
1984	truck			21.7 95-105
1985	truck	4,000		62 105-120
1986	truck	5,200		90.5
1987	truck	6-9,000		100
1988	truck	11-13,000		252
1989	truck	14-19,000		271 440

* Source : Low Cost Housing Project , F.A. Sabri -CTA , 1987

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

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 small private enterprises are more adaptive than a big plants. Since the lime for housing is among the basic needs with local raw-materials certain flexibility and easier adaptation to the inflation is feasible.

3.2.3.3 Distribution channels

The present practice of the lime sales is the ex-kiln selling. The customers are paying the transportation costs to the site.

3.2.3.4 Trade promotion and commercial practice

Lime Calcining plant if proven viable and competitive could, pack certain quantities of lime for Mogadishu market and give if found profitable transportation to the site what can with good quality and competitive price improve existing commercial practice and increase sales, price and profit. This option is to be examined.

3.2.5 Estimate of Sales Revenue

Sales Revenue should be estimated on a basis of constant prices and envisaged utilization of capacity in the period of the business operation (1990-1997). This revenue should be based on a ex-factory sales price of Lime Calcining Plant valid at the moment of the feasibility study preparation. Since the project engineering is not yet done and production costs are not yet known for the information need sales price of small artisan kilns could be used as very conservative and safe estimate of potential sales revenue expected. Prices are based on one truck quantity (traditional measurement) converted to tons at the beginning of March 1989.

Expected Sales for LIM3 (at present artisan prices)

Year	Description	Plant capacity		Actual % Tons	Unit price So.Sh. per Ton	Sales Revenue
		Full				
1990	Line-slacked	10,000	77%	7,700	2,500	19,250,000
1991	"	10,000	80%	8,000	2,500	20,000,000
1992	"	10,000	82%	8,200	2,500	20,500,000
1993	"	10,000	85%	8,500	2,500	21,250,000
1994	"	10,000	87%	8,700	2,500	21,750,000
1991	"	10,000	89%	8,900	2,500	22,250,000
1991	"	10,000	91%	9,100	2,500	22,750,000
1992	"	10,000	95%	9,500	2,500	23,750,000
1993-94	"	10,000	100%	10,000	2,500	25,000,000

Source : Own estimate

CHAPTER IV

MATERIALS AND INPUTS

Definition of annual plant capacity at cca 10,000 tons of burnt lime , located close to Jesira , selection of technology not based on wood 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 burnt lime is a coral limestone

4.1.1 Coral limestone

To produce 10,000 tons of burnt lime per year cca 17,000 cubic meters of coral limestone is needed. The cost of coral limestone is zero and this is natural resource available in huge quantities.

Investigations of the limestone quality in Jesira , Avei Daxan , Key Saney , Beach of Mogadishu , El Urego and Merca locations and its changes in the composition during the process of burning should be done prior to the site selection. Detailed results covering geological investigations with physical-geographical information ; maps with ground outlines ; topographical plan ; temperature , density and level observations have to be done in the separate support study.

Since the technological part of the feasibility study is to be undertaken by the lime production expert more precise data explaining properties of limestone from various sites will be included.

4.1.2 Auxiliary Materials

No auxiliary materials are needed to produce the 10,000 tons of burnt lime to be sold to the local consumers in bulk. If decided that the lime should be sold in bags this could be purchased at the local Mogadishu market since the packing materials are produced by a local producers.

4.1.3 Utilities

For regular production only electric power is needed for lime burning equipment. Electric power must be generated locally since the Mogadishu power plant , which is in the near vicinity of potential Jesira Site 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 lime burning equipment and other consumers of the power will be supplied from the refinery outside the Mogadishu and also in close vicinity of the potential site.

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 1,200 tons per year.

4.2 SUPPLY PROGRAMME

For the envisaged production of 10,000 tons per year of burnt lime all manufacturing inputs are domestic and locally available in Mogadishu.

CHAPTER V

LOCATION AND SITE

5.1 LOCATION

There are several potential sites for the Lime Calcining Plant all nearby Mogadishu. Jesira deposits are situated 18 km to the south-east of Mogadishu on the Indian-ocean coast. The plant location in Jesira enjoy the following advantages :

- Availability of the basic raw material coral limestone
- 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 lime in housing 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 , El Urego , Avei Daxan deposits the site close to the refinery is very convenient. 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 are to be done and presented for the technology expertise.

The site should have the size of 200 m x 200 m in order to allow future expansion. To determine final building and plant design a survey should be made for soil conditions. The land could be bought or leased according to the more convenient alternative.

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 site 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 could be 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 potential site , but of insufficient capacity for regular supply. For safety reasons own generating unit is advisable.

5.2.4 Manpower

Manpower for the Lime Calcining plant operation could be in a future inhabitants of a Jesira village employed in fishing , cattle breeding. 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 establishment of industrial enterprises 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

For implementation of the proposed Lime Calcining plant

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

Establishment of lime production has no negative impacts on environment , on the contrary , it will save natural wood at the moment heavily used as a fuel.

5.2.8 Cost Estimate

Proposed cost estimates will be provided by the lime technology 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 :

6.2 MANUFACTURING TECHNOLOGY

The major stages of burnt lime production are the following :

- Raw Material Transport
- Crushing, Screening and Storage of Raw Materials
- Mechanized Filling of Skips
- Lime-Burning Process

All stages concerning technological process are at the moment very global and should be, by technological expertise, designed and estimated for Lime Calcining plant nearby Mogadishu. The definite findings on technical part of this Industrial Investment Project should be provided by the UNIDO expert for lime production, as envisaged in the Terms of References for the completion of the Feasibility Study for Lime Calcining plant.

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 establishment of lime industrial production is planned analysis of required machinery and equipment is essential. Distinction of foreign and local origin is also required.

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

6.4 MATERIAL STANDARDS

Based on the proposed technology and selected equipment material standard for production of one ton of burnt lime as well as annual material quantity , unit price and value balance should be provided. This should be provided by the UNIDO expert for lime production , as envisaged in the Terms of References for the completion of the Feasibility Study for Lime Calcining plant.

6.5 CIVIL ENGINEERING WORKS

Planned establishment of Lime Calcining plant 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 lime production , as envisaged in the Terms of References for the completion of the Feasibility Study for Lime Calcining plant.

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 lime production , as envisaged in the Terms of References for the completion of the Feasibility Study for Lime Calcining plant.

CHAPTER VII

PLANT ORGANIZATION AND OVERHEAD COSTS

Organization of business operations is based on the existing production practice. LCP has the small office in the center of Mogadishu and warehouse at the road close to the airport in direction to Jesira. Since the LCP 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

Number of new workers will be determined by the technological requirements and all working posts will be covered by Somali nationals. Since the Lime Calcining plant (LCP) is small scale industrial enterprise the role of 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

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 lime production , as envisaged in the Terms of References for the completion of the Feasibility Study for Lime Calcining plant .

CHAPTER IX

IMPLEMENTATION SCHEDULING

Total project cycle is estimated on 11 years out of which one year is the project implementation and 10 years are period of LCP 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 LCP lime 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, Mogadishu. Result should be basis for the LCP management and shareholders decision to implement lime

production in order to satisfy existing local demand for the lime. 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 industry in Somalia.

9.1.2 Tendering and contracting

After LCP decision on lime production , 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 LCP lime production 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 LCP 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 LCP production will start up with regular commercial production. 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.

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 lime production, as envisaged in the Terms of References for the completion of the Feasibility Study for LPC establishment.

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	**
Start of commercial operations	1..

10.1 TOTAL INVESTMENT COSTS

10.1.1 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 LCP line 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 line production and should be provided by the UNIDO expert for line production , as envisaged in the Terms of References for the completion of the Feasibility Study for LCP establishment.

10.1.2 Net Working Capital

Net working capital (NWC) indicates financial means required for normal business operation of LCP line 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 line production , as envisaged in the Terms of References for the completion of the Feasibility Study for LCP establishment.

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 Industry (SSI).

Since LCP establishment of lime production fulfills all these requirements of small scale 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 lime production , as envisaged in the Terms of References for the completion of the Feasibility Study for LCP 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 , LCP , are brought from the Market Analysis.

Expected Sales for LIMA (at present artisan prices)

Year	Description	Plant capacity		Unit price So.Sh. per Ton	Sales Revenue	
		Full	Actual % Tons			
1990	Lime-slacked	10,000	77%	7,700	2,500	19,250,000
1991	"	10,000	80%	8,000	2,500	20,000,000
1992	"	10,000	82%	8,200	2,500	20,500,000
1993	"	10,000	85%	8,500	2,500	21,250,000
1994	"	10,000	87%	8,700	2,500	21,750,000
1991	"	10,000	89%	8,900	2,500	22,250,000
1991	"	10,000	91%	9,100	2,500	22,750,000
1992	"	10,000	95%	9,500	2,500	23,750,000
1993-94	"	10,000	100%	10,000	2,500	25,000,000

Source : Own estimate

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

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

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. JOB DESCRIPTION FOR INDUSTRIAL TECHNOLOGY SPECIALIST FOR
LIME PRODUCTION

PROJECT IN THE SOMALI DEMOCRATIC REPUBLIC

Establishment of Industrial Consultancy Unit

JOB DESCRIPTION

SOM / 86 / 34 - ext. FS

Post Title Industrial Technologists for the Lime Production

Duration Four 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 Lime Calcining Plant

Duties Based on Market Analysis for the lime , examine technological and technical conditions for Lime Calcining plant with annual capacity of 10,000 tons.

1. Evaluate the present status of artisan lime production and quality and use of wood as a fuel.
2. Examine possibilities to establish industrial lime production (limits for initial investment costs in fixed assets , market limits)
3. Asses the present artisan full absorption price per kg of lime (quantities , unit prices and value of all INPUTS).
4. Evaluate Location and Site of LCP concerning possible cheap and easy erection.
5. Propose a technological and technical process to produce 10,000 tons of lime 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 LCP erection (activities , duration , Gantt-chart , years and months).
8. Estimate Production Costs (Materials and Inputs , Utilities) per ton of lime 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 , low energy oriented equipment due to the lack of regular electric current , etc.) and describe proposed " adapted " technology for the LCP lime production.
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 Lime Calcining plant establishment 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 LCP establishment (ICU , 1989) with :
 - Market Potential cca 10,000 tons of burnt lime at low price.
 - Product : LIME FOR THE HOUSING

2b. Feasibility Study for the Lime Calcining Plant , Kienbaum Entwicklungs - Consult Gummersbach , F.R.G., June 1981

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 lime production).

Only BURNT LIME at very low retail price is acceptable for the local market.

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 Date After four weeks of starting date , 1989

A P P E N D I X II.

Persons contacted

Mr Abdulahi Roble Shadoor	Line Association , General Manager
Mr F.A. Sabri , CTA	Low Cost Housing Project, 1987 , Mogadishu
Mr Mohamed Ali Essa	Urban Construction Company , Mogadishu
Mr Isa Adam Farrah	HASA , Association of Tanneries , Mogadishu Technology expert
Mr Abukar Moallim 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