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A
STUDY OF
FIFTY SMALL SCALE
INDUSTRIES WHICH CAN
UTILIZE LOCAL RAW MATERIALS
IN SOMALIA

Volume I

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INTRODUCTION

The purpose of this study is to provide Somali businessmen with basic data on 50 smallscale industries which can utilize locally available materials.

The information contained in this study is intended to provide cost estimates of required imported equipment and supplies for each industry, as well as raw material sources in Somalia. It also provides personnel, fuel, water, electrical, and space requirements for each industry.

This study is intended to provide basic information only. It does not provide balance sheets, cash flow projections, profit and loss statements, and other data normally associated with feasibility studies.

Any Somali businessman considering investing in any of these industries (or any other industry) should first have a feasibility study prepared by a competent consultant with indepth knowledge of the particular industry.

This study has been sponsored by the U.S. Agency for International Development (USAID) Mission in Somalia.

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Throughout the study, reference is made to required personnel. In each case, a skilled level is given. By "skilled" personnel reference is made to an employee with university or technical school training, plus indepth experience in the particular line of work.

"Semi-skilled" classification is given to jobs where experience or prior training is needed. These positions are usually reserved for secondary school graduates.

"Laborer" or "unskilled" positions are those which require no formal training.

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FEED MILL

Feed mills are used to make nutritionally balanced composed animal feed from grains and waste materials for poultry, sheep and goats, cattle, horses, swine and rabbits.

If Somalia is to open new markets for livestock, and maintain its existing markets, it must begin to produce a healthier breed of animals. By providing composed feed, the creation of feed mills will not only assist animal health, but will help provide for animal nutrition during the period droughts that affect Somalia.

An export market also exists for animal feed throughout the Middle East.

Raw Materials and Sources

There are many raw materials currently available in Somalia to produce animal feed. Wheat germ and wheat bran are available from the Government-owned pasta factory and flour mill in Mogadishu. Bagasse and molasses in unlimited quantities are available from the sugar mills of Johar and Juba. Corn cobs, sorghum, sesame seed cake, and silage is available from many small farmers throughout Somalia, as is maize germ, cottonseed cake, and sunflower seed cake in limited quantities. The feed mill operator will have to organize many farmers to provide the latter materials.

In addition, many other feed ingredients will become available if associated industries are created in Somalia. Fish meal

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and shellfish meal, important ingredients for poultry feed, will become available if a fish meal plant is created. Bone meal, blood meal, and meat meal will become available if a rendering plant was started in Somalia.

Required Imported Raw MATERIALS

The only imported raw materials needed are vitamin and mineral concentrates, available in Kenya and the U.S.

Required Imported Machinery

The best and most competitively priced equipment is made in the U.S., the largest producer of both animal feed and animal feed equipment. The primary equipment needed is:

- A) Receiving Bins
- B) Conveyors
- C) Storage Bins
- D) Hammermill
- E) Augers
- F) Feed Mixer
- G) Pelletizer
- H) Bagging Equipment
- I) Molasses Injection Equipment
- J) Boiler
- K) Air Compressor
- L) Electrical Controls
- M) Scales

The approximate cost of the equipment is \$250,000-\$300,000, depending upon the storage and receiving capacities.

Suggested capacity of the mill is 5 tons per hours.

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Personnel Requirements

Per shift, a production manager/engineer is needed (skilled), as well as two feed mill operators (semi-skilled) and two to three laborers (unskilled).

Water, Fuel, and Power Requirements

Approximately two gallons of water per minute is needed for the boiler.

The full consumption of the boiler will be approximately 34 litres per hour of diesel no. 2.

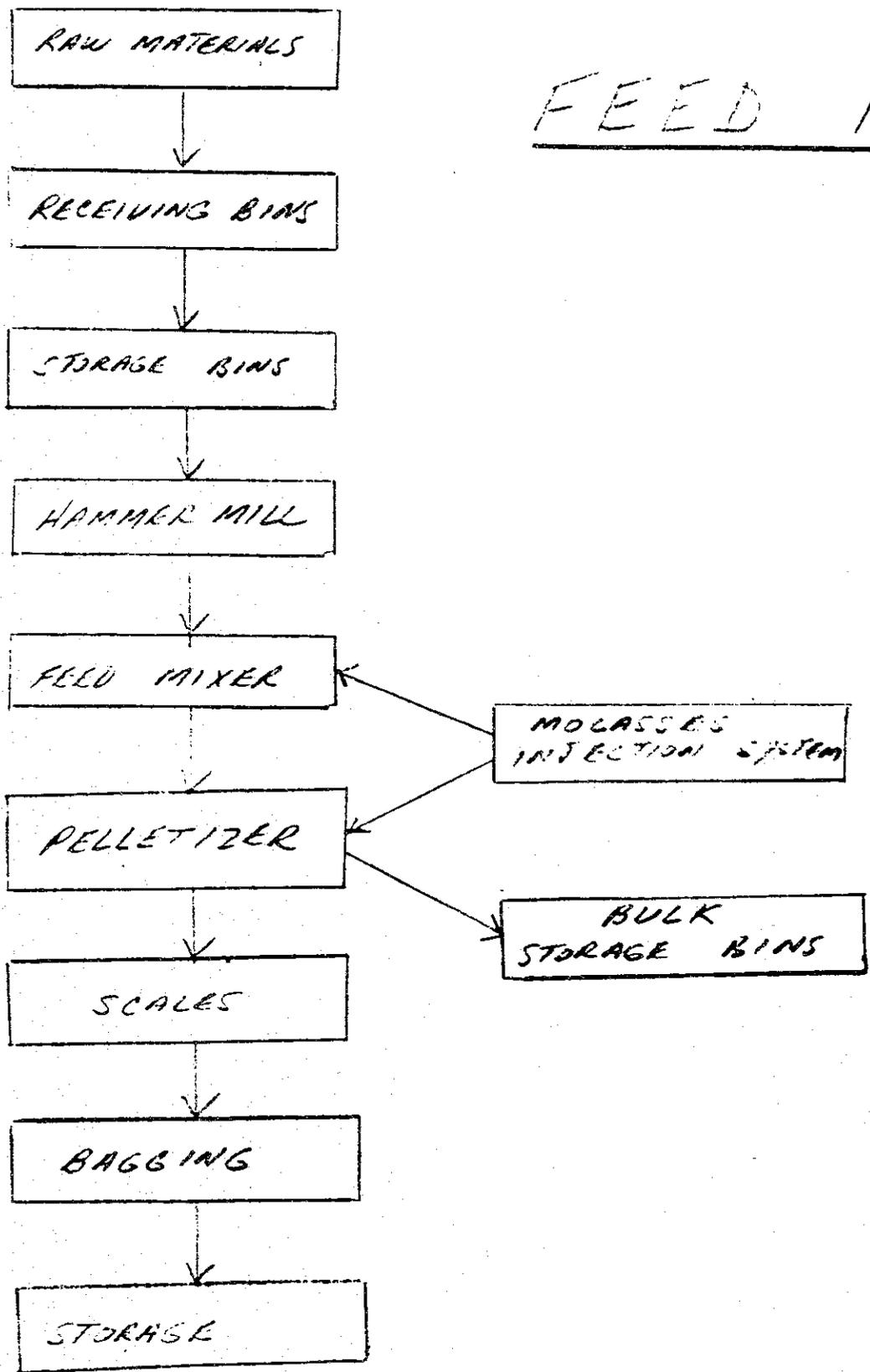
The absorbed electricity of the motors will be approximately 165 kw. Also, an additional 20 kw will be needed for auxiliary services such as lighting. Therefore, the total consumption at capacity will be approximately 185 kw.

Space Requirements

A land area of at least one acre is needed to build a feed mill. A cement foundation for the receiving and storage bins is required. In addition to administrative offices, a building with an area of 2,000 square feet is needed for the feed milling equipment.

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FEED MILL



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FEED LOT

Source of Raw Materials:

Since the purpose of the feed lot is to fatten livestock before slaughter or export, the principal items needed are livestock (cattle, goats, and sheep) and composed feed and/or fodder. Livestock are readily available for purchase throughout Somalia.

Composed feed is unavailable on the local market and it would be uneconomical if imported. (Many ingredients for making composed feed are available in Somalia. If an operating feed mill was created, composed feed would become available). As a substitute it is recommended that the operator purchase feed ingredients such as wheat germ, sesame seed, cake, etc. and mix his own feed.

Fodder production in Somalia has not reached a commercial stage. The development of commercial fodder sources will be a prerequisite to the successful operation of a feedlot.

Currently, the only identified commercial source of fodder in Somalia is the Arab Essa Haid Farm in Jinale. Approximately 20 tons per month of leucaena, the poor man's alfalfa, are available for sale, as well as 200 tons per month of elephant grass. Both are excellent fodders. Mr. Haid can produce much more of both if he had markets.

Other farmers could be induced to produce fodder if they had a market. But given the realities of Somalia it would be wise

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for the feedlot operator to grow his own fodder (see Fodder Production Plant, pgs. 9-10).

Imported Raw Materials

Small quantities of veterinary medicines and vitamin and mineral concentrates. Each are available through many sources in the U.S. and in Kenya.

Required Imported Equipment

Barbed Wire for fencing can be imported from Kenya, Taiwan, Korea, and many other code 941 countries.

Wooden Posts are available from many code 941 countries and may be available locally, especially in Jinale.

Cement for feed trough is available locally through importers.

Corrugated Steel Sheeting is available locally.

Mix Mill is available from many code 941 countries, but the best source is the U.S.

Harnesses (500) can be fabricated locally.

Capacity of the feed lot should be for a maximum of 1500 head of cattle rotated in monthly lots of 500 head.

Cost of the equipment will be \$50,000 to \$100,000 depending on the size and number of the paddocks.

Personnel Requirements

One semi-skilled livestock manager/supervisor is needed as well as 10 to 20 herders/laborers (unskilled).

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Water, Fuel, Power Requirements

Approximately 3000-5000 gallons of water will be needed per day for watering the cattle.

No fuel or electricity is needed for production.

Space Requirements

A land area of at least five acres is needed for a feed lot. For 1500 animals, the land should be paddocked with a minimum of 15 separate paddocks, one for each 100 animals. Each paddock should have feeding and water troughs.

If the feed lot operator buys a small mix mill to compose feed from different ingredients, a small building of approximately 600 square feet will be required.

Space for administrative offices is also needed.

It is suggested that any feed lot operator in Somalia should also grow his own animal fodder. For a 1500 head feed lot, a fodder farm of 500 acres will be needed.

DAIRY LOT

Dairy lots are used to produce and collect raw cow's milk, for either immediate distribution or for pasteurization before distribution.

Also, culled animals, calves, and steers can be sold for additional income.

Raw Material Sources

Dairy Cows available in various locations throughout Somalia, but particularly in Afgoy, as are bulls.

Required Imported Raw Materials

While dairy cows are available in Somalia, it is recommended that the initial herd should be quality graded Heifers imported from Kenya.

In addition, barbed wire for fencing and paddocks should be imported from Kenya, Taiwan, Korea, India, or Pakistan.

Posts for fencing and corrugated steel roofing can be imported from many code 941 countries, but may be available from importers in Somalia.

Also, each year the dairy lot operator should budget approximately \$5,000 for spare parts, strainers, inflations, detergent, detachers, and veterinary medicines. The best and most competitive equipment is available from numerous sources in the U.S.

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Required Imported Equipment

The best and most competitively priced equipment is available in the U.S. At a minimum, the dairy lot should include:

- 1) A double six or 10 aside herringbone milk parlor with associated equipment
- 2) 2 HP air compressor
- 3) A 2,000-4,000 litre stainless steel milk storage tank
- 4) 12 or 10 unit pipeline milker
- 5) Two feed bins
- 6) Standby Generator, 25 kw

The suggested capacity is 100 head of dairy cattle, gradually increasing to 300 head. Milk production at 100 head should be a minimum of 10 to 15 litres per day, per head.

Personnel Requirements

The operator will need a skilled dairy operator, 4 semi-skilled milkers, one to two semi-skilled standby milkers, and five to seven unskilled laborers/herders.

Water, Power, and Fuel Requirements

Water would be needed for watering the herd. Each animal will need approximately 10 gallons of water per day.

Electrical power needed is 25 kw.

Diesel fuel would be needed for the standby generator.

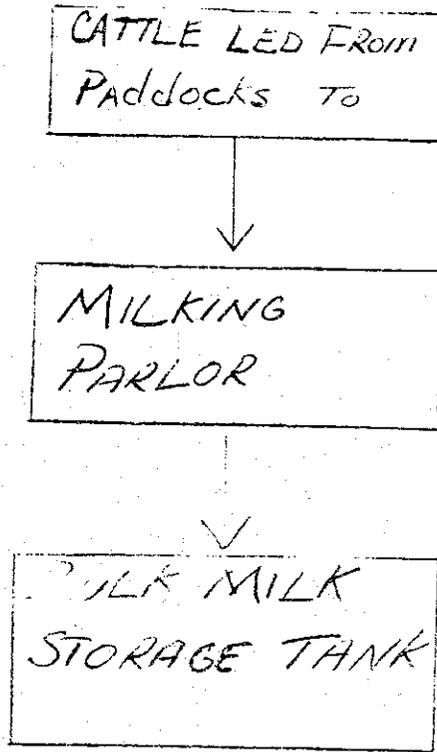
Space Requirements

A dairy lot for 100 head of cattle would require a building of 1,000 square feet for milking and storage.

Another 75 acres would be needed for grazing the herd and for growing high protein fodder such as alfalfa.

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DAIRY LOT



FODDER PROCESSING PLANT

The production of animal fodder in Somalia is particularly important in view of USAID new Livestock Marketing Project. The object of the project is to develop healthier animals for export. A major component of the project is to quarantine and fatten cattle for 21 days before exportation. It is estimated that at peak periods, the quarantine stations will need approximately 140 tons of fodder or composed animal feed per day.

Raw Material Sources

The basic raw material will be fodder grasses. It is recommended that the operator grow his own grasses on approximately 500 acres of land. The best grasses to grow are Rhodes grass, Sudan grass, Elephant grass, and/or Alfalfa, all of which grow in Somalia.

Required Imported Raw Materials

Fertilizer and Seeds should be purchased from the U.S.

Fifty kilo sacks are available from the U.S. and many Code 941 countries.

Required Imported Machinery

- A) Two six-five Hp Tractors
- B) Two Hay Mowers
- C) Two Hay Rakes
- D) Two Agricultural Trailers (at least 5 ton capacity)
- E) One Cultivator
- F) One Industrial Fodder Cuber, or
- G) Two Hay Balers

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With the exception of the Industrial Cuber, which is only available in the U.S., all can be purchased in Brazil or the U.S.

The estimated cost of the equipment is \$90,000.

The capacity of the industrial fodder cuber should be 5 tons of input per hour. IMPORTANT - An industrial fodder cuber can only be used in areas where the fodder can be sun dried to 12% moisture or less. In all other cases, hay balers should be used.

Personnel Requirements:

- 1) One Production Manager (semi-skilled)
- 2) Two Tractor Drivers/Mechanics (semi-skilled)
- 3) One Cuber Operator (semi-skilled)
- 4) Five to ten laborers (unskilled)

Power, Water and Fuel Requirements

Each tractor will need approximately 60 litres of diesel per day.

The industrial fodder cuber will need 5 to 10 gallons of water per ton of fodder. It will also need approximately 10 litres of diesel per hour.

No electricity is needed.

Space Requirements

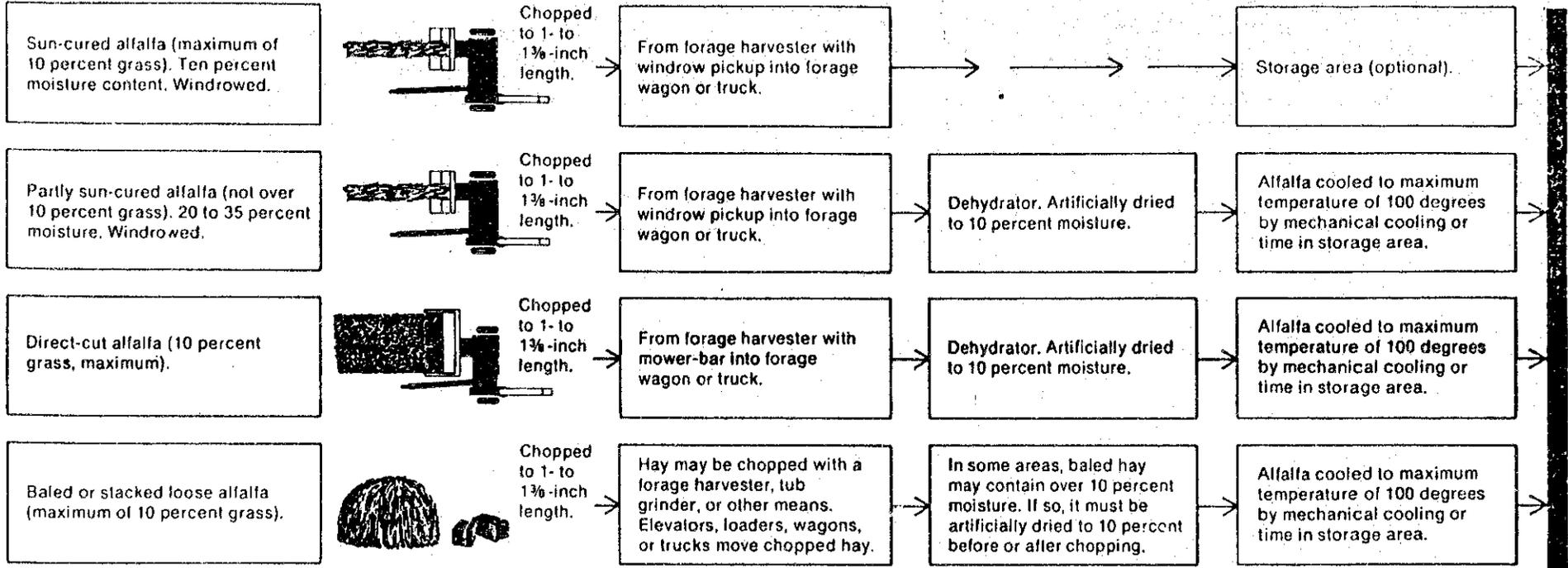
As previously mentioned, an area of 500 acres is recommended for fodder production, especially if the operator is using an industrial fodder cuber. The cuber will occupy an area of approximately 1,000 square feet, which should provide sufficient storage capacity.

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If hay balers are used instead of an industrial cuber, fodder production can be on as little as 25 acres. Storage sheds for the equipment and for baled fodder would be needed.

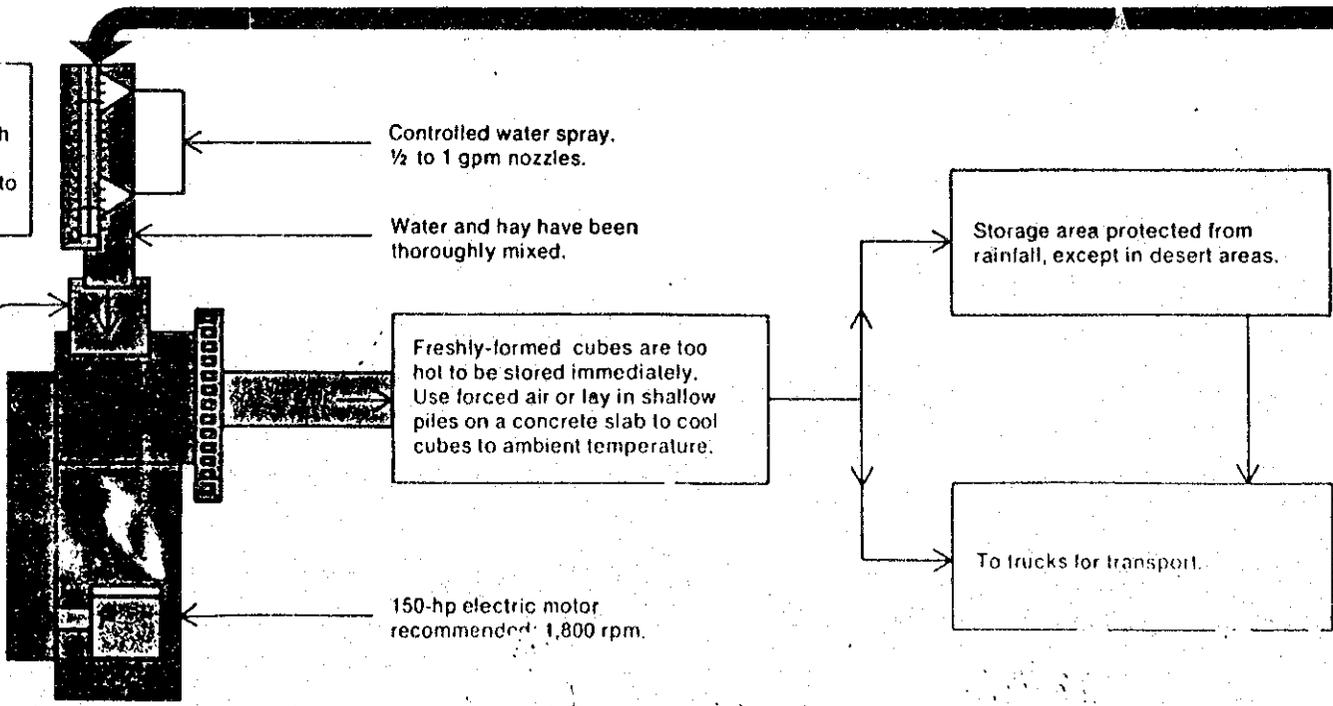
Note - for small baling operations (50 acres or less) the equipment costs are reduced to approximately \$40,000.

Flow chart for stationary hay cubing



Alfalfa ready for cubing (not over 10 percent grass, maximum of 10 percent moisture, 1 to 1 1/4-inch length, 100 degrees or less). Conveyed, elevated, or loaded into metering feeder.

Uniformly moistened hay fed evenly into 20-inch opening into Cuber.



EEEF SAUSAGE PLANT

Beef sausage can become a staple breakfast food in Somalia with the creation of a beef sausage plant. Also, a huge export market exists in Saudi Arabia and throughout the Gulf for beef sausage.

Raw Material Required

Required raw materials consist of bovine livestock, which exist in abundance in Somalia. Also, ground hot peppers can be added for flavoring. These peppers can be grown in all farming areas of Somalia.

Required Imported Raw Material

None, except packaging materials, which are available in the U.S., Taiwan, India, and Korea. Cost and type of packaging materials would depend upon whether sausages were for domestic consumption or for export.

Required Machine Import

The following machines are required for the small sausage plant:

Mixer
Grinder
Lynker
Packing machine
Curling cooler
Cooler
Floor mounted lavatory
Knifebox for above lavatory
Immersion heat element
Two compartment sink

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Faucet for above sink
Drainboard for above sink
Drainboard for above sink
Aluminum dollies
Poly lugs for above dollies
55-gallon "brute" drums
Curing trucks
Bench dial scale
Stainless steel pan
Check-weigh scales
Long stuffer table
Boning table
Work table
Pickle pump
Portable pumping table
Boning knives
Steel knives
Knife sharpener
Skewer thermometers
Picnic netting
Heavy duty bag closer
Staples
Bone hooks
Casing linker
Twine
Heavy pressure washer
Band saw
Grinder
Forged knives
Triumph plates 3/18"
Triumph plates 3/8"
Triumph plates 3/4"
Capacity mixer
Electric slicer
Water heater
115v saw
Electric smokehouse
Electric heat elements
Pen recorder controller
"P" type probes
Smoke producer and pipes
Smoke truck
Stuffer
Vacuum packaging machine
Vacuum pump
Refrigeration system
Curing cooler
1 3/4" diameter castings
2 3/8" diameter castings
3 3/8" diameter castings
4" diameter castings
Quick cure
White sugar cure
Golden sugar cure
Flour binder

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Rate of Capacity

Sausage production of 1600/2000 sausages per day, based on four loads per hour of 50 lbs. each load, total 200 lbs. per day. Smoke production of sausages is approximately 1,600 sausages per day, based on loads of 400 lbs. ever two hours or 4 loads of 400 lbs. per day, equal 1,000 lbs. per day.

Cost of Machinery

Total cost of machinery is approximately USD \$130,000

Best Country from which to Import

The best country from which to import is the United States.

Personnel Requirements

- (1) Manager - skilled
- (2) Machine operators - semi-skilled
- (10) Laborers - unskilled

Power, Fuel, and Water Requirements

Electrical consumption is 40 kwh, 220 volts, 3 phase, 50 Hz. Approximately one gallon of water per minute is needed.

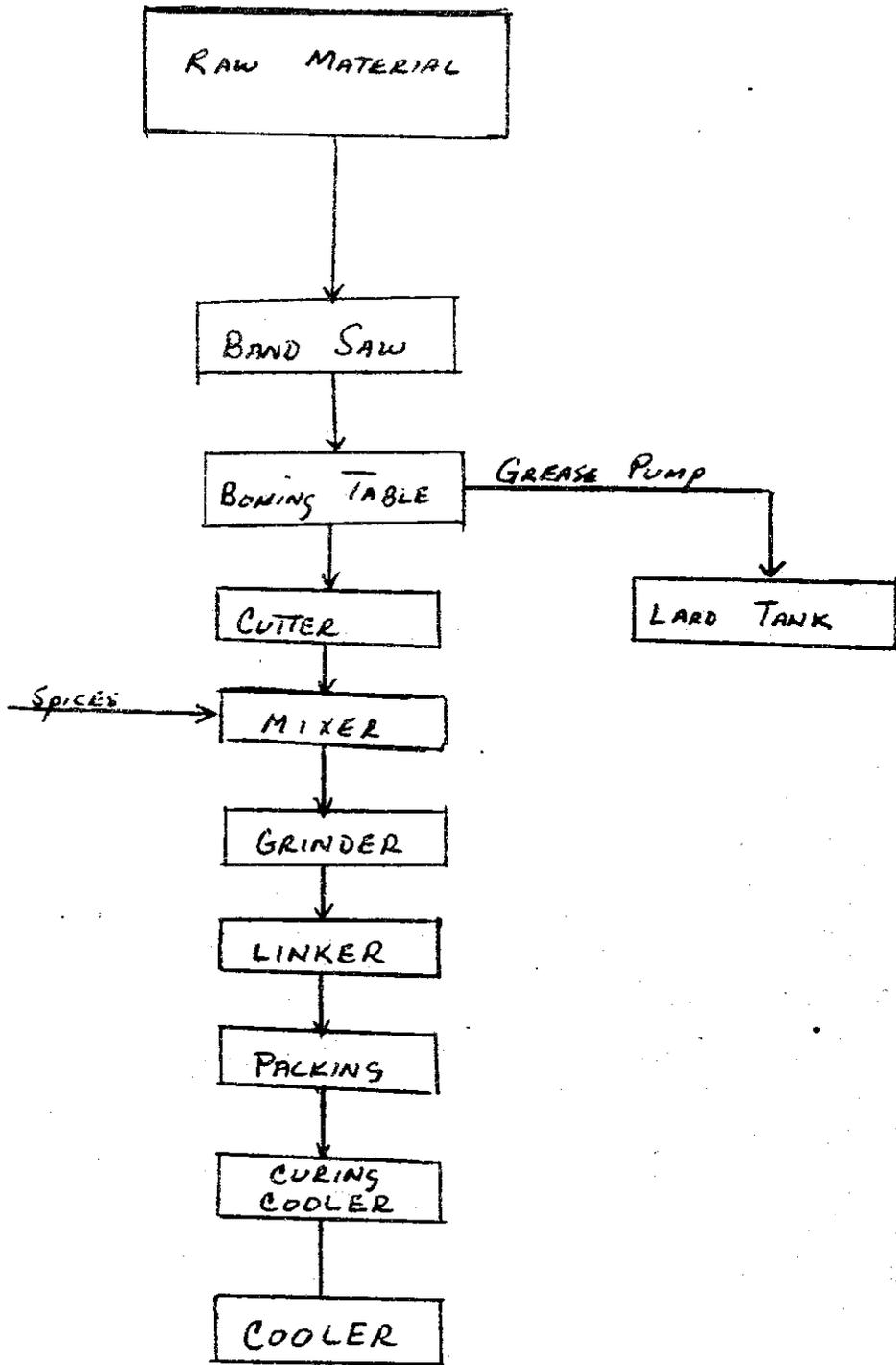
No fuel is needed, except for a standby generator.

Space Requirements

A building of approximately 1500 square feet is needed.

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BEEF SAUSAGE PLANT



RENDERING PLANT

Rendering plants utilize the by-products of livestock slaughtering houses to produce such items as bone meal, blood meal, protein meal and other various organic components which can be used for livestock feed.

Rendering plants also produce tallow or animal fat used in making soap.

The rendering plant would be very suitable and profitable for Somalia in that it would, one, utilize the vast quantities of misused by-products of the numerous slaughterhouses and, two, provide great quantities of nutritious animal feed for Somali livestock.

Required Imported Raw Materials

None. All raw materials can be provided locally.

Raw Material Sources in Somalia

The slaughterhouse in Mogadishu currently dumps its waste materials into the ocean. This slaughterhouse will be the primary source of raw materials. Wastes can also be gathered from smaller slaughterhouses, tanneries, and butchers.

Required Imported Equipment

Rendering Cooker (dry)
Internal Pressure by-pass unit
Cooked product receiver w/electric drainage basket
Hydraulic press w/electric hydraulic pump

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Skip hoist
Cake breaker
Screw conveyor
Fat Pumps

Capacity of this plant will be from .5 mt/hr to 4 mt/hr depending on products being processed, their moisture content, etc.

Approximate total cost is approximately USD \$205,000.00.

Best country from which to purchase materials: USA.

Personnal Requirements

Manager and engineer - Skilled

2-4 Semi-skilled workers to operate the various machines of rendering plant

4 Unskilled laborers to deliver the rendering plant materials

Power, Water, and Fuel Requirements

Power requirements are approximately 205 kwh of electricity, 220 volts, 3 phase, 50 hz.

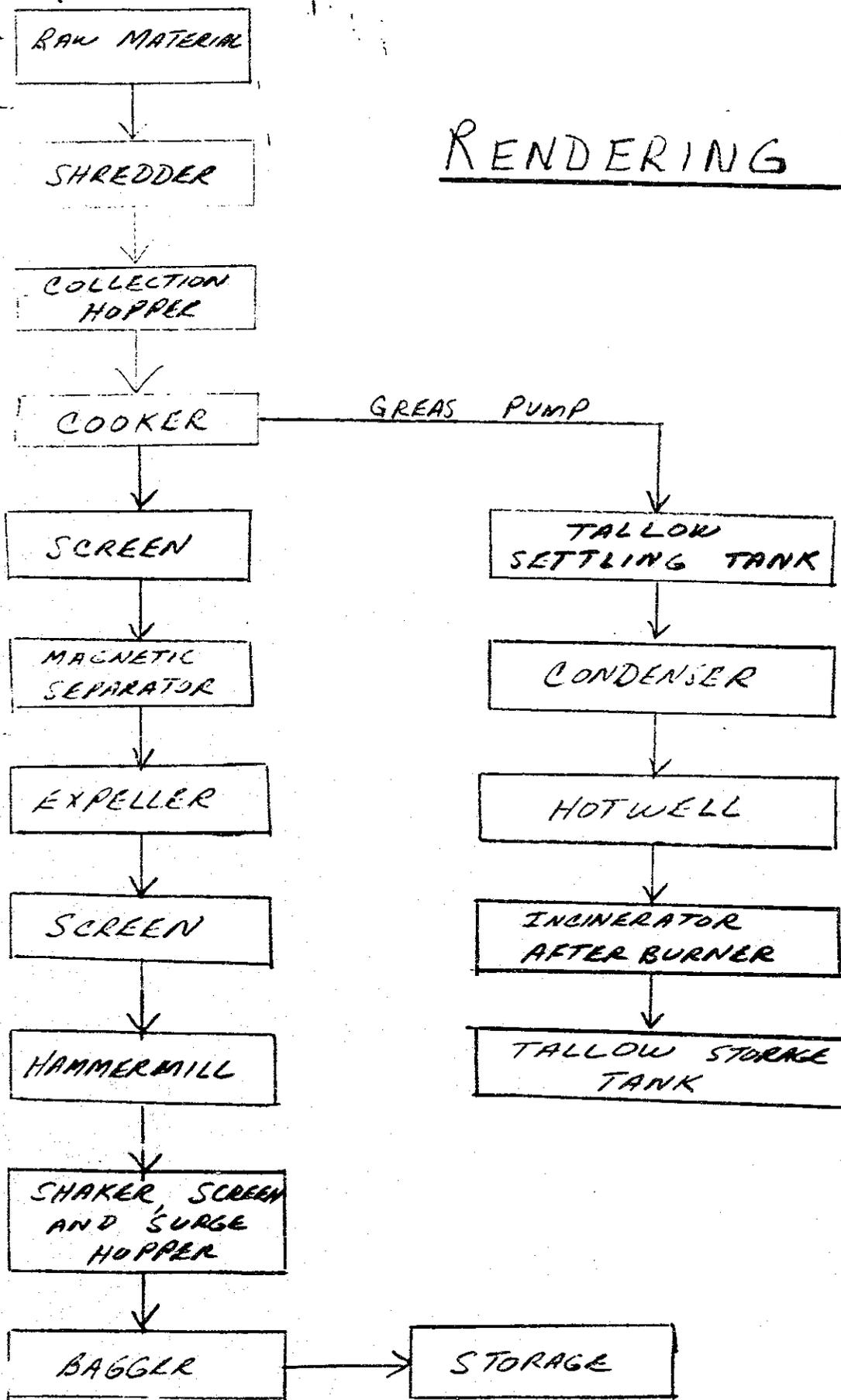
Approximately two gallons of water per minute are needed.

Space Requirements

A building of at least 1,500 square feet is needed for production. In addition, another 1,000 square feet is needed for storage of finished products.

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RENDERING PLANT



POULTRY FARM

Required Raw Materials

Required raw materials for this project consist primarily of live chickens of hearty breed and stock.

Required Imported Raw Materials

Required imported raw materials consist of live chicks of hearty breed and stock; a variety more healthy and of better quality than that which indigenously thrives in Somalia.

Animal feed ingredients and concentrates, particularly fish meal and nitrates. The best source is the U.S. Fish meal would not be necessary if a fish meal plant is started in Somalia.

Required Imported Equipment

Required imported equipment consists of:

- Automatic Poultry Feeders
- Round plastic waterers
- Jet Brooders
- Feed Cart
- Feed Scoop
- Plastic Feed Lids
- One Gallon Plastic Chick Waterers
- Ten-Hole Nests
- Incubators and Hatchers
- Ten-ton Bulk Tank
- Ladder for above tank
- Slide Valve for bulk tank
- Drive Head
- Bin Boot
- 30° Elbow
- Fill Switch
- Connectors

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Clamps
10'0" Conveyor Tubes
6'0" Conveyor Tube
Flexible Auger
Drop Tee
Flexible Drop Tubing
Plastic Drop Tubing
Hangar Straps
1/2 Horsepower motor, 220 volt, 50 cycle
One gallon plastic chick waterers
Double drum winch
Aircraft cable
Cable clamps
Pulleys
Single cast iron pulleys
Double cast iron pulleys
Hangar chain
"S" Hooks

Fill System with Bulk Tank

Ten-ton Bulk Tank
Ladder for above tank
Slide valve for bulk tank
Drive Head
Bin boot
30' Elbow
Fill switch
Connectors
Clamps
10'0" Conveyor Tubes
6'0" Conveyor Tube
Flexible Auger
Drop Tee
Flexible Drop Tubing
Plastic Drop Tubing
Hangar Straps
1/2 Horsepower Motor 220v, 50 cycle

Fill System for Laying House

Ten-ton Bulk Tank
Ladder for above tank
Slide valve for bulk tank
Drive Head
Bin Boot
30' Elbow
Fill Switch

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- Connectors
- Clamps
- 10' Conveyor Tubes
- 6' Conveyor Tube
- Flexible Auger
- Drop Tee
- Flexible Drop Tubing
- Plastic Drop Tubing
- Hangar Straps
- 1/2 Horsepower Motor 220v, 50 cycle

Rate of Capacity: 10,000 boilers per week

Cost of machinery: \$270,000

Best Country from which to import: United States

Personnel Requirements:

- (1) Production Manager - skilled
- (1) Laying House Manager - skilled
- (1) Hatchery Manager - skilled
- (10) Laborers - unskilled

Power, Fuel, and Water Requirements

Electrical output needed for this facility is 30 kwh, 220 volts, 3 phase, 50 cycle.

Five hundred gallons of water per day are needed for watering the chickens and chicks, and for cleanup.

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Space Requirements

A land area of approximately one acre is sufficient. Cement foundations for ten poultry houses must be laid. Each poultry house is 40 feet by 250 feet.

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POULTRY SLAUGHTERHOUSE

Poultry slaughterhouses are used to prepare chilled and frozen chickens, particularly for the export market. If a large-scale poultry industry is created in Somalia, and if Somalia wanted to export chickens to Saudi Arabia and other Gulf states, a poultry slaughterhouse must be created.

Saudi Arabia currently imports over 4 million kilos of frozen chickens from Brazil, the U.S., and Europe, particularly France. Given its close proximity to Saudi Arabia, Somalia should enter this highly lucrative business.

Local Raw Materials

The only raw materials needed are chickens with a weight of 1 to 1½ kilos. There are currently two industry size poultry farms in Somalia, one on K-14 in Mogadishu and the other near Afgoy. However, both are inefficient and could not provide the necessary supplies in a timely fashion. It is suggested that an entrepreneur not enter this business until poultry farming has entered a higher stage of development.

To operate a poultry slaughterhouse efficiently, approximately 1000-2000 birds should be slaughtered per day.

Required Imported Raw Materials

The only imported raw materials necessary are duck wax and packaging supplies. It is recommended that the chickens are packed in polyethylene bags, vacuum sealed.

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Required Imported Machinery

The machinery necessary for a kill capacity of 150 to 400 birds per day are:

- (4) Shackles
- (1) Killing cabinet
- (1) Dunkmaster
- (1) Scalding
- (1) Spin-pick picker
- (1) Eviscerating table
- (1) Each - pinning and receiving tables
- (1) Electric stunning knife
- (1) Wax tank
- (1) Inside bird washer
- (10) Chill tanks
- (40) Various size pinning and boning knives
- (2) Lung scrapers
- (2) Gizzard, heart, liver shears
- (1) Vacuum gun
- (3) Ice machines
- (1) Air compressor
- (1) Refrigeration system with cooler and shelving
- (1) Water heater
- (2) 20-gallon capacity utility tanks
- (2) Packing tables
- (2) Bag closers
- (2) Vacuum Packaging Machine

The best source for the equipment is the United States. The approximate cost is \$175,000.

Personnel Requirements

This facility will require the following personnel:

- (1) Production manager/engineer - skilled
- (20) Laborers - unskilled

Power, Water, and Fuel Requirements

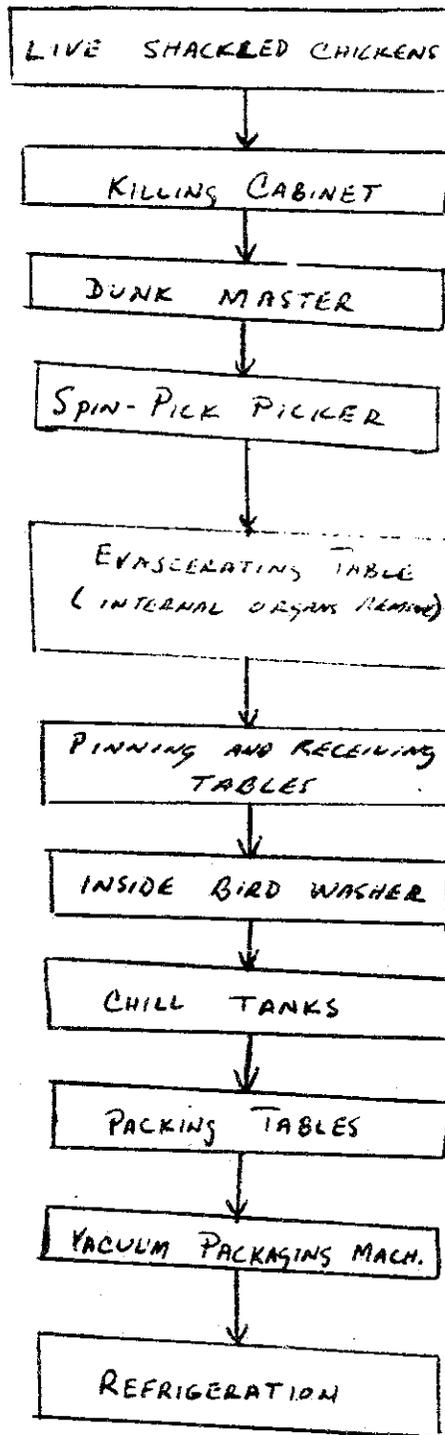
The electrical power needed is 20 kwh, 220 volts, 3 phase, 50 cycle. The water requirements are 60 gallons per day. No fuel is necessary.

Space Requirements

A building of 1,000 square feet is required.

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POULTRY SLAUGHTER HOUSE



LEATHER SHOE AND SANDAL FACTORY

With Somalia's great amount of livestock processing, the situation is right for a leather shoe and sandal manufacturing plant, which will make use of the leather hides left over after slaughtering. The principal leathers to be used come from camel, cattle (and goat).

At present, the shoe manufacturing plant in Mogadishu produces shoes and boots of very limited quality and quantity. Its manufacturing process is inefficient. The introduction of a more modern facility would greatly enhance an already very appropriate industry in Somalia. Not only would this facility produce more shoes and sandals, but shoes and sandals of better quality and at a cheaper price. With better production and quality controls, shoes could be produced for export.

Raw Material Sources in Somalia

Tanned leather is available in substantial quantities from the tanneries in Mogadishu and Kismayo.

Necessary Imported Raw Materials

Pre-molded heel units available from Korea and Taiwan.

Required Imported Equipment

All leather shoe and sandal production equipment will all be imported. The list of equipment is as follows:

(4) Dry Thread Sewing Machines
Click and Die Machine, plus various size dies
Heel Seat Lasting Machine
Power Toe Lasting Machine
Insole Tacking Machine
Shank Material
Sole Attaching Machine
Cement Sole Attaching Machine
Shank Fitting Machine
Heel Nailing Machine
Splitting, Skiving and Folding Machine

Recommended capacity: 200-400 pairs per day.

Approximate cost: The total cost for all imported machinery will be \$125,000.

The recommended machinery can best be purchased from the United States. A special CIP waiver will be necessary to purchase the splitting, skiving and folding machine, which is only available in Italy and Germany.

Personnel Requirements

- (1) Manager/Engineer
- (16) Semi-skilled Machine Operators
- (5) Unskilled workers

Power, Water and Fuel Requirements

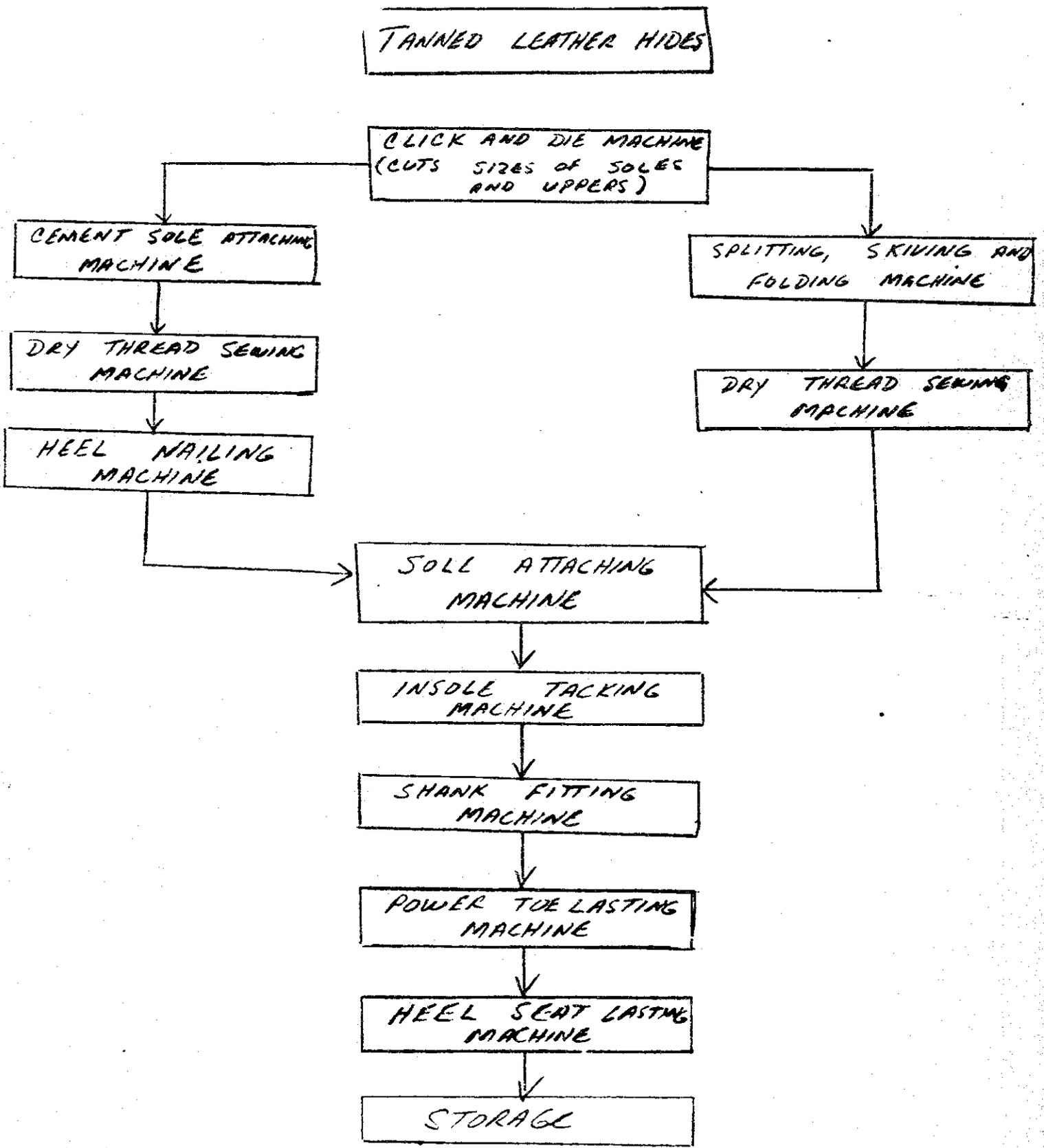
The electrical capacity of a plant this size is 50 kwh, 220 volts, 3 phase, 50 Hz.

No fuel or water is needed.

Space Requirements

A building of 1,000 square feet is required.

LEATHER SHOE AND SANDLE FACTORY



INDUSTRIAL LEATHER GLOVES FACTORY

Industrial leather gloves are used by workers in most heavy industries, but particularly in the petroleum and construction industries. Not only is there a good sized local demand for industrial leather gloves, but a huge export market exists in Saudi Arabia and other Gulf states.

The only drawback to starting this type of industry in Somalia is the degree of technical assistance necessary to make the factory run efficiently. A consultant would be necessary for a period of at least two months for plant start-up and training. The cost of the technician will range from \$300 to \$400 per day, plus expenses.

Raw Materials

Tanned and wet blue leather, available in substantial quantities at all tanneries in Somalia.

Required Imported Raw Materials

Thread; available in the U.S., Taiwan, Philippines and many code 941 countries.

Required Imported Machinery

- A) Five Single Needle Sewing Machines
 - B) Two Double Needle Sewing Machines
 - C) One Merrow Machine
 - D) Two Post Machines
 - E) One Click Die Machine
 - F) Glove Dies
- 36

All machines to be equipped with stand, table, lights and motors.

The best source for the equipment is the U.S., although it is also made in Korea and Taiwan.

Total cost of equipment approximately \$50,000.

Suggested Production Capacity: 400 pairs industrial leather gloves per day.

Personnel Requirements

- (1) One production supervisor - skilled
- (8) Sewing machine operators - skilled
- (3) Machine operators - semi-skilled
- (2) Laborers - unskilled

Power, Water, and Fuel Requirements

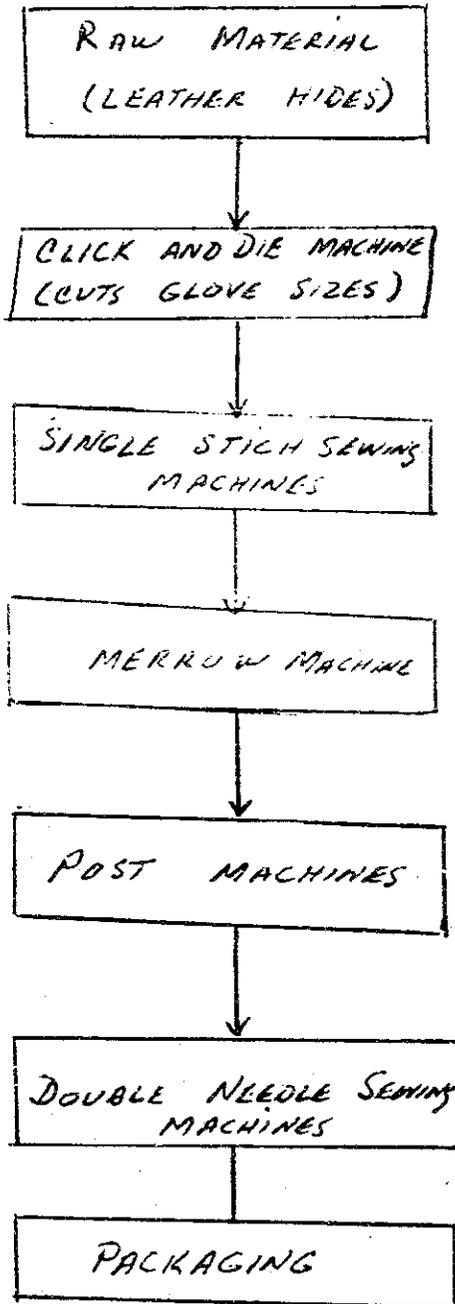
No water or fuel is needed. Electrical consumption is approximately 25 kwh, 220 volts, 3 phase, 50z.

Space Requirements

A building of 800 square feet is required.

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INDUSTRIAL LEATHER GLOVES



RABBIT FARM AND SLAUGHTERHOUSE

Industrial rabbit farms are used to rapidly grow rabbits for both pelts and meat. Due to the high reproductive qualities of rabbits and the low labor costs in Somalia, the rabbit farm operator would have an exceptionally high profit margin.

While rabbit meat could very easily become desirable in Somalia, it is recommended that the rabbit farm operator look toward the export market. The largest importers for rabbit meat are France, Germany, and Saudi Arabia.

The largest importers for rabbit pelts are France, Germany, the U.S. and Italy.

Required Local Raw Materials

Foodstuffs such as carrots, lettuce and other vegetables can be procured locally, but at a rather high price. If a feedmill were created in Somalia, composed rabbit feed would be available.

After one or two large rabbit farms are created, breeding stock would become available.

Required Imported Raw Materials

Initially, the operator would have to import breeding stock. There are many varieties of rabbits, each with different characteristics. Some are larger for higher meat yields. Some have larger litters or shorter reproductive gestation periods. Others have higher quality pelts. Whichever type the operator chooses, he should initially import 5,000 animals for breeding stock. The cost will be roughly \$15,000.

In addition, the operator may want to import vitamin and mineral concentrates. The best source for both the rabbits and the vitamins and minerals is the U.S.

Required Imported Machinery

For production purposes, the rabbit farm will need:

- (10,000) Rabbit cages equipped with feeders and waterers
- (2) Feed carts (can be made locally)

For slaughtering, the slaughterhouse will need:

- (4) Shackles
- (1) Killing cabinet
- (1) Eviscerating table
- (2) Stunning knives (electric)
- (40) Pinning, boning knives, various sizes
- (1) Water flush trough
- (10) Chill tanks
- (1) Ice machine
- (1) Refrigeration system
- (1) Vacuum packaging machine

The total cost for the equipment is approximately \$100,000. The best source is the U.S.

Personnel Requirements

- (1) Production manager - skilled
- (2) Assistant managers - semi-skilled
- (25) Laborers - unskilled

Power, Water, and Fuel Requirements

The rated electrical requirements are 20 kwh, 220 volts, 3 phase, 50 Hz. Approximately 100 gallons of water per day are needed. No fuel is needed.

Space Requirements

A building of 2000 square feet is required.

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LAKE AND RIVER FISHING

The rivers and lakes throughout Somalia are filled with Catfish and Talapia. For the most part, river and lake fishing in Somalia is done with lines and hooks, which are nice for relaxation but hardly useful for commercial fishing. Developing commercial fresh water fishing is an inexpensive, yet efficient way to increase fresh water fish for local consumption as well as export.

Raw Materials and Sources

No raw materials are needed to develop this industry. Fresh water fish are abundant in the Juba and Shebelli Rivers and throughout the lakes in Somalia.

Raw Materials to be Imported

None

Required Imported Equipment

Various size seine nets and hooks. Also, net repair kits. In addition, boning and fillet knives will be needed. All of above are available from numerous sources in Taiwan. Approximate cost \$2,000 per year.

In addition, one five-ton truck will be needed to transport the catch to the marketplace. Approximate cost: \$25,000.

If fish are to be transported fresh for local consumption, fiberglass or metal holding tanks must be fabricated locally or

imported. If imported, the best source is Kenya. Budget: \$1,000 for tanks.

If fish are to be dried for export, the holding tanks are unnecessary.

Locally Available Required Equipment

The operator will need one 12-18 ft. boat and 2 to 4 smaller boats. These boats are available from the fiberglass boat factory in Mogadishu.

With the above equipment, an operator can catch 2 to 3 tons of fish per day per location.

Personnel Requirement

Each boat will require a two-man unskilled crew. In addition, a truck driver and helper will be needed.

If filleting the catch, 2 to 4 unskilled laborers will be needed.

Power, Fuel and Water Requirements

None, except petrol for truck and outboard motors.

4/2

FISH FARM

Fish farms are small man-made ponds used to intensively grow and harvest fish. In Somalia, particularly in the dryer regions, fish farms could become a source of cheap protein for local consumption. Also, fish produced in this manner could be dried for export.

Fish farms consist of small ponds one-half acre to one acre in size and 3 to 4 feet deep. Sophisticated fish farms with piping, aeration devices, and incubation tanks are not needed in Somalia. What is needed is small ponds fed with fingerings (baby fish) to be harvested 2 to 3 times per year.

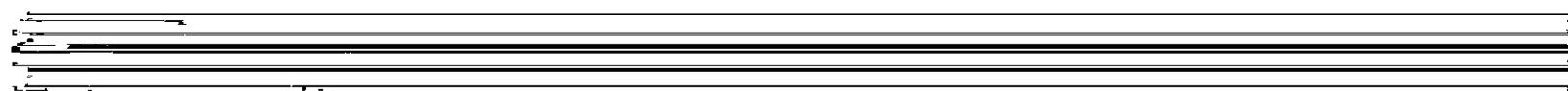
Required Local Raw Materials and Sources

Fingerings can be caught in the Juba and Shebelli Rivers and transported live to the fish farm. Animal dung and other by-products should be fed into the pond periodically. No other local raw materials are necessary.

Required Imported Raw Materials

None. However, operator may want to import rapid growth fish food from the U.S.

Required Imported Equipment



Power, Water, and Fuel Requirements

Electricity: None

Water: Drinking water and washing for crew:

Ice for ice box if freezer not used:

Fuel: Diesel p/hr 3.5-8 gallons depending on size of
boat, load of fish.

Space Requirements.

None, except port docking facilities.

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LOBSTERING AND CRABBING

Lobsters and crabs are abundant along the shores of Somalia, yet only a few fishermen have taken advantage of the huge price these shellfish demand on the world market. It is interesting in that the capital investment to capture these shellfish is very small.

The shellfish caught can be sold on the local market or packaged for export.

Local Raw Materials

Lobsters, crabs and other shellfish are found throughout the Somali coastline, and particularly in the Kismayo region.

Local Equipment

Boats up to 18' can be purchased at the boat factory in Mogadishu.

Required Imported Raw Materials

None

Required Imported Equipment

The entrepreneur will need to import the following:

- (2) Outboard motors
- (2) Air compressor with at least two outlets for divers
- (4) Sets of diving goggles, regulators, hoses, and wet suits
- (30) Lobster traps and crab traps

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The best source for the equipment is the U.S. The approximate cost is \$5,000.

Personnel Requirements

The personnel needed for this facility are:

- (1) Manager - semi-skilled
- (4) Divers - semi-skilled

Power, Water, and Fuel Requirements

No electricity or water is required. Diesel will be required for the outboard motors and for the air compressors. Three gallons of diesel per day should be sufficient.

Space Requirements

None, except docking area for boats.

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FISH PROCESSING PLANT

Fish processing plants take raw fish and package them for local consumption or export. The finished product is usually either canned or frozen. Since the canning of fish would be expensive in Somalia, the following plant is for frozen fish.

Local Raw Materials

Freshwater and ocean fish which are abundant in Somalia. The operator would have to make arrangements with local fishermen to guarantee daily supplies.

Required Imported Raw Materials

The only required imported raw material is packaging materials.

Required Imported Machinery

For a small three ton per day facility, which will yield approximately 1.8 tons per day of fillet, the entrepreneur would need:

- (1) Fish chute and conveyor
- (6) Cutting tables (can be made locally)
- (50) Boning and fillet knives
- (12) Offal collection pans
- (12) Fillet collection pans
- (2) Washing bins
- (1) Packaging machine
- (1) Cold store, 204 m³

The best source for the equipment is the U.S. The cost of the equipment is approximately \$80,000.

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Personnel Requirements

The personnel required for this facility are:

- (1) Plant manager - skilled
- (6) Fillet cutters - semi-skilled
- (10) Laborers - unskilled

Power, Water, and Fuel Requirements

A constant flow of 20 kwh of electricity at 220 volts, 3 phase, 50 cycles is required.

Forty gallons of water for washing the fillet is required per day.

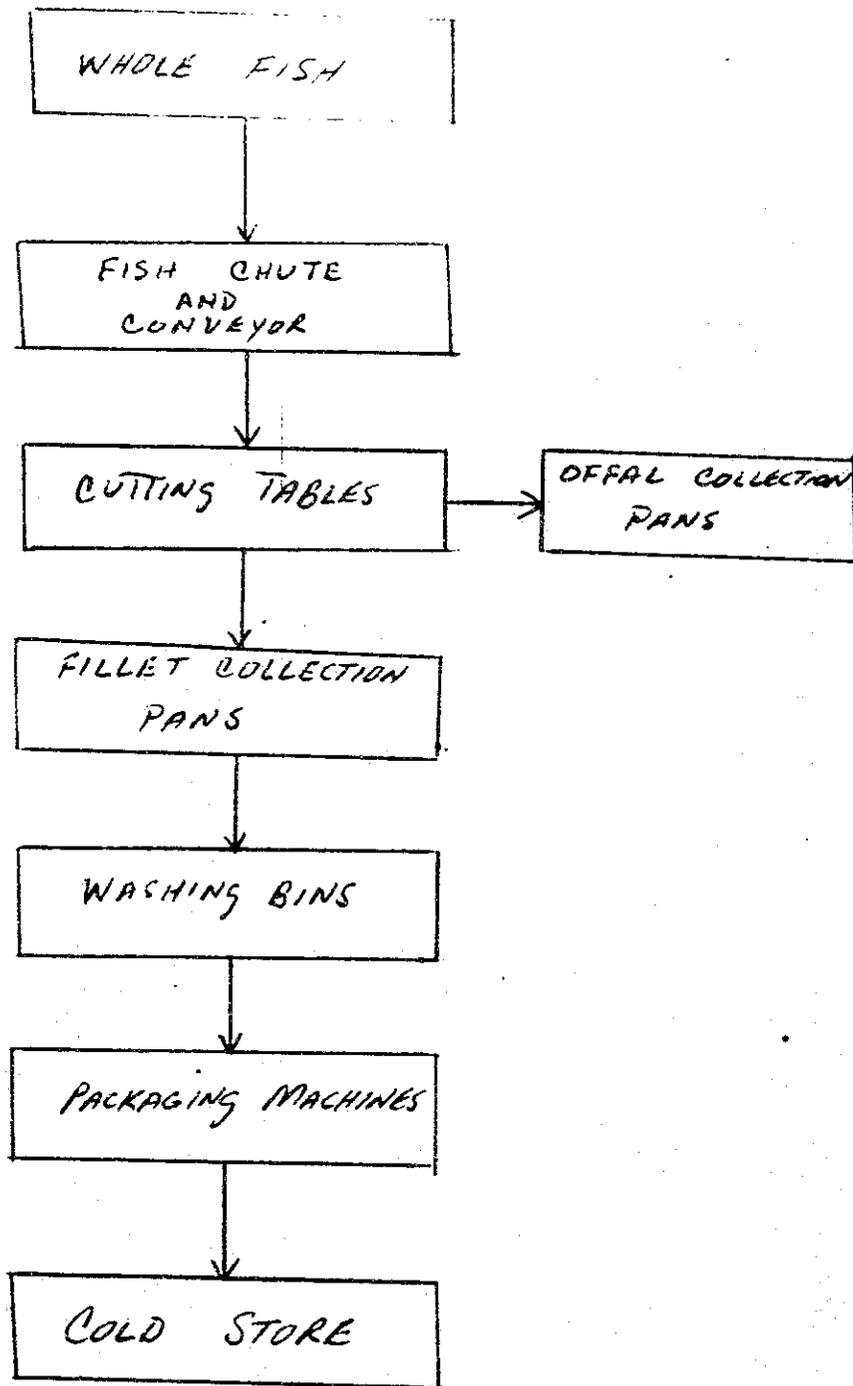
No fuel is needed.

Space Requirements

A building of at least 800 square feet is required.

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FISH PROCESSING PLANT



5/2

SHARKSKIN AND OIL PROCESSING PLANT

There are many shark fishermen in Somalia. Most dry the sharkmeat for local consumption or for export to Kenya. While sharkmeat is a valuable commodity, other parts of the shark can bring in substantial export earnings, especially the sharkskin on large sharks, the shark fins, and the abundant shark oil contained in the liver. There is also a marginal market for shark teeth, particularly in the tourist area or southern Europe, the Caribbean and the southern parts of the U.S.

Sharkskin is used to make high-priced, quality leather items such as shoes, belts, wallets, handbags and pouches. Quality skins are in short supply and demand high prices from tanneries in the U.S., Germany, France, Italy, and Japan.

Shark oil was very popular as a vitamin and mineral supplement after World War II. However, its use diminished after the introduction of cheaper synthetic supplements. Today a market exists in Norway and Japan for shark oil for pharmaceutical purposes. Also a large market exists for shark liver oil as a lubricant due to its exceptional heat resistant and friction qualities.

Shark fins are prized by Chinese for making shark fin soup.

The shark meat can continue to be dried for export. The offal can be sold to a fishmeal plant if one is created in Somalia.

Local Raw Materials

Sharks, which are abundant along the coasts of Somalia. Also, salt for salting the hides can be obtained in Mogadishu and in markets throughout Somalia.

Required Imported Raw Materials

None

Required Imported Equipment

For skinning, salting and curing 10 large sharks a day, the following equipment is needed:

- (1) Storage tank
- (1) Elevated platform for skinning (can be made locally)
- (1) Trimming table (can be made locally)
- (1) Skin soaking tank
- (20) Skinning, fleshing, trimming knives
- (1) Skin curing shed (can be made locally)

For oil extraction, the following equipment is needed:

- (1) Cooker, 200 litre capacity
- (4) Wire mesh baskets for boiling the livers
- (1) Oil collection tank

The total cost of the equipment is less than \$10,000. The best country source is Taiwan.

Personnel Requirements

- (1) Plant manager - skilled
- (1) Skinner - skilled
- (10) Laborers - unskilled

Power, Fuel, and Water Requirements

None, except water for cooking the livers, and for clean-up. Four hundred litres per day is sufficient.

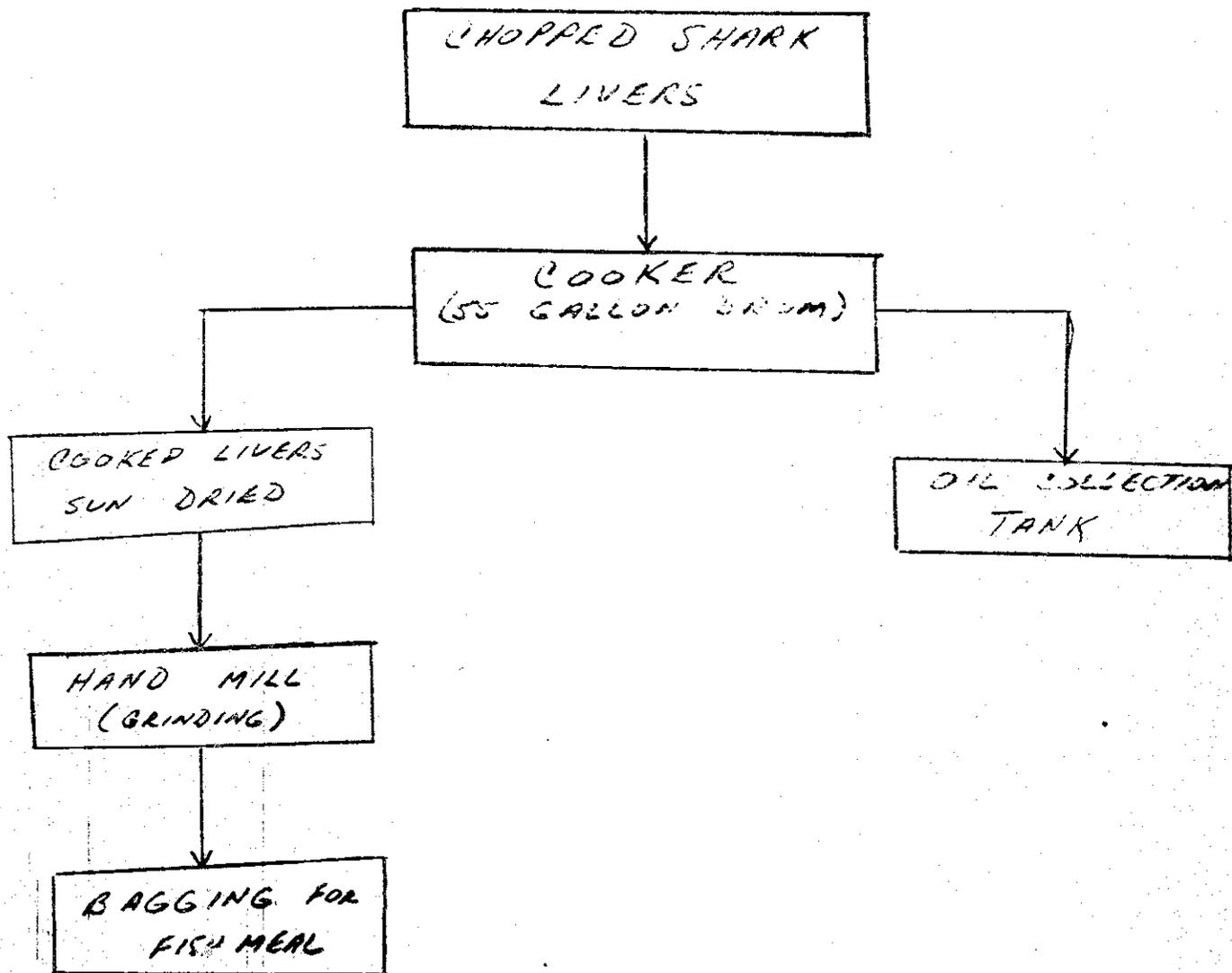
53

Space Requirements

A land area of at least 2,000 square feet is needed. No permanent buildings are needed, except for storage and administrative offices.

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SHARK OIL EXTRACTION



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FISH MEAL PLANT

Fish meal is utilized as animal feed, particularly for poultry. In limited cases, it is also used as a fertilizer and as a food supplement for humans.

Large markets exist for the export of fish meal throughout the Middle East and East Africa. Local markets also exist at the two poultry farms at K-13 and K-17.

Raw Material Sources

The basic raw materials for making fish meal and extracting fish oil are:

A) Fish caught for the sole purpose of making fish meal. Usually, this includes all fish and shellfish which are unmarketable as human food.

B) Fish and shellfish offcuts, offal, and bones.

The rivers and ocean will be the primary source for whole fish and shellfish. Quantities of fish and shellfish suitable for mealing are unlimited.

Shrimp, lobster and fish wastes and offals are available daily at the fish processing plant in Kismayo (3.5 to 5 tons p/day) and at the fish market in Mogadishu (1 to 1.5 tons p/day). As Somalis become more accustomed to eating fish, the quantities of fish and shellfish wastes will increase substantially.

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Both the fish processing plant and the Mogadishu fish market have waste disposal problems and would be anxious to have a fish meal operator collect wastes on a daily basis.

Required Imported Raw Materials

The only imported raw materials needed are 50 kilo bags for packing. Although jute, paper, and woven plastic bags may be used, the solid sheet plastic bag offers the best protection. Sources for 50 kilo packing bags are plentiful in the U.S., Europe, Kenya, India, Taiwan, Korea and other 941 countries. Operator should budget \$4,500 each year for bags.

Imported Machinery

Packaged fish meal plants are available in the U.S., Korea, Taiwan, and India, in capacities ranging from 5 to 60 tons of input (raw materials) per 24 hour day. Packaged plants are recommended because of the small recommended capacity for a fish meal plant in Somalia (10 tons of input per day). Packaged plants are compact units built to suit the requirements of the user and to facilitate installation. Plant will include:

- A) Cooker
- B) Press
- C) Drier
- D) Oil Separator
- E) Oil Collection Tank
- F) Evaporator Unit
- G) Hammermill
- H) Weighing Scales
- I) Bagging Machine

Cost of Equipment: Approximately \$200,000.

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Suggested Capacity: 10 tons of raw material input to yield 2.5 tons of fish meal and one ton of fish oil.

Personnel Requirements:

The personnel needed to operate a small fish meal plant per 8 hour shift are:

- A) Plant Manager/Operator (day shift only) - skilled
- B) Production Line Operator - semi-skilled
- C) Raw Fish Bin cleaner - unskilled
- D) (2) Baggers/Laborer - unskilled

In addition, if operator is picking up wastes from the processing plant or fish market, a driver and laborer, both will be unskilled, will be needed.

Power, Water, and Fuel Requirements

Power: 100 kw hours of electricity will be needed per 8 hour shift.

Water: Two gallons of water per minute will be needed.

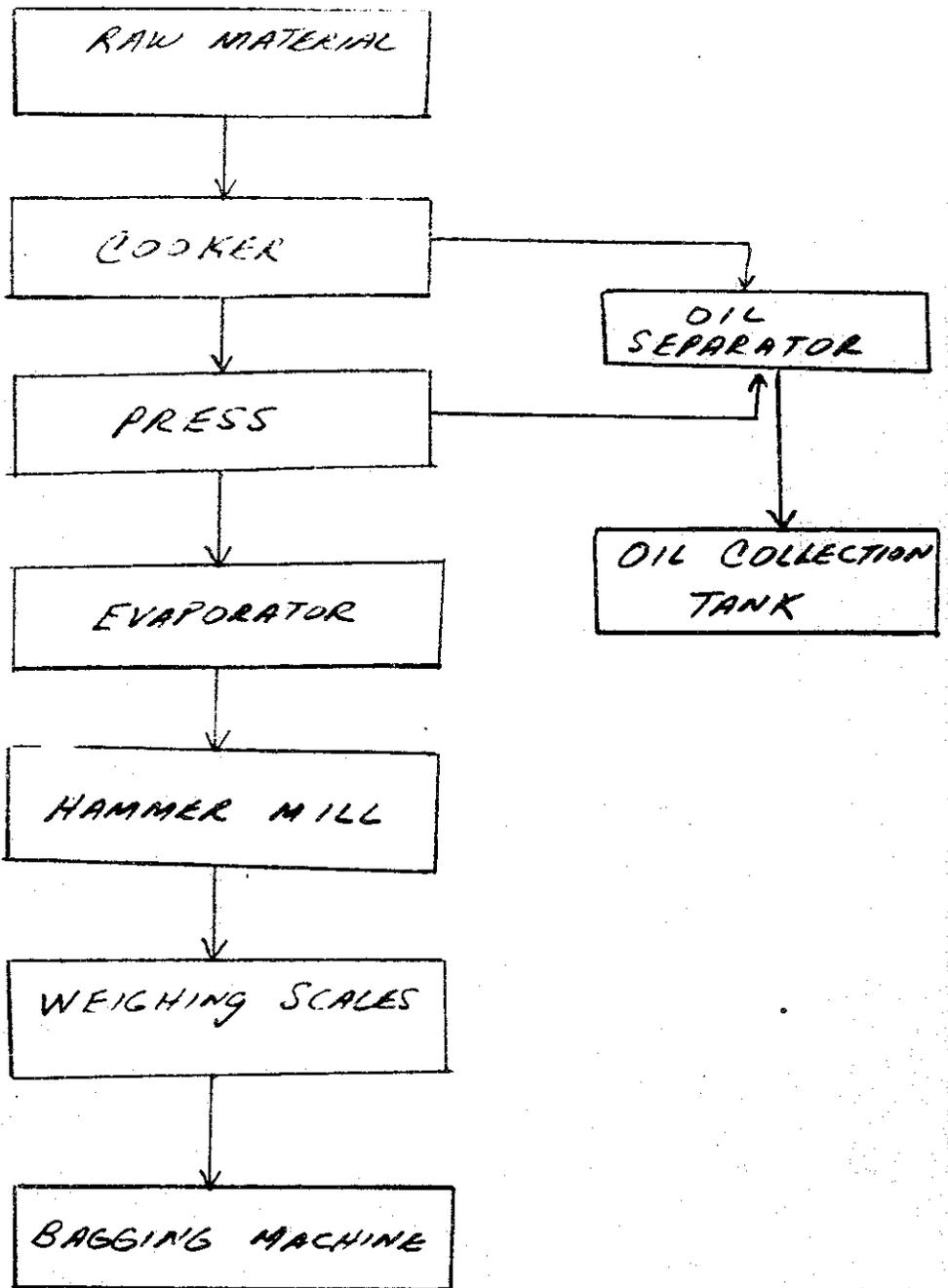
Fuel: 115 litres of diesel will be needed per 8 hour shift

Space Requirements

A building of 1,000 square feet is required.

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FISH MEAL PLANT



GRAIN MILL AND STORAGE PLANT

Industrial grain milling and storage is necessary if Somalia is ever to end its dependence on imported grains.

Locally Available Raw Materials and Their Source

Both sorgum and maize are easily grown throughout Somalia, while both are available in small quantities from farmers. It is suggested that the operator have his/her own farm to guarantee supplies. To successfully operate, a farm of 500 to 1000 acres is needed.

Required Imported Raw Material

None

Required Imported Machinery

A small scale plant would include the following sections and capacities:

<u>Receiving:</u>	75 metric tons per day in 10 hrs.
<u>Cleaning:</u>	75 metric tons per day in 10 hrs.
<u>Drying:</u>	3.12 mt/hour, reducing moisture from 21% to 14%, working 24 hrs. a day during harvesting season
<u>Storage:</u>	2,267 mt

This size plant can process approximately 2,250 mt in 30 days.

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Needed Equipment

- 1 Receiving hopper (locally fabricated)
 - 2 Grain cleaners - capacity 7.5 mt each with electric motor 3 hp
 - 2 Receiving bins, hopper bottom - capacity: 756 bushels = 15.4 mt each
 - 1 Grain dryer - capacity: 8.17 mt per pass, reducing 2% moisture per pass, including preheated combustion chamber with modulating burner for diesel n. 2, dust collectors, fan motor, water proof cover
 - 2 Tempering bins - capacity: 15.4 mt each
 - 4 Grain storage bins - 36 ft. diameter, by 40 ft. 4 in. overall height for a capacity of 566 mt each.
 - 4 Aeration systems, type y, with perforated floor, high pressure axial fans. Magnetic line starters and push button stations.
 - 4 Temperature detection systems for grain storage silos
 - 4 Portable 8 in. diameter bin sweepers
 - 1 Mill day tank, hopper bottom - capacity: 68 mt.
 - 1 Grain mill, 5 ton per hour capacity.
- Augers, Conveyors, Elevators to move grain.

Approximate cost - \$250,000

Best country source - U.S.A.

Personnel Requirements

- One production manager/engineer - skilled
 - Two operators - semi-skilled
 - 5-10 Laborers - unskilled
- 61

Power, Fuel, and Water Requirements

Electrical consumption is approximately 165 kw H, 220v, 3 phase, 50 Hz.

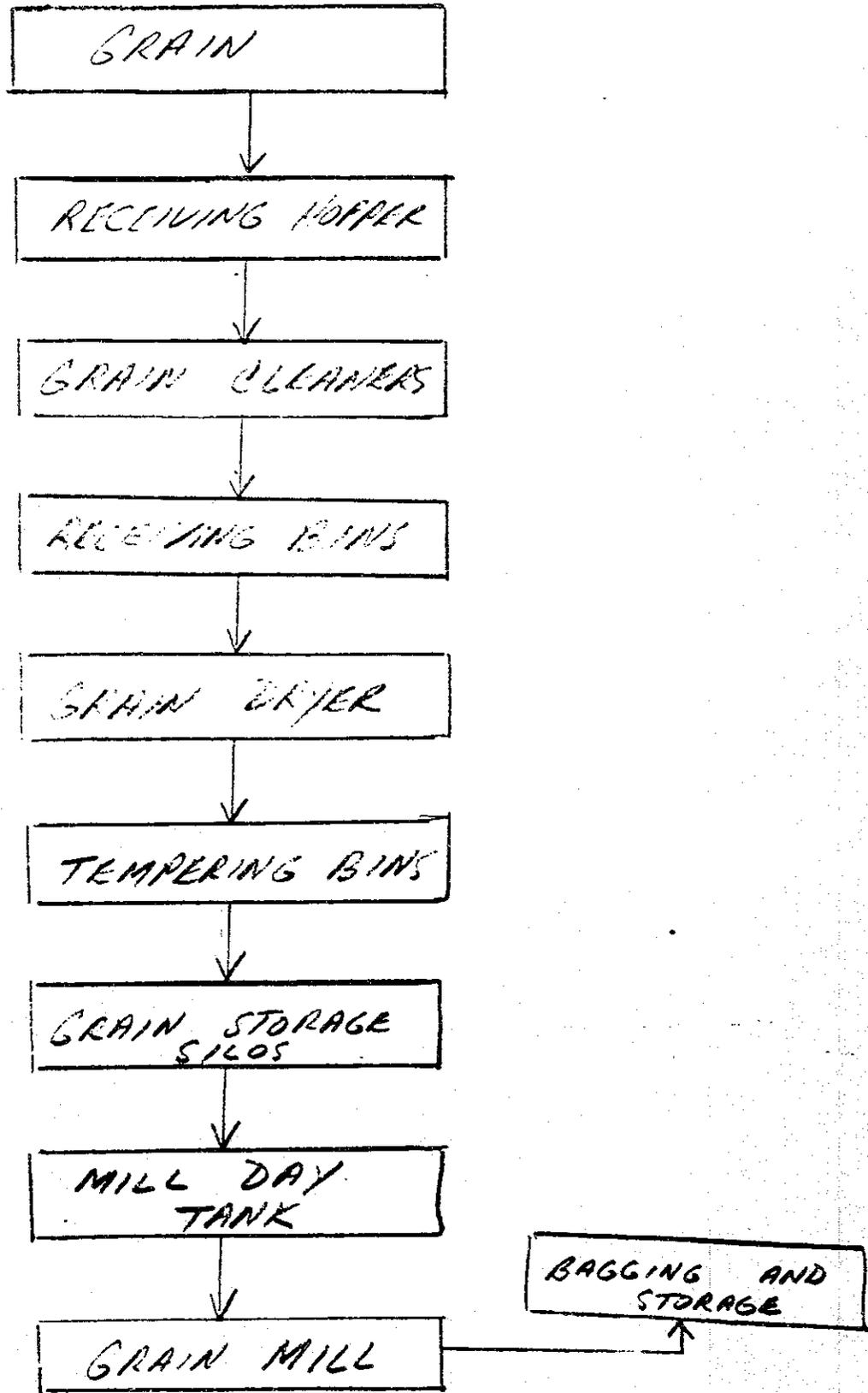
Approximately two gallons of water per minute is needed. No fuel is needed except for a backup generator.

Space Requirements

A building of approximately 1,000 square feet is needed. In addition, concrete foundations for receiving and storage bins will be needed.

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GRAIN MILL AND STORAGE



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FLOUR MILL

Raw Materials

Duram wheat, according to studies and a pilot project operated by the British, can be grown in Gapile in Northern Somalia. However, until it is grown in substantial quantities, the operator must purchase duram wheat through Somali Government auction of USAID PL-480 Food for Peace Program.

Imported Raw Materials: None

Required Imported Machinery

- Cleaning Section
- Regrinding Screeners Section
- Grinding Section
- Storage Section
- Cleaning Pneumatic Section
- Grinding Pneumatic Section
- Flour Distribution Pneumatic Section
- Accessories
- Electrical Controls

Cost of Equipment is approximately \$1,250,000. Suggested production capacity: 5 tons per hour. The best source for the equipment is Mexico.

Personnel Requirements

- One plant manager/engineer - skilled
- Three mill operators - skilled
- Ten to fifteen laborers - unskilled

Power, Water, Fuel Requirements

The electrical requirements for this factory are 300 kwh, 220 volts, 3 phase, 50 Hz. No water or fuel is necessary.

Space Requirements

A 4,000 square foot building will be required.

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PASTA FACTORY

Pasta factories manufacture all types of pasta products, i.e. spaghetti, noodles, linguini, etc. which are very basic and simply produced products.

The Somali diet consists largely of high carbohydrate pasta products to complement its basic diet of meat products, fruit and vegetables. The creation of a pasta factory will generate more of this staple to the remote areas of Somalia, helping to make the diet of those people more well rounded.

Raw Materials and Sources

The basic raw materials required are Seminola wheat flour or Duram number two wheat ground into flour. Neither are currently available locally, but the wheat can be grown in regions of the North. Semolina and Duram can be purchased from the Somali government through its auctions of PL-480 grains.

Required Imported Equipment

The only imported raw materials needed are machines required to produce pasta. They are:

- Long goods line
- Flour system
- Pack Machines - Long
- Power, Heat, Air Distribution Material
- Die Washer
- Spare Parts
- Diesel Generator

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Recommended Capacity

This pasta factory is guaranteed to make 700 pounds per hour of standard (.073 diameter spaghetti). The equipment is manufactured to operate 24 hours per day.

Estimated storage capacity excluding alleys are approximately 152,000 bags wheat flour - 50 kgs each, 2.51 cft per bag, about 7,600 metric tons.

The total cost of required machinery will be approximately USD \$1,000,000.

Personnel Requirements

The labor required to operate this facility per shift include:

		Number
Plant Manager	Skilled	1
Flour Dump Worker	Semi-skilled	3
Pressman	Skilled	3
Stripper Operator	Semi-skilled	3
Packing Supervisor	Skilled	2
Packer	Unskilled	6
Mechanic	Skilled	1
Receiving	Skilled	1
Sanitation	Unskilled	1

Power, Water, and Fuel Requirements

A plant this size will need electrical power rated at 310 kwh, 220/380 volts, 3 phase, 50 cycle.

One hundred gallons of water per hour will be needed.

Diesel fuel will be needed for the standby generator.

Space Requirements

A 2500 square foot building will be required.

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OIL EXTRACTION PLANT

Locally Available Raw Materials and Their Source

Sesame, maize, sunflower, cottonseed, and peanuts are grown throughout Somalia. However, due to the logistical problems and cost of collecting the crops, it is recommended that the operator have a farm of no less than 500 hectares to grow the majority of his crop needs.

Required Imported Raw Material

Solvents, available in abundant quantities from Djibouti and Kenya.

Required Imported Machinery:

A small-scale oil extraction plant would require the following equipment:

Preparation:

- Ripple separator
- Magnet separator
- Grain separator
- Conditioner
- Cracking roll
- Dehuller
- Cooker
- Flaking roll

Extraction:

- Extraction unit
 - Desolventizer unit
 - Miscella distillation system
 - Solvent recovery system
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Bleaching Process:

- Mixer
- Heat exchanger
- Bleaching vessel
- Filter
- Check filter

Additional Equipment:

- Steam boiler
- Laboratory equipment
- Crude oil tanks
- Refined oil tanks

Capacity: 10 Tons of input per day

Approximate Cost: \$500,000 - \$600,000

Best Country Source: Taiwan, India

Personnel Requirements:

One production manager/engineer - skilled

Two technicians/plant operators - skilled

One quality control person - skilled

8 - 10 laborers - unskilled

Power, Fuel, and Water Requirements

Electrical requirements for this facility are 300 kwh, 220/380 volts, 3 phase, 50 cycle.

Four gallons of water per minute are needed.

Twenty litres of diesel per hour are needed for the boiler.

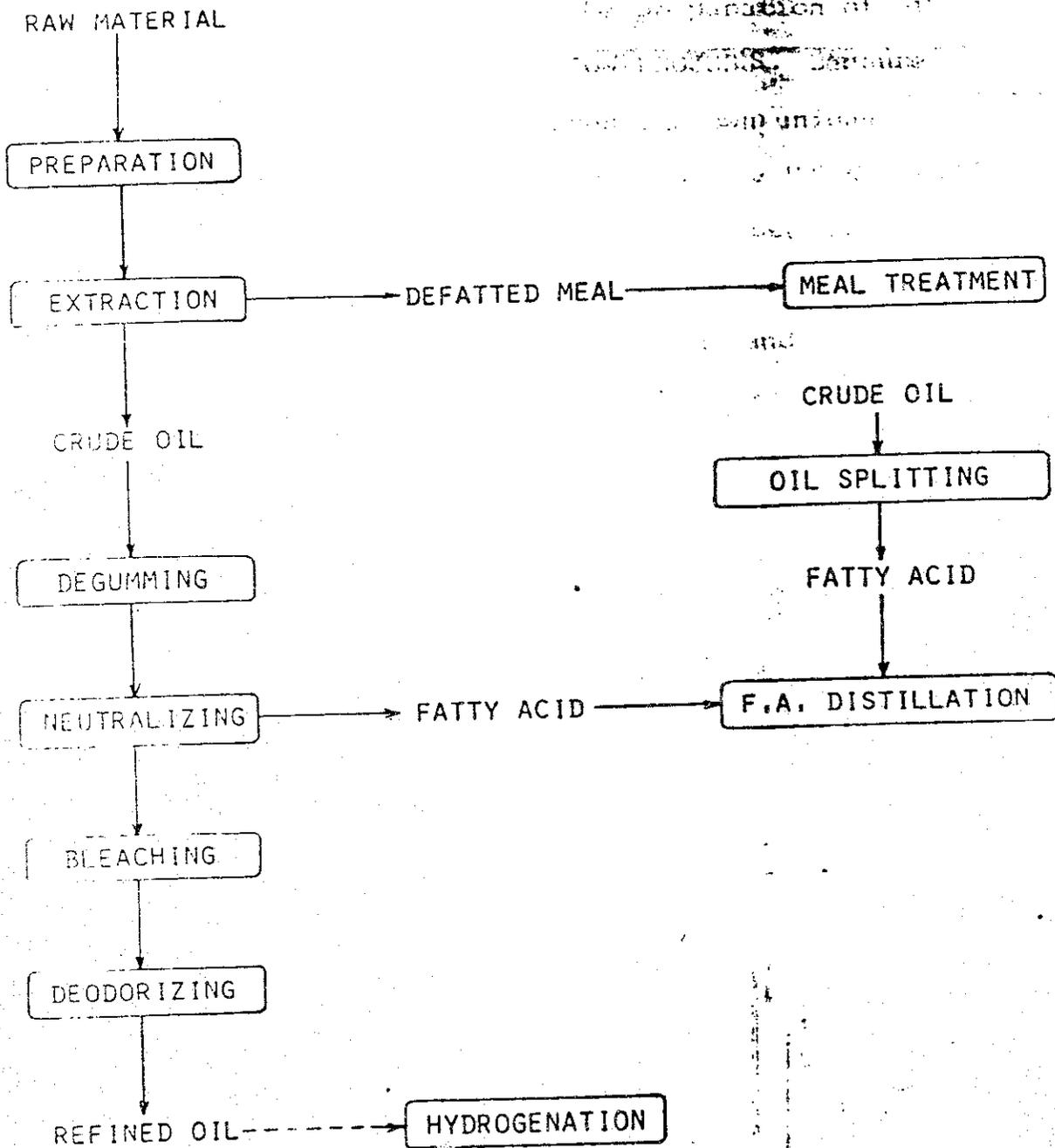
Space Requirements

A building of 2,000 square feet is needed.

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UNIT PROCESSES AND OIL FLOW

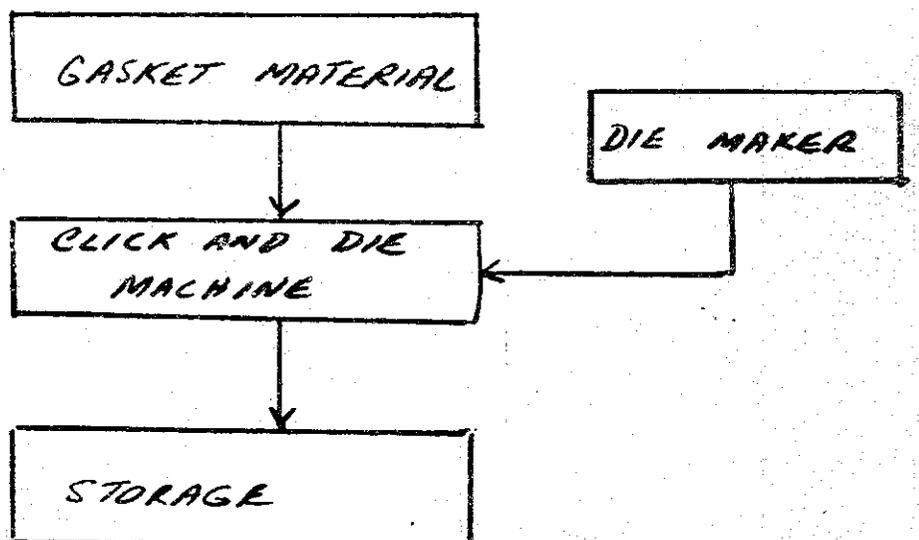
YOSHINO
SEISAKUSHO CO. LTD.



YOSHINO SEISAKUSHO CO., LTD. can supply the unit processes listed above as well as other specialized processes for PICE BRAN OIL and FLM OIL.

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GASKET PLANT



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SALT PROCESSING

A salt processing plant takes rock or sea salt, washes it to remove impurities, dries it and grinds it into table salt for public consumption or fine salt for industrial use.

Raw Materials and Sources:

Sea salt is available from numerous collectors along Somalia's long coastline. The availability of sea salt is substantial.

Required Imported Raw Material

The only required imported material is pvc film for packing.

Required Imported Equipment

For a plant with a recommended capacity of 1.5 - 2.0 mt/hr., the following equipment is required:

- Salt washer, screw type
- Vibrating screens
- Belt conveyors (30° trough)
- Slurry tank and mixer
- Hydro-cyclone
- Crusher (roller type)
- Rotary dryer
- Rotary cooler
- Bucket elevator (centrifugal)
- Centrifuge (pusher type)
- Bulk storage tank

All surface contact with salt is of stainless steel #304, other stainless #41.

- one weighing/filling/sealing machine to package salt into 100 gr., 250 gr. and 500 gr. plastic bags.
- roll stock for bagger.

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Approximate Costs: \$180,000

Best Country Source: Taiwan

Personnel Requirements

- (1) Production manager/engineer - skilled
- (2) Plant Operators - semi-skilled
- (5) Laborers - unskilled

Power, Fuel, and Water Requirements

Electrical consumption is 30 kwh, 220 volt, 3 phase, 50 hz.

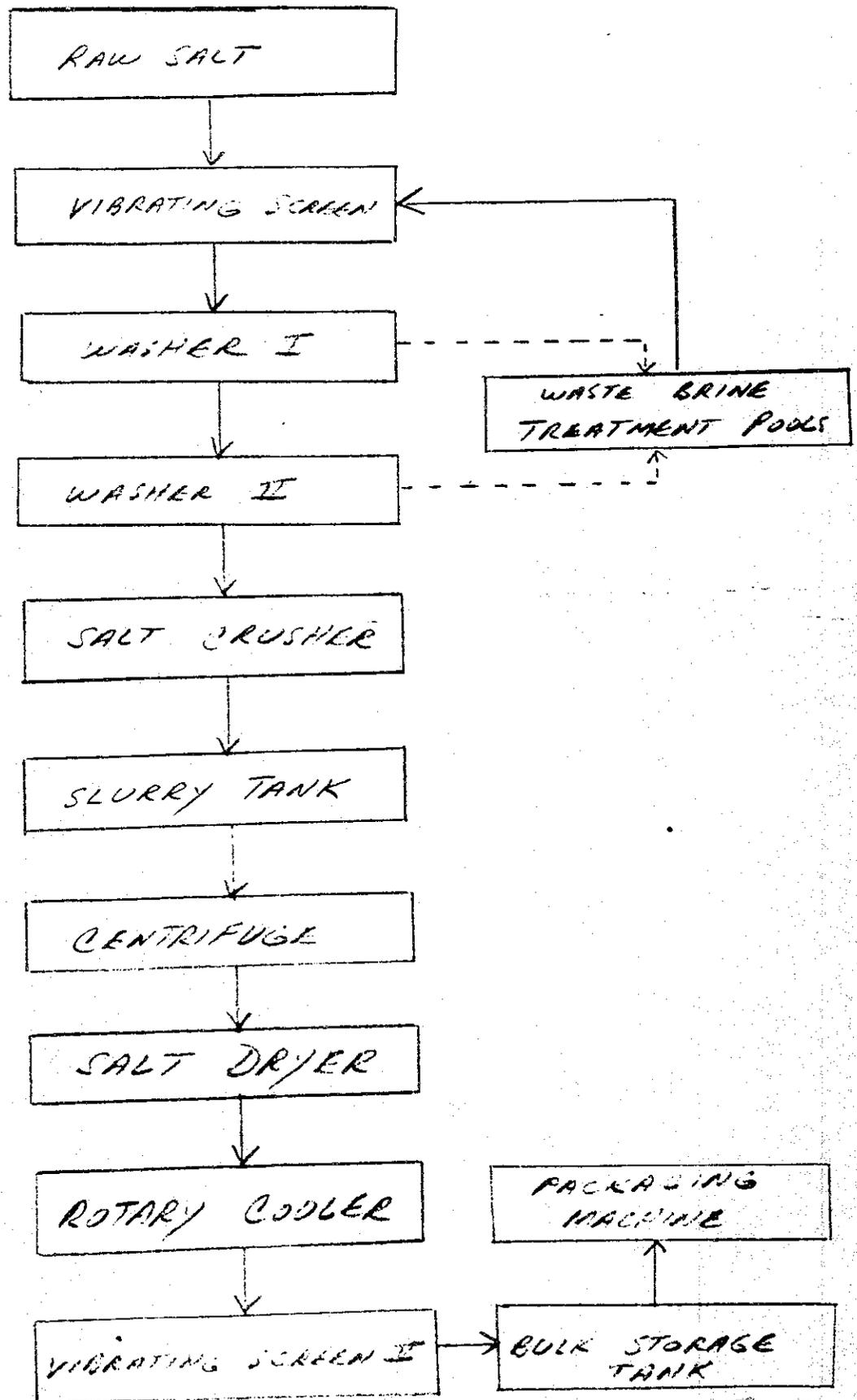
Three gallons of water per minute are needed.

Space Requirements

A building of 1,000 square feet is needed.

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SALT PROCESSING



SUGAR PACKAGING PLANT

Sugar packaging plants are used to box sugar in $\frac{1}{2}$ kilo and one kilo cardboard boxes. Currently, in Somalia, sugar is sold in the markets out of sacks and packaged in old newspapers or any other available wrappings. This is very unsanitary and lends to loss of produce due to punctures in the wrappings.

Also, boxed sugar can be exported to Djibouti and Saudi Arabia.

Local Raw Materials

The major raw material is sugar, available from the sugar factories in Johar and the Juba Valley.

Required Imported Raw Materials

Cardboard (printed) for making the cartons is available in the U.S., Taiwan and Korea. The operator should budget \$100,000 per year for cardboard.

Required Imported Machinery

- (1) Cardboard die cutting machine
- (1) Form, fill and seal cartoner
- (1) Set of change parts
- (1) Hopper with chute

The form, fill, and seal machine should fill a minimum of 30 one-kilo cartons per minute. The best sources for this equipment are the U.S. and Taiwan.

The approximate cost of the equipment is \$80,000.

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Personnel Requirements

- (1) Production Manager - skilled
- (1) Die Cutting Operator - semi-skilled
- (1) Cartoning Machine Operator - semi-skilled
- (5) Laborers - unskilled

Power, Fuel, and Water Requirements

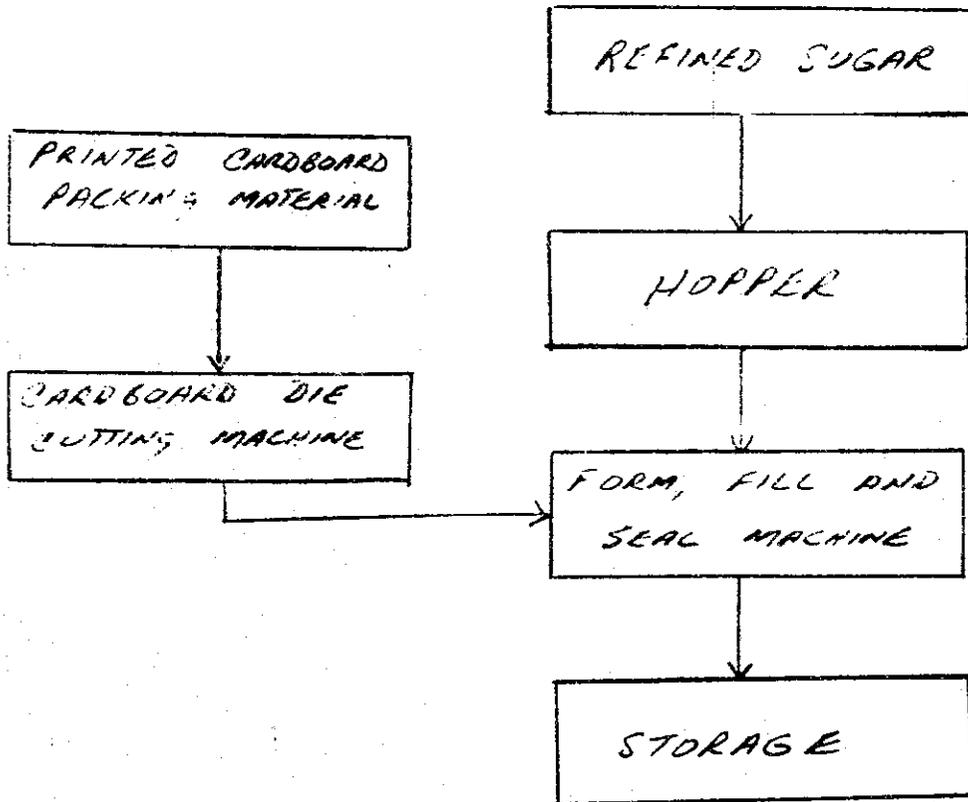
The approximate electrical consumption is 20 kwh, 220 volts, 3 phase, 50 cycles.

No water or fuel is required.

Space Requirements

A building of 1,000 square feet is needed.

SUGAR PACKAGING PLANT



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MEDICINAL ALCOHOL

Medicinal or rubbing alcohol is used by individuals, hospitals, and clinics for a variety of purposes, including cleaning medical instruments, cleaning the surface area of skin before injections, and rubbing soreness and tightness out of muscles.

Not only does a large domestic market exist for this product, but also a substantial export market exists in Saudi Arabia.

Raw Materials and Sources

Fermented, diluted molasses wort, with a minimum of 7-8% alcohol per volume; 2900 litres/hour. Available from the sugar factories in Johar and Juba Valley.

Required Imported Raw Material

The operator must import plastic bottles and caps. However, these imports will become unnecessary if a blow mold bottle factory is started in Somalia.

Required Imported Equipment

For a plant with a recommended capacity of 2500 litres per day of hydrated alcohol (92-96%), the following equipment is needed:

Steam Production:

- One multibar boiler for saturated steam
capacity: 900 kg./hr.
working pressure: 8/10 kg. hr.
fuel: wood or kane bagasse
- One water tank, horizontal, cylindrical, of
carbon steel plate
capacity: 2000 litres
- Pressure reducing valve

Fermenting Equipment:

- One molasses box, of carbon steel
capacity: 1000 litres
- One dilutor, unit for continuous dilution, of
carbon steel
capacity: 150 litres
- Fermenting vats (6) vertical, open, with external
cooling by circular spraying, of carbon steel
total capacity: 6000 litres
- Accessories (pipes, valves, flanges, bolts)

Distilling Equipment)

- Distilling column, superposed sections
- Pre-heater, vertical, cylindrical, with
supports
- Condenser (as above)
- Cooler
- Soda box (of carbon steel)
- Control panel
- Measuring tank
- Piping, valves and accessories

Pumps

- Wort pump - centrifugal (stainless steel #304)
- Alcohol pump (as above)
- Two water pumps (cast iron), output 20,000 litres/hr.
- Interconnecting pipes and valves

Tanks

- Alcohol tank (carbon steel)
capacity: 60,000 litres

Approximate Costs: \$150,000

Best Country Source: Brazil

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Personnel Requirements

- (1) production manager/engineer - skilled
- (2) plant operators - semi-skilled
- 5-10 laborers - unskilled

Power, Fuel, and Water Requirements

Water: Industrial water, acid and solids free, max. temperature 28°C, 17,000 litres/hr.

Steam: Saturated steam, at 1 bar: 3.8/4.3kg./litre of alcohol

Electricity: Tri-phase, power 220 or 380 volts, 50 Hz: 6 kw/hr.

Space Requirements

A building of 2,000 square feet is needed.

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POTATO CHIP FACTORY

Potato chips are a snack food consisting of thinly sliced potatoes which are deep fried and salted. The operator of a potato chip factory will find an eager market among the large expatriate community in Somalia as well as among the local population. An export market also exists in Saudi Arabia and the Gulf.

Required Raw Materials

Potatoes, salt and vegetable oils are the required raw materials for this project. Potatoes are currently grown in Northern Somalia, but

Required Raw Material Import

This project requires the importation of a healthy variety of potato seeds, a variety more healthy than that which currently is found in Somalia. Also, the importation of vegetable oils and plastic bags are required. The best source for seeds and bags is the U.S. The vegetable oils should be purchased from India, Taiwan or Philippines.

Required Machine Material

The following machinery is needed for the installation of a potato chip factory.

ED

- Screw type feed system
- Automatic weighing hopper
- Abrasive t e peeler
- Inspection and slicer feed conveyor
- Potato slicing machine
- Slicer stand
- Potato chip cooker
- Exhaust hood
- Salter and salter conveyor
- Weighing and packing table
- Star filter press
- Speed Sealer
- Discharge System

Capacity Rate: 120 pounds per hour

Cost of Machinery: \$110,000

Best Country from which to Import: The best country from which to import is the United States.

Personnel Requirements

- 1 Manager - skilled
- 2 Machine operators - semi-skilled
- 5 Laborers - unskilled

Power, Fuel, and Water Requirements

The electrical power of this facility is 30 kwh, 220 volts, 3 phase, 50 Hz.

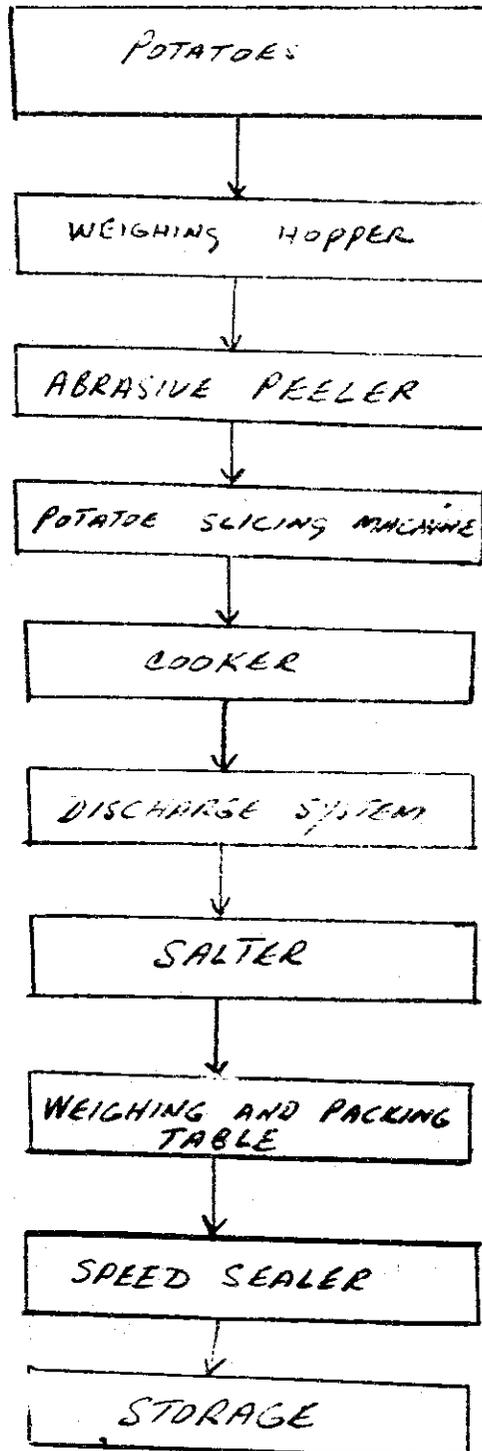
Approximately 10 gallons of water per hour is required. No fuel is needed.

Space Requirements

A building of 2,000 square feet is needed. In addition, a large storage bin or building must be constructed to hold at least a ten day supply of potatoes.

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POTATO CHIP FACTORY



BAKERY

Raw Material Sources

All raw materials used in the production of bread (flour, water, yeast, vegetable oil, sugar) can be procured locally. Flour is available from the flour mill in Mogadishu, although there are periodic shortages. Sugar and vegetable oil can be purchased daily in the markets. Yeast, while imported, can be purchased from importers.

Required Imported Equipment

- Spiral Mixer
- Flour Shifter
- Ice Machine
- Water Meter
- Underwater Meter
- Manual Dough Divider
- Conical Rounder
- Bread Proofer
- Stainless Steel Chute for Proofer
- Humidifier for Proofer
- Exhaust Fan
- French Bread Moulder
- Final Proofing Cabinet
- Revent Rack Oven
- Double Racks
- Baquette Baking Pans

Recommended Capacity

1000 kilograms per day

Approximate Costs

USD \$169,000

EE

The best country from which to purchase machinery is the U.S.

Personnel Requirements

- (1) Manager - skilled
- (14) Laborers - skilled

Power, Water, and Fuel Requirements

Electrical power requirements are 30 kwh, 220 volts, 3 phase, 50 Hz.

Water requirements are 100 gallons per day. No fuel is necessary.

Space Requirements

A building of at least 1,000 square feet is needed.

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COOKIE & CAKE FACTORY

Locally Available Raw Materials

The primary ingredients for making cookies and cakes are flour, sugar, butter and milk. While it may be possible to grow wheat for flour in Northern Somalia, it is not currently grown. Therefore, the operator will have to depend upon flour auctioned by the Somali government under the PL-480 USAID Program.

Sugar is available in large quantities from the sugar mills in Johar and at Juba.

In order to obtain milk and butter in sufficient quantities, the operator will have to make supply arrangements with local dairy cow owners.

As an added attraction, the operator may want to add nuts, sesame seeds and/or fruit chunks to his cakes and cookies. All are available locally in good quantities.

Also, rum, available periodically at the Johar sugar factory, could be added with fruit chunks and nuts to make rum fruit cakes.

Required Imported Raw Materials

The only raw material which must be imported is wrapping materials for the cakes and bagging materials for cookies. It is suggested that heat sealed cellophane film is used for wrapping cakes and heat sealed cellophane bags are used for packaging cookies. The best source is the U.S., Taiwan or Korea.



Required Imported Equipment

The best and cheapest source for the equipment is the United States. However, it is also made in Taiwan and Korea.

The suggested capacity of the facility is 2 mt of cookies or cakes per day. The necessary equipment follows:

- (1) Ultra high-speed or spiral mixer, with stainless steel bowl, 140-lb capacity
- (1) Flour sifter with spout
- (1) Wire cut cookie dropper, fully automated with a speed conveyor belt
- (4) Round cookie dies
- (1) Rack oven with stainless steel interior and exterior
- (16) Racks, stainless steel
- (600) Bun pans 18" x 26", 16 gauge, heavy duty
- (1) Ingredient water chiller, 7 1/2 hp
- (1) Water meter
- (1) Stainless steel sink

The approximate cost of the above equipment is \$150,000.

Personnel Requirements

One baker - skilled

Two baking assistants - semi-skilled

Four to six laborers - unskilled

Power, Water, and Fuel Requirements

Electrical Power: 220 volt, 3 phase, 50 Hz, 163 kw per day

Water Requirements: 600 Kg of water per day

No diesel is necessary unless a generator is used.

Space Requirements

A building of at least 1,000 square feet is needed.

DOUGHNUT FACTORY

Required Raw Materials

Required raw materials for the establishment of a doughnut factory are: sugar, flour, water, and cooking oil. All are locally available throughout Somalia.

Required Imported Raw Materials

None

Required Machine Material

A doughnut factory of this type requires the importation of the following machinery:

- Feed table
- Proof cloths
- Fryer
- Fat melter
- Conveyor
- Glazer
- Screen loader
- Screens

Rate of capacity: The capacity rate for a plant of this size is 100 dozen doughnuts per hour.

Approximate cost: Approximate cost of above-mentioned machinery is USD \$36,200.00.

Best country from which to import: Best country from which to import is the United States.

Personnel Requirements:

The following personnel are required for a plant of this type:

- 1 Manager - skilled
- 3 Machine operators - semi-skilled
- 4 Laborers - unskilled

Power, Fuel, and Water Requirements:

At the estimated capacity rate of 100 dozen doughnuts per hour, the following power requirements are necessary: 15.9 kw at 240v 50/60 hz 1 ph or 3 ph. Fuel requirements are standard for running a diesel generator in place of municipally supplied electricity during power outages.

Approximately 1/2 gallon of water per minute is also required.

Space Requirements

A building of 500 square feet is required.

EE

CITRUS JUICE FACTORY

Citrus fruits such as grapefruit are abundant in Somalia, particularly in the Jinale region. A small citrus juice factory could make drinks for the local market and frozen concentrate for the export market.

Local Raw Materials

Grapefruit, which is abundant in Jinale and Merka. Some oranges are also grown in Somalia.

Required Imported Raw Material

None, except packaging materials. It is recommended that aluminum foil pouches are used instead of tin cans. The pouches, which are only available in the U.S. are cheaper and less bulky than cans. The operator should budget \$25,000 per year for pouches.

Required Imported Machinery

A small-scale processing line with an output capacity of 1 mt/hr. requires the following equipment:

- Wash feed hopper
- Elevator to drum
- Washer drum
- Inspection pan
- Elevator to cutter
- Cutter unit
- Centrifugal extractor

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Add for puree processing:

- Steam tunnel
- Crusher-scraper
- Macerator
- Feed chute

Approximate costs: \$150,000

Additional equipment for further processing and canning:

- Pulper
- Finisher
- Pumps
- Tanks
- Heater Exchanger
- Can Filler
- Sealer
- Cooker
- Spin sprayer
- Dryer
- Case stacker

Additional costs: Approximately \$500,000

Best country source: U.S.A.

Personnel Requirements

- 1 supervisor - skilled
- 1 forklift driver for bins - semi-skilled
- 2 sorters - unskilled
- 1 attendant for pulper, finisher, pumps, waste belts - semi-skilled
- 1 quality control person - skilled
- 1 person for product filling line and heat exchanger operation - skilled
- 3-5 laborers for clean-up, etc. - unskilled

Power, Fuel, and Water Requirements

At 6 hr./day operation, 22 days per month: 3700 kw hrs./month

Water - 1300 - 1500 gallons/day for operation and cleanup.

Steam consumption - 260,000 btu/hr.

Space Requirements

A building of 2,000 square feet is needed.

TOMATO, MANGO, PAPAYA PROCESSING PLANT

Local Raw Materials

Acidic fruits such as tomatoes, mangos, and papaya which grow in abundance throughout the Central and Southern regions of Somalia.

Required Imported Raw Material

None, except packaging materials. It is recommended that aluminum foil pouches are used instead of tin cans. The pouches, which are only available in the U.S., are cheaper and less bulky than cans. The operator should budget \$25,000 per year for pouches.

Required Imported Machinery

A small-scale processing line with an output capacity of 1 mt/hr. requires the following equipment:

- Wash feed hopper
- Elevator to drum
- Washer drum
- Inspection pan
- Elevator to cutter
- Cutter unit
- Centrifugal extractor

Add for puree processing:

- Steam tunnel
- Crusher-scraper
- Macerator
- Feed chute

Approximate costs: \$150,000

Additional equipment for further processing and canning:

Pulper
Finisher
Pumps
Tanks
Heater Exchanger
Can Filler
Sealer
Cooker
Spin sprayer
Dryer
Case stacker

Additional costs: Approximately \$500,000

Best country source: U.S.A.

Personnel Requirements

- 1 supervisor - skilled
- 1 forklift driver for bins - semi-skilled
- 2 sorters - unskilled
- 1 attendant for pulper, finisher, pumps, waste belts - semi-skilled
- 1 quality control person - skilled
- 1 person for product filling line and heat exchanger operation - skilled
- 3-5 laborers for clean-up, etc. - unskilled

Power, Fuel, and Water Requirements

At 6 hr./day operation, 22 days per month: 3700 kw
hrs./month

Water - 1300 - 1500 gallons/day for operation and cleanup.

Steam consumption - 260,000 btu/hr.

Space Requirements

A building of 2,000 square feet is needed.

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RICE MILLING

Rice is one of the main components of the Somali diet. However, most of it is currently being imported. The Chinese have demonstrated in the Juba Valley that rice can successfully be grown and harvested in Somalia.

Raw Materials and Source

Rice, which can be grown locally (see above). It is recommended that a pilot farm of 500 ha. be set up in order to supply the mill.

Raw Materials to be Imported

None

Required Imported Equipment

Recommended capacity of rice mill: 5 tons per hour.

The mill would require a receiving, drying, storage and cleaning section for the raw rice.

Receiving and cleaning capacities: 75 mt of paddy rice per day in 10 hours.

Drying section: 3 mt/hr.

Storage: 2,267 mt of paddy rice.

Equipment list for the cleaning, drying and storage section:

- 2 paddy cleaners (7.5 mt capacity) with 3 hp motors
- 2 receiving bins, hopper bottom, 44 mt capacity each
- 1 grain dryer (capacity 19.5 mt per pass)
- 2 tempering bins
- 4 grain storage bins (1.1 mt capacity each)

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- 4 aeration systems
- 4 temperature detection systems for grain storage
- bin sweepers
- 1 mill-day tank, hopper bottom.
- screw conveyors, elevators and augers to move grain

Complete Rice Mill:

- paddy cleaner
- 2 stoners
- 1 hopper scale
- 2 paddy huskers
- 2 paddy separators
- 3 rice whitening machines
- 3 friction type polishers
- 2 rice refiners
- 1 rotary sifter
- 2 rice graders
- 1 packing machine
- bucket elevators
- control panel
- 3 suction blowers
- 3 cyclones

Approximate Costs

1. Cleaning, drying and storage section: \$375,000
2. Rice Mill: \$180,000

Best Country Sources

U.S. for cleaning, drying and storage. Taiwan for rice mill.

Personnel Requirements

- One production manager/engineer - skilled
- Two plant operators - semi-skilled
- 5-10 laborers - unskilled

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Power, Fuel and Water Requirements

Electrical consumption required is 150 kwh, 220 volt, 3 phase, 50 hz.

Approximately 2 gallons of water per minute are needed.

No fuel is needed except for a backup generator.

Space Requirements

A land area of 1.5 acres is needed. A building to house the equipment with at least 2,500 square feet is recommended.

In addition, operator should have a minimum of 250 hectares of rice under cultivation.

VEGETABLE CANNERY

Required Local Materials

Vegetables are available throughout Somalia, but especially in the Kismayo, Merka, Afgoy and Jinale regions. It is recommended that the operator also have his own farm to guarantee availability of vegetables.

Salt is available from processors in Mogadishu.

Required Imported Raw Materials

The only imported raw material needed is tin for making cans. The best source is Taiwan.

Required Imported Machinery

The recommended capacity for a vegetable cannery in Somalia is one ton of input per hour. The following equipment is necessary:

- Section I - Product Receiving System
Manual Dump Box and Wash Tank
Dewatering Elevator
Secondary Wash Flume
Dewatering Flume
2 hp Air Blower
- Section II - Roller Sorting System
Sorting Table
Cull Chutes & Conveyor
Vegetable Chopper
- Section III - Finishing System
Finisher
400 litre Product Surge Tank
Product Removal Pump

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Section IV - Cooking System
 Feed Tank
 Evaporator
 Recirculation and Transfer Pump
 Product Discharge Tank
 Scraped Surface Product Heater

Section V - Canning System
 Can Maker
 Empty Can Feeder
 Change parts for can sizes
 Can Seamer

Section VI - Control Panel

Approximate cost of above equipment is \$220,000.

The best sources are Taiwan, Korea, and India.

Personnel Requirements

A production manager/engineer is required per shift, as well as a control operator. Both are skilled positions. Ten to twelve unskilled laborers will be needed for product handling and packing.

Power, Water, and Fuel Requirements

Steam - approximately 1000 kg per hour
 Water - approximately 300 litres per minute
 Air - approximately 100 litres per minute @ 5.62 kg/cm²
 Electrical - power needed is 60 kwh, 3 phase, 50 Hz

Space Requirements

A building of 2,000 square feet is needed. Also, operator should operate a farm for vegetable production of at least 250 acres.

BROOM FACTORY

A large domestic and export market exists for brooms and wisk brooms. This labor intensive industry is a natural for Somalia due to the low capital costs and the abundant availability of corn stalks and silage.

Locally Available Raw Materials and Their Source

Broom corn, broom grass, other readily available fibers which can be grown locally.

Required Imported Raw Material

None

Required Imported Machinery

A basic broom, mop and duster factory, with a capacity of 600 brooms per 8 hours, would require the following equipment:

- Broom stitcher
- Winder
- Suraper or Seeder
- Corn vibrator or bumper
- Bundle cutter
- Hand clipper
- Bunchomatic (pneumatic) - optional

Approximate costs: \$50,000

Best country source: U.S.A.

Personnel Requirements

- 1 Production manager/engineer - skilled
- 6-12 Laborers - unskilled

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Power, Fuel, and Water Requirements

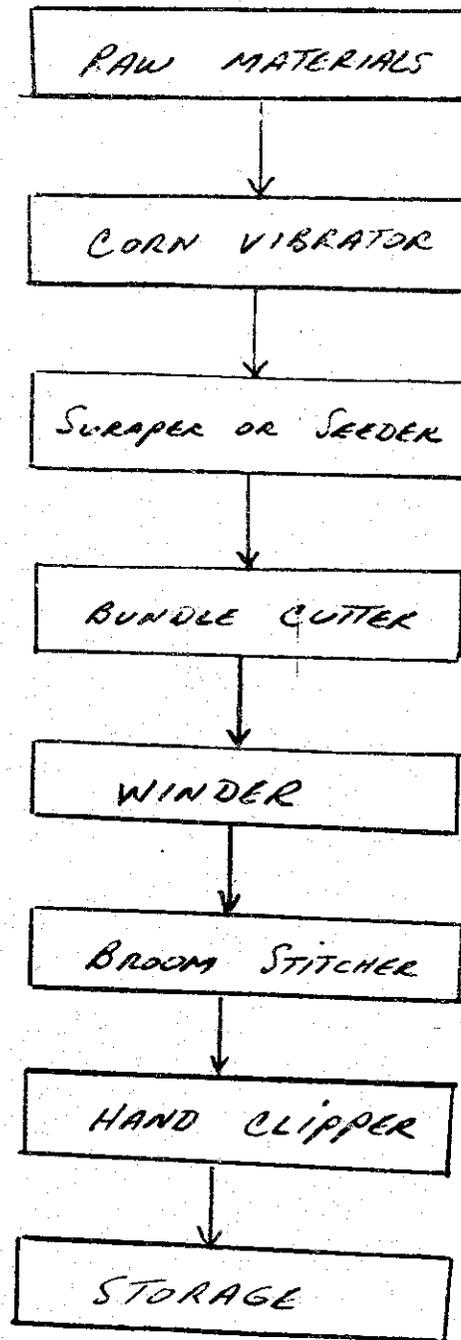
Electrical consumption is 15 kwh, 220v, 3 phase, 50 cycle.
No water or fuel is needed.

Space Requirements

A building with 600 square feet is needed.

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BROOM FACTORY



WATER WELL DRILLING COMPANY

Required Local Raw Material

None, except ground water.

Required Imported Raw Material

- Drilling mud
- Casing
- Well screens
- Pumps

Required Imported Machine Material

The following list of machinery is required to begin a water well drilling company:

Rotary Drill Rig equipped with the following:

- A. Hydraulics
 - a. Reservoir
 - b. Filtration
 - c. Hydraulic oil cooler
 - d. Hydraulic pumps
- B. Frame
 - a. Deck
 - d. Levelling jacks
 - d. Drill pipe rack
 - e. Controls
- C. Derrick
 - Derrick hoist
- D. Breakout wrench
- E. Pulldown
- F. Rotary table
- G. Draw works
- H. Mud pump
- I. Water injection
- J. Sand reel
- K. Welder
- L. Compressor
- M. Line oiler

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Rate of capacity: The rate of capacity for this well to pump water is between 300 and 562 gpm. Water injection into well is rated as 25 gpm.

Approximate cost of equipment: \$350,000

Best country from which to import: United States

Personnel Requirements

Manager - skilled
Machine operator - semi-skilled
Laborers - unskilled

Power, Water, and Fuel Requirements

Water requirement for drilling is 8 gallons per minute. No electrical power is needed.

Fuel requirements for the rig in operation is 3 gallons per hour.

Space Requirements

A storage yard of at least 1/4 acre is needed to store the drilling rig, other vehicles, and supplies such as piping, casing, screens, drilling mud, pumps, etc.

A small administrative building will also be needed.

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CAUSTIC SODA PLANT

Caustic soda or lye is used primarily to manufacture soap. Somalia currently imports a minimum of 300 tons of caustic soda (solid) per year, and could probably use another 200 tons. The following facility will produce caustic soda as well as chlorine for both domestic use and export to neighboring countries. It should be noted that no caustic soda facility exists in East Africa or the Middle East.

Raw Material Sources

Salt found locally throughout Somalia.

Required Imported Raw Materials: None

Required Imported Equipment:

A plant of this type requires importation of the following equipment:

- Electrodes
- Steamchests
- Vapor and liquid separations
- Condenser
- Caustic Flash Cooler
- Vacuum Equipment
- Pumps
- Piping

Control Instruments (Systems)

- Steam flow
- Absolute pressure
- Liquid level
- Differential temperature
- Condensate level
- Miniature Strip Chart
- Free Standing Control Panel

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Reactor tanks
Feed tanks
Pumps
Storage tanks

Recommended Capacity: 20 tons per day

Approximate Costs: Cost for this type of plant will be approximately USD \$850,000.

Best Country: from which to import these machines is the United States.

Personnel Requirements

Manager/Engineer	Skilled
2 Control Operators	Skilled
10 Laborers	Unskilled

Power, Water, and Fuel requirements

Evaporation equipment will require the following approximate quantities of utilities:

Steam for evaporation	6,000 #/hr @ 150 psic
Water for surface condenser	350 gpm @ 90°F
Steam for ejectors	150 #/hr. @ 150 psic
Water for ejectors	10 gpm @ 90°F

Space Requirements

A building with 3,000 square feet is needed. Also a storage area for raw salt is required.

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AGRICULTURE AND HEAVY EQUIPMENT GARAGE

With the emphasis USAID has placed on agricultural and livestock production in Somalia, agricultural and heavy equipment garages with skilled mechanics will be necessary in each region of the country. These businesses will specialize in repairing agricultural tractors, trucks, and earthmoving equipment, particularly dozers, wheel loaders, and motor graders.

Required Imported Equipment

As a minimum, each facility will need the following equipment:

Crankshaft Grinder, Heavy Duty
Crankshaft Grinder, Light Duty
Vertical Boring Bar
Milling Machine
Diesel Powered Welders
Electric Chain Hoist
50 Ton Press
Valve Refacing Machine
Valve Seat Grinder
Air Compressor, 5000 ltr.

Cost of Equipment: Approximately \$240,000.

Source: U.S., Taiwan, Korea

Required Imported Raw Materials

Lubricants of various weights available in Kenya.

Spare parts available in the U.S. or through local Somali agents of the equipment manufacturer.

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Personnel Requirements

Each garage should have at least two skilled mechanics and one to three unskilled laborers.

Power, Water, and Fuel Requirements

No water requirements are necessary.

Approximately one litre of diesel per hour is needed for operation of the power welders.

Electrical power requirements would depend upon the volume of work and type of work being performed. At least 20 kwh should be available at site.

Space Requirements

An enclosed or partially enclosed work area of 400 square feet is needed. Also a storage yard of 1/4 acre is recommended.

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PAINT FACTORY

The purpose of a paint factory is to manufacture exterior and interior paint to supply its increasing need in Somalia.

The recent increase in construction requires an increased supply of paint. The equatorial climate and cultural preferences necessitate the production of white and pastel colored paints.

Currently, there is only one paint factory in Mogadishu which supplies almost all requirements in Somalia, however, the introduction of another such facility would not only make paint available in other parts of the country, but will also meet the ever increasing demand for paint which the present factory cannot meet.

Locally Available Raw Materials and Sources

No raw materials required for the production of paint, chemicals, color pigment, etc. are produced locally and must be brought in from the outside. Kenya, India, Taiwan, and the United States are places from which these necessary ingredients can be imported.

Required Imported Raw Materials

The required imported raw materials include various chemicals, pigment, turpentine resins, etc. There are literally hundreds of varying formulas for manufacturing paint. One inexpensive formula follows:

Water	63.73 gallons
Natrosol 250 MR Thickener	.64 gallons

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Metasol	57 Fungicide	.05 gallons
Tamol	731 Dispersant (25%)	.56 gallons
Potassium Tripolyphosphate		.10 gallons
Igepal CO-630 Surfactant		.27 gallons
Ammonium Hydroxide		.60 gallons
Texanol Coalescing Agent		1.27 gallons
Ethylene Glycol		1.61 gallons
Nopco Defoamer		.27 gallons
Titanium Dioxide		4.50 gallons
Aluminum Silicate		9.55 gallons
Acrylic Emulsion		<u>17.85</u> gallons
		100.00 gallons

Sources for the raw materials include the U.S., India, Kenya, and Taiwan.

The operator should budget \$500,000 per year for raw materials.

Required Imported Equipment

All imported equipment necessary for the production of paint follows:

- High Speed Dispensers
- Paint Straine
- Mix Tanks
- Air Compressor
- Paint Filler and Lid Closer
- Can Labeler
- Accumulating Table
- Viscometer and Hegman Grind Gauge
- Laboratory Equipment

Recommended capacity: 2,000 to 4,000 gallons per day.

Approximate costs: \$150,000.

The United States offers the best equipment. However, equipment is also available from India, Taiwan, and Korea.

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Personnel Requirements

The personnel requirements for this project are:

One Manager	Skilled
Two Machine Operators	Skilled
Two Chemical Mixers	Semi-skilled
Four Manual Laborers	Unskilled
One Laboratory Technician	Skilled

Power, Water and Fuel Requirements

Water: 2,000 to 3,000 gallons per day.

Fuel: None

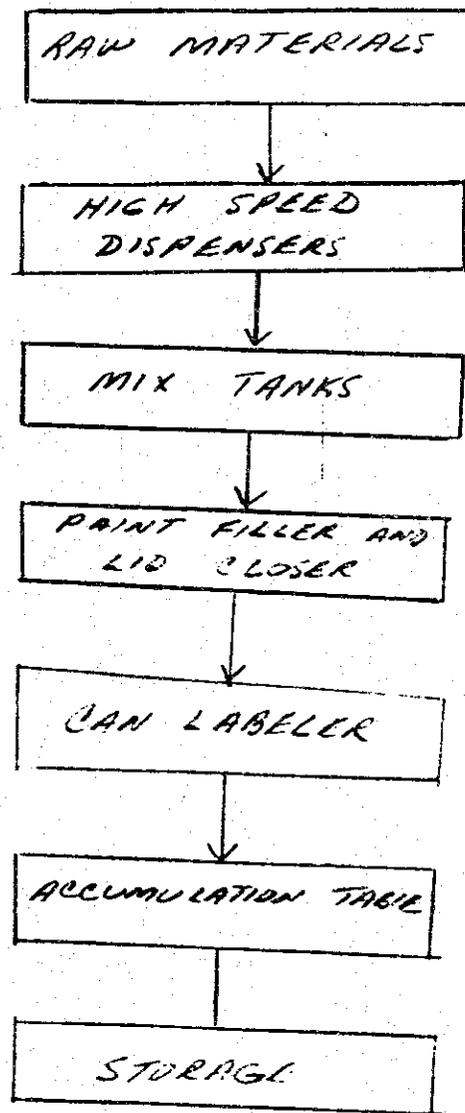
Electricity: 100 kwh, 220 volts, 3 phase, 50 Hz.

Space Requirements

A building of 1,500 square feet is needed.

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PAINT FACTORY



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SOAP BAR FACTORY

Although two factories making soap bars are currently in operation in Somalia, there is room for many more. Somalia currently imports approximately half of its requirements from Kenya and Italy.

Locally Available Raw Materials and Their Source

No raw materials for making soap are currently available in Somalia. However, tallow or animal fat, an essential ingredient would be available if Somalia had a rendering plant.

Caustic soda, another essential ingredient, would become available if a Caustic Soda Plant was created in Somalia.

Coconut or cottonseed oil would become available if an oil processing plant was started in Somalia.

Required Imported Raw Material

The basic raw materials for making soap bars are: caustic soda, tallow, coconut, cottonseed, or corn oil, and perfume agents. The best source for importing the tallow and the caustic soda is the United States.

The best sources for coconut oil are Malaysia and the Philippines.

Required Imported Machinery

A small scale production line with a capacity of 250 kg/hour of 100 grain soap bars would require the following equipment:

- One oil collection tank, stainless steel, 1000 litre capacity, and fittings (steam oil, steam valve, steam trap and discharge valve)
- One appliance for evacuation, with valve, nozzle and chain, including armatures for steam supply, collecting channel with sieve and discharge valve.
- One oil filter
- One oil pump, stainless steel capacity: 75 litres/min., with electric gear motor
- One soap crutcher, double jacket, with all fittings (steam valve, steam trap, discharge valve for soap, thermometer, pressure gauge)

Soap bar equipment - 130,000 CTF Boiler 15k

- Soap molds in portable design (10)
- Soap block cutting machine with cutting tables and adjustable cutting wires
- Pendulum press
- Box die for stamping soap, with engravings as per customer's wishes
- One steam boiler

Approximate cost: \$140,000

Best country source: U.S.A.

Personnel Requirements

- 1 Production manager/engineer - skilled
- 2 Operators - semi-skilled
- 5-10 Laborers - unskilled

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Power, Fuel, and Water Requirements

The electrical consumption for this facility is 30 kwh, 220v, 3 phase, 50 hz.

One half gallon of water per minute is needed for the boiler.

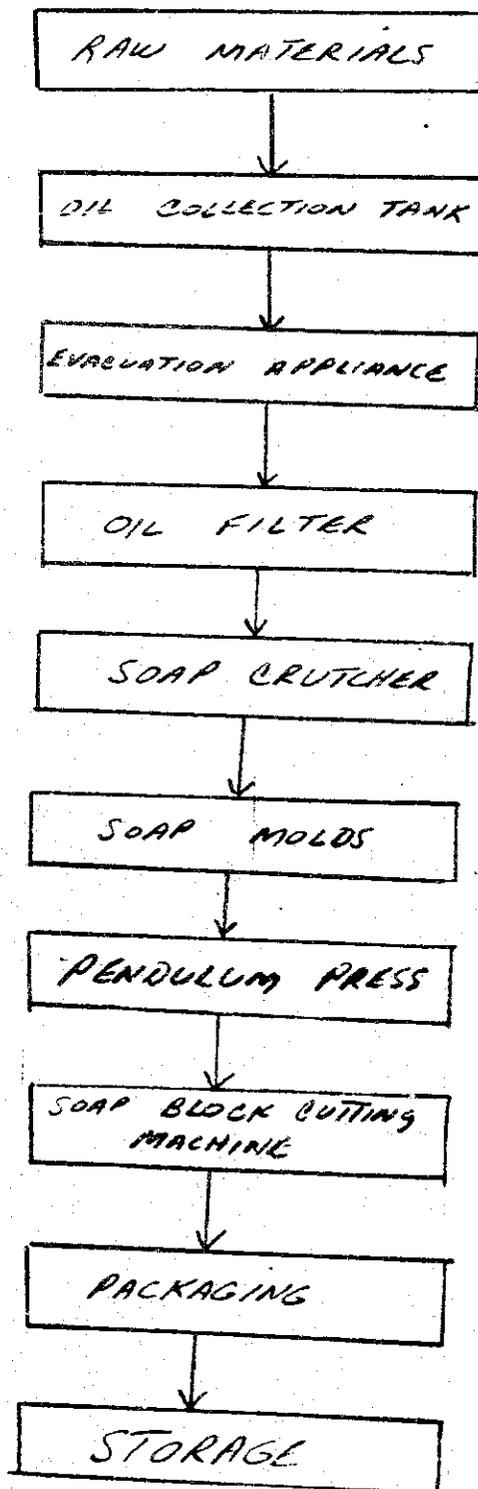
Diesel will be needed for a backup generator.

Space Requirements

A building of 1500 square feet is needed.

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SOAP BAR FACTORY



SOAP DETERGENT FACTORY

Required Local Raw Materials

No local raw materials are available.

Required Imported Raw Materials

All required imported raw materials consist of standard chemical ingredients used in the manufacture of detergent:

1. Sodium tripolyphosphate	26.7%
2. Sodium carbonate	24.0%
3. Sodium metasilicate	8.0%
4. Sodium perborate	18.0%
5. Magnesium silicate	2.0%
6. E.D.T.A.	0.5%
7. Optical brightener	0.3%
8. CMC	2.0%
9. Nonionic 25 MOL	10.0%
10. Fatty acid C ₂₀	2.0%
11. Water	6.5%

Required Machine Import

A detergent plant of this sort requires the use of the following:

- Stainless steel fluid bed u/a
- cleaning door
- power inlet
- open chute
- vibrating motors
- Stainless steel nozzle assembly
- Stainless steel liquid tanks
- Metering pump
- Premixer
- Metering feeder
- Fan cabinet
- Three delivery fans
- One suction fan
- Three air jets - stainless steel
- Two air heaters w/copper tubes, aluminum fins and frames in galvanized steel
- Flexible sleeves
- Air ducts
- Cyclone filter
- Rotary discharge valve
- Air duct
- Power duct
- Instrument panel/steel housing

Rate of capacity: The aforementioned machinery has the capacity to produce between 200 packs of 250 kg of detergent per hour.

Best country of import: The best country of import is the U.S.

Approximate Cost: Approximate cost of the machinery is USD \$250,000.00

Required Personnel

The following personnel are required for this detergent factory:

- 1 Manager - skilled
- 2 Machine operators - semi-skilled
- 10 Laborers - unskilled

Power, Water and Fuel Requirements

The machine has the following rate of consumption schedules:

Air heater: steam heated 2 x 35 kg/hr. steam
i.e. max. 70 kg/hr.
steam pressure, saturated 3 kp/cm²

Alternatively: electrically heated 2 x 24 kw
i.e. max. 48 kw

Nozzles: compressed air max 4 x 250 l/min.
air pressure 6 kp/cm²
air heater approx. 3 x 1 kw
steam pressure, saturated 3 kp/cm²

Motors: installed power 23 kw

Power supply: 3 phases 380/220v, 50 cycles, or to be specified w/order.

Space Requirements

A building of at least 1,500 square feet is needed.

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Stone Cutting Plant

Stone cutting plants are used to produce quality stone blocks needed for the construction of building, houses, roads and monuments.

Somalia, which in the past few years has been experiencing an upsurge in the area of construction, needs badly a facility which can produce quality stone fittings from its abundant limestone and granite quarries. Quality stone fittings not only lead to better constructed edifices, but more durable structures too, making long term cost more profitable than poorly constructed ones which require maintenance outlays and rebuilding.

Required Imported Equipment

3 Cantilever Diamond Cut-off Machine
(for granite/marble)

Raw Material Sources

Indigenous granite limestone and limestone deposits found throughout Somalia.

Approximate Costs

USD \$26,000 per machine. Price includes total CIF Mogadishu.

Best Country from Which to Import

The United States, Korea, and Taiwan.

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Personnel Requirements

Per shift, a production manager is needed (skilled), as well as a cantilever operator (semi-skilled) and two to three laborers (unskilled) per machine.

Power, Water and Fuel Requirements

The absorbed electricity of the machinery will be approximately 10 kwh per machine.

No water or fuel is necessary.

Space Requirements

A partially enclosed building of 500 square feet is needed. Also a 1/4 acre yard for storing cut and uncut stones is required.

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STONE CRUSHING PLANT

Stone crushing plants are used to reduce rocks from quarries and gravel pits to fine pebbles to be used as building materials.

Raw Material Sources

All raw material input for this plant will consist of stone from quarries and gravel pits located throughout Somalia.

Required Imported Equipment

1. Stone Crusher (portable)
 - A. Grizzly feeder - consisting of:
mainframe w/spring pads
liners for pan and sides
grizzly bars (adjustable)
vibrators
coil springs
 - B. V-belt drive and mount
 - C. By-pass chute
 - D. Jaw crusher
 - E. Front delivery conveyor
 - F. Chutes, hoppers, supports and platform
 - G. V-belt prime drive and mount
 - H. TEFC electric motors, starters and complete plant wiring
 - I. Skid frame
 - J. Plant guards -
Universal Screenmaster
Universal Dual Roll Crusher
Universal Feed Conveyor
Universal Return Conveyor
2. One Bull Dozer
3. One Wheel Loader
4. Three Jack Hammers and Compressors

Recommended Capacity:

25 tons per hour

Approximate Costs

Total approximate cost for stone crusher plant like this will be USD \$550,000.

Best Country

Machinery required from this plant can be supplied from the United States.

Personnel Requirements

(1) Manager	Skilled
(2) Machine Operators	Skilled
(5) Laborers	Unskilled
(1) Bull Dozer Operator	Semi-skilled
(1) Wheel Loader Operator	Semi-skilled
(3) Jack Hammer Operator	Semi-skilled

Power, Water, and Fuel Requirements

No water or electricity is necessary. Approximately 50 gallons of diesel per eight hour shift is necessary.

Space Requirements

None. Stonecrushing equipment is to be transported to gravel pits and quarries.

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APPAREL SEWING FACTORY

Although a textile mill exists in Somalia, nearly all clothing items are imported. Many tailors in Somalia can make clothing, but a production line (or piece work) clothing factory is needed for ready to wear clothing items.

Due to its low initial investment, this type of factory is ideal for the small investor. The following sewing factory is for womens' blouses and mens' shirts.

Local Raw Materials and Source

Bolts of cloth re available from the textile mill near Johar.

Required Imported Raw Materials

Thread and yarn must be imported. The best country sources are Taiwan, India, Pakistan, Philippines and Korea.

Required Imported Machinery

It is recommended that the operator start with a small ten machine operation and gradually expand as orders increase. The startup equipment needed is:

- (5) Single stitch sewing machines
- (2) Double stitch sewing machine
- (1) Cutting machine
- (1) Button hole machine
- (1) Button machine
- (3) Steam presses
- Various size patterns

The total cost of the equipment is approximately \$30,000.

The best country source is the U.S. Less rugged machines are made in Taiwan and Korea.

Personnel Requirements

One plant supervisor is needed as well as ten machine operators. All are skilled positions.

Three unskilled press operators will be needed as well as two unskilled laborers for racking and cleaning.

Power, Fuel, and Water Requirements

The plant will require approximately 15 Kw of power per hour.

Each steam press will need 2 litres of water per hour.

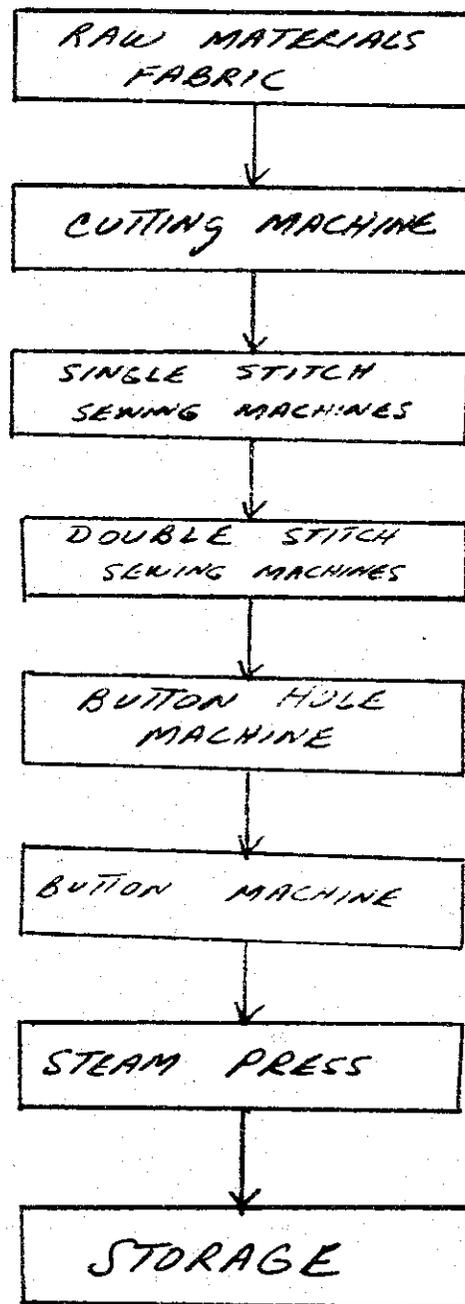
No fuel is needed.

Space Requirements

A building with 1,000 square feet is required.

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APPAREL SEWING FACTORY



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INJECTION MOLDING PLANT

Injection molding is used to manufacture all items made of plastic. The process involves taking PVC or polyethylene pellets, melting them, injecting the liquid plastic into molds, and cooling the finished product.

Different types of injection molding equipment is needed to manufacture different types of plastic products. The operator of an injection molding plant would therefore need to know what items he/she wants to make before ordering equipment.

The following injection molding equipment is used to manufacture electrical accessories such as sockets, wall plugs, light switches, etc.

Required Raw Materials

None

Required Imported Raw Materials

PVC pellets available from numerous sources in the U.S.

Required Machine Import

The required machine import is as follows:

5 ton hydraulic clamp
Low pressure mold close
Adjustable clamp pressure
Nitralloy 2 1/2 : 1 compression feed screw w/general
purpose rip & anti-sack flow check
Nitralloy barrel
3 Zone pyrometer control
Water saver valve
Plug-in timers
Cycle counter

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Adjustable back pressure
Screw decompression
Injection pressure adjustment
Injection speed control
Injection speed control
Injection screw rpm adjustment
Hydraulic sprue break
General purpose nozzle
8 Station Verticle
Mechanical cam knownout-adjustable

Rate of capacity: Up to 1,200 parts per hour plastic
ring capacity 34 lbs./per hr. Hopper capacity 25 lbs. (vinyl).

Approximate cost: \$150,000

Best country from which to import: The best country
from which to import these materials is the United States.

Personnel Requirements

- 1 Manager - skilled
- 2 Machine Operators - semi-skilled
- 3 Laborers - unskilled

Power, Water, and Fuel Requirements

Electrical power needed is 30 kwh, 220v, 3 phase, 50 cycle.

One gallon of water per minute is needed.

No fuel is required.

Space Requirements

A building with 1,000 square feet is required.

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BLOW MOLDING FACTORY

Blow molding, as opposed to injection molding, is used to manufacture plastic bottles and containers, and their caps and tops.

Required Local Raw Materials

None available.

Required Imported Raw Materials

PVC or polyethylene pellets available from numerous sources in the U.S.

Required Machine Import

The following machines are required for a blow moulding factory. These units are made in single and double blow mould types.

- Deflashing device
- Verticle extruder
- Extruder w/grooved bush
- Screws
- Control system
- Conveying equipment
- Aligned transfer of the blown articles
- Wide-neck containers
- Mould closing safety device
- Leak test control unit

Rate of capacity: The single blow mould machine has the capacity to produce products with the dimensions of up to 500 ccm. The double blow mould unit has the capacity to handle up to 2 x 200 ccm.

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Approximat cost of machinery: \$200,000

Best country from which to import: The United States,
Taiwan, or Korea.

Required Personnel

1 Manager - skilled
1 Machine operator - semi-skilled
5 Laborers - unskilled

Power, Fuel, and Water Requirements

The following requirements are necessary for the operation
of one blow mould machine:

Electric hydraulic motor kw 25
Heating capacity extruder kw 2.8
Electrical control part automatic kw 0.7
Current capacity max kw 11
Air requirement approx. l/min. 50
Air working pressure atm 8-10
Water cooling approx. m³/h .3

Space Requirements

A building of 1,000 square feet is required.

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ICE MAKING PLANT

Required Local Raw Materials

The only raw material necessary is water. Since most ice making plants are located in cities, the availability of water should not be a problem.

Required Imported Raw Materials

None

Required Imported Machinery

The best source for ice making machinery is the U.S. For larger cities such as Mogadishu, a 40-ton per day ice maker is recommended. The following equipment is necessary:

- One 40-ton per day ice maker
- One 80-ton storage bin
- Refrigeration for 20 degrees fahrenheit at 110°F ambient - (2) 7 1/2 HP condensing units with evaporators
- One 30-ton rake unit
- One evaporator with 200-ton condenser
- Auger system
- Surge bin (2000 pound capacity)
- Automatic ice bagger

Approximate Cost: \$260,000

Personnel Requirements

One production manager/engineer - skilled

Four to eight laborers - unskilled

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Power, Water, and Fuel Requirements

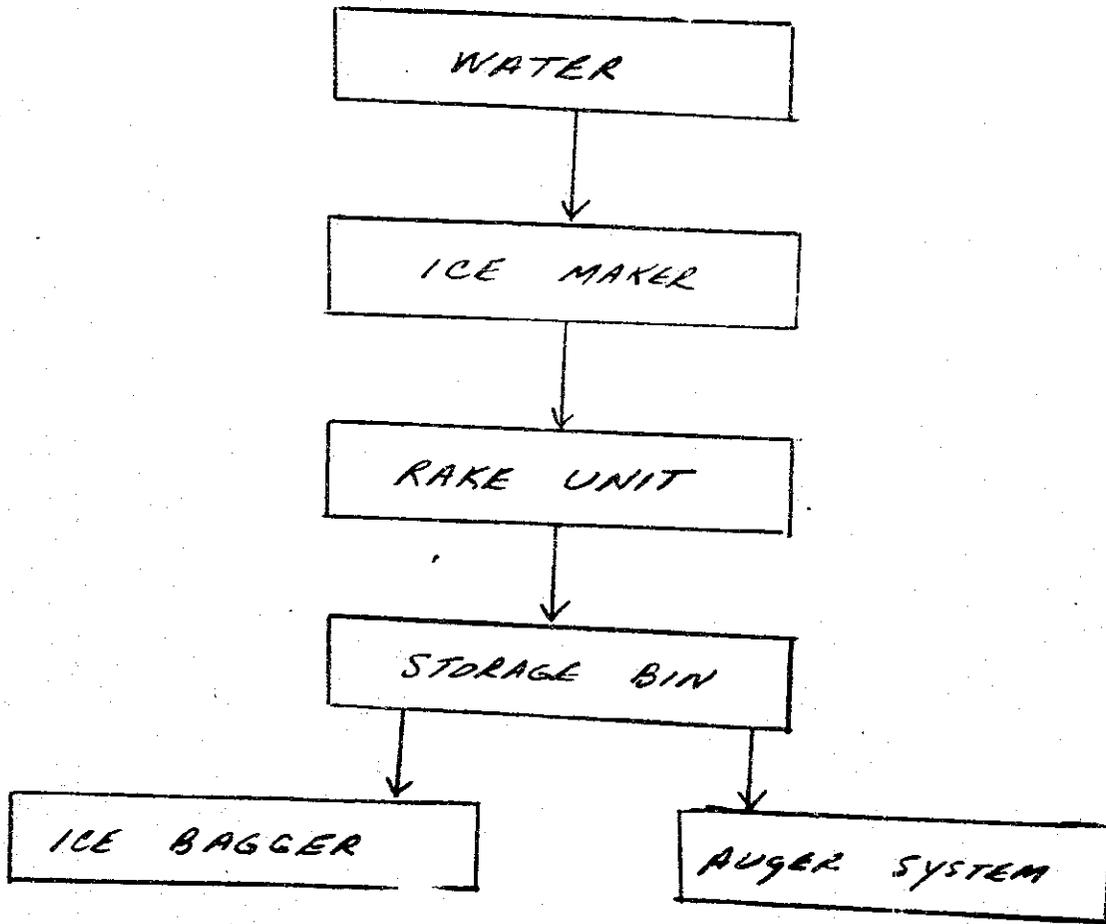
Approximately 40 tons of water will be required daily. In addition, electricity rated at 60 kwh, 220 volts, 3 phase, 50 Hz will be needed. No fuel is required except for a backup generator.

Space Requirements

A land area of 1/5 acre is required.

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ICE MAKING PLANT



CAN MAKING FACTORY

If the canning of fruits and vegetables for local consumption and/or exports is to be attained in Somalia, a can making factory will be necessary.

Local Raw Material

None

Required Imported Raw Materials

Sheet tin is the major import. It is available from the U.S., Taiwan, Korea, and India.

Required Imported Machinery

The equipment for a four hundred can per hour line is:

- (1) Can maker
 - (1) Tin cutter
 - (1) Can seamer
 - (1) Lid sealer
- Change parts for can sizes

The approximate cost for this equipment is \$40,000. The best country sources are India and Taiwan.

Personnel Requirements

A plant manager/engineer is needed (skilled) as well as two equipment operators (semi-skilled). Four to six laborers (unskilled) are also required.

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Power, Fuel, and Water Requirements

Electrical power is rated at 15 kwh, 220 volts, 3 phase, 50 Hz.

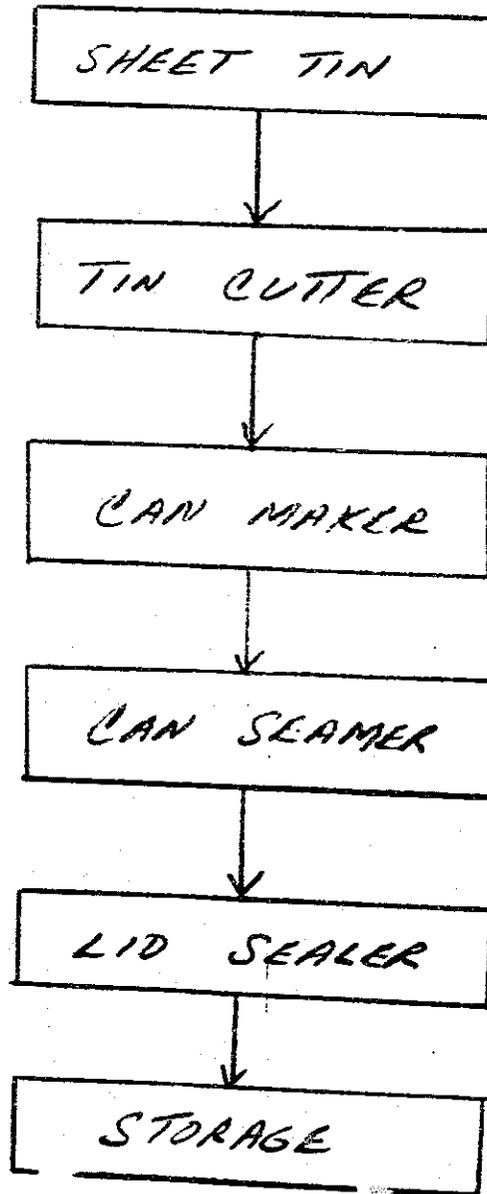
No fuel or water is needed.

Space Requirements

A building of 1,000 square feet is required.

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CAN MAKING FACTORY



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SANITARY NAPKINS PLANT

Raw Material Sources

Raw material sources will all have to be imported. Although ingredients such as pulp filler and polyethylene can be obtained from recycled sources found locally in Somalia, quantities are not sufficient enough to be dependent upon.

Required Imported Raw Materials

Required imported raw materials include:

- Pulp filler
- Polyethylene plastic
- Wadding/tissue
- Pressure Sensitive Adhesive
- Hot Melt Adhesive
- Silicone
- Adhesive Tape
- Cold Adhesive

All are available in the United States.

Required Imported Equipment

Sanitary Napkin Machine

Recommended capacity: capacity is calculated to be three-hundred (300) pads per minutes.

Approximate cost: The cost of machinery will be USD \$450,000. The cost of raw materials will be USD 4.95 per 1,000 napkins less cost of freight.

Best country: The best country from which to import machinery is the United States.

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Personnel Requirements

Labor requirements are plant manager, one machine supervisor and one or two packaging attendants depending upon product count.

Power, Fuel and Water Requirements

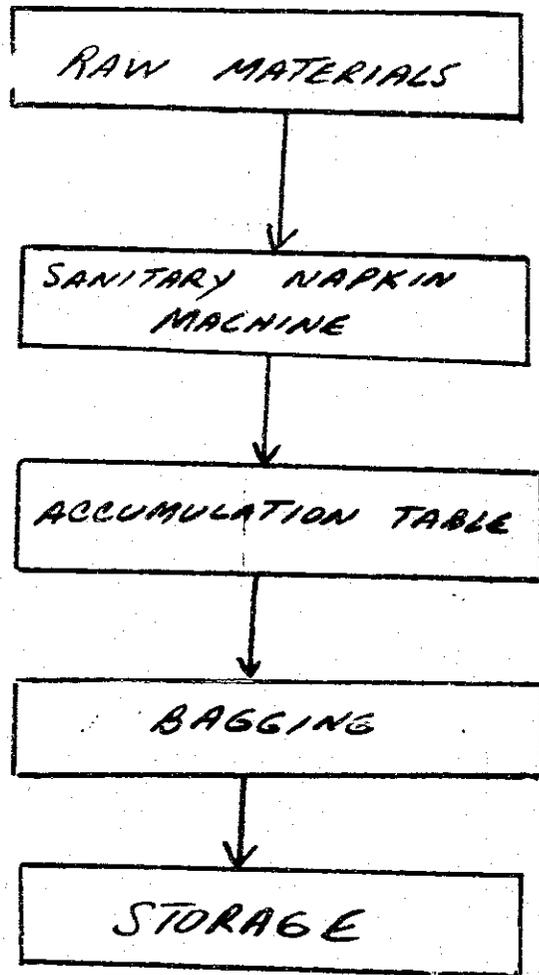
150 amp electric service required along with regular 220v circuit service. Water consumption will be 7.5 gpm/max at 40 psi. No fuel is necessary.

Space Requirements

A building of 1,000 square feet is required.

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SANITARY NAPKINS PLANT



PLASTIC BAG FACTORY

Currently, Somalia does not have a plastic bag factory. The following factory will be able to produce plastic shopping bags of various sizes as well as 30 gallon plastic bags.

Local Raw Materials

None

Imported Raw Materials

Rolls of polyethylene and polypropelene film of varying density will be required. The best source is the U.S. The operator should budget \$100,000 per year for raw materials.

Required Imported Machinery

The only machinery required is an industrial bag maker with a capacity of at least 50 bags per minute. The best source is the U.S. The cost is roughly \$60,000.

Personnel Requirements

The following personnel are needed for this factory:

- (1) Plant Manager - skilled
- (2) Machine Operators - semi-skilled
- (6) Laborers - unskilled

Power, Water, and Fuel Requirements

This plant will need electricity rated at 15 kwh, 220 volts, 3 phase, 50 Hz.

No fuel or water is required.

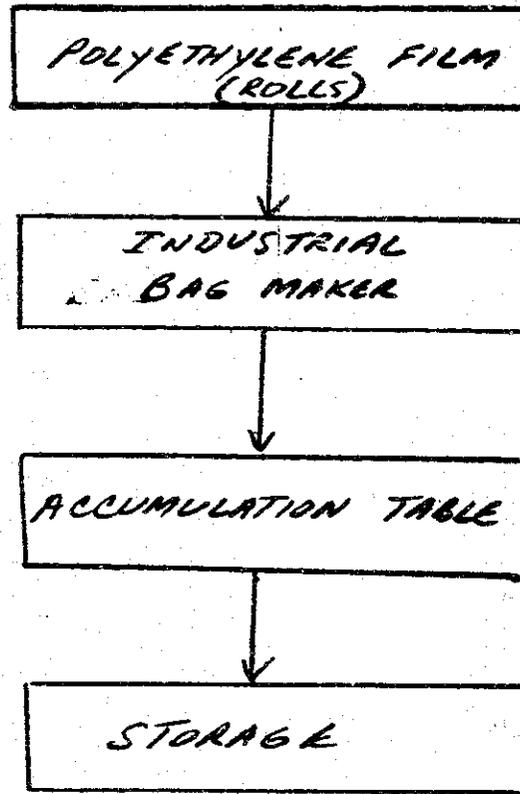
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Space Requirements

A building of 1,000 square feet is required.

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PLASTIC BAG FACTORY



GASKET PLANT

Gaskets are used as sealing materials, cushions, or insulation, in all motor engines to prevent oil, water, and fuel leaks. Gaskets are also used in air compressors and air-conditioners.

Although gaskets are easily made, all gaskets currently sold in Somalia are imported.

Locally Available Raw Materials

Leather from tanneries is available throughout Somalia. (It should be noted that leather is only used to make certain types of gaskets. Because of its porous nature, leather is a poor material for most automobile and motor gaskets).

Required Imported Raw Materials

Various gasket making materials, primarily asbestos, copper, cork, and plastic compounds. The best source is the U.S.A., Taiwan, or Korea. The investor should budget \$20,000 per year for imported raw materials.

Required Imported Machinery

- (2) Click and Die Machines (Pneumatic Die Cutters)
- (1) Die Maker
- (1) Air Compressor 85 CFM
- (1) Generator (Backup), 25 KW

The approximate cost of the equipment is \$50,000. The best country sources are the USA, Korea, and Taiwan.

Personnel Requirements

The personnel needed to operate this facility are two semi-skilled machine operators. One unskilled laborer for cleanup and other chores.

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Water, Fuel and Power Requirements

The absorbed electrical capacity of the machinery is 20 KW per hour.

Fuel would be needed for the backup generator. No water is needed.

Space Requirements

Approximately 500 square feet of space is needed for this factory.

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