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(1 of 2)

Volume I
(Main Report--Final)

Fertilizer Plant Feasibility Study – Haiti

Prepared for

United Nations Industrial Development Organization (UNIDO)

and

United Nations Development Programme (UNDP)

UNIDO Contract No. 90/028/GYL
UNIDO Project No. DP/HAI/89/033

Prepared by

International Fertilizer Development Center (IFDC)
Muscle Shoals, Alabama, U.S.A.

IFDC Contract No. 00926/90

October 1990

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Table of Contents

Table of Contents

Table of Contents

Table of Contents

List of Figures

Notes

1. All weights are expressed in metric units and indicated as "tonnes", "t", or "kg". In some very special cases (for example, Table 3-9) short tons (2,000 pounds), and pounds "lb" are used but these units are clearly indicated.
2. All financial calculations are expressed in 1990 U.S. dollars (US $). Where Haitian dollars are used they are indicated as H $.
3. The official exchange rate is H $1.0 is equal to US $1.0. However, the current exchange rate (shadow exchange rate) is H $1.5-to-US $1.0. The shadow exchange rate is used in all calculations.
4. Volume I contains the project rationale, description, and findings. Volume II contains the appendixes referenced in Volume I.

List of Tables

FERTILIZER PLANT FEASIBILITY STUDY--HAITI

EXECUTIVE BRIEF

This study deals with determining the feasibility of establishing a fertilizer mixing (blending) and bagging plant in Haiti. The proposed plant would be owned and operated by a private-sector Haitian company. The objective of the company is to provide a cost-effective package of fertilizer products and related services to the Haitian farmer thus helping to increase food production and generally increase the productivity of the agricultural sector. As Haiti has no commercial fertilizer resources, all fertilizer materials required from the proposed project would have to be imported.

The fixed capital investment required for the project is small by most commercial standards, ranging from about US $0.7 million to US $0.9 million depending upon the level of mechanization selected. In either case, the fixed investment has little impact on the total production cost of the proposed fertilizer products or the financial feasibility of the project because the cost of imported fertilizer raw materials represents the overwhelming recurring cost of production. Raw materials alone, account for 80%-90% of the factory-gate cost of production.

The project is not financially feasible according to the assumptions used for this study. Therefore, the project is not recommended for implemencation unless the indicated margin between the cost of production and factory-gate selling price can be increased. An increase in the margin of about H $35/t (about US $23/t) over and above the expected margin assumed for this study is required to achieve the desired internal rate of return of 15% over the life of the project.

It may be possible to achieve the increased margin through a number of efforts, the two most significant being (1) optimization of raw material procurement and transport to decrease the landed cost of imported raw materials and (2) an increase in the factory-gate selling price through development of a dealer network that would decrease dependence upon the existing importers as dealers, since these importers demand discounts which amount to about H $30/t. Of course, the likelihood of increasing the margin by developing a special dealer network is uncertain and will require additional investment and operating costs.

Despite the lack of financial feasibility, the proposed project embodies a number of possible benefits to the Haitian agricultural economy, namely:

- The development of a domestic industry that will create gainful employment for an extremely poor and underutilized workforce.
- An improvement in the security of supply and relative price stability for fertilizer products which are essential to the increased growth and productivity of the Haitian agricultural sector.
- The creation of a responsible agroservice company that, in addition to supplying high-quality (physical and agronomic) fertilizer products and other essential inputs, would provide an urgently needed package of technical services to help ensure that fertilizers and other inputs are used in a cost-effective way, thus increasing agricultural production and improving the economic status of the Haitian farmers and farm workers who account for about 75% of the nation's workforce.
- Stimulate increased competition among the existing importers thus helping to improve product availability, product quality, price stability, and the level of services provided to dealers and farmers.
- Ensure the availability of a more appropriate line of high-quality fertilizer products designed for specific crops and agroclimatic conditions.
- Create a general improvement in the credibility of the fertilizer supply sector, thus helping in the formulation and implementation of technically sound and responsible government agricultural policies.

In order to provide a more sound basis for taking an investment decision on the proposed fertilizer plant project, the following investigations and evaluations are proposed. These activities will help to strengthen the agricultural sector even if the proposed fertilizer plant project is not implemented.

Raw Material Procurement--Because raw materials represent 80% or more of the cost of production, methods for decreasing the landed cost of raw materials should be confirmed. The most likely method is to exploit the possible economics of raw material procurement and transport that could accrue if participation of the potential partner from the Dominican Republic can be confirmed and some type of cooperative agreement for raw material procurement and ocean transport could be arranged. Such an arrangement would take advantage of the large tonnage procurement and transport procedures practiced by the potential Dominican Republic partner, thus resulting in a lower landed cost of raw materials to the Haitian plant site.

Pricing Structure--Confirm a product pricing structure (f.o.b. factory gate) that is attainable in both the short term and long term, including the dealer incentives and costs that will be required to achieve the required margin between production cost and selling price.

Other Agricultural Projects--Determine the status and confirm the scheduled completion of other agricultural projects, particularly irrigation, to more precisely predict total fertilizer market demand and market share.

Supportive Technical Assistance--Determine scope, cost, and sources of technical input and funding for supportive assistance projects that will enhance the objectives of this project as well as those of the total agricultural sector. The most urgently needed assistance projects include (1) dealer training and development, (2) one or more soil and plant tissue testing laboratories to help determine optimum fertilizer recommendations, (3) short-term credit programs to assist dealers establish warehouse facilities and stock fertilizer products, and (4) an evaluation of the agricultural input-output pricing structure to assist the Government of Haiti in formulating effective policies to promote fertilizer use and increase agricultural productivity. This last activity should be given the highest priority as it will provide valuable input to an urgently needed government agricultural policy.

<u>Note</u>

This study was performed according to the UNIDO Guidelines for Preparation of Industrial Feasibility Studies. The layout of the ensuing report, beginning with Chapter 1.0 <u>Executive Summary</u> and ending with Chapter 10.0 <u>Financial and Economic Evaluation</u> conforms to these Guidelines.

1.0 EXECUTIVE SUMMARY

1.1 Introduction

This project deals with the establishment of a fertilizer mixing (blending) and bagging plant in Haiti. The proposed plant would be owned and operated by a private-sector Haitian company. The objective of the company is to provide a cost-effective package of fertilizer products and related services to the Haitian farmer thereby helping to increase food production and generally increase the productivity of the agricultural sector. Since Haiti has no significant domestic sources of fertilizer raw materials, essentially all materials required from this project will be imported.

In addition to supplying fertilizer products to the Haitian agricultural sector, the project will provide a package of services, particularly technical assistance to dealers and farmers, to ensure that the correct products are used in the most cost-effective way. This technical assistance activity currently is lacking in Haiti and poses a major constraint to increased fertilizer use, improved crop production, and an enhanced quality of life for the resource-poor Haitian farmers and farm workers who currently account for about 75% of the nation's workforce.

The proposed project design takes into consideration a number of practical local factors including:

1. An extremely resource-poor population.
2. A high level of instability at all levels of government.
3. Severe constraints on the availability of foreign exchange.
4. A relatively small and unstable market for fertilizer.
5. A severe shortage of technical assistance relative to fertilizer use and crop production.
6. The potential for strong competition from established importers currently supplying the Haitian fertilizer market.
7. The need for reliable supplies of high-quality and agronomically appropriate fertilizer products at stable prices to help stimulate fertilizer use and increased crop production.

1.1.1 Project Promoter/Initiator

The proposed project is being promoted by a Haitian entrepreneur.[1] While the equity participation in the company is not clear at this time, it is quite likely that, in addition to the promoter, private-sector principals of the Dominican Republic fertilizer industry (a major current supplier of imported fertilizers to Haiti) and a group of Haitian investors will be involved. Borrowed funds are likely to be obtained from Société Financiére Haïtienne de Développement S.A. (SOFIHDES) and offshore funding sources.

In addition to financial equity, the equity partners are expected to bring to the proposed company (1) managerial and fertilizer marketing skills; (2) technical skills relative to procurement of fertilizer materials, blending plant operation, transport and logistics; and (3) business acumen pertinent to the region.

1.2 Project Background and History

1.2.1 Historical Development

This proposed project is in part an outgrowth of an earlier initiative taken by a Canadian entrepreneur who established a fertilizer blending plant in Haiti in 1981. The blending plant was operated under the corporate name of Agricultural Services S.A. (ASSA). The company flourished for a few years and then, due to a number of internal and external problems ceased operation in May 1987.[2]

The promoter of this current project was one of ASSA's major fertilizer dealers for a period of about 3 years and thus is aware of the potential benefits that fertilizers could offer to the Haitian farmer, provided they could be supplied in the correct nutrient mix at a competitive price along with a package of technical services that would ensure their cost-effective use thus leading to farmer acceptance and farmer loyalty.

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1. Mr. Jean-Michel Cherubin, P.O. Box 13372, Delmas, Port-Au-Prince, Haiti.

2. International Fertilizer Development Center (IFDC). 1990. "Supplying Quality Multinutrient Fertilizers in the Latin American and Caribbean Region-Emphasizing Bulk Blending and the Complementary Role of Granulation," IN *NPK Workshop Proceedings*, Special Publication IFDC-SP-14, IFDC, P.O. Box 2040, Muscle Shoals, Alabama, 35660.

With the financial assistance of UNIDO/UNDP, a study to evaluate the feasibility of establishing a new fertilizer-blending and bagging plant in Haiti was solicited by UNIDO/UNDP in February 1990 on behalf of the current promoter. The International Fertilizer Development Center (IFDC) with Headquarters in Muscle Shoals, Alabama, U.S.A., was selected to perform the study.[3] IFDC began field evaluation/data collection work in Haiti June 4, 1990.

1.2.2 Other Studies and Investigations

In 1985 ASSA was contemplating relocation and expansion of their blending plant. This relocation and expansion plan was designed to decrease the cost of production and delivery of fertilizer to the major farming areas and to better facilitate the servicing of a growing market for ASSA fertilizer products. A study, funded by the Canadian International Development Agency, was performed by a Canadian firm--Hatch Associates Limited (Hatch) of Toronto.[4] Hatch subcontracted a portion of the fertilizer plant process design study work to IFDC. The study was completed in January 1986 about the time when ASSA was undergoing a severe financial crises and the Duvalier Government collapsed. Since that time no action has been taken on implementation of the ASSA plant relocation and expansion project, and ASSA closed its business in mid-1987.

The actual commercial experience of ASSA as well as the Hatch Study showed that a significant potential market for fertilizer exists in Haiti. However, in view of the severe technical, financial, and political constraints of the country, the development of this market will require a unique mix of practical, technical, commercial, and financial skills in addition to supportive government policies. The required skills and other unique features of the proposed project are more fully elaborated in this study.

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3. UNIDO Contract No. 90/028/GYL; Project No. DP/HAI/89/033; accepted by IFDC May 31, 1990, IFDC Contract No. 00926/90.

4. Hatch Associates Ltd. 1986. *Engineering & Financial Analysis*, Volume I--The Report, and Volume II--Appendices and Drawings, Toronto, Ontario, Canada.

1.3 Market and Plant Capacity

1.3.1 Current Market Demand for Fertilizer

Data Base--Because of the long-term disturbed economic and political situation in Haiti, little reliable data, relative to the agricultural sector and particularly fertilizer use, are available.

In the absence of reliable secondary data, primary data were collected and analyzed to determine the fertilizer market. The data were generated by examination of records and/or documents available at entry points of supply into the country. The data were cross-checked with the major sources of supply, particularly the Dominican Republic. Consumption areas and market shares of the various importers were determined and evaluated by in-country observations and interviews with importers, dealers, small-holders and plantation farmers, private- and government-sector technicians, and operating personnel.

Agricultural Resource Base--By most economic norms Haiti is one of the poorest countries in the world; its people are the poorest in Latin America. The contrast in wealth is stark. The wealthiest 1% of Haitians account for 44% of national income. Of the 6.5 million population, most live in the rural areas and about 75% earn the equivalent of only one-sixth of the US $352 national average per capita income; and this continues to decline. Out of a work force of 2.4 million, 80% are unemployed or not working in paying jobs. Women dominate the transport and marketing of farm produce.

About two-thirds of the country is rough, mountainous terrain, unsuitable for cultivation. Out of the total land area of 27,750 km^2, only about 40% or 1.1 million ha is arable. The climate is tropical, but generally semiarid.

Agriculture, which is the main economic sector, has steadily declined as a result of severe deforestation, soil erosion, low soil fertility, primitive crop production methods, and the lack of a defined national agricultural policy. Crop production in rice, maize, and sugarcane is inadequate to supply domestic demand. The problems in food production are complex and require a serious and sustained commitment by the Government together with appropriate outside assistance. One positive step to improve agricultural production is the establishment and operation of a local fertilizer supply industry, the subject of this study.

Land Use--The major agricultural areas and the corresponding principal crops are shown in Table 1-1. Accurate data on the irrigated area are not available. The major irrigated area is the Artibonite Valley. The estimated total irrigated area in 1984 was about 74,000 ha. There has been no assessment since then, but it is evident that the total irrigated area has declined considerably during the past 6 years because of poor maintenance, deterioration of the irrigated land structure, and a reduction of the water source as the result of deforestation and silting of the irrigation canals by severe soil erosion. Observation of the irrigated areas shows that efficiency of water use in the systems is below 70%. Since rice farming, the principal irrigated crop, is practically done by hand, the distribution and control of water in the irrigated areas is very inefficient.

Role of Agriculture--As previously indicated, about 40% or 1.1 million ha is utilized for the cultivation of various crops. In 1988, about 75% of the working population was engaged in agriculture, forestry, and farming but they provided only 32% of the country's gross national product. The production of agricultural commodities provided a livelihood for about 70% of the population in 1989. One-third of the peasants have no land, while the remainder own only about 1% of the land. Exclusive of the large farms, there are about 620,000 small-scale farms of which 95% are well below 1-ha size. About 60% of the arable area is cultivated in rice, plantain, maize, sorghum, potatoes, cassava, taro, and yams, which are the principal food crops of the country.

Fertilizer Consumption--Fertilizer consumption in Haiti decreased from about 16,000 t of product in 1985 to about 13,000 t in 1989.

The major factors attributed to the decrease in consumption are:

1. Low farm-gate prices for farm produce, particularly rice, where 65% of the fertilizer is consumed.
2. Delays in importation of fertilizer thus limiting the timely supply in the marketplace.
3. Lack of credit in the marketplace; most transactions are performed on a cash basis.
4. Political instability of the country. Since the revolution in February 1986, the country has operated under a provisional government with very unstable political conditions.
5. Lack of post-harvest marketing and distribution facilities.
6. Very poor crop production practices.

Fertilizer consumption from 1985 to 1989, by product and nutrient, is shown below.

Fertilizer Product	1985	1986	1987	1988	1989
			(t)		
Urea	9,623	9,043	7,942	7,853	7,729
Ammonium sulfate	802	754	662	654	644
20-20-10	321	301	265	262	258
12-12-20	4,811	4,521	3,971	3,927	3,221
Composite[a] (14-14-20)	481	452	397	393	1,031
Total	16,038	15,071	13,237	13,089	12,883

Nutrients	1985	1986	1987	1988	1989
			(t)		
N	5,304	4,984	4,377	4,328	4,273
P_2O_5	709	666	585	579	582
K_2O	1,090	1,025	900	890	876
Total	7,103	6,675	5,862	5,797	5,731

a. 14-14-20 is composite average nutrient analysis of miscellaneous products.

Consumption by Agricultural Area--The 1989 fertilizer consumption pattern by major agricultural area is summarized as follows:

Consumption Area	Crop	Fertilizer Consumption: % of Total	Fertilizer Consumption: Total Product (t)
Artibonite Valley	Rice/onions	65	8,373
Leocane	Maize/industrial tomatoes	2	258
Kenscoff	Vegetables (all kinds)	12	1,546
Fôret des Pins	Vegetables (potatoes/ onions/cabbage)	7	902
Cul de Sac	Tobacco/industrial tomatoes/vegetables	6	773
Les Cayes	Sugarcane/rice/maize/ tobacco	5	645
Cap Haitien/others	Sugarcane/citrus/coffee vegetables/onions	3	386
TOTAL		100	12,883

1.3.2 Fertilizer Market Forecast (Total)

The market data obtained during the field study covered a period of 5 years, 1985-89, and showed that fertilizer consumption in Haiti has declined during the period for the reasons already discussed. A market segmentation method of forecasting was used for projection of fertilizer demand taking into consideration the limited amount of reliable data.

The decline in fertilizer use leveled off in 1988 and 1989. Use data for the first half of 1990 showed more or less the same level as the first half of 1989. This indicates that fertilizer consumption in the country may continue at the same level through 1991 unless significant changes occur in the factors affecting the fertilizer market. Political stability in the country can only start after the scheduled election in November 1990, and 1991 will serve as the transition year for the new government. An increase in stability can be expected to have some positive impact by 1992. Based on this rationale, the fertilizer market in 1991 is assumed to be the same as 1989 and is used as the fertilizer market base year for this study.

On the basis of assumptions more fully described in Chapter 3, a summary of the total market forecast for fertilizer use by crop segment follows:

	Fertilizer Use (product basis)											
	1991 (Base)		1992		1993		1994		1995		1996	
Crop Segment	%	t	%	t	%	t	%	t	%	t	%	t
Food crops	92	11,852	90	12,062	87	12,134	85	12,342	85	13,057	85	13,932
Industrial crops	8	1,031	10	1,340	13	1,813	15	2,178	15	2,304	15	2,458
TOTAL	100	12,883	100	13,402	100	13,947	100	14,520	100	15,361	100	16,390

1.3.3 Total Projected Sales Forecast and Market Share for Proposed Project

The foregoing evaluation of Haiti's existing fertilizer market was conducted to establish a benchmark for formulating the proposed project's 5-year sales forecast (market share) and marketing plan for 1992-96. The projected sales forecast for the project takes into account (1) the current fertilizer supply scheme, (2) existing marketing channels, and (3) domestic and foreign competition. The main elements of these three factors are briefly described.

Current Fertilizer Supply--All commercial fertilizer products are currently imported. The complex NPK grades and part of the urea fertilizers are sourced from the Dominican Republic while the balance of the urea is sourced from Trinidad, Venezuela, and Guyana. Among the complex NPK grades, 12-12-20 is preferred, supplying 30% of consumption. Granular urea from Trinidad is preferred over the prilled material from Venezuela and Guyana. The annual Japanese fertilizer donation normally consists of a 60:40 mix of nitrogen fertilizers (urea and ammonium sulfate) and complex NPK grades.

Marketing Channels--The following marketing channels are used for handling imported fertilizers in Haiti:

Channel A--Fertilizer is channeled from supplier, to importer, to dealer, to small farmer.

Channel B--Fertilizer is channeled from supplier, to importer, to dealer, to merchant, to small farmer.

Channel C--Fertilizer is channeled from supplier, to importer, to the branch store of importer, to small farmer.

Channel D--Fertilizer is channeled from supplier, to importers who are direct users (large farmers and plantations).

Competition--Fertilizer competition in Haiti exists in three forms: (a) the fertilizer companies from the Dominican Republic that export to Haiti and monopolize the commercial NPK blend market and part of the urea market, (b) the Haitian fertilizer companies that import all their NPK grades and part of their urea fertilizer needs from the Dominican Republic, (these companies represent 54% of Haiti's yearly fertilizer requirement), and (c) direct imports (by large farmers and plantations) of urea fertilizer from Trinidad, Venezuela, and Guyana. The local companies also participate in the sale of the yearly Japanese fertilizer donation. The donor tonnage currently represents 31% of the supply. The sources of fertilizer supply for 1989 are shown below:

Source (1989)	Quantity Share (%)	Volume (t)
Dominican Republic	54	6,957
Trinidad/Venezuela/Guyana	15	1,826
Japan (donation)	31	4,100
TOTAL	100	12,883

Sales Forecast for Project--Given the foregoing total Haitian market demand, the market share for the proposed new fertilizer plant project is expected to grow from 30% to 65% during the first 5 years of operation as shown below:

Project Sales Forecast (t product)

Year	Commercial Market % Project Share	Commercial Market t	Japanese Donation 20% Project Share (t)	Total Project Sales (t)
1992	30	3,271	500	3,771
1993	45	5,151	500	5,651
1994	55	6,611	500	7,111
1995	65	8,360	500	8,860
1996	65	9,029	500	9,529

A breakdown of the total projected annual sales by product is shown below:

Product	1992	1993	1994	1995	1996
	(t)				
Urea	2,451	3,560	4,409	5,316	5,527
Ammonium sulfate	57	113	142	177	191
20-20-10	94	113	142	177	191
12-12-20	980	1,582	2,062	2,658	3,049
14-14-14	189	283	356	532	572
TOTAL	3,771	5,651	7,111	8,860	9,529

1.3.4 Urgently Needed Support Programs

To bring about the proposed fertilizer plant project sales objectives and accrue the national benefits of an integrated agroservice industry in Haiti (this project and others), the following foreign assistance programs are urgently needed.

1. Soil and tissue testing laboratory and staff to support cost-effective fertilizer recommendations.
2. Fertilizer and agroservice dealer training and dealer network development.
3. Farm-level extension/education programs to promote cost-effective fertilizer use.
4. On-farm demonstrations and field days to show benefits of fertilizer use.
5. Agricultural input/output pricing study to guide government agricultural policymaking.

1.4 Materials and Inputs

1.4.1 Fertilizer Material Terminology

In the context of this fertilizer plant project, the terms materials, raw materials, and products are used interchangeably depending upon the context in which they are discussed. For example, urea, a fertilizer *material*, is also referred to as a *raw material* when it is mixed with other materials to prepare a multinutrient-blended product such as 14-14-14, and finally, it is called a *product* when it is simply bagged and sold as a straight material.

1.4.2 Selection of Fertilizer Materials

Required Fertilizer Material Physical Properties--Since the fertilizer materials used in this project will often be used to prepare blends of two or more individual materials to achieve a number of nutrient ratios and grades required by the market, it is important that the particle (granule) size of the individual materials be reasonably uniform to facilitate uniform mixing (blending) and to minimize the risk of separation of the individual materials (segregation) after the product is mixed and bagged.

The use of granular materials as opposed to nongranular materials (often referred to as standard-grade materials) is also often preferred when the materials are sold as "straights" without first blending. This is because granular materials are generally quite free-flowing and nondusty thus facilitating handling and application. Many standard-grade products, because of their large surface area, have a tendency to cake and form hard lumps during storage making them more difficult for the farmer to handle and apply.

Some products, particularly urea, are also available in a prilled form. Prilled urea is smaller in particle size than granular urea. In most cases, the prilled product is more likely to cake than the granular counterpart. Also because of its smaller particle size (usually about 1-2 mm), prilled urea is not well suited for blending because the other granular materials (for example, phosphate and potash materials) are significantly larger in size.

1.4.3 Sources of Fertilizer Materials

All fertilizer materials for the project must be imported, therefore, it is essential that all specified materials are widely available on the international market to ensure competitive f.o.b pricing and security of supply. Fortunately, the materials required for this project meet this criterion and can be sourced from the U.S. Gulf Coast, Trinidad, Venezuela, and even Europe and the Far East.

1.4.4 Other Material Inputs

In addition to the basic fertilizer nutrient materials, the project will require recurring expenses for the following materials and utilities:

1. Nonnutrient granular filler material to adjust the nutrient concentration of the blended NPK products to the guaranteed value. This material will be obtained from local sources.
2. Finely powdered clay to provide a conditioning agent for the NPK blends and some of the straight materials to minimize caking. This material will be imported in 25-kg bags.
3. Empty 50-kg capacity bags, plastic bag liners, wire ties, and stitching thread for packaging the fertilizer products. These materials will be purchased from local sources.

4. Diesel fuel for emergency/standby electric power generator and plant mobile equipment. All fuel and lubricants will be obtained from local sources.
5. Electric power for operation of all plant facilities and security lighting will be obtained from the public utility service.

1.4.5 Fertilizer and Other Material Input Quantities

Fertilizer Materials--A determination of the quantity of fertilizer materials required for the project was made on the basis of (1) a product slate consisting of three blended NPK products and two straight nitrogen products and (2) annual projections of market share over a period of 15 years.

The annual material requirements for the 15-year project life are summarized in Table 1-2.

Other Inputs

In addition to fertilizer materials, the project will require electricity, water, fertilizer bags, fuel, and miscellaneous operating supplies as described below.

Electricity--The project will require a total demand of about 100 kW of electric power based on 1.5 times the connected load of about 70 kW. The indicated demand (100 kW) will allow for the future expansion of the warehouse and the gradual replacement of manual operations with mechanized operations.

Electric power for the project will be obtained from the local public utility. Provisions have been made in the investment estimates to bring the public utility supply to the factory site. In addition to the public utility supply, the project is equipped with an emergency 75-kW diesel-driven electric power generator. This generator will be used to power the facility when the public utility supply is interrupted.

Water--Since selection of the project site has not been finalized, the water supply source is uncertain. The plant process operations require essentially no water. However, a significant amount of water will be needed for the worker's washing facilities and for drinking. For the purpose of the project estimates, it is assumed that all water for washing and drinking will be collected from rain and stored in a cistern located on the factory site. Treatment facilities will be provided to ensure that the water is safe for human consumption.

Bags, Fuel, and Other Supplies--Empty 50-kg capacity woven polypropylene fertilizer bags, plastic bag liners, bag stitching (closing) thread, diesel fuel, and miscellaneous operating supplies, such as lubricants and employee safety equipment, will be purchased from local sources.

1.5 Location and Site

1.5.1 General Location Criteria

The location of the proposed fertilizer plant is critical to the success of the project. The essential location criteria include:

1. Direct access to deep and calm water to facilitate receipt of all imported raw materials by ship.
2. Close proximity to the major agricultural areas to minimize land transport of fertilizer products and thereby maintain a competitive delivered cost structure.
3. Close proximity to one or more population centers to benefit from developed infrastructure that is normally associated with such population centers.

1.5.2 Specific Site Features

According to these general location criteria, three potential sites were considered and the site known as Shada was selected as the basis for this study (refer to Figure 5-1).

The Shada site is located directly on the sea about 20 km south of St. Marc. The national highway passes within 1 km of the site. The site was originally developed for a plant that extracted oils from plants and seeds for use in the cosmetic industry. The oil extraction plant has been defunct for several years. At present, the site is being leased by an entrepreneur from the United States and the buildings have been refurbished and are being used for the manufacture of hand-embroidered cloth.

In addition to the space required for the embroidered cloth operation, the Shada site has considerable unoccupied space; the site is level and has direct access to sea and land transport. An important feature of the site is a partially completed wharf that could be rehabilitated to complement the proposed raw material unloading scheme.

1.6 Project Engineering

1.6.1 General Layout

The proposed fertilizer blending and bagging project is basically one of solid material handling, mixing, and bagging using 50-kg plastic-lined open-mouth bags. The major elements of the process consist of:

1. Unloading of imported fertilizer materials from ocean-going ships which may be moored to an offshore anchorage or shoreside wharf.
2. Inloading of the fertilizer materials into a bulk storage warehouse fitted with partitions to prevent cross mixing of the different materials.
3. Reclaiming of bulk materials from storage and either weighing and mixing them to achieve the desired grade/nutrient ratio (the blending process) or simply bagging straight materials. In all cases, all blended or straight materials are bagged before dispatch.

Project engineering and financial data are developed for two plant scenarios. One scenario, referred to as the "simple plant," is designed to hold the fixed investment to a minimum level and maximize the use of variable-cost contract labor in an effort to minimize risk with regard to the fixed costs of production; the second scenario, referred to as the "optimum plant," is designed to lower the total cost of production by using a higher level of mechanization and therefore fixed investment, and a lower level of variable-cost contract labor. A more complete analysis of the operational and financial advantages and disadvantages of each of these scenarios will be needed to determine the optimum implementation strategy. Assuming the project is implemented, it is likely that favorable elements of each scenario will be exploited according to a phased investment strategy dictated by the market situation.

1.6.2 Description of Blending and Bagging Process and Equipment

Blending--In the blending process for the optimum plant scenario, raw materials are reclaimed from bulk storage using a motor-driven, front-end loader. The material is dumped into a lump breaker. This unit is used to crush lumps that normally form during storage. The lump breaker is designed to gently crush lumpy material while inflicting only a minimum amount of damage to the granules.

The material from the lump breaker is transferred by a bucket elevator to a multicompartment hopper system (cluster hopper) located above the blending equipment. The capacity of the bucket elevator is much greater than the average capacity of the blending unit since it is usually fed on an intermittent basis and must therefore be designed to accommodate short-term surges.

The raw material proportioning (weighing) and mixing steps are performed on a batch basis. Manually operated discharge gates on the cluster hopper are used to sequentially discharge (by gravity) the various raw materials into a weigh hopper located below the cluster hopper unit. After the total batch is weighed, the batch of materials is discharged into a mixer. After an appropriate period of mixing, the material is discharged and conveyed to one of three manual bagging hoppers.

If only bagging is required, the reclaimed material is fed to the lump breaker as previously described but the batch weighing and mixing equipment is bypassed and the material is fed directly to the manual bagging hoppers. If a conditioning agent must be added to a straight material to minimize caking, this can be done by routing the material through the batch weighing and mixing system as with conventional blending.

In the simple plant scenario, the elevated cluster hopper and gravity-fed batch weighing operation is replaced with a more simple ground-mounted weighing system that is fed directly with the front-end loader. While this simple system is less costly to install, it requires more time and care to properly weigh a batch of material prior to mixing.

Bagging--A manual bagging system is used with both plant designs. The manual bagging system consists of three portable bagging hoppers that are filled by positioning a swivel spout over the appropriate hopper. The hoppers may also be filled directly using the front-end loader. Portable platform scales are located beneath each hopper and the operator fills plastic-lined, open mouth-type 50-kg bags by operating a manual discharge gate (filling spout) while observing the platform scale beam balance indicator. The filled bags are closed by first tying the plastic liner with a rubber band or plastic-coated wire tie. The outer bag (jacket), usually made of woven polypropylene, is stitched closed using a hand-held electric sewing machine.

1.6.3 Civil Engineering Works

The following major civil works will be required:

1. Rehabilitation and expansion of existing wharf to facilitate unloading of fertilizer raw materials.
2. Construction of a bulk raw material storage building including an area for the process plant (blending and bagging machinery and equipment) and bagged product storage and dispatch (truck loading).
3. Construction of a maintenance workshop with space allocated for storage of machinery and equipment and special products (agricultural chemicals and implements).
4. Construction of an office and showroom complete with an underground cistern for collection and storage of potable water.
5. Installation of plant yard and security lighting.

The most significant civil works cost item is for bulk material storage. In the simple plant scenario, a total bulk product storage area of 1,200 m^2 is assumed in addition to the space (about 300 m^2) required for the blending and bagging system and for bagged product storage and truck loading. The 1,200 m^2 area dedicated for bulk storage, less 30% to allow for a material reclaiming work aisle, is sufficient to store approximately 3,000 t of material provided divider partitions are used and care is taken to fill the individual bins to capacity. Likewise, with the optimum plant scenario, the 2,000 m^2 bulk material storage area (2,300 m^2 total) will be sufficient to store about 5,000 t of bulk material. In all cases the storage building will be designed to facilitate future expansion by adding to its length.

1.7 Plant Organization and Overhead Costs

Due to the relative simplicity of this project and the low level of staffing, the only overhead cost specified is for the recurring annual land lease.

1.8 Manpower

The full-time project staff is divided into two major groups: (1) general administration and sales and (2) production. A description of the duties and responsibilities of these two staff categories follows.

General Administration and Sales--This staff consists of 12 full-time employees and is headed by the president-general manager, who is responsible for the entire project. This staff carries out the following major functions:

1. Procurement and scheduling of all raw material and production inputs.
2. Marketing and sales, including technical assistance and services to dealers and farmers.
3. Scheduling of plant production program.
4. Dispatching of all products to dealers and other approved accounts.
5. Accounting, credit, and related financial activities.
6. Payroll, insurance, bookkeeping, and general administration.
7. Plant security, safety, and public relations.

Production--This staff, consisting of 7 full-time employees, is headed by a plant superintendent, who reports directly to the president-general manager. The production staff is responsible for material unloading, warehousing, blending and bagging, maintenance, and all other production-related activities including the procurement of short-term contract labor and services.

A summary of the full-time project staffing is shown below.

Project Staffing

	Number
Administration and Sales	
President and general manager[a]	1
Technical sales representative	1
Finance manager/accountant	1
Cashier/bookkeeper	1
Secretary	1
Messenger	1
Security (guard)	6
Subtotal	12
Plant Operations (Direct Labor)	
Plant superintendent	1
Foreman/operator	1
Mechanic/operator	1
Operator	2
Laborer (bag hauler)	2
Subtotal	7
TOTAL[b]	19

a. President and general manager also serves as marketing manager.
b. Additional short-term contract labor may be needed from time to time to cope with peak periods of fertilizer demand and plant production.

1.9 Implementation Scheduling

A 1-year timeframe is estimated for the engineering, procurement, and construction of the facilities required for the project. Assuming project approval, including financing, is obtained by late 1991 and the appropriate company structure is formed, the plant will be ready for commercial operation in the beginning of calendar year 1992.

1.10 Financial and Economic Evaluation

1.10.1 Methodology

The financial and economic evaluation described in this study was performed according to UNIDO Guidelines for Preparation of Industrial Feasibility Studies using COMFAR© software (Computer Model for Feasibility Analyses and Reporting). Unless noted otherwise, all values are expressed in 1990 US dollars and an exchange rate of H $1.5-to-US $1.0 is used.

1.10.2 Total Fixed Investment Cost

The following is a summary of the total initial fixed capital investment required for the project using a simple and optimum plant scenario.

Summary of Total Initial Fixed Capital Investment

Item	Optimum Plant		Simple Plant	
	US $	H $	US $	H $
Land (leased at H $6,000/year)	0	0	0	0
Site preparation and development	0	66,000	0	66,000
Structures and civil engineering	207,000	109,000	152,000	84,000
Incorporated fixed assets[a]	50,000	2,000	15,000	1,000
Plant machinery and equipment[b]	326,800	45,000	250,800	30,000
Preproduction expenditures[c]	166,300	0	139,4[illegible]	0
Subtotal	750,100	222,000	557,200	181,000
Total Initial Fixed Investment (US $)[d]	898,150		677,880	

a. Made up of engineering, project management, and contractor's fee.
b. Includes mobile equipment.
c. Made up of US $60,000 feasibility study, contingency, and interest during construction.
d. Based on H $1.5-to-US $1.0 exchange rate. Values may not add due to rounding.

1.10.3 Project Financing

The project financial package is not final but is expected to consist of 50% equity provided by the project partners (promoters) with the remaining 50% secured from borrowed funds. While it may be possible to secure some donor equity, this source of equity funds is not considered in the analysis.

1.10.4 Total Production Cost

Annual Production Cost (Composite of All Products)--The total annual cost of production, in U.S. dollars, for each year of the project beginning in 1992 is summarized below. It is important to note that raw materials account for about 70%-90% of the total factory-gate production cost, depending upon the type of plant and year of project life. Thus, anything that can be done to decrease the landed cost of imported raw materials will significantly benefit the overall economics of the project.

Total Production Cost

Year of Project	Simple Plant			Optimum Plant		
	Raw Materials[a]		Total	Raw Materials[a]		Total
	- - -(thousand US $) - - -			- - -(thousand US $)- - -		
1 (1992)	598.2	(74%)[b]	808.8	540.1	(69%)[b]	778.3
2	936.6	(80%)	1,168.5	845.6	(77%)	1,104.2
3	1,200.2	(83%)	1,447.6	1,083.7	(80%)	1,357.0
4	1,512.8	(85%)	1,779.1	1,366.4	(82%)	1,657.4
5 (1996)	1,628.6	(86%)	1,899.6	1,471.3	(83%)	1,765.8
6	1,762.0	(86%)	2,038.0	1,591.8	(84%)	1,889.9
7	1,903.0	(87%)	2,184.0	1,719.2	(85%)	2,020.6
8	2,041.9	(88%)	2,329.8	1,844.7	(86%)	2,151.1
9	2,174.7	(88%)	2,468.1	1,964.6	(86%)	2,274.4
10 (2001)	2,294.1	(89%)	2,587.8	2,072.5	(87%)	2,380.1
11	2,397.6	(89%)	2,689.2	2,166.0	(88%)	2,468.7
12	2,481.3	(89%)	2,778.2	2,241.6	(88%)	2,549.6
13	2,545.9	(89%)	2,846.7	2,300.0	(88%)	2,611.8
14	2,594.4	(90%)	2,897.8	2,343.8	(88%)	2,658.2
15 (2006)	2,638.7	(90%)	2,944.2	2,383.8	(88%)	2,700.3

a. Includes all imported fertilizer materials, filler, and conditioning agent (clay). Does not include empty bags, fuel, and miscellaneous operating materials and supplies.
b. Values in parentheses indicate percentage of total cost attributed to raw materials.

Production Cost by Product--A summary of the production cost for each product in the production program for selected years of the project is shown in Table 1-3. The variation in cost from year to year is due to the cost structure which varies, depending upon the amount of working capital and the loan repayment and depreciation schedule.

1.10.5 Financial Evaluation

Net Present Value and Internal Rate of Return--The following is a summary of the net present value and internal rate of return for the two project scenarios evaluated (simple and optimum plant) assuming a 15% discount rate and two levels of product selling prices (to importers and dealers) f.o.b. factory gate.

	Simple Plant	Optimum Plant
Discounted Selling Price		
Net present value at 15% discount rate	(-) US $1.59 million	(-) US $1.17 million
Internal rate of return	(-) 12.2%	2.1%
Maximum Selling Price (No Discount)		
Net present value at 15% discount rate	(-) US $547,000	(-) US $131,000
Internal rate of return	6.7%	13.7%

Payback Period--In both project scenarios, the payback period exceeds the assumed project life of 15 years.

Cash-Flow Analysis--A summary of the net cash flow for years 1, 6, and 15 of the project for the two plant scenarios using two levels of product selling prices (to importers and dealers) f.o.b. factory gate.

Year	Net Cash Flow	
	Simple Plant	Optimum Plant
	- - - -(thousand US $)- - - -	
Discounted Selling Price		
Year 1	(-) 276.7	(-) 348.1
Year 6	(-) 139.5	1.74
Year 15 (end of project)	(-) 121.7	123.6
Cumulative discounted cash flow (at 15%) for 15-year project life	(-) 1,588.3	(-) 1,172.1
Maximum Selling Price (No Discount)		
Year 1	(-) 209.0	(-) 280.5
Year 6	62.4	203.6
Year 15 (end of project)	108.7	425.9
Cumulative discounted cash flow (at 15%) for 15-year project life	(-) 547.4	(-) 131.2

Sensitivity Analysis--Because the overall project cost structure is so highly dependent upon the cost of imported raw materials, there is little scope for decreasing the factory-gate production cost except by optimizing the landed cost of raw materials.

The foregoing analysis already examined the financial impact of (1) fixed capital investment and (2) the factory-gate selling price according to the basic assumptions used for the study

The following data show the selling prices to importers and dealers that would be required in the optimum plant scenario at the exchange rate of H $1.5-to-US $1.0 to achieve the desired internal rate of return of 15%.

	Values Used for Base-Case Analysis		
	Discounted f.o.b. Selling Price	List f.o.b. Selling Price (No Discount)	Required[a] f.o.b. Selling Price
	(H $/t)		(H $/t)
Urea	287	318	322 (35)[b]
Ammonium sulfate	221	244	248 (27)
20-20-10	314	347	352 (38)
12-12-20	287	318	322 (35)
14-14-14	307	340	344 (37)
Internal rate of return, %	2.1	13.7	15.0

a. This price structure would result in an overall internal rate of return for the project of 15% and an accumulated net present value of zero at the end of 15 years.
b. Value in brackets indicates the increase in selling price per tonne over the discounted selling price.

1.10.6 National Economic Evaluation

The net economic benefit of the proposed project to the country was not determined. However, it is expected to be quite small since the majority (80%-90%) of the major recurring cost of the project is for imported fertilizer raw materials and the in-country value-added component is relatively small. Implementation of the project is more properly justified according to the advantages listed in the following conclusions.

1.11 Conclusions

1.11.1 Advantages of Project

The proposed project embodies a number of advantages, namely:

1. The development of a domestic industry that will create gainful employment for an extremely poor and underutilized workforce.
2. An improvement in the security of supply and relative price stability for fertilizer products which are essential to the increased growth and productivity of the Haitian agricultural sector.
3. The provision of a responsible agroservice company that, in addition to supplying fertilizer products and other essential inputs, will provide an urgently needed package of technical services to help ensure that fertilizers and other inputs are used in a cost-effective way, thus increasing agricultural production and improving the economic status of the Haitian farmers and farm workers who account for about 75% of the nation's population.
4. Stimulate increased competition among the existing importers thus helping to improve product availability, price stability, and the level of services provided to dealers and farmers.
5. Ensure the availability of a more appropriate line of fertilizer products designed for specific crops and agroclimatic conditions.
6. Create a general improvement in the credibility of the fertilizer supply sector, thus helping in the formulation and implementation of technically sound and responsible government agricultural policies.

1.11.2 Disadvantages of Project

Financially, the project is not viable according to the assumptions used for the study and it cannot be recommended as a sound investment.

The justification for, and level of, donor participation in, and government support of, the project should be viewed in terms of the previously mentioned benefits of the project and the government's desire to stimulate long-term increased agricultural productivity and self-sufficiency in food production.

To make the project financially sound the margin between the cost of production and the factory-gate selling price would have to be increased about H$ 35/t (US $23/t) over and above the discounted selling prices used in this study. The achievement of such an increase will require the combination of a number of actions including (1) optimiztion of raw material procurement and transportation methods to decrease the landed cost of raw materials, (2) some type of farmer incentive scheme to encourage fertilizer use despite the elevated cost, (3) donor financing to lessen the impact of borrowed capital on the cost of production, and (4) government policy reforms designed to encourage the development of a domestic, value added fertilizer industry.

1.11.3 Recommendations

The following recommendations are proposed for further evaluation before either abandoning or implementing this project:

1. Raw Material Procurement--Because raw materials represent 80% or more of the cost of production, methods for decreasing the landed cost of raw materials should be confirmed. The most likely method is to exploit the possible economics of raw material procurement and transport that could accrue if participation of the potential partner from the Dominican Republic can be confirmed and some type of cooperative agreement for raw material procurement and ocean transport could be arranged.
2. Project Financing--Confirm project financing alternatives for fixed investment. Also explore ways to secure favorable financing for short-term working capital.
3. Pricing Structure--Confirm product pricing structure and incentives that will be required to establish the majority of the existing Haitian importers as the initial buyers for the project's output.
4. Allied Products--Determine the scope, sourcing, pricing, and market share that can be expected for such allied products as pesticides, seeds, and farm tools and implements.
5. Other Agricultural Projects--Determine the status and confirm the scheduled completion of other agricultural projects, particularly irrigation, to more precisely predict total fertilizer market demand and market share.
6. Supportive Technical Assistance--Determine scope, cost, and sources of technical input and funding for supportive assistance projects that will enhance the objectives of this project as well as those of the total agricultural sector. The most urgently needed assistance projects include (1) dealer training and development, (2) soil and plant tissue testing laboratory to help determine optimum fertilizer recommendations,

(3) short-term credit programs to assist dealers establish warehouse facilities and stock fertilizer products, and (4) an evaluation of agricultural input-output pricing structure to assist the Government of Haiti in formulating effective policies to promote fertilizer use and increase agricultural productivity.

Table 1-1. Major Agricultural Areas, 1986

Agricultural Area	% of Total	Population Density (persons/km²)	Principal Crops
Arid and semiarid plains	45	77-200	Maize, millet, peas, beans
Mountainous (dry)	25	39-100	Maize, millet
Mountainous (humid)	15	200	Coffee, vegetables, fruits
Plains (humid)	10	300-400	Rice, maize, bananas, fruits, sugarcane
Plains (irrigated)	5	650	Rice, bananas, vegetables, tobacco
	100		

Source: Hatch Associates Ltd. 1986. *Engineering & Financial Analysis*, Volume I--The Report, and Volume II--Appendices and Drawings, Toronto, Ontario, Canada.

Table 1-2 Annual Fertilizer Raw Material Requirements for 15-Year Project Life

Raw Material[b]	Annual Raw Material Requirements[a]														
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Urea	2,383	3,656	4,636	5,719	6,020	6,514	7,035	7,549	8,039	8,481	8,863	9,173	9,411	9,590	[illegible]
Standard ammonium sulfate	50	106	136	172	186	201	217	233	248	262	274	283	290	297	302
Diammonium phosphate (DAP)	317	515	678	907	1,028	1,112	1,201	1,288	1,372	1,447	1,513	1,566	1,607	1,637	1,665
Muriate of potash (MOP)	345	574	760	1,009	1,152	1,246	1,346	1,445	1,538	1,623	1,696	1,755	1,801	1,835	1,867
Filler	229	380	502	673	765	828	894	959	1,022	1,078	1,126	1,166	1,196	1,219	1,240
Conditioning agent (bagged)	45	74	98	130	148	160	173	186	198	209	218	226	231	236	240
TOTAL	3,369	5,305	6,810	8,610	9,299	10,061	10,866	11,660	12,417	13,100	13,690	14,169	14,536	14,814	15,068

a. Indicated quantities include allowance for an overall shrinkage (loss) of 3.0%.

b. All materials are granular except ammonium sulfate and conditioning agent (clay).

Table 1-3. Total Production Cost by Product for Selected Years of Project

Year of Project	Urea	Ammonium Sulfate (Standard)	20-20-10	12-12-20	14-14-14
	(US $/t bagged product)				
Simple Plant					
Year 1 (1992)--3,271 t total production					
Raw materials[a]	192.9	107.8	199.8	164.0	163.8
Conversion cost[b]	39.6	39.6	39.6	39.6	39.6
Depreciation	9.3	9.3	9.3	9.3	9.3
Financial cost	15.5	15.5	15.5	15.5	15.5
TOTAL	257.3	172.2	264.2	228.4	228.2
Year 6 (1997)--9,768 t total production					
Raw materials[a]	192.9	107.8	199.8	164.0	163.8
Conversion cost[b]	21.6	21.6	21.6	21.6	21.6
Depreciation	3.2	3.2	3.2	3.2	3.2
Financial cost	3.5	3.5	3.5	3.5	3.5
TOTAL	221.2	136.1	228.1	192.3	192.1
Year 15 (2006)--14,629 t total production					
Raw materials[a]	192.9	107.8	199.8	164.0	163.8
Conversion cost[b]	18.6	18.6	18.6	18.6	18.6
Depreciation	2.2	2.2	2.2	2.2	2.2
Financial cost	0.1	0.1	0.1	0.1	0.1
TOTAL	213.8	128.7	220.7	184.9	184.7
Optimum Plant					
Year 1 (1992)--3,271 t total production					
Raw materials[a]	173.7	88.6	183.1	149.4	149.8
Conversion cost[b]	39.6	39.6	39.6	39.6	39.6
Depreciation	12.7	12.7	12.7	12.7	12.7
Financial cost	20.6	20.6	20.6	20.6	20.6
TOTAL	246.6	161.5	256.0	222.3	222.7
Year 6 (1997)--9,768 t total production					
Raw materials[a]	173.7	88.6	183.1	149.4	149.8
Conversion cost[b]	21.6	21.6	21.6	21.6	21.6
Depreciation	4.3	4.3	4.3	4.3	4.3
Financial cost	4.6	4.6	4.6	4.6	4.6
TOTAL	204.2	119.1	213.6	179.9	180.3
Year 15 (2006)--14,629 t total production					
Raw materials[a]	173.7	88.6	183.1	149.4	149.8
Conversion cost[b]	18.6	18.6	18.6	18.6	18.6
Depreciation	3.0	3.0	3.0	3.0	3.0
Financial cost	0.1	0.1	0.1	0.1	0.1
TOTAL	195.4	110.3	204.8	171.1	171.5

a. Indicated cost includes allowance for an overall shrinkage (loss) of 3.0%.

b. Includes all direct and indirect costs of production.

2.0 PROJECT BACKGROUND AND HISTORY

2.1 Project Background

This project deals with the establishment of a fertilizer blending and bagging plant in Haiti. The proposed plant would be owned and operated by a private-sector Haitian company. The objective of the company is to provide a cost-effective package of fertilizer products and related services to the Haitian farmer thereby helping to increase food production and generally increase the productivity of the agricultural sector.

With regard to fertilizer, Haiti currently relies totally upon imported bagged fertilizers that are not further processed in Haiti to increase their value or improve their agronomic effectiveness. Since Haiti has no indigenous fertilizer raw material resources of commercial significance, the proposed project will also depend heavily upon imported raw materials. However, the required materials will be imported in a more economical bulk form and will be bagged locally, thus decreasing the landed cost compared with the current cost of imported bagged fertilizers. Some of the nitrogen, phosphate, and potassium (potash) materials will be mixed (blended) prior to bagging to achieve optimum nutrient ratios and concentrations. This local blending and bagging activity will further increase the use of local resources thus improving the Haitian value-added component of each bag of fertilizer.

In addition to supplying fertilizer products, the project will provide a package of services, particularly technical assistance to dealers and farmers, to ensure that the correct products are used in the most cost-effective way. This technical assistance activity currently is lacking in Haiti and poses a major constraint to increased fertilizer use, improved crop production, and an enhanced quality of life for the resource-poor Haitian farmers and farm workers who currently account for about 75% of the population.

The proposed project design takes into consideration a number of practical local factors including:

1. An extremely resource-poor population.
2. A high level of instability at all levels of government.
3. Severe constraints on the availability of foreign exchange.

4. A relatively small and unstable market for fertilizer.
5. A severe shortage of technical assistance relative to fertilizer use and crop production.
6. The potential for strong competition from established importers currently supplying the Haitian fertilizer market.

In view of these and other technical, commercial, and less tangible factors, the envisioned project incorporates the following stabilizing factors to minimize risk and thereby help to ensure success.

1. Low initial fixed capital investment with a plan for staged expansion to accommodate increased business activity should it occur.
2. High equity-to-debt ratio.
3. Flexibility with regard to mode of operation, product type, and services offered.
4. Maximum utilization of local management and labor and other domestic resources.
5. Heavy emphasis on market intelligence and market research designed to identify and meet dealer/farmer needs and ensure competitiveness.

Additionally, the project will seek to strengthen its position in the market and increase its visibility and revenues by promoting the servicing of fertilizer imports supplied by donors which currently amount to about 2,500 tpy. Also, as a basic supplier of fertilizer products and services, the project is well positioned to increase its business activity by marketing allied products such as seeds, pesticides, and farm tools and implements.

2.2 Project Promoter/Initiator

The proposed project is being promoted by a Haitian entrepreneur.[5] While the equity participation in the company is not clear at this time, it is quite likely that, in addition to the promoter, private-sector principals of the Dominican Republic fertilizer industry (a major current supplier of imported fertilizers to Haiti) and a group of Haitian investors will be involved. Borrowed funds are likely to be obtained from Société Financière Haïtienne de Développement S.A. (SOFIHDES) and offshore funding sources.

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5. Mr. Jean-Michel Cherubin, P.O. Box 13372, Delmas, Port-Au-Prince, Haiti.

In addition to financial equity, the equity partners are expected to bring to the proposed company (1) managerial and fertilizer marketing skills; (2) technical skills relative to procurement of fertilizer materials, blending plant operation, transport and logistics; and (3) business acumen pertinent to the region.

Additionally, because the principal promoter has obtained funding from UNIDO/UNDP for performing this preproject study, many of the significant technical, market, and financial parameters are defined and described well in advance of implementation to facilitate sound planning thus minimizing the risks that may be encountered should the project be implemented.

2.3 Project History

2.3.1 Historical Development

This proposed project is in part an outgrowth of an earlier initiative taken by a Canadian entrepreneur who established a fertilizer blending plant in Haiti in 1981. The blending plant was operated under the corporate name of Agricultural Services S.A. (ASSA). The company flourished for a few years and then, due to a number of internal and external problems ceased operation in May 1987.[6]

The promoter of this current project was one of ASSA's major fertilizer dealers for a period of time (about 3 years) and thus is aware of the potential benefits that fertilizers could offer to the Haitian farmer, provided they could be supplied in the correct nutrient mix at a competitive price along with a package of technical services that would ensure their cost-effective use thus leading to farmer acceptance and farmer loyalty.

With the financial assistance of UNIDO/UNDP, a study to evaluate the feasibility of establishing a new fertilizer-blending and bagging plant in Haiti was solicited by UNIDO/UNDP in February 1990 on behalf of the current promoter. The International Fertilizer Development Center (IFDC) with

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6. International Fertilizer Development Center (IFDC). 1990. "Supplying Quality Multinutrient Fertilizers in the Latin American and Caribbean Region-Emphasizing Bulk Blending and the Complementary Role of Granulation," IN *NPK Workshop Proceedings*, Special Publication IFDC-SP-14, IFDC, P.O. Box 2040, Muscle Shoals, Alabama, 35660.

Headquarters in Muscle Shoals, Alabama, U.S.A., was selected to perform the study.[7] IFDC began field evaluation/data collection work in Haiti June 4, 1990.

2.3.2 Other Studies and Investigations

In 1985 ASSA was contemplating relocation and expansion of their blending plant. This relocation and expansion plan was designed to decrease the cost of production and delivery of fertilizer to the major farming areas and to better facilitate the servicing of a growing market for ASSA fertilizer products. A study, funded by the Canadian International Development Agency, was performed by a Canadian firm--Hatch Associates Limited (Hatch) of Toronto.[8] Hatch subcontracted a portion of the fertilizer plant process design study work to IFDC. IFDC also provided market-related consulting services to Hatch. The study was completed in January 1986 about the time when ASSA was undergoing a severe financial crisis and the Duvalier Government collapsed. Since that time no action has been taken on implementation of the ASSA plant relocation and expansion project, and ASSA closed its business in mid-1987.

The actual commercial experience of ASSA as well as the Hatch Study showed that a significant potential market for fertilizer exists in Haiti. However, in view of the severe technical, financial, and political constraints of the country, the development of this market will require a unique mix of practical, technical, commercial, and financial skills in addition to supportive government policies. The required skills and other unique features of the proposed project are more fully elaborated in this study.

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7. UNIDO Contract No. 90/028/GYL; Project No. DP/HAI/89/033; accepted by IFDC May 31, 1990, IFDC Contract No. 00926/90.

8. Hatch Associates Ltd. 1986. *Engineering & Financial Analysis*, Volume I--The Report, Volume II--Appendices and Drawings, Toronto, Ontario, Canada.

2.4 Feasibility Study

2.4.1 Author

This study was prepared by an IFDC team consisting of the following specialists:

James J. Schultz (Team Leader)--Fertilizer Plant Engineering and Production/Supply Specialist

Catalino C. Yaptenco, Jr.--Market Development Specialist

Gene T. Harris--Agricultural Economist

Jorge R. Polo--Industrial Investment/Financial Analyst

C. John Currelly--Market/Commercial Analyst (short-term consultant to IFDC with residence in Haiti)

2.4.2 Study Title: Fertilizer Plant Feasibility Study--Haiti

Although this study is referred to as a feasibility study and the UNIDO Guidelines for performing such a study are followed to the extent possible, additional study and evaluations will be required to achieve a more complete input, especially with regard to the following aspects:

1. Selection of the plant site is only preliminary and the detailed civil engineering works and costs related to the selected site, or an alternative site, must be more fully developed.
2. Project financing and equity makeup criteria have been assumed based on a very preliminary analysis of the project's needs and potential.
3. A more complete evaluation of the national economic value of the project is needed to help obtain favorable government policy support for the project.

Although this study lacks complete elaboration of the above components, a maximum effort, within the scope of the available contract funds (budget), was made to determine the most urgent and critical parameters of the project including:

1. Characterizing and quantifying the market for the project's fertilizer products (type, price, and quantity).
2. Determination of the possible impact of competition.
3. Estimation of the minimum level of investment that could be made consistent with the local market situation.
4. Development of a first-year business/marketing plan.

5. Identification of the constraints and recommendations for additional assistance projects that will be needed to allow the project to develop and grow while serving the Haitian farmer with cost-effective fertilizer products and services.

2.4.3 Ordering Party

United Nations Industrial Development Organization (UNIDO) contracts section (M. Kohonen, Acting Chief), Vienna, Austria, May 31, 1990.

3.0 MARKET AND PLANT CAPACITY

3.1 Demand and Market Study

3.1.1 Determination of Fertilizer Consumption and Market, 1985-89

Because of the long-term disturbed economic and political situation in Haiti, little reliable data, relative to the agricultural sector and particularly fertilizer use, are available.

In the absence of reliable secondary data, primary data were collected and analyzed to determine the fertilizer market. The data were generated by examination of records and/or documents available at entry points of supply into the country, either by land or ocean transport. Cross checks were done with the major sources of supply, such as the Dominican Republic. Consumption data by agricultural area, together with market shares and pricing structure of the various importers, were evaluated by in-country trips and interviews with importers, dealers, small and plantation farmers, private and government technicians, and operating personnel.

3.1.2 Data and Alternative Projection Methods

Resource Base--By most economic norms Haiti is one of the poorest countries in the world; its people are the poorest in Latin America. The contrast in wealth between classes is stark. The wealthiest 1% of Haitians account for 44% of national income but pay only 3.5% in taxes. The total population is about 6.5 million with most people living in the rural areas. About 75% earn the equivalent of only one-sixth of the US $352 national average per capita income and this continues to decline. Out of a work force of 2.4 million, 80% are unemployed or not working in paying jobs. Women dominate the transport and marketing of farm produce. Less than 10% of the population has access to running water.

About two-thirds of the country is comprised of rough, mountainous terrain, unsuitable for cultivation. Out of the total land area of 27,750 km^2, only about 40% or 1.1 million ha is arable. The climate is tropical, but generally semiarid. This is due to the mountains dividing Haiti from the Dominican Republic which cut off moist trade winds. Agriculture, which is the main economic sector, has steadily declined as a result of severe deforestation, soil erosion, low soil fertility, primitive crop production methods, and the lack of a defined national agricultural policy. Crop production in rice, maize, and sugarcane is inadequate to keep up with domestic demand. The problems in food production are complex and require a serious and sustained commitment by the Government together with appropriate outside assistance. One positive step to improve agricultural production is the establishment and operation of a local fertilizer industry, the subject of this study.

Land Use--The major agricultural areas and the corresponding principal crops are shown in Table 3-1.

The location of the plains, plateaus, and mountains is shown in Figure 3-1.

Rainfall--Rainfall is bimodal in most parts of the country with maximum precipitation in April and May and October and November. Most of the country receives 1,000 mm of rainfall; substantial parts of the country receive over 1,500 mm and the higher elevations in the southern peninsula and the northern and central plateau receive 1,800-2,000 mm. Monthly precipitation data for the 1984-87 period are given in Table 3-2. At least 1,500 mm of rainfall is required to sustain a normal crop growth in the Haitian tropical environment.

Of the two dry seasons, December through February is usually the most severe, with March, June, and July being moderately dry. Widespread deforestation has caused very serious soil erosion in many areas. Most soils are thin and exhibit poor water absorption and retention properties.

Agriculture--About 1.1 million ha is utilized for the cultivation of various crops. In 1988, 74% of the working population was engaged in agriculture, forestry, and farming but they provided only 32% of the country's gross national product. The production of agricultural commodities provided a livelihood for 70% of the population in 1989. One-third of the peasants have no land, while the remainder owns only about 1% of the land. Exclusive of the large farms, there are about 616,700 small-scale farms of which 95% are well below 1-ha size; about 5% of the farms have a maximum size of 1.25 ha. About 60% (about 0.7 million ha) of the arable area is cultivated in rice, plantain, maize, sorghum, potatoes, cassava, taro, and yams, which are the principal food crops of the country. Data pertaining to the principal crops are shown in Table 3-3.

The planting season for the major crops is spread quite evenly throughout the year as shown in Table 3-4.

Accurate data on the irrigated area are not available. The major irrigated area is the Artibonite Valley. In the agricultural sector assessment report of Haiti by USAID,[9] the estimated total irrigated area in 1984 was 73,720 ha. There has been no assessment since then, and it is evident that the total irrigated area has declined considerably during the past 6 years because of poor maintenance of the irrigation systems, deterioration of the irrigated land structure, and a reduction of the water source as the result of deforestation and silting of the irrigation canals by severe soil erosion. Observation of the irrigated areas shows that efficiency of water use in the systems is below 70%. Since rice farming is practically all done by hand, the distribution and control of water in the "irrigated areas" is very inefficient.

As shown in Figure 3-2, fertilizer consumption in Haiti decreased from 16,030 t product in 1985 to 12,883 t product in 1989, or 20% in a period of 5 years.

The major factors which caused the decrease in consumption can be attributed to:

1. Low farm-gate prices for farm produce, particularly rice, where 65% of the fertilizer is consumed.
2. Delays in importation of fertilizer thus limiting the supply in the marketplace.
3. Severe reduction of credit in the marketplace; most transactions are performed on a cash basis.
4. Political instability of the country. Since the revolution in February 1986, the country has operated under a provisional government with very unstable political conditions.
5. Lack of post-harvest marketing and distribution facilities.
6. Very poor crop production practices.

The fertilizer market of Haiti from 1985 to 1989, by product and nutrient, is shown in Table 3-5.

Out of the 12,883 t of fertilizer products used in 1989, 92% or 11,852 t was consumed in the food crop sector, and the balance (8% or 1,031 t) was consumed in the industrial crop sector. About 55% was used during the first half of the year and 45% in the second half of the year.

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9. Agricultural Sector Assessment, Haiti, USAID, 1987.

In 1989 nitrogen fertilizer, principally urea, accounted for 65% of the market, 12-12-20 for 25%, and the remaining 15% was shared by a number of complex grades having an average (composite) analysis of 14-14-20. Fertilizer usage during the same period showed that rice and onions in Artibonite, and potatoes, onions, and cabbage in Kenscoff consumed 65% and 12%, respectively. Maize and sorghum are not usually fertilized, except when planted in large plantations where fertilizer is used. Fertilizer application on sugarcane and coffee has been reduced drastically and often not practiced because of the low export price received for sugar and the disease infestation in coffee. With the domestic demand for sugar, however, it is expected that the area of fertilizer application on sugarcane will increase.

The 1989 fertilizer consumption areas shown in Figure 3-3 are based on the following data:

Consumption Area	Crop	% of Total	Fertilizer Consumption (t product)
Artibonite Valley	Rice/onions	65	8,373
Leocane	Corn/industrial tomatoes	2	258
Kenscoff	Vegetables (all kinds)	12	1,546
Fôret des Pins	Vegetables (potatoes/ onions/cabbage)	7	902
Cul de Sac	Tobacco/industrial tomatoes/vegetables	6	773
Les Cayes	Sugarcane/rice/maize/ tobacco	5	645
Cap Haitien/others	Sugarcane/citrus/coffee vegetables/onions	3	386
TOTAL		100	12,883

Except for the plantation crops or crops cultivated for industrial markets, crop farming in Haiti is generally primitive, being done by hand using hand implements. Harvesting and processing of crop produce is also completely manual. In irrigated rice, for example, where 65% of the fertilizer is consumed, land preparation, distribution and control of irrigation water, fertilizer use, and other agronomic practices are below acceptable levels. It is estimated that nearly half of the nutrient value of urea fertilizer applied on irrigated rice is lost due to improper timing and application methods. This could be the reason why farmers apply a 196-12-20 kg nutrients (400 kg of urea plus 100 kg of 12-12-20) when the recommended rate of application is 100-60-60 kg nutrients (N + P_2O_5 + K_2O) per hectare as shown in Table 3-6. The data supplied by farmers and used to determine the economics of yield showed that the value/cost ratios for paddy rice, maize, and tobacco are 3.9, 2.6, and 2.6, respectively.

Except for tobacco and industrial tomatoes (plantation farming), the use of pesticides is far below recommended levels; they are mostly used on rice seed beds, vegetables, and some on sugarcane. The fields are usually weedy and cultivation is not normally practiced after transplanting or planting.

3.1.3 Market Data and Final Results

The market data obtained covered a period of 5 years, 1985-89, show that fertilizer consumption in Haiti has declined during the period for the reasons already discussed. A combination of forecasting methods was used for projection of fertilizer demand taking into consideration the limited amount of reliable data available. The impact of the factors responsible for the reduction of fertilizer use was determined and quantified, while projecting the possible positive realistic changes in these factors and their effects on the market segments. These elements, together with the availability of a local supply of fertilizers and the proposed project's marketing programs, are expected to slowly reverse the declining trend in fertilizer use.

The decline in fertilizer use leveled off in 1988 and 1989. Use data for the first half of 1990 show more or less the same level as the first half of 1989. This indicates that fertilizer consumption in the country may continue at the same level through 1991 unless significant changes occur in the factors affecting the fertilizer market. The return to political stability in the country can only begin after the election tentatively scheduled in December 1990 or early 1991. The year 1991 will serve as the transition year for the new government. An increase in stability can be expected to have some positive impact in 1992. Based on this rationale, the fertilizer market in 1991 is assumed to be the same as 1989 and is used as the fertilizer market base year for this study.

Based on the experience of other developing countries with problems in fertilizer consumption similar to Haiti, a 5% annual increase in the commercial fertilizer market during each of the next 3 years and 7% during the fourth and 8% during the fifth year are considered realistic projections. It is assumed that the Japanese fertilizer donation of 2,500 tpy will be maintained for the next 5 years.

Less developed countries, whose consumption bases are very small, are certainly capable of increasing growth in fertilizer consumption at a much higher rate than has been projected. However, because of the volatile political situation in Haiti and the absence of a defined agricultural policy, it is assumed that a high growth rate will not occur. Growth in the fertilizer market will most likely be much more erratic than the smooth growth projected, but the growth rates projected are thought to be realistic at this time.

The assumptions factored into the market forecast for the first 5 years of commercial operation of the project (1992-96) are listed. These assumptions evolved from discussions with, and information gathered from, those directly or indirectly involved and concerned with the fertilizer and agricultural sectors of Haiti.

<u>1992</u>

1. Political stability in the country will only start to improve if the scheduled elections in November 1990 can be conducted successfully and the elected government takes control. The year 1991 will be a transition period for improving the overall business climate of the country.
2. Fertilizer production from the proposed fertilizer plant will definitely increase fertilizer consumption.
3. The improved farm-gate price for rice will remain the same as in 1990 and will sustain the incentive for rice farmers to use fertilizers.
4. The domestic market for sugar and the export market for Chinese vegetables will offer a strong incentive to implement planned projects that will increase fertilizer use.[10]
5. The newly elected government will place a priority on the rehabilitation of the country's agriculture where the majority of its population is dependent. The objectives will be to achieve self-sufficiency in rice, maize, and sugar and to reduce and ultimately eliminate food imports.

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10. Vegetables for the U.S. oriental market such as bitter melon, hot pepper, and Thai eggplant.

The various agroforestry programs to improve the watershed will also be a government priority and such restoration programs will require fertilizer.

6. The Japanese donation of 2,500 tpy will continue at this same approximate level for at least 5 years.
7. The total commercial fertilizer market is projected to increase by 5%.

1993

1. The program of the new government for rehabilitation of agriculture will continue to receive priority, particularly for much needed improvements in irrigation systems. This should allow two crops annually on 73,720 ha of irrigated area.
2. Parallel with rehabilitation of the irrigation system, there will be a priority rice production program to attain self-sufficiency in the country's staple food. The program will not only increase fertilizer consumption but will adjust the nutrient imbalance from the existing rate of 196-12-20 kg nutrients (N-P_2O_5-K_2O) per hectare to the recommended 100-60-60 kg nutrient dose.
3. The change in the nutrient ratios for paddy rice and the supply of custom-blended NPK compounds for the industrial crop market will change the product mix ratio, with more growth in blended NPK compounds than in straight nitrogen fertilizers.
4. Continued expansion in the fertilized sugarcane area to meet the domestic demand for sugar.
5. A sustained market increase in the commercial sector of 5% is projected for 1993.

1994

1. This year will be the turning point for the agricultural economic recovery program. Improved political stability of the country will provide a more positive climate for private investments and for continuation of foreign aid support for the infrastructure projects needed to sustain recovery.
2. Rehabilitation of the irrigation systems will be complete. The irrigation system improvements will maximize two croppings of rice per year and will increase fertilizer consumption.

3. The pending plan for a 15,000-ha irrigation project, funded by the Banque Interaméricaine de Dévelopment (BID), will be implemented to help support the new government's food production program.
4. The marketing activities of the new fertilizer plant project over the past 3 years will serve as a catalyst in increasing the fertilizer market. The competition is expected to create additional activity to maintain or increase their share of the market.
5. The total commercial market increase in 1994 will be similar to 1993 at 5%.

1995

1. The country will be working toward attaining self-sufficiency in rice and sugar for its domestic needs.
2. The expansion of compound (NPK) fertilizer use in industrial crops (sugarcane, tobacco, and industrial tomatoes) will further change the ratio of straight nitrogen fertilizers-to-NPK blends from 65:35 to 58:42.
3. A maize production program will be needed to meet the requirements for poultry and hog feed and reduce or eliminate maize imports. An attractive contract price from feed millers, and government support for production credit, will encourage plantation farmers to produce hybrid maize.
4. Commercial vegetable production for export will expand because of the availability of low-cost labor and Haiti's proximity to the United States market. Increased fertilizer consumption per hectare of land will occur.
5. Part of the 15,000-ha new BID-funded irrigation system will be operational.
6. An increase of 7% in the commercial market is expected for 1995.

1996

1. The fertilizer market will continue to grow steadily as a result of the various programs designed to improve the agricultural sector. An even higher growth rate will occur in 1996 if most of the 15,000-ha new irrigation system becomes operational.
2. Improvements in the fertilizer marketing system of the proposed fertilizer plant project will continue to contribute to the market growth.

3. The ratio of fertilizer consumption between straight nitrogen fertilizer and compound NPK blends will remain at about 58:42.
4. The continuity of the food production programs, expansion of irrigation facilities, and increased areas for plantation crops will bring about a fertilizer market recovery to the 1985 consumption level of about 16,000 t.
5. A commercial market growth of 8% is projected for 1996.

The total fertilizer market is forecast to increase by 27% from 12,883 t in 1989 to 16,390 t in 1996. This fertilizer market recovery will bring fertilizer consumption to the 1985 level of about 16,000 t product as shown in Figure 3-4.

The fertilizer market forecasts for the period 1992-96 by product and nutrient and by consumption areas are shown in Tables 3-7 and 3-8, respectively.

The ratio of food crop to industrial crop shares in the market forecast will change from 92:8 in 1991, the base year for this study, to about 85:15 in 1996. This change will be due mainly to expansion of sugarcane area in order to achieve self-sufficiency and eliminate the import of sugar. The expansion in fertilized areas for commercially grown tobacco will also increase fertilizer demand for industrial crops.

A summary of the total market forecast for all fertilizer products by consumer crop segment follows:

	Fertilizer Use											
	1991 (Base)		1992		1993		1994		1995		1996	
Crop Segment	%	t	%	t	%	t	%	t	%	t	%	t
Food crops	92	11,852	90	12,062	87	12,134	85	12,342	85	13,057	85	13,932
Industrial crops	8	1,031	10	1,340	13	1,813	15	2,178	15	2,304	15	2,458
TOTAL	100	12,883	100	13,402	100	13,947	100	14,520	100	15,361	100	16,390

The quarterly fertilizer use pattern for the next 5 years will continue to be dictated by rice and vegetable production. Consumption by quarter will remain at 25%, 30%, 23%, and 22%, respectively.

3.2 Sales Forecasts and Marketing of Products

3.2.1 Data and Alternatives

An evaluation of Haiti's existing fertilizer market was conducted (Section 3.1.3) to establish a benchmark for formulating the sales forecast and marketing plan for 1992-96.

1. Demand Forecasting--There is no agency, private or public, forecasting the fertilizer market demand for Haiti. For that matter, there are no public data available on past fertilizer consumption. The market data assembled as a result of this study are needed not only to identify and evaluate the market size and its profile and the factors linking demand to actual consumption, but more importantly to establish a basis for forecasting future requirements. Realistic forecasts of demand are essential as they provide the basis for all planning, including national fertilizer sector policy, as well as procurement and marketing.
2. Fertilizer Supply--All commercial fertilizer products are currently imported. The complex NPK grades and part of the urea fertilizers are sourced from the Dominican Republic by truck or sea while the balance of the urea is sourced from Trinidad, Venezuela, and Guyana (Dutch origin) requiring longer delivery leadtime which sometimes results in unscheduled delays in transit. Among the complex NPK grades, 12-12-20 is preferred, supplying 30% of consumption. Granular urea from Trinidad is preferred over the prilled material obtained from Venezuela and Guyana. The Japanese fertilizer donation normally consists of nitrogen fertilizer (urea and ammonium sulfate) and complex NPK grades having a 60:40 straight N-to-NPK ratio. The bag sizes used in the Haitian market are 50 kg or 100 lb (45.4 kg). The bags are constructed of woven polypropylene with polyethylene liners. Bags with import markings (brand identification) are preferred and, according to the experience of dealers, command better prices. Only Agri-Supply Co., a local fertilizer company, is starting to use their own brand on imported urea fertilizer bags. The preference for imported brands could be due to the classical colonial mentality that assumes imported products are better than domestic products.

   Tendering and procurement from Trinidad, Guyana, and Venezuela are by irrevocable United States bank-confirmed letters of credit (this incurs an additional expense of 1.5% of the f.o.b. price for United

States banker's acceptance) or United States bank draft. Importation from the Dominican Republic is normally paid in cash in U.S. dollars.

3. Marketing Channels--There are four existing marketing channels for handling imported fertilizers in Haiti as follows:

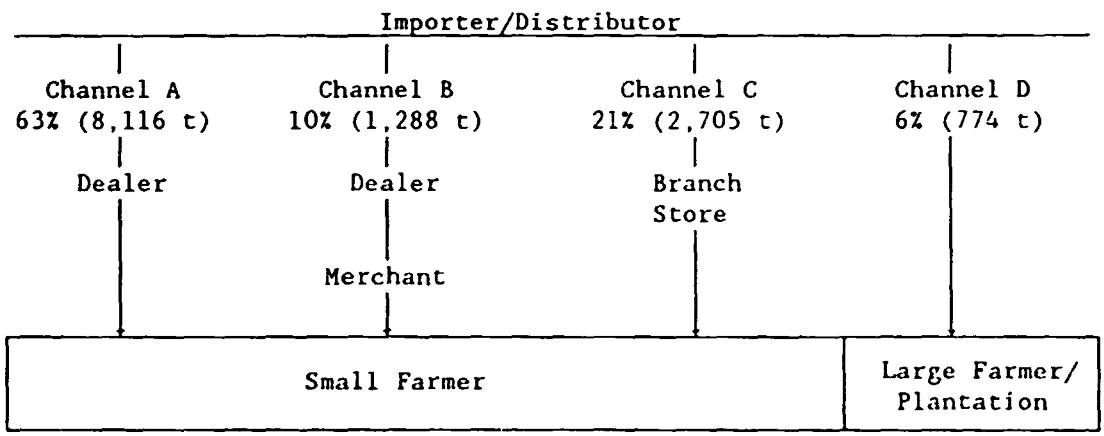
Channel A--Fertilizer is channeled from supplier, to importer, to dealer, to small farmer.

Channel B--Fertilizer is channeled from supplier, to importer, to dealer, to merchant, to small farmer.

Channel C--Fertilizer is channeled from supplier, to importer, to the importer's branch store, to small farmer.

Channel D--Fertilizer is channeled from supplier, to importers who are direct users (large farmers and plantations).

These channels and their corresponding share of market in 1990 are shown below:



The margins customarily made by the importers, dealers, and merchants are indicated in Table 3-9.

The dealers are independent traders whose business activities include consumer goods, cement, farm supplies, and some pesticides. The service provided to farmers is usually in the form of price discounts, and in a few cases, a very limited amount of credit.

It is important to note that in Channel D (importer/plantation) one account, Haitian American Sugar Company, a very small consumer in 1989, is starting to increase consumption in 1990 and 1991 because of expansion of area to be fertilized.

4. Physical Distribution--As mentioned earlier, the modes of transport for imports are either by truck or by small ocean-going ships, while all distribution in-country is by truck. Trucks with a capacity of 20 t-36 t and ships with a capacity of 500 t-2,000 t are readily available for imports. For in-country transport, 5-t to 10-t capacity trucks are readily available.

   The cost of transporting fertilizer by truck from suppliers in the Dominican Republic to major points follows:

DR--Port-au-Prince	US $27.5/t (450 km)
DR--St. Marc	US $33.0/t (550 km)
DR--Les Cayes	US $41.3/t (650 km)

   Warehouses varying in capacity are normally available in the fertilizer market centers except in Kenscoff and Foret des Pins where storage space is scarce.

5. Fertilizer Prices--Fertilizer retail prices at the dealer will vary from one market place to another depending on the distance from source of supply, amount of handling required, and the level of competition. Granular urea has the same retail price per bag as the 12-12-20 NPK grade, while the price of prilled urea is H $1.00/bag less. The fertilizer retail price buildup by market centers as of June 1990 is shown in Table 3-9.

6. Prices of Farm Produce--The farm-gate price of paddy rice is affected by the supply of illegally imported rice sold at low prices. During the first half of 1990, stricter impositions and collection of taxes on imported rice slightly improved the farm-gate prices of rice thus encouraging farmers to increase their rates of fertilizer application.

   Domestic prices for maize and sugar are relatively attractive for crop production. These crops, however, are dependent on limited rainfall. The lack of irrigation water and poor agronomic practices limit the production of these crops.

7. Competition--Fertilizer competition in Haiti exists in three forms: (a) the fertilizer companies from the Dominican Republic that export to Haiti and monopolize the commercial complex NPK blend market and supply

part of the urea market, (b) the Haitian fertilizer companies that import all their complex NPK grades and part of their urea fertilizer needs from the Dominican Republic, representing 54% of Haiti's yearly fertilizer requirement, and (c) direct imports (by large farmers and plantations) of urea fertilizer from Trinidad, Venezuela, and Guyana, which represents 15% of the total market requirement. The local companies also participate in the sale of the annual Japanese fertilizer donation to Haiti. This donor tonnage currently represents 31% of supply requirement. The distribution of the fertilizer supply sources in 1989 is shown below:

Supply Source (1989)	Fertilizer Supply % Share	Fertilizer Supply Volume (t)
Dominican Republic	54	6,957
Trinidad/Venezuela/Guyana	15	1,826
Japan (donation)	31	4,100
TOTAL	100	12,883

The competition from the Dominican Republic is made up of two fairly large fertilizer companies: Fertilizantes Quimicos Dominicanos, S.A. (FERQUIDO) and Fertilizantes Santo Domingo, C.A. (FERSAN) who produce fertilizer blends from imported raw materials. Their combined domestic and export market is about 450,000 tpy. These two companies share more or less equally in the Haiti export market, which totaled 6,957 t in 1989. These imports accounted for 54% of the Haiti market for that year. Each company is represented in Haiti by an agent/importer, who is part of Haiti's fertilizer marketing channel discussed earlier.

The commitment of FERQUIDO management to Mr. Jean-Michel Cherubin (promoter of this project) to invest in the proposed Haitian fertilizer company has been confirmed by Mr. Marcial M. Najri, Assistant to the President of FERQUIDO. A discussion with Mr. Najri during the in-country study confirmed (a) his commitment to invest in the project as a private person, (b) his strong business relationship with Mr. Cherubin, and (c) his confidence in the future of the proposed project. On behalf of FERQUIDO, he offered assistance in the implementation of the project.

With FERQUIDO an an investor, foreign competition will then be coming mainly from FERSAN.

On the local scene, competition will come from two companies--Agri-Supply Co. and Agrotechnique S.A. These are the major companies in the market with 30% and 16% market share in 1989, respectively. The other importers are small, importing for their own use and perhaps selling a small amount, and large fertilizer users (plantation or industrial crops). Agri-Supply Co. sells its volume through nonexclusive independent dealers who are free to obtain their supply from any sources. Agrotechnique S.A., on the other hand, utilizes its own branch stores/warehouses as sales outlets, and most likely incurs a higher field sales overhead than Agri-Supply Co. Their sales outlets are nicely painted and have attractive "Agroservice" signs. It was observed, however, that despite the signboards, the sales outlets did not supply any credible agronomic services to their customers. It was obvious that the "Agroservice" name was fcr appearance only.

These two companies were interviewed not only to determine their capabilities but also to obtain their reaction to the existence of a local blending plant. Agri-Supply Co. management was very explicit in its response. They do not intend to purchase their fertilizer supply locally; they will compete in the market by importing their fertilizers. Agri-Supply Company's major strength is its nonagricultural product exports which generate U.S. dollars to sustain their need for foreign currency required for importing fertilizer. Their weakness is their poor relationship with their dealers and they are slowly losing their network. Agrotechnique S.A., on the other hand, is open and will buy its fertilizer supply locally if the prices are less than imports and the products are acceptable. Agrotechnique S.A. will always team up with suppliers that can give them an advantage to compete with Agri-Supply Co. to improve their market share. Agrotechnique S.A. has not yet decided whether to support the proposed project and prefers to leave the door open. As for the other importers, the increasing complexity of ordering from abroad, including the difficulty of obtaining acceptable foreign instruments for payment, mitigates against their staying in the importing business. A number of these small importers indicated interest in joining and investing in the company, depending upon the profitability of the project. In general, the interest of local competition in joining and investing is an opportunity to decrease the problems that the new project will have in penetrating the market. This situation will have to be considered in the company's marketing strategies.

A summary of the market share by company/importer in 1989 follows:

Company/Importer	Product Volume (t)	Market Share (%)
Japan donation	4,100	32
Agri-Supply Co.	3,871	30
Agrotechnique S.A.	2,072	16
Solange Michel	472	4
Andre Pierre	435	3
Famosa	327	3
Hasco	218	2
Darbouco	36	nil
Others	1,352	10
	12,883	100

The trend among company/importers is to increase their sourcing of urea and ammonium sulfate from suppliers in Trinidad, Venezuela, and Guyana, with granular urea being preferred over prilled urea. The information obtained from the Japanese Embassy in Haiti indicates that the fertilizer donation in 1990 will be 2,500 t of product and will be maintained yearly thereafter at that level.

8. Japanese Fertilizer Donation--This is a yearly Japanese grant of fertilizer, pesticides, and farm equipment worth the equivalent of 250 million yen. This donation started in 1983. Fertilizer is the major portion of the donation consisting of 1,000 t of urea, 500 t of ammonium sulfate, 500 t of 12-12-20, and 500 t of 16-10-20 or 20-20-10. As a condition to the donation, the Government of Haiti has to recover 60% of the f.o.b. cost and generate funds for projects to improve agriculture. As this donor fertilizer is sold at lower prices, it not only disrupts the free market prices but also creates anomalous transactions. It is common knowledge that funds generated from the fertilizer donations have been "diverted to other projects."

9. Credit--Credit availability at the farm level is very limited. Most of the transactions are on a cash basis. Importers and dealers extending credit are very selective; usually not exceeding 10%-15% in credit sales at 2.5% interest per month (30% annual rate). It is of interest to note that the use of postdated checks (normally good checks, because of stiff penalty enforcement for bad checks) to secure credit sales is not maximized. This transaction document could be more fully used to secure credit sales to dealers.

10. Technical and Extension Services for Market Development--Farmers normally seek technical advice from dealers who are not usually capable of giving reliable agronomic information. Government agronomists responsible for extending technical services to farmers are usually either not in the field to do their jobs or are not equipped with skills and facilities to adequately perform their jobs. The few agronomists, who are relatively capable and dedicated, do provide farmers with sound advice on the agronomics of crop production. However, there are no farm demonstrations of fertilizer for educating farmers. Product demonstrations, if any, are mostly on pesticides.

    The need for a reliable farm extension service in the farming community is acute. This is a priority area which should be given attention as an important part of Haiti's agricultural food production program. Technical service programs on soil testing to determine fertilizer recommendations, farm demonstrations and field days, farmers' meetings to ask questions and seek advice, and dealer training on agronomic services are the most urgent programs needed.

11. Government Policies--The country has had no stated agricultural policy for the past 4 years because the existing governments were provisional while waiting for a new government to be elected. Because of this instability most bilateral foreign aid projects have been suspended. This includes the agricultural projects funded by BID for the new 15,000-ha irrigation system.

    There are no policies to regulate, restrict, or monitor the fertilizer business. Fertilizer business permits or licenses are required but are open to everybody who wants to operate a fertilizer business. On the other hand, the fertilizer importers have no defined role in the country's agricultural programs. Except for a "consular fee" of 3% of the f.o.b. cost, no duties or sales taxes are imposed on fertilizer transactions.

12. Other Allied Businesses--Other allied business opportunities that can be developed in the country include complementary products for the farm such as pesticides, seeds, sprayers, farm tools, and implements. The pesticide market in 1989 is estimated to have a gross sales value of US $375,000. The pesticide market by product and sales participation of importing companies is presented in Tables 3-10 and 3-11, respectively. The pesticide market by major crop is shown in Table 3-12. Pesticides represent the largest allied product line in the agricultural market.

    The seed business, the bulk of which is onion seed, is the second biggest allied product with a high potential for expansion. The existing market is estimated at US $200,000/year. A government food production program supported with farm credit could drastically increase the pesticide and seed markets. Dealers in the pesticide and seed business are few, and they are not performing any sales promotion. Farm supplies together with other farm tools and implements, if given the right sales and promotion effort, should generate substantial complementary business. Since harvesting and processing of crops are all done by hand, the availability of simple mechanical rice threshers could provide an important service to help improve the efficiency of processing the harvest for the market. This form of service could improve the collection of crop production loans at harvest time that may be extended to farmers by dealers.

3.2.2 Marketing Plan and Program for Proposed Project

In the foregoing discussion, inadequacies causing problems and constraints in the fertilizer market and marketing system were examined and identified. To bring about the necessary changes in the farmer's practices and to increase fertilizer use and food production, the following critical components need to be developed: (1) timely availability of fertilizer supplies, (2) effective marketing channels and physical distribution systems, (3) increased level of technical extension services, (4) equitable fertilizer and crop prices, and (5) appropriate credit facilities. The status of these critical components must be integrated into a marketing plan.

Period of Marketing Plan--Although a project life of 15 years is assumed for the financial analysis, the life of the initial marketing plan is 5 years. Considering the volatile political situation and the lack of a defined agricultural policy in the country, a marketing plan that goes beyond 5 years is too uncertain.

The plan (1) summarizes the problems and opportunities, (2) postulates the assumptions under which the plan will effectively operate, (3) defines the sales and program objectives to be accomplished, (4) specifies the strategies that will guide its implementation, (5) defines the key action steps that must be performed, and (6) states the policies and procedures to be followed by the organization in implementing the plan.

Summary of Problems and Opportunities--A summary of the problems and opportunities of the proposed marketing plan follows:

Problem	Opportunity
Fertilizer consumption decreased from 16,038 t in 1985 to 12,883 in 1989, a reduction of 20% in 4 years.	The factors that caused the reduction in fertilizer consumption have been identified and will serve as a clear basis for formulating the most appropriate programs for recovery.
Fertilizer usage on rice, where 65% of country's fertilizer is consumed shows: (1) an unbalanced nutrient ratio of 196-12-20 kg/ha, (2) an estimated 45% of the urea nitrogen is lost due to improper application, (3) poorly maintained irrigation facilities and inefficient use of irrigation water, (4) poor land preparation and cultivation, (5) lack of applied agrotechnology for crop production, and (6) unstable farm-gate prices for rice due to the low price of imported rice.	Treat rice as the priority crop not only because it is the country's staple food but it also offers the highest potential for improved production and the opportunity to achieve self-sufficiency to eliminate imports. It is the major area of concentration to provide the appropriate technical and agronomic services for the proper use of production inputs. The rice crop should also be the priority crop for government and foreign assistance programs designed to rehabilitate the irrigation system, provide farm produce support prices, and production credit.
Heavy soil erosion of vegetable and other crop areas in the mountains.	Technical service on soil conservation and contour farming.

(Continued)

Problem	Opportunity
Lack of a reliable network of dealers to efficiently supply crop production inputs, establish an efficient network of inputs, and provide agronomic information and advice (technical assistance) to the farmers.	Establish an efficient network of dealers and implement a dealer development program.
Competition; in this area it is clear that (1) the foreign competitor's strength and capabilities can erode fertilizer prices and (2) domestic competitors will aggressively seek to protect their share of market.	Meet foreign competition on the basis of (1) lower production cost to support competitive selling prices, (2) accessibility of fertilizer supplies and formulation of proprietary complex blends according to buyer's specifications, (3) cooperation with one of the foreign fertilizer companies from the Dominican Republic as an equity partner in the proposed project, (4) provide technical assistance to dealers and farmers, and (5) work towards seeking government protection through taxation of imports of finished (NPK) fertilizer products.
	Meet domestic competition by (1) recognizing their market and their role in the existing marketing and distribution channels by appointing them as the company's initial dealer network base, and (2) inviting importers, dealers, farmers' associations, and operators of large plantation farms to join as investors in the company and become "built-in buyers" of the company's products.
Severe lack of distribution and production credit.	Offer credit on secured bases as a part of the total sales program package to dealers; encourage dealers to extend selective production credit to farmers.
Technical service programs and dealer training for network development are relatively costly to develop and will require substantial initial funding.	Seek funding assistance from foreign donor and investment organizations whose mission includes this type of technical assistance for agriculture in developing countries.

(Continued)

Problem	Opportunity
Japanese-donated fertilizers, which are sold at 60% of f.o.b. cost, disrupt the market.	Make representations to have the fertilizer sold at prevailing commercial prices. Participate in the donor fertilizer sales and distribution business and negotiate to supply locally the complex NPK grades currently offered by donors.
Lack of linkage between the fertilizer industry and agricultural agencies in the government.	Initiate an industry-lobbying organization of fertilizer suppliers and/or importers and establish linkages with government agricultural production programs.
The corporate image of the proposed company as a credible supplier of quality products and reliable services will take time to develop and will require a considerable outlay of funds.	Initiate a yearly corporate public relations project for the agricultural community through joint sponsorship with prestigious organizations, such as civic clubs, Haiti Press Club, and the Ministry of Agriculture, with prizes and awards solicited from donors.
Limited reliability of government agronomists to provide urgently needed extension services.	Hire a highly qualified agronomist to administer the company's field sales and technical services programs; tap the most capable government agronomists to extend and support the work initiated by the company's agronomist.
Lack of current reliable and updated sources of information on competitors' activities and the Haitian fertilizer market in general.	Establish reliable "listening posts" as sources of information at the fertilizer business centers; establish a monitoring system and an evaluation and recording system to monitor results/information on a monthly basis.
The small size of the fertilizer market offers limited business for the company.	Develop the complementary products business to generate additional revenues and to maintain a high profile in the agricultural community.
Lack of foreign currency to import the fertilizer raw materials and complementary products.	Explore fertilizer export possibilities to other Caribbean countries for blended complex grades to earn foreign currency. Explore the possibility of bagging bulk material for re-export to small markets on a tolling arrangement.

Information Based Marketing Assumptions--Based on the assessment of the fertilizer market and marketing system, the assumptions specific to the 1992-96 marketing plan follow:

a. The assumptions postulated in forecasting the fertilizer market from 1992 to 1996 will prevail (refer to 3.1.3).

b. The proposed blending and bagging plant can produce quality bagged fertilizer grades at costs that can profitably compete in the market against prices offered by an efficient fertilizer importer.

c. Some local importers, dealers, operators of plantation and industrial crop farms, farmers' associations and cooperatives, and the Assistant to the President of FERQUIDO in the Dominican Republic will fulfill their commitment to join and invest in the project; the local investors will become the "built-in customers" of the company thereby decreasing the strength of foreign and domestic competition.

d. Most of the existing importers and dealers will be appointed as the company's initial marketing and distribution network.

e. The company can negotiate with the Ministry of Agriculture (Government of Haiti) and the Government of Japan through its Embassy, to source locally from the proposed project the supply of complex NPK grades for the annual Japanese fertilizer donation.

f. Foreign assistance funding can be obtained and becomes available in 1992 to support soil and tissue testing, farm demonstrations, and dealer training programs which are necessary to improve farm practices and services.

g. The company can profitably market proprietary NPK fertilizer blends for custom application on plantation and industrial crops.

h. The company will have the necessary manpower organization and material resources to support the sales and marketing plan from 1992 to 1996.

i. The Government of Haiti will not promulgate policies or regulations that will harm the fertilizer business.

j. The company will be able to obtain an annual market share of 30%, 45%, 55%, 65%, and 65% out of the total commercial fertilizer market; 20% of the sales of the annual Japanese fertilizer donation; and participate in the business of complementary products for the next 5 years.

Sales and Program Objectives--The sales objectives of the company's marketing plan from 1992 through 1996 follow:

1. Sales objectives for commercial market and for Japanese donation, 1992-96.

Year	Commercial Market % Market Share	Commercial Market t	Japan Donation 20% Market Share (t)	Total Sales (t)
1992	30	3,271	500	3,771
1993	45	5,151	500	5,651
1994	55	6,611	500	7,111
1995	65	8,360	500	8,860
1996	65	9,029	500	9,529

2. Sales objectives by product and nutrient, 1992-96.

Product	1992	1993	1994	1995	1996
	(t)				
Urea	2,451	3,560	4,409	5,316	5,527
Ammonium sulfate	57	113	142	177	191
20-20-10	94	113	142	177	191
12-12-20	980	1,582	2,062	2,658	3,049
14-14-14	189	283	356	532	572
TOTAL	3,771	5,651	7,111	8,860	9,529

Nutrient	1992	1993	1994	1995	1996
	(t)				
N	1,302	1,914	2,384	2,911	3,066
P_2O_5	163	252	326	484	484
K_2O	243	384	498	656	743
TOTAL	1,708	2,550	3,207	3,996	4,294

3. Fertilizer sales objectives by consumption area, 1992-96.

Area	Crop	1992					
		Urea	Ammonium Sulfate	20-20-10	12-12-20	14-14-14	Total
		(t)					
Artibonite	Rice, onions	1,593	37	61	637	123	2,451
Leogane	Maize, industrial tomatoes	49	1	2	20	4	75
Kenscoff	Vegetables (all kinds)	294	7	11	118	23	452
Foret des Pins	Potatoes, coffee, onions, cabbage	172	4	7	69	13	264
Cul de Sac	Tobacco, industrial tomatoes, other vegetables	147	3	6	59	11	226
Les Cayes	Sugarcane, rice, beans, maize, tobacco, sorghum	123	3	5	49	9	189
Cap Haitien	Cane, citrus, onions, other vegetables	74	2	3	29	6	113
TOTAL		2,451	57	94	980	189	3,771

Area	Crop	1993					
		Urea	Ammonium Sulfate	20-20-10	12-12-20	14-14-14	Total
		(t)					
Artibonite	Rice, onions	2,314	73	73	1,029	184	3,673
Leogane	Maize, industrial tomatoes	71	2	2	32	6	113
Kenscoff	Vegetables (all kinds)	427	14	14	190	34	678
Foret des Pins	Potatoes, coffee, onions, cabbage	249	8	8	111	20	396
Cul de Sac	Tobacco, industrial tomatoes, other vegetables	214	7	7	95	17	339
Les Cayes	Sugarcane, rice, beans, maize, tobacco, sorghum	178	6	6	79	14	283
Cap Haitien	Cane, citrus, onions, other vegetables	107	3	3	47	8	170
TOTAL		3,560	113	113	1,582	283	5,651

Area	Crop	1994 Urea	Ammonium Sulfate	20-20-10	12-12-20	14-14-14	Total
		(t)					
Artibonite	Rice, onions	2,866	92	92	1,340	231	4,622
Leogane	Maize, industrial tomatoes	88	3	3	41	7	142
Kenscoff	Vegetables (all kinds)	529	17	17	247	43	853
Foret des Pins	Potatoes, coffee, onions, cabbage	309	10	10	144	25	498
Cul de Sac	Tobacco, industrial tomatoes, other vegetables	265	9	9	124	21	427
Les Cayes	Sugarcane, rice, beans, maize, tobacco, sorghum	220	7	7	103	18	356
Cap Haitien	Cane, citrus, onions, other vegetables	132	4	4	62	11	213
TOTAL		4,409	142	142	2,062	356	7,111

Area	Crop	1995 Urea	Ammonium Sulfate	20-20-10	12-12-20	14-14-14	Total
		(t)					
Artibonite	Rice, onions	3,455	115	115	1,728	346	5,759
Leogane	Maize, industrial tomatoes	106	4	4	53	11	177
Kenscoff	Vegetables (all kinds)	638	21	21	319	64	1,063
Foret des Pins	Potatoes, coffee, onions, cabbage	372	12	12	186	37	620
Cul de Sac	Tobacco, industrial tomatoes, other vegetables	319	11	11	159	32	532
Les Cayes	Sugarcane, rice, beans, maize, tobacco, sorghum	266	9	9	133	27	443
Cap Haitien	Cane, citrus, onions, other vegetables	159	5	5	80	16	266
TOTAL		5,316	177	177	2,658	532	8,860

Area	Crop	1996 Urea	Ammonium Sulfate	20-20-10	12-12-20	14-14-14	Total
		- - - - - - - - - - - - - - (t) - - - - - - - - - - - - -					
Artibonite	Rice, onions	3,592	124	124	1,982	372	6,194
Leogane	Maize, industrial tomatoes	111	4	4	61	11	191
Kenscoff	Vegetables (all kinds)	663	23	23	366	69	1,143
Foret des Pins	Potatoes, coffee, onions, cabbage	387	13	13	213	40	667
Cul de Sac	Tobacco, industrial tomatoes, other vegetables	332	11	11	183	34	572
Les Cayes	Sugarcane, rice, beans, maize, tobacco, sorghum	276	10	10	152	29	476
Cap Haitien	Cane, citrus, onions, other vegetables	166	6	6	91	17	286
TOTAL		5,527	191	191	3,049	572	9,529

4. Fertilizer sales objectives by quarters, 1992-96.

Quarter	1992	1993	1994	1995	1996
	- - - - - - - - - - - - - - (t) - - - - - - - - - - - - -				
1st (Jan-Mar)	943	1,413	1,778	2,215	2,382
2nd (Apr-Jun)	1,131	1,695	2,133	2,658	2,859
3rd (Jul-Sep)	867	1,300	1,635	2,038	2,192
4th (Oct-Dec)	830	1,243	1,564	1,949	2,096
TOTAL	3,771	5,651	7,111	8,860	9,529

5. Complementary product sales objectives, 1992-96.

Products	1992	1993	1994	1995	1996
	- - - - - - - - (thousand U.S. dollars) - - - - - - - -				
Pesticides	75	100	120	150	175
Sprayers	2	5	5	5	5
Seeds	10	30	50	75	100
Farm tools	-	2	5	5	5
TOTAL	87	137	180	235	285

The choice of the appropriate marketing programs takes into account the priority needs of the market and marketing system. The need for reliable marketing channels, which can efficiently service the farmers, and the need for farmers to improve their farming practices are identified as the critical priorities.

To satisfy these needs, the most urgently needed and recommended marketing programs include (1) soil testing, (2) farm demonstrations, (3) dealer training and development, and (4) a strong community relations program. These recommendations are based on the experiences of other developing countries similar to Haiti where such programs have worked successfully.

The program objectives of the marketing plan from 1992 to 1996 follow:

1. Soil testing and fertilizer recommendation program.

Crop/Soil Tests	Level of Activity				
	1992	1993	1994	1995	1996
	(number of samples)				
Rice/soil samples	None	1,850	1,925	2,092	2,145
	None	(25)[a]	(35)[a]	(45)[a]	(65)[a]
Vegetable/soil samples	None	100	200	300	300
Other crop/soil samples	None	100	200	300	300
TOTAL	None	2,250	2,325	2,692	2,745

a. Values in parenthesis indicate number of samples per dealer assuming a 50% level of performance.

2. Farm demonstrations and field day programs.

Crop	Level of Activity 1992	1993	1994	1995	1996
	- - - - - - - - - -	- -	-(number)-	- - - -	- - - -
Rice					
Farm demonstration	None	40	50	60	70
Field day	None	4	4	6	6
Vegetables					
Farm demonstration	None	10	10	10	10
Field day	None	1	2	4	4
Other Crops					
Farm demonstration	None	10	10	10	10
Field day	None	2	2	4	4
TOTAL					
Farm demonstration	None	40	70	80	90
Field day	None	7	8	14	14

Note: Field days are conducted on the basis of selected successful demonstrations to benefit neighboring farmers.

3. Dealer training and network development.

Item/Activity	Level of Activity 1992	1993	1994	1995	1996
Annual fertilizer sales objective (t)	3,710	5,540	6,990	8,690	9,950
Number of dealers needed	148	110	93	86	66
Average annual sales per dealer (t)	25	50	75	100	150
Number of quarterly dealer performance evaluations	4	4	4	4	4
Dealer training programs	None	2	2	2	2

Note: Dealer selection starts in 1992; training in 1993. The goal is for dealers to achieve a profitable sales volume for the dealership business.

4. Community relations program.

This is a corporate public relations program (CPRP) for the agricultural community; a "doing something good and talking about it" program. The objective of the CPRP is to establish a credible image of the company, its products and services, and the company's important role in the agricultural development of the country.

A CPRP on "The Outstanding Rice Farmer and Agronomist of the Year" is recommended. This program would be conducted on a joint sponsorship with a prestigious civic organization, the Haiti Press Club, and the Ministry of Agriculture of the Government of Haiti. Prizes donated by companies doing business in agriculture would be awarded. This should be an annual CPRP event for the company.

Marketing Strategies and Action Plans--The strategies provide directions to the operations of the plan, while the action plan outlines the key action steps or activities that must be performed to realize the expected results of the plan. The strategies and the action plan dovetail the sales and program objectives of the plan for the period from 1992 to 1996.

Strategy and action plan for the 5-year period 1992-96:

Strategy	Action Plan/Key Action Steps
Incorporate a production and marketing company; adopt a company name/logo which can be carried as product brand in packaging, with good product recall.	The company Directors to appoint the executive officers, defining their responsibilities and authorities during the first Board meeting; corporate management to hire the required personnel as needed, and select appropriate company logo design for 1992 operations.
Competitive selling prices.	Corporate management to establish the break-even cost of products; competitive selling prices by market center location; set up a pricing mechanism to handle direct sales; have product price list ready 1 month before plant production begins and 2 months before executing supply agreement with customers/dealers.
Respect the existing markets of importers and dealers by initially channeling sales through them in 1992.	Marketing management to appoint the required number of dealers sufficient to support the attainment of the sales objectives in 1992; execute supply contract agreements with dealers/accounts; secure the major sales volume commitments of accounts by offering credit lines secured by cash bonds (treat cash advance for purchases as cash bonds) to earn interest; all action steps to be completed 2 months before plant production begins.

(Continued)

Strategy	Action Plan/Key Action Steps
Establish a reliable dealer network.	Marketing management to develop and implement a dealer network development program on a sustained effort starting in 1992 through 1996; provide for a quarterly performance review, dealer classification and upgrading, semestral dealer training, and year-end sales performance incentive system.
Product and sales development.	Marketing management to concentrate on the sales development of proprietary complex NPK blends for custom application on sugarcane, tobacco, industrial tomatoes, and chinese vegetables.
Concentration of sales effort/ support to the rice and vegetable crop markets.	Marketing management to establish field warehouses (dealer operated) strategically located in the major market centers of Artibonite Valley, Kenscoff, and Les Cayes starting in 1993; utilize these field warehouses as sales outlets to service dealer or direct customers whenever or wherever applicable to maximize sales; require dealers to conduct farm demonstrations and field days and soil sampling for soil testing services as part of dealer development according to yearly program objectives for period of 5 years subject to availability of funding assistance.
Package credit with sales program on secured basis.	Marketing management to forward fertilizer stocks with selected dealers in high market volume areas utilizing the dealer's warehouse with scheduled invoicing at delivered prices (to dealer's warehouse), secured with post-dated checks, and renewable quarterly; similar arrangement to be pursued with plantation accounts and large farm accounts.
Supply locally the yearly requirement for complex NPK grades for the Japanese fertilizer donation.	Marketing management to negotiate with Ministry of Agriculture/ Government of Haiti and Japanese Embassy to supply the complex (NPK) fertilizer donation from local production each year starting in 1993.

(Continued)

Strategy	Action Plan/Key Action Steps
Seek foreign funding assistance to implement soil and tissue testing, farm demonstrations, and dealer training development programs.	Corporate management to prepare and submit proposal to the Special Industrial Service (UNIDO) for funding assistance with the technical service and dealer training programs; to be completed 1 month after the plant starts production; implementation of the technical service and dealer training programs will be dependent upon availability of funding assistance.
Linkage with Government of Haiti crop production programs.	Corporate management to establish relationship with government crop production agencies and participate whenever possible in agricultural council activities after the company is organized.
Initiate a yearly corporate public relations project (CPRP).	Corporate management will develop and implement a CPRP project on "The Outstanding Rice Farmer and Agronomist of the Year" starting in 1993 through 1996; project should be cosponsored by a civic club, Haiti Press Club, and Ministry of Agriculture of the Government of Haiti with prizes donated by agricultural product suppliers.
Obtain services of highly qualified technical sales representative.	Marketing management to hire a highly qualified agronomist who can handle both the field extension services and sales programs within the dealer network. Should also function as technical sales representative and liaison with government agronomists.
Maintain up-to-date data and information on competition and the Haitian fertilizer market.	Marketing management to establish "listening posts" to monitor competition and markets; maintain an updated monthly fertilizer market data, sales, and program results report.
Regular monitoring of competition.	Marketing management to keep track of competitors' sales activities monthly, and neutralize their efforts.

(Continued)

Strategy	Action Plan/Key Action Steps
Develop the allied products business to generate additional revenues using fertilizer products as the primary sales vehicle.	Marketing management to source and negotiate supply contracts with supplies of pesticides, sprayers, seeds. and farm tools at the best price and terms possible starting in 1992 on a sustained annual effort to improve and complete the company's product line; complete in 2nd quarter of 1992.

To further guide the first year marketing operation, the 1992 marketing plan and program is presented in more detail.

3.3 The 1992 Marketing Plan

This plan covers only the first year of the proposed 5-year marketing plan. It is presented in detail so it can serve as the operating guide (manual) for the marketing function.

The foregoing listing of facts about the Haitian fertilizer market and marketing system identified problems and opportunities which were summarized in the 5-year marketing plan. Most of these problems and opportunities are expected to occur in the first year and since these have already been discussed, they will not be repeated. It is enough to state, however, that these problems and opportunities were taken into careful consideration in the development of the plan.

There is no one time solution to a problem; problems "solved" in the first year will most likely produce new problems later on. Solutions to problems must be therefore evaluated carefully before they are applied to ensure that larger and more complicated problems are not created.

What is most important is to understand that problems also create opportunities; if these are identified and properly exploited, there is most likely something to be gained.

3.3.1 1992 Assumptions

The following assumptions are the postulated conditions under which the marketing plan will successfully operate in 1992. These are categorized into internal and external assumptions. The internal assumptions are those which concern and/or relate to the internal affairs of the company and its management, while the external assumptions are those which relate to the external environment of the market.

Internal Assumptions

1. That the company can produce quality fertilizer products at production costs which can profitably compete with competition from efficient fertilizer importers.
2. That the Assistant to the President of FERQUIDO will make good his personal commitment to join Mr. Jean-Michel Cherubin (the project's promoter) and invest in the project thereby reducing the threat of foreign competition from the Dominican Republic.
3. That some importers, dealers, farmers' associations and cooperatives, and operators of plantations and industrial crop farms invited to join and invest in the blending plant will make good their intentions and will become "built-in customers" of the company for its products.
4. That a good number of existing importers and dealers can be appointed as the company's initial marketing and distribution channels.
5. That the company will have the necessary manpower organization and material resources to implement the marketing plan for 1992.
6. That the company will be able to obtain a 30% share of the fertilizer market in 1992.

External Assumptions

1. That the assumptions postulated in forecasting the fertilizer market in 1992 will prevail.
2. That the Ministry of Agriculture of the Government of Haiti and the Government of Japan through its Embassy will agree to source the supply of complex NPK grades locally for the annual Japanese fertilizer donation.

3. That a foreign organization will be willing to provide funding assistance to support soil testing, farm demonstrations, and dealer development/training programs.
4. That production of rice will be a priority program for the newly elected Government of Haiti.
5. That the Government of Haiti, through its ministries, will not promulgate policies or regulations that will harm the fertilizer business.

3.3.2 1992 Sales and Program Objectives

The sales and program objectives, directed to the opportunities of the fertilizer market and the market forecast assumptions for 1992, follow.

1992 Total Fertilizer Market Forecast

Product	Commercial Market	Japan Donation	Total Market
	(t)		
Urea	6,541	1,000	7,541
Ammonium sulfate	545	500	1,045
20-20-10	218	0	218
12-12-20	3,271	500	3,771
14-14-20[a]	327	500	827
TOTAL	10,902	2,500	13,402

a. 14-14-20 is composite average nutrient analysis of miscellaneous products.

The company's sales forecast will be 30% (3,271 t) of the commercial market and 20% (500 t) of Japanese fertilizer donation for a total of 3,771 t. The company's fertilizer sales objective by product and quarter for 1992 follows.

1992 Fertilizer Sales Objective by Product and Quarter

Product	Quarter: First	Second	Third	Fourth	Total
	(t)				
Urea	613	735	564	539	2,451
Ammonium sulfate	14	17	13	13	57
20-20-10	24	28	22	20	94
12-12-20	245	294	225	216	980
14-14-14	47	57	43	42	189
TOTAL	943	1,131	867	830	3,771
% of total	25	30	23	22	100

In addition to urea and ammonium sulfate, the company will produce the standard complex NPK blends plus 14-14-14 to replace the nutrients . contained in the 14-14-20 composite.

About 65% or about 2,450 t of the fertilizer sales objective will be consumed in the Artibonite Valley where the major crops are rice and onions. The company's sales objective by consumption area is presented below.

1992 Fertilizer Sales Objective by Consumption Area

Area	Crop	Urea	Ammonium Sulfate	20-20-10	12-12-20	14-14-14	Total
		(t)					
Artibonite	Rice, onions	1,593	37	61	637	123	2,451
Leogane	Maize, industrial tomatoes	49	1	2	20	4	75
Kenscoff	Vegetables (all kinds)	294	7	11	118	23	452
Foret des Pins	Potatoes, coffee, onions, cabbage	172	[illegible]	7	69	13	264
Cul de Sac	Tobacco, industrial tomatoes, other vegetables	147	3	6	59	11	226
Les Cayes	Sugarcane, rice, beans, maize, tobacco, sorghum	123	3	5	49	9	189
Cap Haitien	Cane, citrus, onions, other vegetables	74	2	3	29	6	113
TOTAL		2,451	57	94	980	189	3,771

The proposed fertilizer price list in Haitian dollars (H $) closely matches the June 1990 prices of fertilizer importers to dealers as follows:

Product	Proposed Fertilizer Selling Prices to Current Dealers (f.o.b. factory gate)	
	Per 50-kg Bag	Per t
	(H $)	
Urea	16.0	318
Ammonium sulfate	12.5	244
20-20-10	17.5	347
12-12-20	16.0	318
14-14-14[a]	17.0	340

a. 14-14-14 is not currently imported.

The above selling prices will have a discounting provision of less 5%, less 5%. This discount will be used to service importers and meet any price reduction of the foreign competition. With this discounting, the net selling prices (factory gate, not including delivery) in Haitian dollars (H $) will be as follows:

Product	Net (Discounted) Fertilizer Selling Prices to Importers	
	Per 50-kg Bag	Per t
	(H $)	
Urea	14.4	287
Ammonium sulfate	11.1	221
20-20-10	15.8	314
12-12-20	14.4	287
14-14-14	15.4	307

Based on the commercial market sales objective of 3,271 t (not including the Japanese donation) and the net (discounted) selling prices, the sales revenue for 1992 will be as follows:

1992 Fertilizer Sales Revenue Objective for the Commercial Market

Product	Market Share (%)	Sales Volume (t)	Net Price (H $/t)	Sales Revenue (H $)
Urea	65.0	2,126	287	610,162
Ammonium sulfate	1.5	49	221	10,829
20-20-10	2.5	82	314	25,748
12-12-20	26.0	850	287	243,950
14-14-14	5.0	164	307	50,348
TOTAL	100	3,271		941,037

There is a strong potential business for allied products, not only to complete the company's product line but also to generate additional revenues. These products include pesticides, seeds, sprayers, and farm tools. It is normal to obtain a 25%-45% margin from these produc's. Sourcing and negotiating the supply, price, and other terms of these products should be completed within the first quarter of 1992. Marketing will start in the second quarter of 1992. The 1992 gross sales objective for these allied products is presented below. Assuming a 25% margin, the projected gross sales revenue of US $148,000 would amount to a net revenue of about US $37,000 for 1992.

1992 Allied Product Gross Sales Objective

Product	Quarters: First	Second	Third	Fourth	Total
	(thousand US $)				
Pesticides	0	40	30	30	100
Seeds	0	15	12	13	40
Sprayers	0	2	2	2	6
Farm tools	0	-	1	1	2
TOTAL	0	57	45	46	148
% of total	0	39	30	31	100

The program objectives of the 1992 marketing plan follow:

Dealer Network Development

1. Appoint 148 dealer/accounts in January 1992 to support the quarterly sales forecast at an average sales volume of 25 t/dealer or account for the year.
2. Conduct quarterly sales performance evaluations of the 148 appointed dealers and accounts as the basis for selection for further upgrading.

Sales Promotion/Advertising

1. Implement the recommended sales promotion programs focused on the rice market in Artibonite Valley and on vegetables in Kenscoff.
2. Implement 30-second fertilizer radio spot commercials before and during the rice planting months of the year.
3. Implement, with selected dealers and accounts, a forward stocking program, tying secured credit sales with the dealer's warehousing facilities.
4. Establish fertilizer credit lines with dealers and other accounts secured by cash bonds providing an attractive interest earning.

Soil Testing, Farm Demonstrations, and Dealer Training

1. Obtain foreign funding assistance to support these programs in 1993 by submitting funding proposals in the second quarter of 1992.
2. Develop and prepare the programs of implementation for 1993, including dealer participation.

3.3.3 1992 Marketing Strategies

Taking into account the problems and opportunities of the fertilizer market in 1992, the strategies which will give direction to the implementation of the marketing plan follow.

Product

1. Attractive packaging with good brand recall and "imported image."
2. Confine initial production to standard NPK blends already accepted in the market.
3. Negotiate to supply complex NPK grade requirements of the Japanese fertilizer donation.

4. Develop the allied product business to complete the line of products offered.
5. Develop sales of proprietary fertilizer NPK blends for custom crop applications.

Price

1. Provide competitive product selling price to (a) importers, (b) dealers, and (c) direct user (large farms and plantations) accounts.
2. Regularly monitor prices and activities of the competition.
3. Package fertilizer prices together with credit and sales programs.
4. Establish a pricing mechanism to meet prices of legitimate competition.

Place

1. Respect existing markets of importers and dealers by channeling sales through them.
2. Start the development of a reliable dealer network.
3. Utilize dealers' warehouses to implement forward stocking and secured credit.
4. Encourage large volume dealers to establish their own sales outlets.

Promotion

1. Concentrate sales promotion and sales services programs in the rice and vegetable markets primarily in Artibonite Valley and Kenscoff regions.
2. Package secured credit with sales programs to secure sales.
3. Seek foreign funding assistance to support soil testing, farm demonstrations, and dealer training programs.
4. Hire a highly qualified agronomist to handle field technical assistance and sales service programs.

3.3.4 1992 Action Plan

The action plan specifies the key action steps to be performed within a definite timeframe by the person(s) responsible in order to realize the results of the sales objectives set forth for 1992. A summary of the key action items follows.

Timeframe, 1992	Key Action Step	Responsibility
1. Before January 1992	1. Hire highly qualified agronomist to function as technical sales representative and be responsible for field technical assistance, and sales services	1. Marketing Management
2. Ready before January	2. Confidential fertilizer price list for importers, dealers, and direct accounts	2. Marketing Management/Technical Sales Representative
3. Before January	3. Appoint marketing network and execute supply agreement	3. Marketing Management/Technical Sales Representative
4. January and monthly thereafter	4. Monitor prices and activities of foreign and local competition to establish basis for managing the actions necessary	4. Technical Sales Representative
5. January and monthly thereafter	5. Monitor and actively participate in government agricultural production program; establish liaison with government decisionmakers in agriculture	5. Marketing Management/Technical Sales Representative
6. January and monthly thereafter	6. Concentrate sales promotional activities in Artibonite Valley for rice and Kenscoff for vegetables (refer to Appendix I for sales promotion mechanics)	6. Technical Sales Representative
7. January and monthly thereafter	7. Concentrate on sales service to operators of plantation and industrial crops for premium custom NPK blend formulations on a delivered price basis	7. Technical Sales Representative
8. April-June	8. Select reputable performing dealers with warehouses to implement forward stocking programs (Refer to Appendix II for program mechanics)	8. Marketing Management/Technical Sales Representative
9. April-June	9. Establish account credit line by implementing cash bond program to generate credit sales on secured basis (Refer to Appendix III for program mechanics)	9. Marketing Management/Technical Sales Representative
10. April-June	10. Negotiate with Ministry of Agriculture/Government of Haiti and Japanese Embassy to source complex NPK grades locally for annual Japanese fertilizer donation	10. Marketing Management
11. April-June	11. Prepare and submit proposal to the Special Industrial Service Division (UNIDO) for funding assistance to support soil testing, farm demonstrations, and dealer training programs	11. Corporate Management

(Continued)

Timeframe, 1992	Key Action Step	Responsibility
12. September	12. Assist dealer training program, prepare action plan of dealer-assisted soil testing and farm demonstration program for 1993 (Refer to Appendixes IV and V for mechanics)	12. Marketing Management/Technical Sales Representative
13. October-December	13. Select dealers for dealer training; dealer training for network development	13. Marketing Management/Technical Sales Representative
14. January-June	14. Source and negotiate supply contracts for pesticides, sprayers, seeds, and farm tools	14. Corporate Management
15. April	15. Start promotional sales of complementary products with dealers and other accounts	15. Technical Sales Representative
16. November	16. Prepare marketing plan for 1993	16. Marketing Management

3.3.5 Sales Program Support

Refer to Appendixes I through V for sales program support materials for the following programs.

1. Sales promotion (Appendix I).
2. Forward stocking program (Appendix II).
3. Cash bond program (Appendix III).
4. Technical services program (Appendix IV).
5. Dealer training (Appendix V).

3.3.6 Marketing Plan Evaluation

The marketing plan should be evaluated quarterly to measure its performance and to possibly update and modify to improve its effectiveness during the year. The results and experience gained from the operations of the marketing plan will provide useful information for formulating an improved marketing plan for 1993.

Table 3-1. Major Agricultural Areas and Crops, 1986

Agricultural Area	% of Total	Population Density (persons/km^2)	Principal Crops
Arid and semiarid plains	45	77-200	Maize, millet, peas, beans
Mountainous (dry)	25	39-100	Maize, millet
Mountainous (humid)	15	200	Coffee, vegetables, fruits
Plains (humid)	10	300-400	Rice, maize, bananas, fruits, sugarcane
Plains (irrigated)	5	650	Rice, bananas, vegetables, tobacco
	100		

Source: Hatch Associates Ltd. 1986. *Engineering & Financial Analysis*, Volume I--The Report, and Volume II--Appendices and Drawings, Toronto, Ontario, Canada.

Table 3-2. Monthly Precipitation, 1984-87

Region	Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Average
		(mm)													
Cap Haitien	1984	109.1	173.4	49.8	190.0	24.5	122.2	32.3	26.0	139.0	115.0	184.1	52.4	1,217.8	101.5
	1985	175.8	203.9	261.0	140.7	46.8	38.4	84.2	54.3	104.6	80.2	94.2	17.5	1,301.6	108.5
	1986	155.7	18.0	136.5	168.5	112.8	23.8	4.5	40.5	20.2	148.5	13.2	53.1	898.3	74.9
	1987	233.2	49.1	202.5	501.9	241.9	43.8	17.1	73.3	79.5	289.3	153.0	247.5	2,132.1	177.7
Artibonite Valley															
a. Gonaives	1984	60.9	21.5	33.5	39.6	23.3	134.0	43.2	38.2	151.8	20.4	37.5	6.7	610.6	50.9
	1985	0.5	8.7	0.3	62.0	44.0	77.0	64.6	78.8	20.7	74.6	83.4	0	514.5	42.6
	1986	14.6	3.5	60.5	36.6	110.2	74.9	65.1	78.2	33.4	15.2	0	0	492.2	41.0
	1987	19.8	52.5	65.9	56.7	104.0	149.2	43.5	56.6	171.6	53.2	2.5	36.0	718.9	59.9
b. St. Marc	1984	32.5	58.3	14.5	117.5	81.3	230.6	102.8	185.9	249.5	220.9	14.0	1.0	1,308.8	109.1
	1985	0.0	26.5	0.0	114.5	150.0	58.0	279.5	163.2	159.7	103.1	79.4	0.0	1,133.9	94.5
	1986	50.5	16.0	228.5	40.5	86.0	145.0	162.0	265.5	131.5	54.5	12.5	0.0	1,192.5	99.4
	1987	15.0	8.0	58.0	47.0	30.0	79.0	101.4	144.6	104.1	61.1	45.8	49.0	743.0	61.9
c. Maisiada	1984	45.8	113.9	70.9	73.7	480.5	573.6	111.2	126.1	742.3	467.9	15.4	9.4	2,830.7	235.9
	1985	10.5	129.1	55.6	60.8	219.0	159.5	150.4	129.8	230.6	382.0	178.6	8.6	1,714.5	142.9
	1986	12.8	66.2	259.4	245.8	388.4	214.0	261.4	102.2	114.6	307.8	9.2	21.0	2,002.8	166.9
	1987	18.2	71.5	41.2	145.0	358.0	230.8	216.2	178.8	121.2	379.0	112.6	40.0	1,912.5	159.4
d. Mizebolais	1984	113.7	63.1	53.0	45.6	140.5	260.0	214.7	252.2	332.4	257.7	23.3	19.0	1,775.2	147.9
	1985	3.0	36.4	62.2	141.6	151.9	72.3	237.6	329.2	376.4	279.8	174.4	32.0	1,895.8	157.9
	1986	58.6	10.0	214.8	180.0	294.8	138.0	167.8	129.6	148.0	192.4	76.8	28.4	1,639.2	136.6
	1987	6.0	21.0	29.8	201.0	411.0	116.2	220.2	336.4	294.0	296.2	48.0	51.4	2,031.2	169.3
Leogane	1984	40.2	88.3	23.8	28.5	200.5	224.7	102.8	61.4	251.0	158.9	12.4	36.9	1,234.4	102.9
	1985	84.6	29.1	171.1	120.6	85.4	49.4	75.9	116.7	216.0	133.3	150.9	0	1,233.0	102.8
	1986	105.1	20.8	168.1	184.9	228.7	174.4	142.1	139.1	70.9	136.3	97.7	0	1,468.1	122.3
	1987	5.3	38.2	17.8	153.6	142.0	193.8	110.7	75.9	97.9	141.3	86.2	108.2	1,170.9	97.6
Furcy	1984	50.8	100.0	69.6	132.4	400.2	483.6	246.0	106.6	259.4	292.4	57.4	17.8	2,216.2	184.7
	1985	15.8	32.2	62.6	136.6	196.8	105.6	281.8	150.0	130.8	201.4	172.2	8.4	1,494.0	124.5
	1986	107.4	10.8	139.8	149.6	347.0	223.0	152.2	184.6	181.0	204.6	45.2	30.6	1,774.8	142.9
	1987	43.4	47.8	22.8	75.8	149.4	446.2	182.4	134.2	239.4	351.8	50.6	88.0	1,831.8	152.6
Foret des Pins	1984	51.0	45.4	53.2	81.4	209.4	0	39.0	109.2	258.2	306.6	13.2	0	1,166.6	97.2
	1985	9.4	16.4	4.2	112.7	137.0	142.1	97.6	130.0	128.6	274.6	31.0	9.4	1,143.0	95.3
	1986	42.2	26.4	66.2	203.6	254.2	108.2	79.2	139.0	111.6	44.8	94.0	31.4	1,200.8	100.1
	1987	34.8	42.4	28.8	47.9	321.0	169.0	99.0	148.2	93.0	257.0	27.0	184.0	1,452.1	121.0
Les Cayes	1984	64.5	162.9	108.5	151.8	170.3	71.6	177.5	76.6	409.3	116.1	46.7	2.0	1,557.8	129.8
	1985	47.8	136.3	91.9	174.4	175.6	20.2	48.3	180.4	183.4	314.6	29.3	45.9	1,448.1	120.7
	1986	55.4	19.2	61.3	128.2	262.8	677.9	41.4	39.8	85.9	195.6	165.2	68.7	1,801.4	150.1
	1987	85.8	96.7	64.4	102.6	110.9	84.4	73.4	77.0	135.2	421.2	103.9	147.1	1,502.6	125.2
Ganthier	1984	3.4	2.9	7.0	27.7	146.4	36.1	42.1	11.7	114.7	69.1	0	0	461.1	38.4
	1985	11.0	5.6	2.1	99.6	1.7	0	17.6	86.4	138.6	164.8	98.1	0	625.5	52.1
	1986	28.7	11.5	17.6	138.1	153.5	17.8	6.4	4.3	79.4	96.8	145.0	2.1	701.2	58.4
	1987	0	1.4	3.6	136.2	152.4	48.1	0	0.7	131.7	241.2	23.4	31.3	770.0	64.2

Source: Republique d'Haiti, Departement de l'Agriculture des Ressources Naturelles et du Developpement.

Table 3-3. Average Yields, Area Cultivated, and Production of Principal Crops, 1980-86

Crop	% of Total	Area (ha)	Average Yield (t/ha)
Maize	22.0	231,250	0.8
Sorghum	14.9	156,250	0.8
Coffee	12.5	132,000	0.3
Beans	8.5	89,655	0.6
Sugarcane	10.8	114,000	50.0
Banana (plantain)	7.7	80,645	0.7
Cassava	2.7	28,000	4.0
Sweet potatoes	5.9	61,905	0.5
Rice (paddy)	5.6	59,250	2.3
Peanuts	4.3	45,355	0.8
Cocoa	1.0	10,400	0.3
Cotton	1.2	12,445	0.5
Taro	0.8	8,665	4.5
Yams	2.1	22,000	5.0
TOTAL	100	1,051,820	

Source: Service de Statistics Agricoles (MARNDR); 1987.

Note: The area cultivated to other vegetables (tomatoes, onions, cabbage, etc.) and other crops (tobacco, citrus, etc.) is about 35,000 ha; the total area cultivated to agricultural crops is estimated at 1,086,820 ha which is about 40% of total land area.

Table 3-4. Planting Seasons for Major Crops, 1988

Crop	Region	Months
Beans	Northern Plain	April-Nov.-Dec.
	Gonaives Plain	April-Dec.
	Artibonite Valley	Nov.-Dec.
	Cul de Sac Plain	Feb.-March-Dec.
	Leogane Plain	December
	Cayes Plain	October-November
	North East Hillside	February
	North West Hillside	April-May
	South East Hillside	Feb.-March-Aug.-Sept.
	Artibonite River Basin	March-April-Aug.-Sept.
	South West Hillside	Feb.-March-July-Aug.
Maize	Northern Plain	April-May
	Gonaives Plain	Feb.-March-Aug.
	Cul de Sac Plain	Feb.-March-August
	Leogane Plain	Jan.-Feb.-March
	Cayes Plain	Feb.-March-Aug.-Sept.
	North East Hillside	January
	North West Hillside	May-June
	Artibonite River Basin	March-April-May-June
	South East Hillside	March-April-Nov.-Dec.
	South West Hillside	March-April
Sugarcane	Northern Plain	Oct.-Nov.
	Cul de Sac Plain	March-April-May-June
	Leogane Plain	March-April-May
	Cayes Plain	March-April
Plantain	Northern Plain	March-April
	Cul de Sac Plain	March-April-Aug.-Sept.-Oct.
	Leogane Plain	March-April-May-Aug.-Sept.-Oct.
Vegetables	Northern Plain	Sept.-Oct.
	Artibonite Valley	Nov.-Dec.
	Cul de Sac Plain	Aug.-Sept.-Oct.
	Leogane Plain	Oct.-Nov.
	Cayes Plain	Sept.-Oct.
	North West Hillside	Oct.-Nov.
	Artibonite River Basin	Aug.-Sept.-Oct.
	South East Hillside	March-April-May-Aug.
	South West Hillside	April-May-June
Rice	Northern Plain	Aug.-Oct.-Nov.
	Artibonite Valley	January-July
	Cayes Plain	February-Aug.
	South West Hillside	July

Source: Agri News USAID/Haiti.

Table 3-5. Fertilizer Market, 1985-89

A. Product

Fertilizer Product	1985	1986	1987	1988	1989
	(t)				
Urea	9,623	9,043	7,942	7,853	7,729
Ammonium sulfate	802	754	662	654	644
20-20-10	321	301	265	262	258
12-12-20	4,811	4,521	3,971	3,927	3,221
Composite[a] (14-14-20)	481	452	397	393	1,031
Total	16,038	15,071	13,237	13,089	12,883

B. Nutrient

Nutrient	1985	1986	1987	1988	1989
	(t)				
N	5,304	4,984	4,377	4,328	4,273
P_2O_5	709	666	585	579	582
K_2O	1,090	1,025	900	890	876
Total	7,103	6,675	5,862	5,797	5,731

a. 14-14-20 is composite average nutrient analysis of miscellaneous products.

Source: IFDC in-country data.

Table 3-6. Fertilizer Recommendations for Major Crops

Crop	Fertilizer Recommendation (kg nutrient/ha)[a]
Rice (irrigated)	100-60-60
Maize (irrigated)	102-54-72
Maize (nonirrigated)	70-36-48
Beans	100-167-167
Cabbage	170-120-120
Sugarcane	100-82-224
Plantain/banana	140-30-270
Onion	85-60-160
Potatoes	80-83-171
Tomatoes (industrial)	148-76-184
Coffee (first and second years)	36-36-18
Coffee (succeeding years)	54-54-27

a. $N-P_2O_5-K_2O$.

Source: Agricultural Services S.A. (ASSA) 1983 Calendar.

Table 3-7. 1992-96 Fertilizer Market Forecast by Product and Nutrient

A. Product

Product	1992 Commercial Market	1992 Japan Donation	1992 Total Market	1993 Commercial Market	1993 Japan Donation	1993 Total Market	1994 Commercial Market	1994 Japan Donation	1994 Total Market	1995 Commercial Market	1995 Japan Donation	1995 Total Market	1996 Commercial Market	1996 Japan Donation	1996 Total Market
	(t)														
Urea	7,086	1,000	8,086	7,212	1,000	8,212	7,452	1,000	8,452	7,717	1,000	8,717	8,056	1,000	9,056
Ammonium sulfate	164	500	664	229	500	729	240	500	740	257	500	757	278	500	778
20-20-10	273	0	273	229	0	229	240	0	240	257	0	257	278	0	278
12-12-20	2,835	500	3,335	3,205	500	3,705	3,486	500	3,986	3,858	500	4,358	4,445	500	4,945
14-14-20[a] (composite)	545	500	1,045	572	500	1,072	601	500	1,101	772	500	1,272	833	500	1,333
Total	10,902	2,500	13,402	11,447	2,500	13,947	12,020	2,500	14,520	12,861	2,500	15,361	13,890	2,500	16,390

B. Nutrient

Nutrient	1992	1993	1994	1995	1996
	(t)				
N	4,460	4,571	4,724	4,921	5,165
P_2O_5	601	641	680	752	836
K_2O	903	978	1,041	1,152	1,283
Total	5,964	6,190	6,446	6,825	7,284

a. 14-14-20 is composite average nutrient analysis of miscellaneous products.

Table 3-8. 1992-96 Fertilizer Market Forecast by Consumption Areas

Area	Crop	1992					
		Urea	Ammonium Sulfate	20-20-10	12-12-20	(Composite)[a] 14-14-20	Total
		(t)					
Artibonite	Rice, onions	5,256	431	177	2,167	679	8,711
Leogane	Maize, industrial tomatoes	162	13	5	67	21	268
Kenscoff	Vegetables (all kinds)	970	80	33	400	125	1,608
Foret des Pins	Potatoes, coffee, onions, cabbage	566	46	19	233	73	938
Cul de Sac	Tobacco, industrial tomatoes, other vegetables	485	40	16	200	63	804
Les Cayes	Sugarcane, rice, beans, maize, tobacco, sorghum	404	33	14	167	52	670
Cap Haitien	Cane, citrus, onions, other vegetables	243	20	8	100	31	402
TOTAL		8,086	564	273	3,335	1,045	13,402

Area	Crop	1993					
		Urea	Ammonium Sulfate	20-20-10	12-12-20	(Composite)[a] 14-14-20	Total
		(t)					
Artibonite	Rice, onions	5,338	474	149	2,408	697	9,066
Leogane	Maize, industrial tomatoes	164	15	5	74	21	279
Kenscoff	Vegetables (all kinds)	985	87	27	445	129	1,674
Foret des Pins	Potatoes, coffee, onions, cabbage	575	51	16	259	75	976
Cul de Sac	Tobacco, industrial tomatoes, other vegetables	493	44	14	222	64	837
Les Cayes	Sugarcane, rice, beans, maize, tobacco, sorghum	411	36	11	185	54	697
Cap Haitien	Cane, citrus, onions, other vegetables	246	22	7	111	32	418
TOTAL		8,212	729	229	3,705	1,072	13,947

(Continued)

Table 3-8. 1992-96 Fertilizer Market Forecast by Consumption Areas (Continued)

Area	Crop	Urea	Ammonium Sulfate	20-20-10	12-12-20	(Composite)[a] 14-14-20	Total
		1994					
		(t)					
Artibonite	Rice, onions	5,494	481	156	2,591	716	9,438
Leogane	Maize, industrial tomatoes	169	15	5	80	22	290
Kenscoff	Vegetables (all kinds)	1,014	89	29	478	132	1,742
Foret des Pins	Potatoes, coffee, onions, cabbage	592	52	17	279	77	1,016
Cul de Sac	Tobacco, industrial tomatoes, other vegetables	507	44	14	239	66	871
Les Cayes	Sugarcane, rice, beans, maize, tobacco, sorghum	423	37	12	199	55	726
Cap Haitien	Cane, citrus, onions, other vegetables	254	22	7	120	33	436
TOTAL		8,452	740	240	3,986	1,101	14,520

Area	Crop	Urea	Ammonium Sulfate	20-20-10	12-12-20	(Composite)[a] 14-14-20	Total
		1995					
		(t)					
Artibonite	Rice, onions	5,666	492	167	2,833	827	9,985
Leogane	Maize, industrial tomatoes	174	15	5	87	25	307
Kenscoff	Vegetables (all kinds)	1,046	91	31	523	153	1,843
Foret des Pins	Potatoes, coffee, onions, cabbage	610	53	18	305	89	1,075
Cul de Sac	Tobacco, industrial tomatoes, other vegetables	523	45	15	261	76	922
Les Cayes	Sugarcane, rice, beans, maize, tobacco, sorghum	436	38	13	218	64	768
Cap Haitien	Cane, citrus, onions, other vegetables	261	23	8	131	38	461
TOTAL		8,717	757	257	4,358	1,272	15,361

Area	Crop	Urea	Ammonium Sulfate	20-20-10	12-12-20	(Composite)[a] 14-14-20	Total
		1996					
		(t)					
Artibonite	Rice, onions	5,887	506	181	3,214	867	10,654
Leogane	Maize, industrial tomatoes	181	16	6	99	27	328
Kenscoff	Vegetables (all kinds)	1,087	93	33	593	160	1,967
Foret des Pins	Potatoes, coffee, onions, cabbage	634	54	19	346	93	1,147
Cul de Sac	Tobacco, industrial tomatoes, other vegetables	543	47	17	297	80	983
Les Cayes	Sugarcane, rice, beans, maize, tobacco, sorghum	453	39	14	247	67	820
Cap Haitien	Cane, citrus, onions, other vegetables	272	23	8	148	40	492
TOTAL		9,056	778	278	4,945	1,333	16,390

a. 14-14-20 is composite average nutrient analysis of miscellaneous products.

Table 3-9. Fertilizer Retail Selling Price Buildup by Market Centers as of June 1990

Source: Dominican Republic by Truck to:	Port-au-Prince			Kenscoff			Les Cayes			Artibonite		
	Urea or 12-12-20	20-20-10	AS[a] Standard	Urea or 12-12-20	20-20-10	AS [b] (g)	Urea or 12-12-20	20-20-10	AS [b] (g)	Urea or 12-12-20	20-20-10	AS [b] (g)
	(H $)											
Total landed cost of product (per short ton)	308.11	338.16	235.65	318.89	348.18	245.67	323.23	352.51	250.01	314.66	343.95	241.44
Importer markup (per 100-lb bag)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Importer selling price (per short ton)	328.11	358.16	255.65	338.89	368.18	265.67	343.23	372.51	270.01	334.66	363.95	261.44
(per 100-lb bag)	16.41	17.91	12.78	16.94	18.41	13.28	17.16	18.63	13.50	16.73	18.20	13.07
Dealer markup (per 100-lb bag)	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00
Dealer selling price (per short ton)	328.11	358.16	255.65	358.89	388.18	285.67	343.23	372.51	270.01	354.66	383.95	281.44
(per 100-lb bag)	16.41	17.91	12.78	17.94	19.41	14.28	17.16	18.63	13.50	17.73	19.20	14.07
Merchant markup (per 100-lb bag)	N.A.	N.A.	N.A.	2.00	2.00	2.00	1.50	1.50	1.50	3.50	3.50	3.50
Small farmer retail price (per short ton)	N.A.	N.A.	N.A.	398.89	428.18	325.67	373.23	402.51	300.01	424.66	453.95	351.44
(per 100-lb bag)	N.A.	N.A.	N.A.	19.94	21.41	16.28	18.66	20.13	15.00	21.23	22.70	17.57

Source: Dominican Republic by Boat (700 Short Tons) to St. Marc, Thence by Truck to:	St. Marc			Port-au-Prince			Kenscoff			Les Cayes			Artibonite		
	Urea or 12-12-20	20-20-10	AS Standard	Urea or 12-12-20	20-20-10	AS Standard	Urea or 12-12-20	20-20-10	AS [b] (g)	Urea or 12-12-20	20-20-10	AS [b] (g)	Urea or 12-12-20	20-20-10	AS [b] (g)
	(H $)														
Total landed cost of product (per short ton)	298.42	327.92	224.65	306.54	336.04	232.77	317.40	346.90	243.63	325.21	354.72	251.45	302.48	331.98	228.71
Importer markup (per 100-lb bag)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Importer selling price (per short ton)	318.42	347.92	244.65	326.54	356.04	252.77	337.40	366.90	263.63	345.21	374.72	271.45	322.48	351.98	248.71
(per 100-lb bag)	15.92	17.40	12.23	16.33	17.80	12.64	16.87	18.35	13.18	17.26	18.74	13.57	16.12	17.60	12.44
Dealer markup (per 100-lb bag)	1.00	1.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Dealer selling price (per short ton)	338.42	367.92	264.65	326.54	356.04	252.77	357.40	386.90	283.63	365.21	394.72	291.45	342.48	371.98	268.71
(per 100-lb bag)	16.92	18.40	13.23	16.33	17.80	12.64	17.87	19.35	14.18	18.26	19.74	14.57	17.12	18.60	13.44
Merchant markup (per 100-lb bag)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	1.50	1.50	1.50	1.50	1.50	1.50	3.50	3.50	3.50
Small farmer retail price (per short ton)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	387.40	416.90	313.63	395.21	424.72	321.45	412.48	441.98	338.71
(per 100-lb bag)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	19.37	20.85	15.68	19.76	21.24	16.07	20.62	22.10	16.94

(Continued

Table 3-9. Fertilizer Retail Selling Price Buildup by Market Centers as of June 1990 (Continued)

From Indicated Source (Trinidad or Venezuela) by Boat (700 t) to St. Marc, Thence by Truck to:	St. Marc		Port-au-Prince		Kenscoff		Les Cayes		Artibonite	
	Trinidad Urea (g)[b]	Venezuela Urea (p)[c]	Trinidad Urea (g)	Venezuela Urea (p)	Trinidad Urea (g)	Venezuela Urea (p)	Trinidad Urea (g)	Venezuela Urea (p)	Trinidad Urea (g)	Venezuela Urea (p)
	(H $)									
Total landed cost of product (t)	302.87	252.55	312.12	265.73	319.82	273.42	343.86	297.46	307.90	281.51
Importer markup (per 50-kg bag)	1.00	3.00	1.00	3.00	1.00	3.00	1.00	1.50	1.00	3.00
Importer selling price (per t)	322.87	312.55	332.12	325.73	339.82	333.42	363.86	327.46	327.90	321.51
(per 50-kg bag)	16.14	15.63	16.61	16.29	16.99	16.67	18.19	16.37	16.40	16.08
Dealer markup (per 50-kg bag)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.75	1.00
Dealer selling price (per t)	342.87	332.55	332.12	325.73	359.82	353.42	363.86	347.46	362.90	341.51
(per 50-kg bag)	17.14	16.63	16.61	16.29	17.99	17.67	18.19	17.37	18.15	17.08
Merchant markup (per 50-kg bag)	N.A.	N.A.	N.A.	N.A.	1.50	1.50	1.50	1.50	3.50	3.50
Small farmer retail price (per t)	N.A.	N.A.	N.A.	N.A.	389.82	383.42	393.86	377.46	432.90	411.51
(per 50-kg bag)	N.A.	N.A.	N.A.	N.A.	19.49	19.17	19.69	18.87	21.65	20.58

a. AS refers to ammonium sulfate.
b. (g) refers to granular material.
c. (p) refers to prilled material.

Table 3-10. 1989 Pesticide Market by Product Family

Product Family	Annual Gross Sales Volume, US $	% of Total Sales
Insecticide	230,000	61
Herbicide	80,000	21
Fungicide	50,000	13
Rodenticide	15,000	5
Total	375,000	100

Source: IFDC in-country data.

Table 3-11. 1989 Pesticide Market Share of Importing Companies

Company	Annual Gross Sales Volume, US $	Market Share (%)
Agrotechnique S.A.	75,000	20
Agri-Supply Co.	23,000	6
Darbouco SA	15,000	4
Compagnie des Tabacs	90,000	24
Famosa	90,000	24
Hasco	30,000	8
SOPRACH	30,000	8
Others	22,000	6
	375,000	100

Source: IFDC in-country data.

Table 3-12. 1989 Pesticide Market by Major Crop

Crop	Annual Gross Sales Volume, US $	% Share
Tobacco	90,000	24
Tomatoes (industrial)	90,000	24
Rice	30,000	8
Sugarcane	30,000	8
Coffee	11,000	3
Other vegetables	124,000	33
TOTAL	375,000	100

Source: IFDC in-country data.

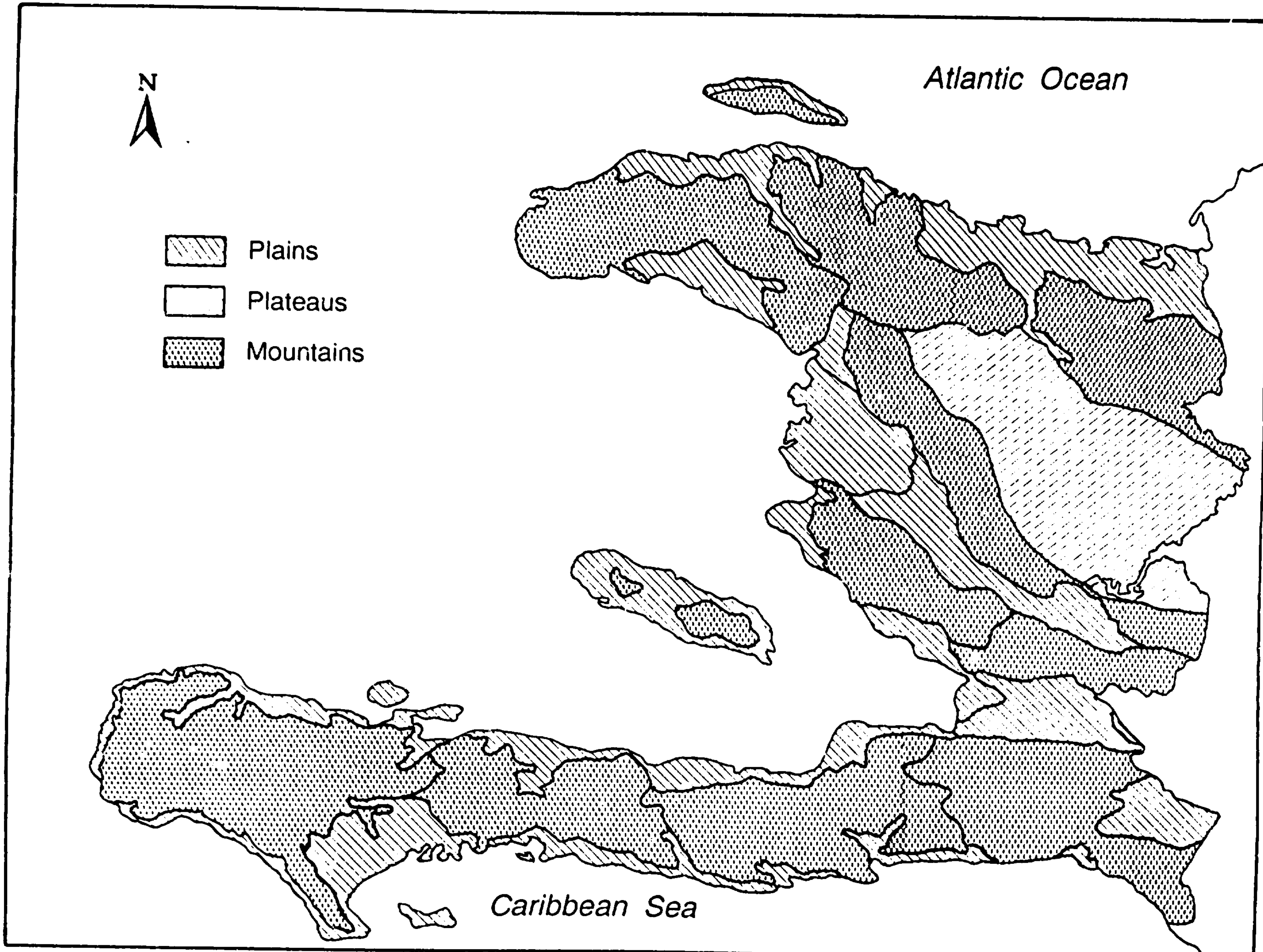


Figure 3-1. Physiographical Regions, Haiti.

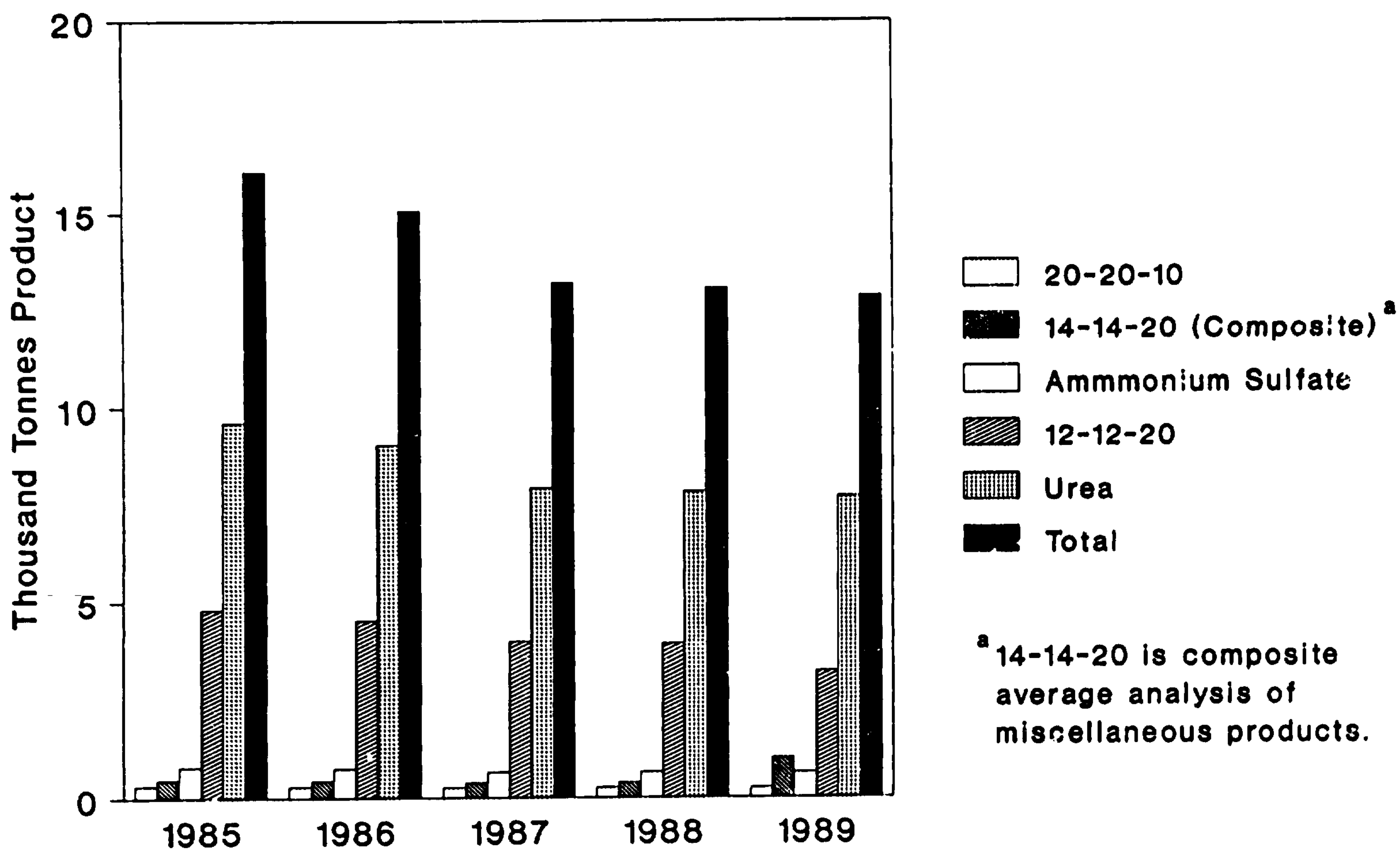


Figure 3-2. Fertilizer Consumption in Haiti, 1985-89.

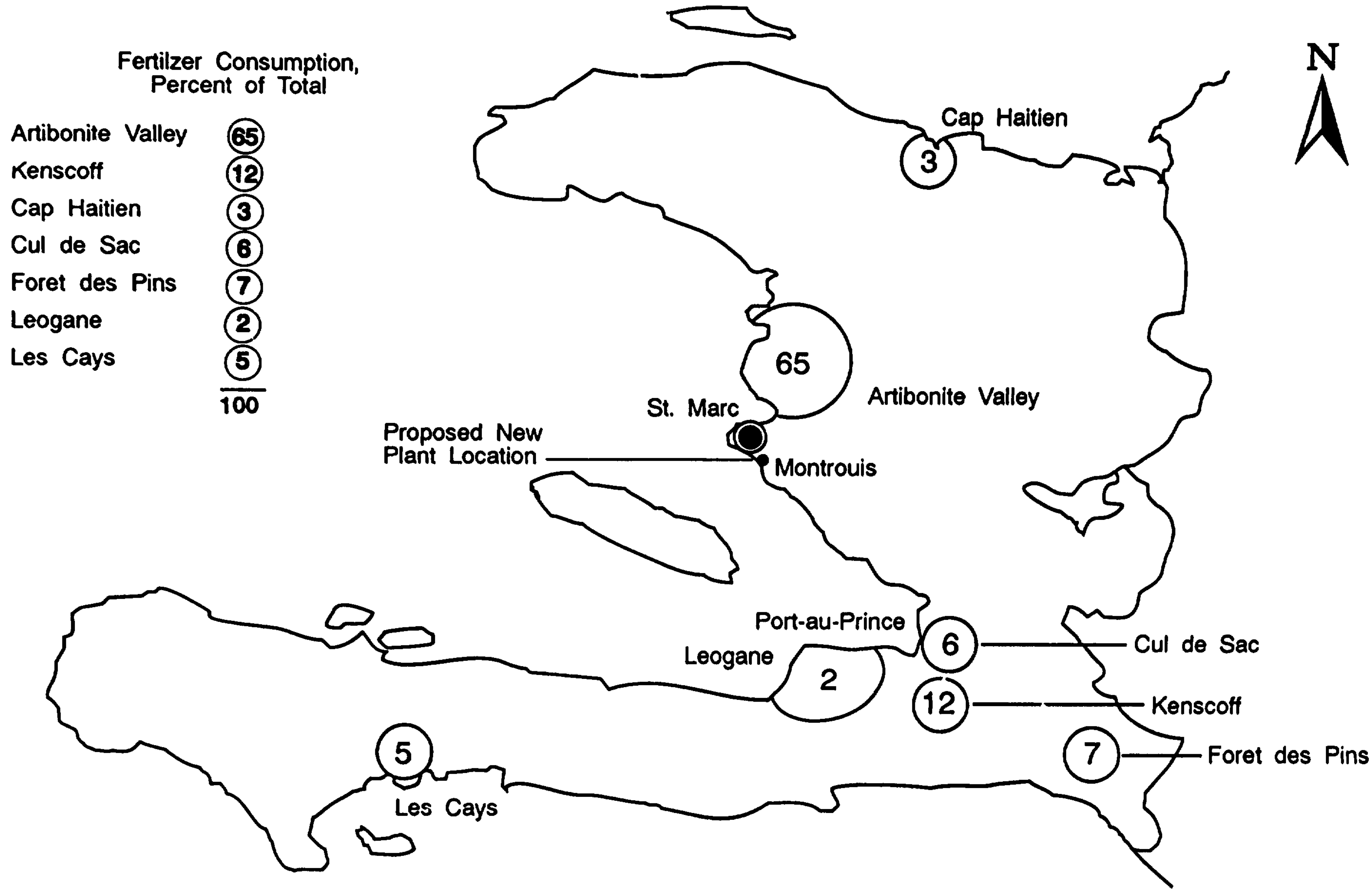


Figure 3-3. Major Fertilizer Consumption Areas (1989).

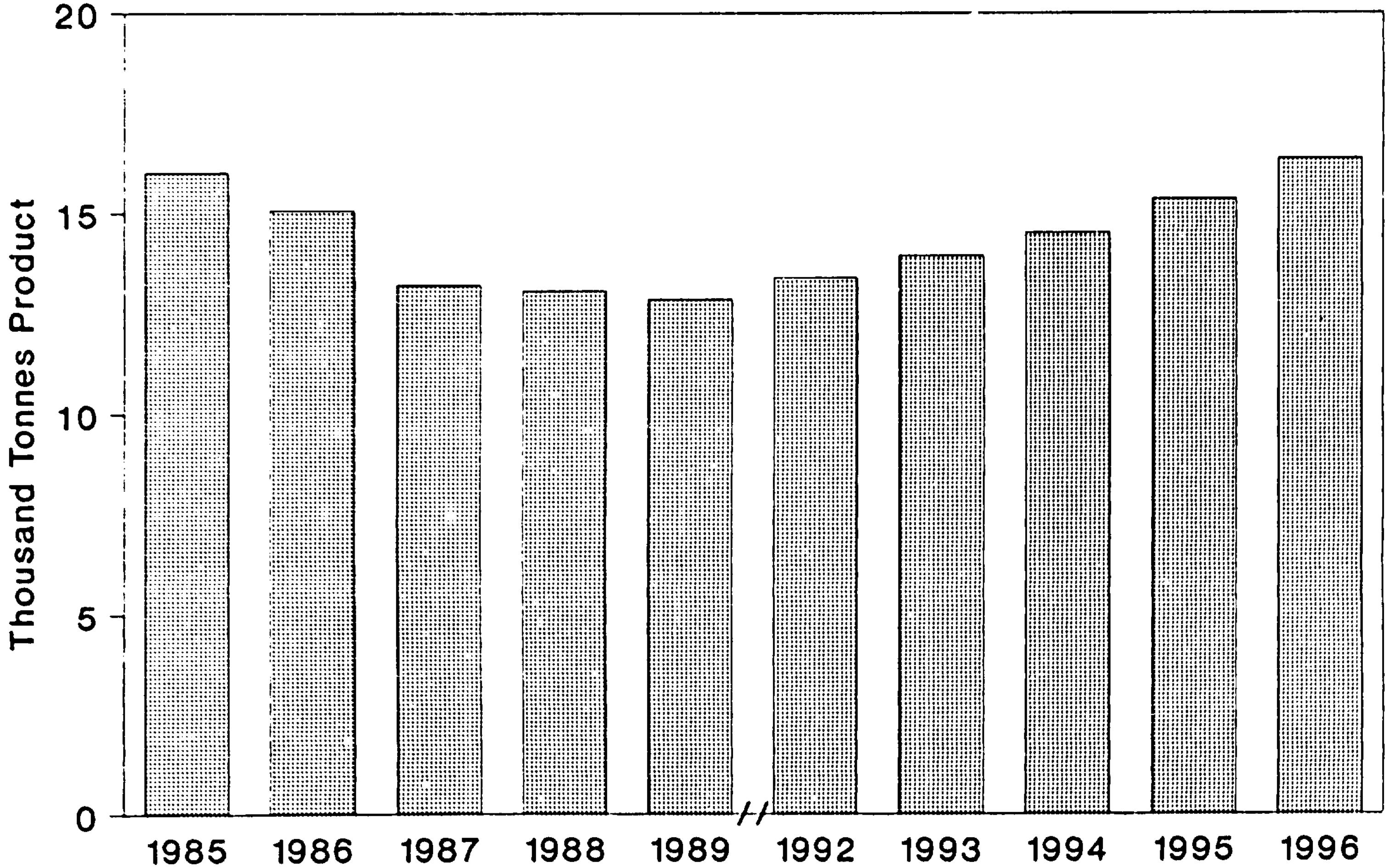


Figure 3-4. Fertilizer Market: Actual for 1985-89; Forecast for 1992-96.

4.0 MATERIALS AND INPUTS

4.1 Definition of Fertilizer Material and Processing Terminology

4.1.1 Fertilizer Material Terminology

In the context of this fertilizer plant project, the terms--materials, raw materials, and products--are used interchangeably depending upon the context in which they are discussed. For example, urea, a fertilizer *material*, is also referred to as a *raw material* when it is mixed with other materials to prepare a multinutrient-blended product such as 14-14-14, and finally, it is called a *product* when it is simply bagged and sold as a straight material.

4.1.2 Process Terminology

In this project, fertilizer materials are not processed by transforming them from one chemical or physical state to another as is customary in many sectors of the fertilizer industry. The term *processing* as used in this project refers to the physical/mechanical handling, mixing (blending), and bagging of various fertilizer materials without altering the physical or chemical state of the individual materials. Fertilizer plants that engage in the physical mixing of two or more materials to obtain a number of nutrient ratios and concentrations are usually referred to as mixers, blenders, or bulk blenders.

4.2 Characteristics of Fertilizer Materials

Fertilizer materials are relatively bulky, typically weighing about 650 to 1,000 kg/m^3 depending upon the particular material. Additionally, most fertilizer materials are quite soluble in water and hygroscopic. Thus, they must be protected from moisture; rain and ground moisture as well as atmospheric humidity.

4.3 Selection of Fertilizer Materials

4.3.1 Required Fertilizer Material Physical Properties

Since the fertilizer materials used in this project will often be used to prepare blends of two or more individual materials to achieve a number of nutrient ratios and grades required by the market, it is important that the particle (granule) size of the individual materials be reasonably uniform to facilitate uniform mixing (blending) and to minimize the risk of separation of the individual materials (segregation) after the product is mixed and bagged.

Uniform mixing and minimum post-production segregation are achieved by selecting materials which have approximately the same granule size and size distribution. The granule-size distribution of common materials used for blending is normally in the range of 1-3 mm or 3-5 mm depending upon origin; materials obtained from Europe tend to be larger in particle size than those obtained from the United States. It is interesting to note that differences in density of the materials have a much less effect on causing segregation than do differences in particle size. Fertilizer materials with the appropriate particle-size characteristics are widely available on the international market. Typical particle-size data for these materials are shown in Table 4-1.

The use of granular materials as opposed to nongranular materials (often referred to as standard-grade materials) is also often preferred when the materials are sold as "straights" without first blending. This is because granular materials are generally quite free-flowing and nondusty thus facilitating handling and application. Many standard-grade products, because of their large surface area, have a tendency to cake and form hard lumps during storage making them more difficult for the farmer to handle and apply. Granular materials, however, are usually more costly than the standard-grade materials (about US $5/t-US $40/t more depending upon the material).

Some products, particularly urea, are also available in a prilled form. Prilled urea is smaller in particle size than granular urea. In most cases, the prilled product is more likely to cake than the granular counterpart. Worldwide, only about 15% of the urea is granular; the majority is prilled. On average, prilled urea usually sells for US $5/t-US $15/t less than granular urea. Also because of its smaller particle size (usually about 1-2 mm), prilled urea is not well suited for blending because the other granular materials (for example, phosphate and potash materials) are significantly larger in size.

4.3.2 Fertilizer Material Chemical Properties

The chemical properties (nutrient content and solubility) of the commercially available fertilizer materials used in this project are described in Table 4-2.

4.3.3 Sources of Fertilizer Materials

All fertilizer materials for the project must be imported, therefore, it is essential that all materials specified are widely available on the international market to ensure competitive f.o.b pricing and security of supply. Fortunately, the materials required for this project meet this criterion and can be sourced from the U.S. Gulf Coast, Trinidad, Venezuela, and even Europe and the Far East. Details of the envisioned supply program are more fully described in 4.5.

4.3.4 Other Material Inputs

In addition to the basic fertilizer nutrient materials, the project will require recurring expenses for the following materials and utilities:

1. Nonnutrient granular filler material to adjust the nutrient concentration of the blended NPK products to the guaranteed value. This material will be obtained from local sources.
2. Finely powdered clay to provide a conditioning agent for the NPK blends and some of the straight materials to minimize caking. This material will be imported in 25-kg bags.
3. Empty 50-kg capacity bags, plastic bag liners, wire ties, and stitching thread for packaging the fertilizer products. These materials will be purchased from local sources.
4. Diesel fuel for emergency/standby electric power generator and plant mobile equipment. All fuel and lubricants will be obtained from local sources.
5. Electric power for operation of all plant facilities and security lighting will be obtained from the public utility service.

4.4. Fertilizer Material Quantities and Costs

4.4.1 Fertilizer Material Quantities

A determination of the quantity of fertilizer materials required for the project was made on the basis of (1) a product slate consisting of three blended NPK products and two straight nitrogen products (urea and ammonium sulfate) and (2) annual projections of market share over a period of 15 years as described in Chapter 3.

The composition (formulation) of the three blended NPK products--20-20-10, 12-12-20, and 14-14-14 is given in Table 4-3. The annual requirements of materials to produce these blends along with the requirements for the two straight nitrogen products--urea and ammonium sulfate--are given in Table 4-4.

4.4.2 Fertilizer Material Cost

Raw materials constitute the majority (about 80%) of the factory-gate production cost.

The cost buildup of the raw materials beginning with the f.o.b. price at the source of supply and ending with the material placed in storage at the project site is given in Tables 4-5 and 4-6.

The cost data in Table 4-5 refers to a simple plant scenario in which the fixed capital investment is minimized and the use of local labor and other domestic resources is maximized. With this scenario, the cost of materials is approximately US $20/t higher than with an alternative scenario (optimum plant, Table 4-6) requiring a higher fixed capital investment. The higher cost of materials using the simple plant scenario is attributed primarily to the following two major factors:

1. A higher ocean freight rate (US $35/t compared with US $20/t) due to smaller cargoes and a longer unloading time.
2. Increased unloading cost (H $9.6/t compared with H $5.7/t) due to increased labor for manual operations.

Even though the simple plant scenario reflects a higher cost for materials, it is evaluated as a possible starting point because the fixed investment for the wharf and bulk storage facilities is minimized, thus decreasing the risk taken by the investors.

As business activity grows and the project obtains increased stability in the marketplace, it may be advisable to expand the plant warehouse storage capacity and improve the wharf facilities to optimize (increase) the cargo size and unloading rate, and thereby decrease the landed cost of materials as shown in Table 4-6.

4.5 Fertilizer Material Supply Program

4.5.1 Critical Supply Constraints

As already indicated, the major recurring cost component for this project is the expenditures required for fertilizer materials, all of which must be imported from off-shore sources. In addition to the c.i.f. cost, other costs directly related to the imported materials accrue; namely, those related to unloading and storage.

Quantity of Raw Materials

The total quantity of fertilizer materials required for the project, especially during the first 5 years, is small by commercial standards. Thus, the costs of procurement (f.o.b. price), ocean transport, and unloading are disproportionately high when compared with larger tonnage operations; for example, procurement and shipment of 10,000-20,000 t cargoes of a single material. Refer to Table 4-4 for annual raw material requirements by type for the projected 15-year project life.

Fixed Capital Investment

Because of the expected relatively low level of sales during the initial years of the project, it is important to minimize the initial investment made in unloading and storage facilities. Thus, it is not feasible to opt toward a large fertilizer material supply program, even though such a system may be more cost-effective when viewed strictly from the material supply side of the project. Instead, a modest system may be more advisable for the early years of operation. Such a system, although more costly in terms of variable cost in the short term, has a very low fixed cost component. A description of such a relatively modest, low investment system follows.

4.5.2 Description of Proposed Initial Supply System

Procurement--The proposed supply system for the initial phase of the project is based on the procurement of relatively small lots of the individual materials that would be assembled into cargoes of up to 2,400-3,000 t, depending upon the density of the materials. The fleet of small ships operating in the region, referred to as minibulkers, would be used. These minibulkers normally have two holds with a capacity of about 1,200-1,500 t each. A hold can be further subdivided to enable the transport of two or more different materials in a single hold.

The need for flexibility offered by the minibulker concept is illustrated by observing the annual fertilizer material requirements for the project during the first 5 years of operation (Table 4-4).

These data (Table 4-4) show that in the first year of operation only one shipload of urea will be needed (about 2,400 t) and the total remaining imported materials (AS, DAP, MOP, and conditioner) will constitute a partial shipload totaling less than 800 t. By the fifth year of operation two shiploads of urea will be needed (about 6,000 t) and the AS, DAP, MOP, and conditioning clay will fill a second minibulker with about 2,500 t.

In actual practice during the first 5 years of operation, it is unlikely that a full cargo (about 2,500 t) of one material would be received at one time. Instead, it is more likely that the supply system will be operated on the basis of partial cargoes of 1,000 t or less scheduled according to annual sales trends and available warehouse space at the plant site. Warehouse space, and thus investment, is deliberately held to a minimum (approximately 3,000-t maximum warehouse space for bulk materials) during the early years of the project. Warehouse space can easily be expanded later as business volume expands. As business expands, a downward trend in the landed cost of raw materials will occur due to lower freight rates and unloading costs resulting from increased mechanization of the unloading operation (refer to 4.5.4).

The Unloading Operation--As with procurement and storage, the unloading operation in the early years of the project is designed to minimize the initial fixed capital investment required for an unloading wharf and material-handling machinery. Thus, a low level of mechanization is used and the use of manual contract (variable cost) labor is maximized. The simple plant investment cost scenario assumes an offshore unloading scheme described below. As the project develops a more sophisticated unloading scheme can be developed.

4.5.3. Description of Offshore Unloading Scheme

This method of unloading bulk or bagged cargoes requires a very minimum investment in fixed-cost shoreside facilities, such as a seaworthy wharf, cranes, conveyers, and other material-handling equipment. Instead, the ship is anchored offshore and small boats (lighters or barges) are used to ferry the cargo from the deepwater ship anchorage to shore. The shore facilities are quite minimum (often temporary) to facilitate offloading of the cargo from the small boats to the shore where it is trucked or manually transported to storage. This method of unloading is widely used along the East Coast of India where large ships (20,000-t cargoes or more) anchor up to 5 km from shore and routinely discharge into 10-t capacity lighters that transfer the bulk cargo (after first temporarily bagging in the ship's hold) to shore. A similar system was observed in Haiti (St. Marc) where bagged cement was unloaded into small boats for transfer to shore.

In the system envisioned for the initial stage of this project, the bulk cargo would be "temporarily bagged" in the hold of the ship to facilitate transfer to shore. The bags would be manually filled and hand or machine stitched in the ship's hold and loaded into rope slings for transfer, using the ship's gear, from the ship's hold to the waiting small boats. A typical sling load would contain about 1 t (about twenty 50-kg bags). Based on experience in India, a 1- to 1.5-t sling can be transferred from the ship's hold to the small boat every 4 minutes. Assuming two gears working two holds, this would amount to a discharge rate of at least 30 tph or 720 tpd (24-h operation). However, for the purpose of the Haiti operation, an unloading rate of 500 tpd is assumed (Table 4-7).

The lighters, carrying anywhere from 2 t to 5 t, would travel to shore (about 100-200 m) and tie to the plant's shallow draft wharf for unloading. Depending upon the relationship of the level of the sea to the level of the wharf, unloading would be accomplished either by single-cable crane lift or by manual unloading using a gangplank. In either case, the bags would be loaded onto company-owned or leased trucks for transfer to the plant warehouse located about 500 m from the wharf.

At the warehouse the bags are opened and dumped into the mechanical inloading system for the warehouse. If the bags are machine-stitched, a nonlock stitch is used to facilitate easy opening. The bags are recycled back to the ship for reuse. The mechanical inloading system is used to maximize the pile depth, and therefore the capacity of the warehouse. Also, the mechanical inloading system, consisting of a bucket elevator and conveyor belt system, gently handles (compared with using front-end loaders to form piles of material) the granular materials thus minimizing breakdown of the granules which will cause dust, segregation, and caking during subsequent storage and processing.

4.5.4 Cost of Offshore Unloading Operation

The cost of the offshore unloading operation is estimated at H $5.5/t (Table 4-7). This compares with H $1.5/t (Table 4-6) for a more mechanized operation in which the ship is tied to a shoreside wharf and the materials are transferred in bulk, using the ship's gear and the company's clamshells, directly from the ship to the transfer trucks parked on the wharf.

As the project develops and the size and scope of the operation increases, it may be justified to invest in a permanent seaworthy wharf facility designed for more efficient and cost-effective bulk unloading. However, the initial scope of the project does not appear to justify such an initial investment.

4.6 Other Inputs

4.6.1 Electric Power

The project will require a maximum demand of about 100 kW based on 1.5 times the connected load of about 70 kW. The indicated demand (100 kW) will allow for the future expansion of the warehouse and the gradual replacement of manual operations with mechanized operations.

Electric power for the project will be obtained from the local public utility. Provisions have been made in the investment estimates to bring the public utility supply to the factory site. The cost of power from the public utility is estimated at H $0.20/kWh.

In addition to the public utility supply, the project is equipped with an emergency 75-kW diesel-powered electric power generator. This generator will be used to power the facility when the public utility supply is interrupted. The project cost calculations assume that public utility power interruptions will occur on an average of 2 h/day.

4.6.2 Water Supply

Since selection of the project site has not been finalized, the water supply source is uncertain. The plant process operations require essentially no water. However, a significant amount of water will be needed for the worker's bathing facilities and for drinking. For the purpose of the project estimates, it is assumed that all water for bathing and drinking will be collected from rain and stored in a cistern located on the factory site. Treatment facilities will be provided to ensure that the water is safe for human consumption.

4.6.3 Other Materials and Supplies

Empty 50-kg capacity woven polypropylene fertilizer bags, plastic bag liners, bag stitching (closing) thread, and diesel fuel will be purchased from local sources. The unit costs of these inputs are shown in Table 4-8. Miscellaneous operating supplies such as lubricants and employee safety equipment are factored into the respective production cost components.

Table 4-1. Typical Particle-Size Data for Commercially Available Fertilizer Materials

Material	(3.35 mm) +6	(2.36 mm) +8	(1.18 mm) +14	(0.85 mm) +20	(0.50 mm) +32	(0.36 mm) +42	(0.30 mm) +48	+100	PAN
	(cumulative % retained on indicated mesh)[a]								
Granular urea	2	78	98	98					100
Granular diammonium phosphate (DAP)	2	50	88	98					100
Granular muriate of potash (MOP)	7	45	96	98					100
Granular ammonium sulfate	6	20	72	96					100
Standard ammonium sulfate				2	18	73	92	99	100
Filler[b]									
Conditioning agent[c]									

a. Tyler mesh series.

b. Purchased locally and screened to match particle size of other granular materials.

c. Kaolin clay with typical particle size of 90% minus 10 μm.

Table 4-2. Typical Chemical Properties (Nutrient Content) of Commercially Available Fertilizer Materials

Material	N	P_2O_5 Total	P_2O_5 Water-Soluble	P_2O_5 Available[a]	K_2O	S	H_2O
	(%)						
Urea	46	-	-	-	-	-	0.2
Ammonium sulfate	21	-	-	-	-	24	0.5
Diammonium phosphate (DAP)	18	46.2	40-41	46.0	-	-	1.5
Muriate of potash (MOP)	-	-	-	-	60	-	0.1

a. Water-soluble plus neutral ammonium citrate-soluble P_2O_5 per Association of Official Analytical Chemists (AOAC) methods.

Table 4-4. Annual Fertilizer Raw Material Requirements for 15-Year Project Life

Raw Material[b]	Annual Raw Material Requirements[a]														
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Urea	2,383	3,656	4,636	5,719	6,020	6,514	7,035	7,549	8,039	8,481	8,863	9,173	9,411	9,590	9,754
Standard ammonium sulfate	50	106	136	172	186	201	217	233	248	262	274	283	290	297	302
Diammonium phosphate (DAP)	317	515	678	907	1,028	1,112	1,201	1,288	1,372	1,447	1,513	1,566	1,607	1,637	1,665
Muriate of potash (MOP)	345	574	760	1,009	1,152	1,246	1,346	1,445	1,538	1,623	1,696	1,755	1,801	1,835	1,867
Filler	229	380	502	673	765	828	894	959	1,022	1,078	1,126	1,166	1,196	1,219	1,240
Conditioning agent (bagged)	45	74	98	130	148	160	173	186	198	209	218	226	231	236	240
TOTAL	3,369	5,305	6,810	8,610	9,299	10,061	10,866	11,660	12,417	13,100	13,690	14,169	14,536	14,814	15,068

a. Indicated quantities include allowance for an overall shrinkage (loss) of 3.0%.

b. All materials are granular except ammonium sulfate and conditioning agent (clay).

Table 4-5. Raw Material Cost Buildup for Offshore Unloading Scheme (Simple Plant Scenario)[a]

	Urea, 46% N		Ammonium Sulfate (AS), 21% N-24% S		Ammonium Sulfate (AS) Standard Grade, 21% N-24% S		Monoammonium Phosphate (MAP), 11% N-52% P_2O_5		Diammonium Phosphate (DAP), 18% N-46% P_2O_5		Muriate of Potash (MOP), 60% K_2O		Conditioner Clay (bagged)		Filler (purchased) in Haiti)	
	US $	H $	US $	H $	US $	H $	US $	H $	US $	H $	US $	H $	US $	H $	US $	H $
c.i.f. cost																
f.o.b.	130.0	0	95.0	0	55.0	0	195.0	0	190.0	0	110.0	0	80.0	0	0	0
Ocean freight[b]	35.0	0	35.0	0	35.0	0	35.0	0	35.0	0	35.0	0	40.0	0	0	0
Insurance (0.5% f.o.b.)	0.7	0	0.5	0	0.3	0	1.0	0	1.0	0	0.6	0	0.4	0	0	0
Subtotal c.i.f.	165.7	0	130.5	0	90.3	0	231.0	0	226.0	0	145.6	0	120.4	0	0	0
Premium for small lots (5% of c.i.f.)[c]	8.3	0	6.5	0	4.5	0	11.6	0	11.3	0	7.3	0	6.0	0	0	0
Subtotal	174.0	0	137.0	0	94.8	0	242.6	0	237.3	0	152.9	0	126.4	0	0	0
Port and unloading charges																
Wharfage	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0	0	0
Customs inspection	0	0.1	0	0.1	0	0.1	0	0.1	0	0.1	0	0.1	0	0.1	0	0
Stevedoring	0	1.0	0	1.0	0	1.0	0	1.0	0	1.0	0	1.0	0	1.0	0	0
Unloading labor, supervision and assistance[d]	0	5.5	0	5.5	0	5.5	0	5.5	0	5.5	0	5.5	0	3.0	0	0
Subtotal	0	9.6	0	9.6	0	9.6	0	9.6	0	9.6	0	9.6	0	7.1	0	0
Administrative/tax charges																
Letter of credit opening and closing (1.5% of c.i.f.)	0	2.6	0	2.1	0	1.4	0	3.6	0	3.6	0	2.3	0	1.9	0	0
Bank acceptance of letter of credit (1.5% of c.i.f.)	2.6	0	2.1	0	1.4	0	3.6	0	3.6	0	2.3	0	1.9	0	0	0
Consul tax (3% of f.o.b.)	0	3.9	0	2.9	0	1.7	0	5.9	0	5.7	0	3.3	0	2.4	0	0
Subtotal	2.6	6.5	2.1	5.0	1.4	3.1	3.6	9.5	3.6	9.3	2.3	5.6	1.9	4.3	0	0
TOTAL (material in storage)	176.6	16.1	139.1	14.6	96.2	12.7	246.2	19.1	240.9	18.9	155.2	15.2	128.3	11.4	0	20.0

a. All materials are shipped in bulk (except clay) and are granular suitable for blending except standard grade AS which is sold as a nongranular straight material. All costs refer to 1.0 t of material.

b. Average value assuming minibulker rates and raw material sourcing from Trinidad and the U.S. Gulf region.

c. Estimated by IFDC assuming extra costs that usually occur when procuring small/mixed product shipments.

d. Includes hired equipment and short-term contract labor involved in offshore unloading operation. Refer to Table 4-7 for details.

Table 4-6. Raw Material Cost Buildup for Conventional Bulk Unloading Scheme (Optimum Plant Scenario)[a]

	Urea, 46% N		Ammonium Sulfate (AS), 21% N-24% S		Ammonium Sulfate (AS) Standard Grade, 21% N-24% S		Monoammonium Phosphate (MAP), 11% N-52% P_2O_5		Diammonium Phosphate (DAP), 18% N-46% P_2O_5		Muriate of Potash (MOP), 60% K_2O		Conditioner Clay (bagged)		Filler (purchased in Haiti)	
	US $	H $	US $	H $	US $	H $	US $	H $	US $	H $	US $	H $	US $	H $	US $	H $
c.i.f. cost																
f.o.b.	130.0	0	95.0	0	55.0	0	195.0	0	190.0	0	110.0	0	80.0	0	0	0
Ocean freight[b]	20.0	0	20.0	0	20.0	0	20.0	0	20.0	0	20.0	0	40.0	0	0	0
Insurance (0.5% f.o.b.)	0.7	0	0.5	0	0.3	0	1.0	0	1.0	0	0.6	0	0.4	0	0	0
Subtotal c.i.f.	150.7	0	115.5	0	75.3	0	216.0	0	211.0	0	130.6	0	120.4	0	0	0
Premium for small lots (5% of c.i.f.)[c]	7.5	0	5.8	0	3.8	0	10.8	0	10.6	0	6.5	0	6.0	0	0	0
Subtotal	158.2	0	121.3	0	79.1	0	226.8	0	221.6	0	137.1	0	126.4	0	0	0
Port and unloading charges																
Wharfage	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0	0	0
Customs inspection	0	0.1	0	0.1	0	0.1	0	0.1	0	0.1	0	0.1	0	0.1	0	0
Stevedoring	0	1.0	0	1.0	0	1.0	0	1.0	0	1.0	0	1.0	0	1.0	0	0
Unloading supervision and assistance	0	0.1	0	0.1	0	0.1	0	0.1	0	0.1	0	0.1	0	0.1	0	0
Miscellaneous equipment and services[d]	0	1.5	0	1.5	0	1.5	0	1.5	0	1.5	0	1.5	0	1.5	0	0
Subtotal	0	5.7	0	5.7	0	5.7	0	5.7	0	5.7	0	5.7	0	5.7	0	0
Administrative/tax charges																
Letter of credit opening and closing (1.5% of c.i.f.)	0	2.4	0	1.8	0	1.2	0	3.4	0	3.3	0	2.1	0	1.9	0	0
Bank acceptance of letter of credit (1.5% of c.i.f.)	2.4	0	1.8	0	1.2	0	3.4	0	3.3	0	2.1	0	1.9	0	0	0
Consul tax (3% of f.o.b.)	0	3.9	0	2.9	0	1.7	0	5.9	0	5.7	0	3.3	0	2.4	0	0
Subtotal	2.4	6.3	1.8	4.7	1.2	2.9	3.4	9.3	3.3	9.0	2.1	5.4	1.9	4.3	0	0
TOTAL (material in storage)	160.6	12.0	123.1	10.4	80.3	8.6	230.2	15.0	224.9	14.7	139.2	11.1	128.3	10.0	0	20.0

a. All materials are shipped in bulk (except clay) and are granular suitable for blending except standard grade AS which is sold as a nongranular straight material. All costs refer to 1.0 t of material.
b. Average value assuming liner rates and raw material sourcing from Trinidad and U.S. Gulf region.
c. Estimated by IFDC assuming extra costs that usually occur when procuring small/mixed product shipments.
d. Includes hired trucks and equipment and short-term contract labor.

Table 4-7. Offshore Fertilizer Material Unloading Data

Vessel and Discharge Data

Cargo size: 2,400-3,000 t assuming minibulker-type ship.
Number of holds: 2 at 1,200-1,500 t each.
Distance between vessel anchorage and shore: 100 m or less.
Ship's gear lifting cycle time: 5 minutes/gear (ship's hold to small boat and return).
Capacity of single lift using rope-type cargo sling: 1.0 t.
Number of lifts per hour: 12/hold; 24 total.
Actual discharge rate: 24 tph; 576 tpd (assume 500 tpd for cost estimating).

Small Boat (Lighter) Data

Average capacity: 5 t.
Loading. unloading, and towing time: 60 minutes/round trip (5 tph).
Number of boats required: six.

Manning Requirements

	Number/Hold and Total		Total
In Ship's Hold (Two Holds)			
Foreman	1	2	
Bag holders	8	16	
Bag fillers	8	16	
Bag closers	2	4	
Cargo sling tenders	2	4	
Subtotal		42	42
	Number/Boat and Total		
Aboard Small Boats (Six Boats)			
Bag handlers	4	24	
Subtotal		24	24
On Shore			
Foreman	1		
Bag handlers	15		
Bag dumpers	5		
Talley clerks	4		
Subtotal	25		25
TOTAL			91

(Continued)

Table 4-7. Offshore Fertilizer Material Unloading Data (Continued)

Estimated Cost

	Number	Cost: Unit Cost Per Hour	Cost: Total Cost Per 24-h Day
		(H $)	(H $)
Manning Position			
Foremen	3	2.0	144
Talley clerks	4	1.5	144
Labor			
Ship's hold	40	0.8	768
Small boats	24	0.6	346
On shore	20	0.6	288
Subtotal (labor)			1,690
Small Boat Rent			
(H $100/24-h day x 6 boats = H $600/day)			600
Subtotal (contract services)			600
TOTAL (24 h period)			2,290

H $2,290/24 hours is equivalent to H $4.58/t assuming 500-tpd (24 h) unloading rate.

Use value of H $5.5/t to cover any other costs that may be incurred (refer to Table 4-5 for total port and unloading charge of H $9.6/t).

Table 4-8. Unit Cost of Empty Fertilizer Bags, Fuel, and Electricity

Item	Cost (H $)
50-kg net capacity empty bags including stitching thread and wire ties for closing[a]	0.85/each
Diesel fuel	0.45/L
Electricity[b]	0.20/kWh

a. Open-mouth woven polypropylene outer bag with polyethylene inner liner (obtained from local source).
b. Purchased from local public utility. Cost of emergency/standby electricity produced by diesel-driven 75 kW generator is included in fertilizer production cost.

5.0 LOCATION AND SITE

5.1 General Location Criteria

The location of the proposed fertilizer plant is critical to the success of the project. The essential location criteria include:

1. Direct access to deep and calm water (about 8 m) to facilitate receipt of all imported raw materials by ship. A minimum water depth of 8 m is preferred to accommodate receipt of 10,000-dwt ships that may discharge only a portion of their cargo.
2. Close proximity to the major agricultural areas, particularly the Artibonite Valley, to minimize land transport of fertilizer products and thereby maintain a competitive delivered cost structure.
3. Close proximity to the national highway system to facilitate land transport and physical distribution of fertilizer products.
4. Close proximity to one or more population centers (cities) to benefit from developed infrastructure that is normally associated with population centers; for example, electric power, water, machinery repair shops, an abundant labor force, and other essential contract services.

5.2 Site Alternatives

According to these general location criteria, three potential sites were considered. A brief description of each follows (refer to Figure 5-1 for location).

5.2.1 St. Marc (Freycineau)

This is the site selected for the relocation and expansion of the ASSA fertilizer blending plant described in Chapter 2. This site, under lease by ASSA until 1986, was thoroughly evaluated in 1985 as it was the subject of the previously mentioned Hatch Study. The site meets all the criteria indicated above. However, the cost of installing a wharf for unloading of bulk fertilizer materials was estimated at about US $500,000 in the Hatch Study. This cost could probably be decreased significantly by using local

H $20,000. Of course, a larger cost would be required to develop the wharf for direct unloading of bulk cargoes.

It is assumed that a sublease arrangement could be negotiated with the primary leaseholder. A subletting fee of H $500/month is assumed for this evaluation, but this must be confirmed.

Since the site is already quite well developed, it is securely fenced and public electric power is available. A cost of H $20,000 is estimated for bringing the power to the battery limits of the proposed fertilizer plant. Likewise, a total of about H $46,000 is estimated to be required for clearing and leveling of the site (including installation of surface drainage facilities), upgrading of access roads, and paving of the plant yard area with crushed stone.

If potable water is available it will be used. However, provisions are made in the estimate for collecting and treating rainwater to ensure an adequate supply for the workers' washing and drinking needs. Refer to Table 5-1 for a summary of the estimated cost of land and site preparation.

5.4 Environmental Impact

Aside from increased human activity and the truck transport of fertilizer products from the site, the proposed factory is expected to have little adverse impact upon the existing environment. In fact, with responsible management, the esthetics of the site will be enhanced through the improvement of the access road, drainage, and appearance of the grounds.

Fertilizer materials are quite soluble and often dusty. Therefore, the facility will be designed to minimize airborne dust or spillage of materials that may be washed into the sea or other waterways. All material-handling systems will be designed to avoid the creation of airborne dust and spillage.

Furthermore, the work force will be equipped with dust masks, gloves, boots, and other protective clothing when working in areas where it is impossible to avoid prolonged direct contact with the fertilizer materials and dust.

Table 5-1. Estimated Cost for Land and Site Preparation[a]

Item	Cost US $	Cost H $
Clearing and leveling of site including surface drainage structures	0	25,000
Crushed stone paving of pl:nt yard area (approximately 12,000 m^2)[b]	0	11,000
Improvement of access road between plant site and national highway (approximately 0.8 km)	0	5,000
Install crushed stone-paved access road between plant raw material warehouse and material unloading wharf (approximately 0.5 km)	0	5,000
Route public electric power supply to plant site	0	20,000
TOTAL	0	66,000

a. Land is leased at H $6,000/year.
b. Delivered cost of crushed limestone estimated at H $7.C/$m^3$.

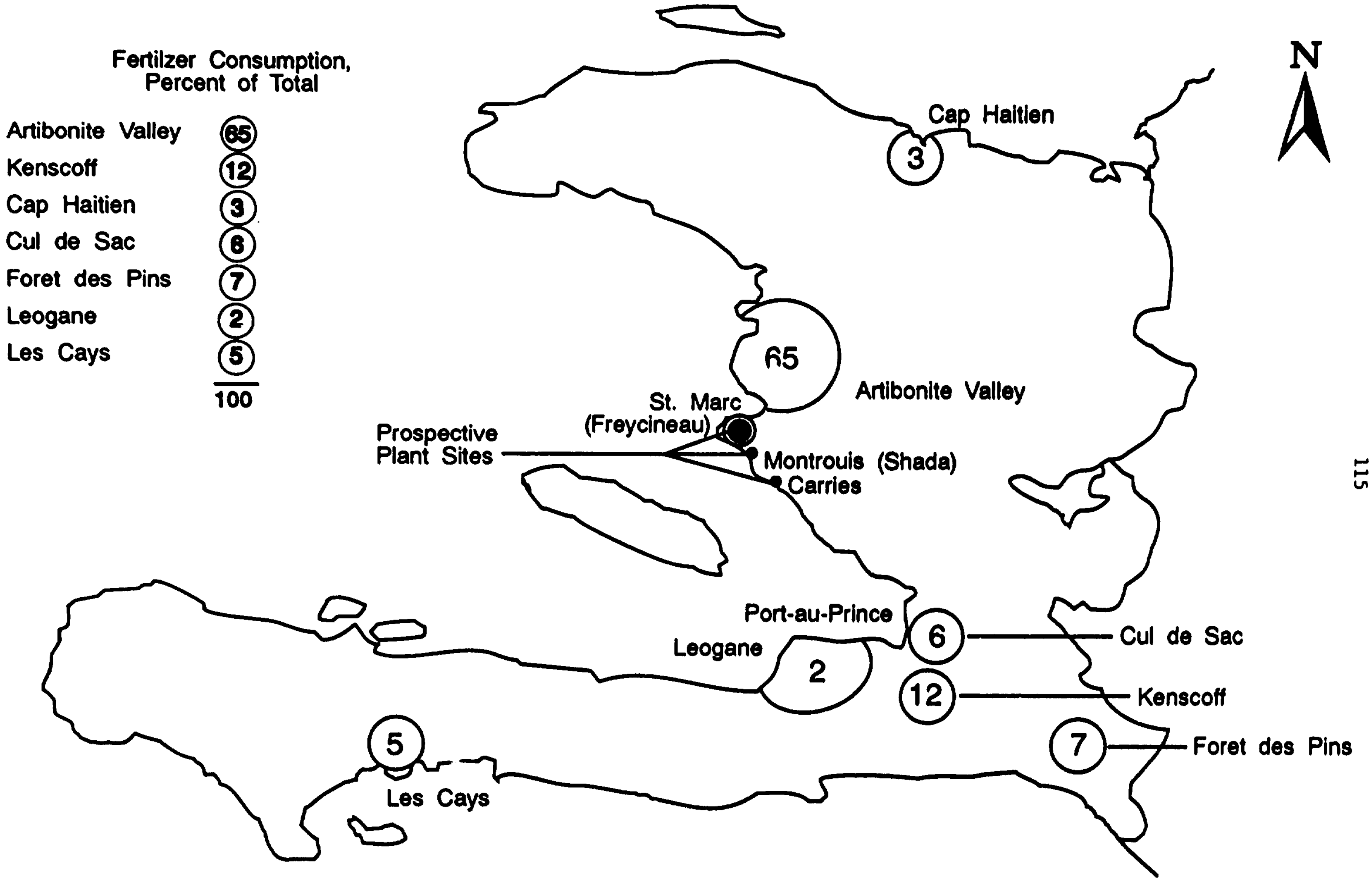


Figure 5-1. Location of Prospective Fertilizer Plant Sites With Respect to Major Fertilizer Consumption Areas.

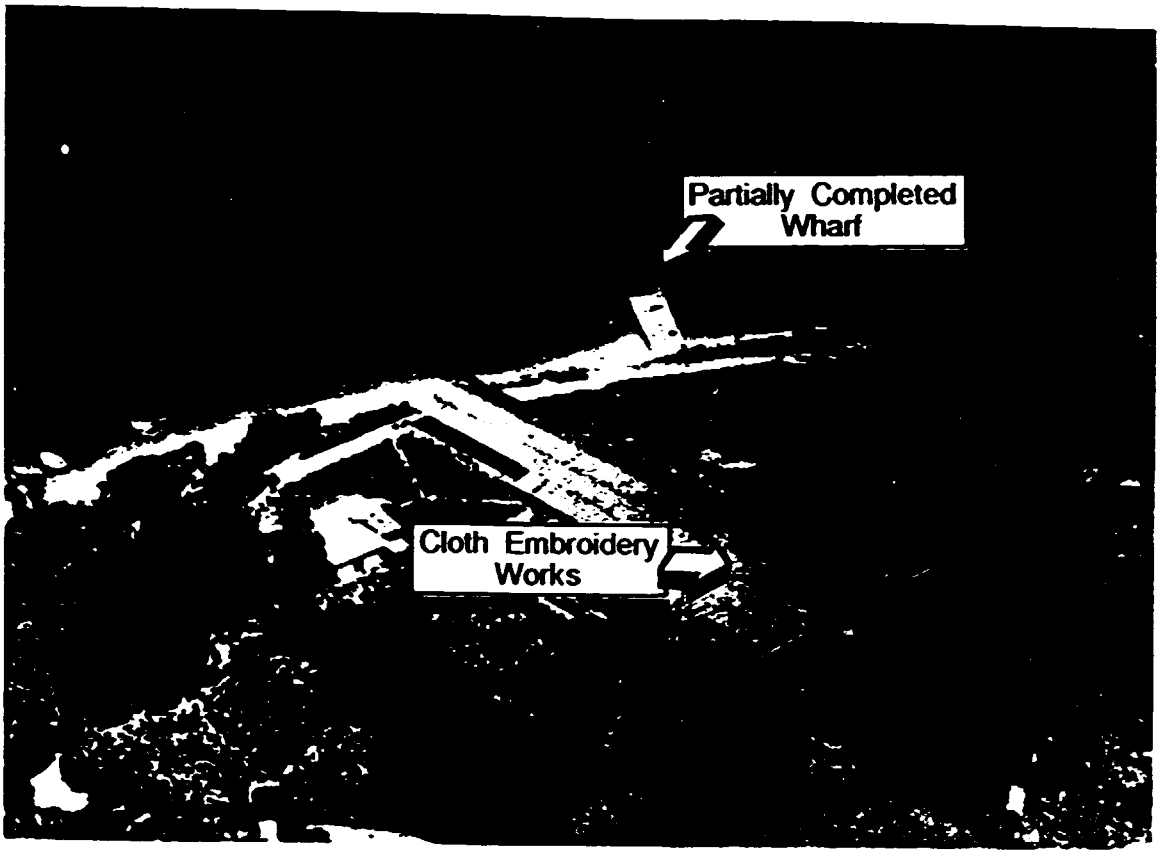


Figure 5-2. Aerial View of Shada Site at Montrouis.

6.0 PROJECT ENGINEERING

6.1 General Layout

The proposed fertilizer project is basically one of solid material handling, mixing, and bagging using 50-kg plastic-lined open-mouth bags. A simplified flow diagram of the overall process is shown in Figure 6-1. The major elements of the process consist of:

1. Unloading of imported fertilizer materials from ocean-going ships which may be moored to an offshore anchorage or shoreside wharf.
2. Inloading of the fertilizer materials into a bulk storage warehouse fitted with partitions to prevent cross mixing of the different materials.
3. Reclaiming of bulk materials from storage and either weighing and mixing them to achieve the desired grade/nutrient ratio (the blending process) or simply bagging straight materials. In all cases, all blended or straight materials will be bagged before dispatch.

6.2 Definition of Blending Terminology

The terms "blending" or "bulk blending" as used in this study refer to the physical mixing of a number of dry fertilizer materials to obtain a desired nutrient ratio and concentration. In most cases, the fertilizer raw materials used for bulk blending should be in a granular form (usually between about 1-3 mm in particle size). However, in some markets mixtures of powdered and granular or semigranular materials are often used. For example, in Malaysia about 0.5 million t of powdered or semigranular NPK blends are used annually to fertilize rubber and oil palm.

The particle size of materials used to prepare acceptable blends is largely dependent upon local cropping conditions and farmer preferences. For example, if fertilizing short-term, heavy-feeding crops, a well-mixed, homogeneous blend is preferred to ensure an abundant supply of nutrients in the correct proportion during a relatively short growing season. Such blends are usually prepared by using granular raw materials that are closely matched with respect to particle size. This close matching minimizes segregation of the individual materials during handling, transportation, and field application. However, with some tree crops (for example, rubber and oil palm) and other long-term crops such as sugarcane, the uniformity of the mixture is not so critical, and the use of less homogeneous mixtures prepared from less expensive, and even less soluble, materials (reactive phosphate rock, for example) may be feasible. However, for the Haitian conditions, high-quality, soluble granular raw materials are assumed and such materials will be considered as the primary alternative for the purpose of this study. As the project develops and fertilizer requirements are more clearly understood, it may be entirely feasible to produce a line of nongranular and less soluble blends (also less costly) for certain segments of the market.

6.3 Description of Blending Process and Equipment

Process flow diagrams of the two blending plant configurations evaluated for this project are shown in Figure 6-2 and Figure 6-3.

In the blending process, raw materials are reclaimed from bulk storage using a motor-driven, front-end loader. The material is dumped into a lump breaker. This unit is used to crush lumps that normally form during storage. This type of lump formation is usually referred to as "pile set" (a mechanical bonding of granular materials); however, some lumps may also form due to "crusting" of the pile surface as a result of absorption of atmospheric moisture. The lump breaker is designed to gently crush lumpy material while inflicting only a minimum amount of damage to the granules.

With the optimum plant design, the material from the lump breaker is transferred by a bucket elevator to a multicompartment hopper system (cluster hopper). The bucket elevator is fitted with a steel link-type chain and metal buckets. The speed of the chain and the size and configuration of the buckets are designed to minimize degradation of the material. The capacity of the bucket elevator is much greater than the average capacity of the blending unit since it is usually fed on an intermittent basis and must therefore be designed to accommodate short-term surges. With the simple plant design, the elevated cluster hopper system is not used and the front-end loader dumps the material directly into a ground-mounted weigh hopper as shown in Figure 6-3.

The raw material proportioning (weighing) and mixing steps are performed on a batch basis. Manually operated discharge gates on the cluster hopper are used to sequentially discharge the various raw materials into a weigh hopper located below the cluster hopper unit. After the total batch is weighed, the batch of materials is discharged into a mixer. The mixer is fitted with internal mixing baffles or paddles and a discharge chute assembly. The mixer has a normal working capacity of 2-5 mt depending upon its design. After an appropriate period of mixing (usually 2-4 minutes), the material is discharged and conveyed to one of three manual bagging hoppers. Micronutrients, coloring agents, and a conditioning agent (to minimize caking) can also be added during the mixing step.

If only bagging is required, the reclaimed material is fed to the lump breaker as previously described but the batch weighing and mixing equipment is bypassed and the material is fed directly to the manual bagging hoppers. If a conditioning agent must be added to a straight material to minimize caking, this can be done by routing the material through the batch weighing and mixing system as with conventional blending.

6.4 Description of Bagging System

For this study, manual bagging is assumed. The manual bagging system consists of three portable bagging hoppers that are filled by positioning a swivel spout over the appropriate hopper. The hoppers may also be filled directly using the front-end loader. The hoppers are equipped with internal baffle assemblies designed to minimize segregation of the blended material. Portable platform scales are located beneath each hopper and the operator fills plastic-lined, open mouth-type 50-kg bags by operating a manual discharge gate (filling spout) while observing the platform scale beam balance indicator. The filled bags are closed by first tying the plastic liner with a rubber band or plastic-coated wire tie. The outer bag (jacket), usually made of woven polypropylene, is stitched closed using a hand-held electric sewing machine. This type of bagging is very accurate and widely used in many developing countries and is an effective alternative to mechanical bagging. One manual bagging station, as described above, served by five workers (bag filler, offbearer and plastic liner closer, sewer, and two helpers) can routinely bag and palletize at a rate of about 5 tph (100 50-kg bags). A photograph of a typical manual bagging operation is shown in Figure 6-4.

An alternative to manual bagging is a mechanical bagging operation. The main difference between manual and mechanical bagging is that with mechanical bagging the weighing operation is performed with an automatic weighing unit (mechanical or electronic) instead of the previously described manually operated filling spout and platform scale system. Although mechanical bagging units are reported by the manufacturers of such equipment to operate at rates of about 50 mtph (1,000 50-kg bags/h), in practice an average rate of about 25 mtph (500 50-kg bags/h) is more realistic. When a woven outer bag and a plastic inner bag are used, proper sealing of the two bags limits the capacity of any type of bagging operation. The net result is that either system (manual or mechanical) requires about the same labor per tonne of product. The mechanical system may appear to be more cost effective, but in fact, it is usually more costly in developing countries because of the larger investment and the higher level of maintenance that is required.

6.5 Blending and Bagging Plant Capacity

6.5.1 Blending Plant Capacity

The proposed blending plant, using a 4-t batch-type mixer, will have a nominal capacity of about 12 tph (about 144 tpd assuming 12 h of actual operation/day). This translates to an annual maximum capacity of 28,800 t assuming 200 12-h workdays. The actual capacity that can be obtained is largely related to the number of raw materials in the blend. A blend containing only two materials can be prepared at a faster rate than a blend containing more materials. The mixing time for each blend is about the same regardless of the number of materials. However, the time required to weigh four materials, for example, is obviously more than what is required to weigh only two materials. For the purpose of this study, a capacity of about 15,000 tpy is assumed for a single shift operation (6 h/day net) assuming 200 days/year. This corresponds to approximately 30% of the projected demand for blended fertilizers by the year 2000.

It is important to note that there is little advantage for constructing a smaller capacity blending unit than envisioned for this study as the fixed capital investment for the machinery varies only slightly over the capacity range of 10-20 tph. Therefore, a standard 4-t batch (12 tph) unit is recommended.

6.5.2 Bagging Plant Capacity

Three manual bagging lines are proposed. Each bagging line will have a capacity of about 5 tph for a total bagging capacity of 15 tph. This matches the instantaneous hourly capacity of the blending unit. As previously mentioned, the bagging rate for a single manual bagging line is usually limited to about 5 tph (100 50-kg bags) because of the time required to properly seal the plastic inner liner and then stitch (sew) the outer bag (jacket).

6.5.3 Bagged Product Storage

For the most part, the fertilizer products will be blended, bagged, and dispatched on an as-ordered basis. Therefore, only a minimum of bagged product storage at the plant site is assumed. A secure bagged product storage area inside the warehouse of 100 t capacity is assumed. The small allocation of storage space for bagged product (blends and straight materials) is preferred to ensure that the products remain fresh and free flowing.

6.6 Machinery and Equipment Cost Estimates

The estimated cost of machinery, equipment (including engineering and installation), and related construction services is itemized in Table 6-1. The scenario referred to as the "simple plant" is indicated as the most likely program for the initial phase of this project. The estimated cost for a more mechanized system referred to as the "optimum plant" is also shown. It is envisioned that, as the project's financial status permits, additional investments may be justified to gradually move from the simple, more labor-intensive mode of operation to a more mechanized mode of operation. The comparative investment criteria for buildings and civil works are also described for the simple and optimum plant scenarios in Section 6.7.

6.7 Civil Engineering Works

In addition to land and site preparation described in Chapter 5, the following major civil works will be required:

1. Rehabilitation and expansion of existing wharf to facilitate unloading of fertilizer raw materials.
2. Construction of a raw material storage building including an area for the process plant (blending and bagging machinery and equipment) and bagged product storage.
3. Construction of a maintenance workshop with space allocated for storage of machinery and equipment and special products (agricultural chemicals and implements).
4. Construction of an office and showroom complete with an underground cistern for collection and storage of potable water.
5. Installation of plant yard and security lighting.

The most significant civil works cost item is for bulk material storage. In the simple plant scenario, a total bulk product storage area of 1,200 m^2 is assumed in addition to the space (about 300 m^2) required for the blending and bagging system and for bagged product storage and truck loading. The 1,200 m^2 area dedicated for bulk storage, less 30% to allow for a material reclaiming work aisle, is sufficient to store approximately 3,000 t of material provided divider partitions are used and care is taken to fill the individual bins to capacity. Likewise, with the optimum plant scenario, the 2,000 m^2 bulk material storage area (2,300 m^2 total) will be sufficient to store about 5,000 t of bulk material. The storage building will be designed to facilitate future expansion by adding to its length and by extending the length of the inloading (shuttle) conveyor located above the various material bins (refer to 6.7.1).

6.7.1 Building Design Features

Bulk Material Storage Building--As already mentioned, this is the most costly component of the entire project. It is especially costly in Haiti because of the general lack of building materials customarily used in fertilizer plant projects--wood, concrete, and steel.

Usually the most cost-effective building configuration for storage of bulk fertilizer materials is the A-frame design. The A-frame design (angle of roof line resembles the letter "A") takes into consideration the natural angle of repose of the fertilizer materials and avoids the need for heavily reinforced, and expensive, outer retaining walls or bulkheads to contain the material--the fertilizer material simply forms a free-standing pile. A steel-reinforced concrete floor is recommended to facilitate the reclaiming of materials from the bins, control surface moisture, minimize losses of material, and generally improve housekeeping.

The A-frame structure is equipped with a movable conveyor belt (shuttle conveyor) located near the roof apex; the shuttle conveyor is fed by an inloading conveyor or bucket elevator. The shuttle conveyor is mounted on wheels that roll on a track assembly. It is positioned as needed, using a manual winch, to discharge the fertilizer material into the appropriate bin. The A-frame building is an open structure and movable bin dividers are used to separate the various materials. The dividers can be constructed of stacked wood planks in a bookshelf-type configuration or they can be made of concrete. The solid concrete units, while minimizing cross contamination of materials, are more cumbersome to use as they require heavy-duty lifting equipment to move from one location to another.

A lean-to-type shed with enclosed sidewalls is fitted along the length of one side of the A-frame structure. This lean-to structure provides a covered work aisle for operation of the front-end loader that is used to reclaim materials from the respective bins and haul them to the blending and bagging unit. The entire building can be easily sealed to minimize the influx of humid outside air. Normal solar heating will help to decrease the relative humidity of the inside air, thus helping to minimize absorption of atmospheric moisture by the fertilizer materials.

6.7.2 Blending and Bagging Plant Building

The envisioned blending and bagging facility is located within an enclosed structure (process plant building) that is essentially an extension of the A-frame bulk material warehouse facility. The structural steel required to support the blending machinery also serves as the major framing and structural support for this portion of the building.

Except for the possible need for a concrete pit (about 3-m deep) for the raw material lump breaker and bucket elevator systems, all equipment is located at or above ground level. The pit is preferred to facilitate easy charging of material into the lump breaker using a payloader, dump carts, wheelbarrows, or hand-hauled bags.

The exact location of the process plant building with respect to the bulk material storage bins in the A-frame building is uncertain. However, depending upon the location it may be necessary to penetrate a portion of the A-frame building roof to enclose the bucket elevator and raw material cluster hopper system required for the blending and bagging plant. If the simple plant blending system is used (Figure 6-3), the building modifications required for installation of the machinery will be simplified because the overhead cluster hopper system is not used.

6.7.3 Other Buildings

Other buildings, including the maintenance workshop, office/ showroom, and miscellaneous storage buildings, will be constructed to conform to local standards. Depending upon the final layout and design of the raw material storage building/blending and bagging plant, these "buildings" may be incorporated under one roof to save space and cost.

6.7.4 Materials of Construction

For the purpose of estimating the cost of the major civil works (particularly the A-frame storage building) it is assumed that the major structural building supports will be made of imported structural steel framing members. Locally produced concrete will be used for all floors. Likewise, locally produced concrete block will be used for all building walls bearing a vertical load; for example, the lean-to attached to the A-frame structure, maintenance workshop, office showroom, and miscellaneous small buildings. The main roof of the A-frame bulk material storage building will be covered with plywood sheeting and hurricane-resistant T-lock shingles. Mineral composite or reinforced plastic sheeting may be used as an alternative to the plywood sheeting and T-lock shingle construction. In all cases, the use of galvanized steel or aluminum sheeting should be avoided as it has a very low resistance to corrosion caused by the combination of corrosive fertilizer salts and humidity. The relative cost of these material alternatives must be determined. Additionally, all exposed structural steel members should be sandblasted and protected with a corrosion resistant coating system.

6.7.5 Cost of Civil Works

A summary of the estimated cost for the major civil engineering works is shown in Table 6-2.

Table 6-1. Estimated Installed Cost of Machinery and Equipment

Item	Optimum Plant (US $)	Optimum Plant (H $)	Simple Plant (US $)	Simple Plant (H $)
1. **Blending and Bagging System**				
Raw material lump breaker/conditioner	11,000	0	11,000	0
Raw material bucket elevator	17,000	0	17,000	0
Cluster hopper, 6 compartment	16,000	0		
Batch-type scale system	6,000	0		
Mixer, rotary- or paddle-type	22,000	0	35,000[a]	0
Conveyor belt with surge hopper	16,000	0		
Portable bagging hoppers, 3 units	12,000	0	12,000	0
Hand-held sewing machines, 6 units	4,800	0	4,800	0
Equipment installation	50,000	20,000	20,000	5,000
Contractor's fee	20,000	2,000	5,000	1,000
Engineering and project management	30,000	0	10,000	0
Subtotal	204,800	22,000	114,800	6,000
2. **Raw Material Unloading Equipment**				
Clam shells for ship unloading, two 1 m^3 capacity used units	20,000		0	0
Dump trucks for transport of raw materials from wharf to storage building, two 15 m^3 used units	20,000	0	20,000	0
Elevator/conveyor system for inloading bulk warehouse	80,000	20,000	80,000	20,000
Subtotal	120,000	20,000	100,000	20,000
3. **Other Equipment**				
Front-end loader (1 m^3 bucket)	18,000	0	18,000	0
Air compressor for general plant air, 2 units	3,000	0	3,000	0
Emergency electric power generator (75 kWh)	25,000	5,000	25,000	5,000
Subtotal	46,000	5,000	46,000	5,000
4. Containerization and ocean transport for imported equipment items	6,000	0	5,000	0
Subtotal	6,000	0	5,000	0
TOTAL	376,800	47,000	265,800	31,000

a. Preassembled system consisting of a ground-mounted batch scale, rotary mixer, and product discharge conveyor (refer to Figure 6-3).

Table 6-2. Estimated Cost of Buildings and Civil Works

Item	Optimum Plant US $	Optimum Plant H $	Simple Plant US $	Simple Plant H $
Raw material storage building including area for process plant and bagged product storage and truck loading	200,000	50,000	150,000	25,000
	(2,300 m^2)		(1,500 m^2)	
Maintenance workshop including space for maintenance materials and special products storage (agricultural chemicals and implements)[a]	0	15,000	0	15,000
Office and showroom including underground cistern for storage of potable water, basic office equipment, and air conditioning unit[a]	1,000	20,000	1,000	20,000
Upgrading of existing raw material unloading wharf	5,000	20,000	0	20,000
Plant yard and wharf security lighting	1,000	4,000	1,000	4,000
TOTAL[b]	207,000	109,000	152,000	84,000

a. These "buildings" and work/storage areas may be incorporated into main raw material storage building structure, thus saving as much as 50% of the indicated cost.

b. Does not include interest during construction. This interest, however, is included in the financial analysis.

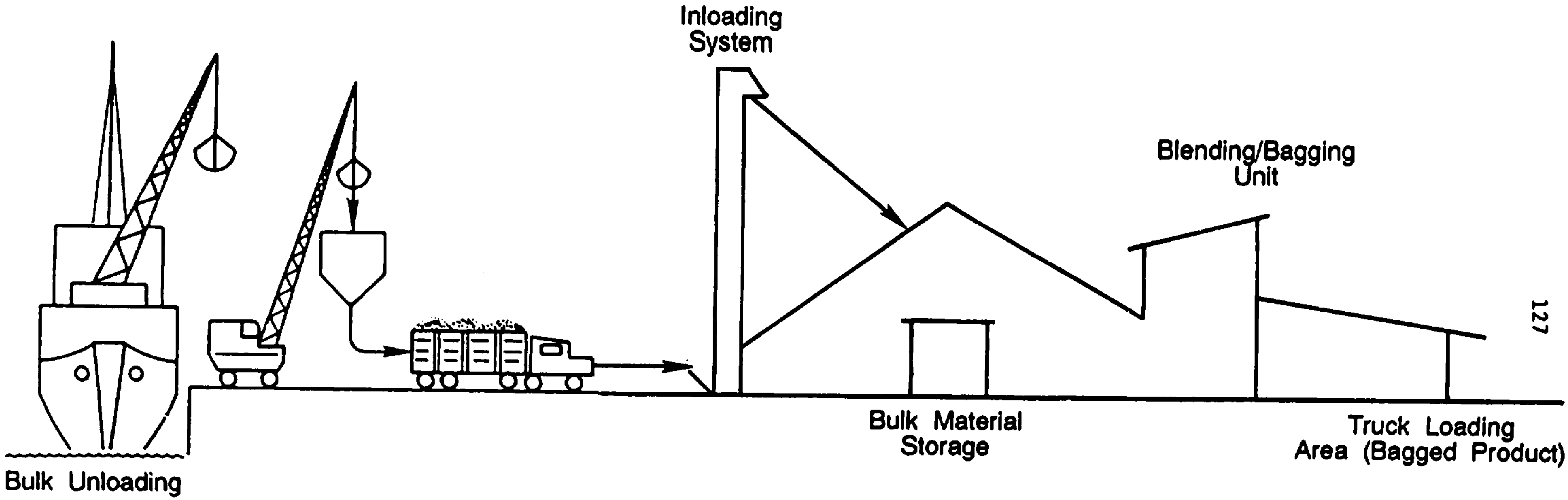


Figure 6-1. Overall Process Flow Diagram for Proposed Fertilizer Blending and Bagging Plant.

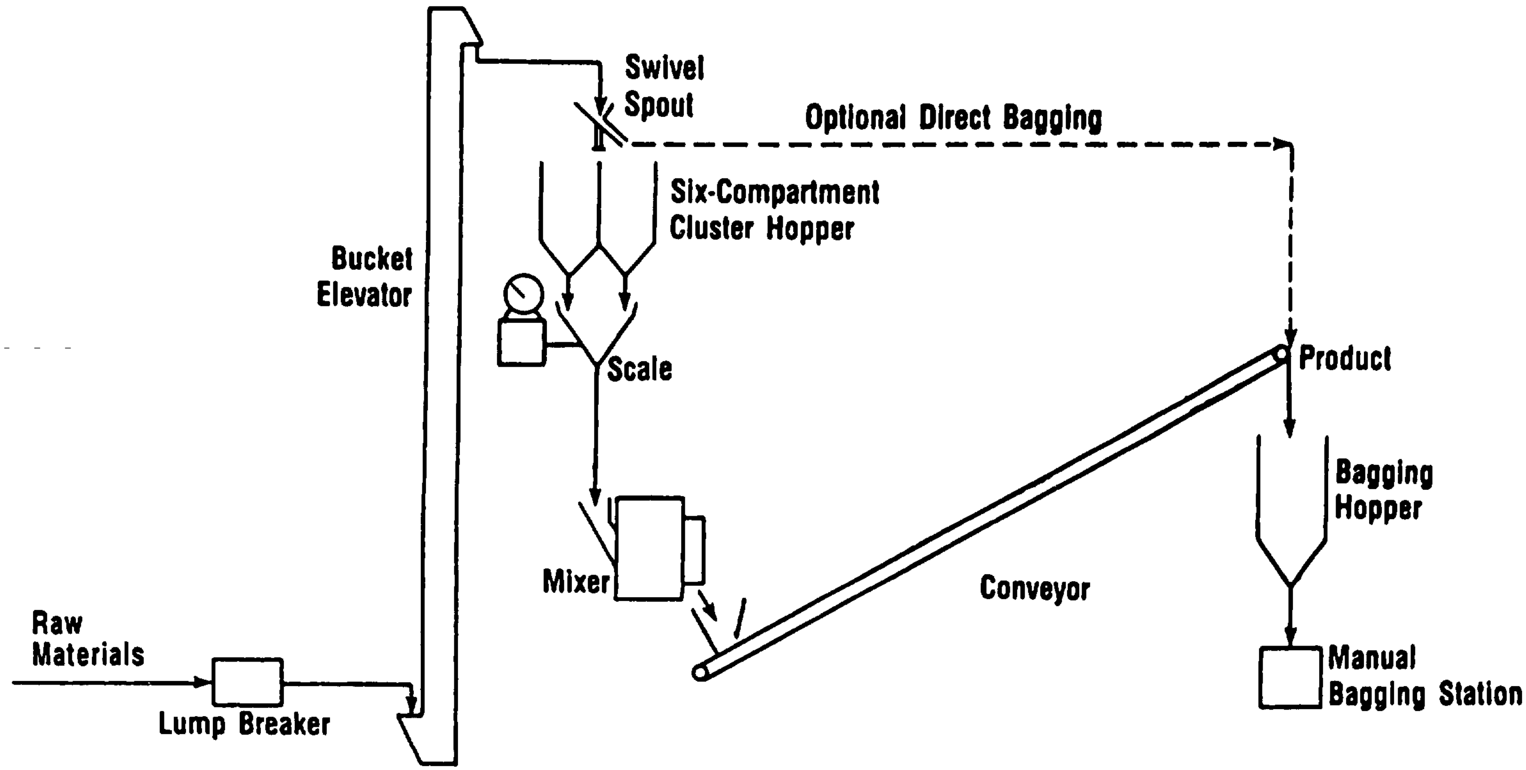


Figure 6-2. Flow Diagram of Blending/Bagging System Used in Optimum Plant Scenario.

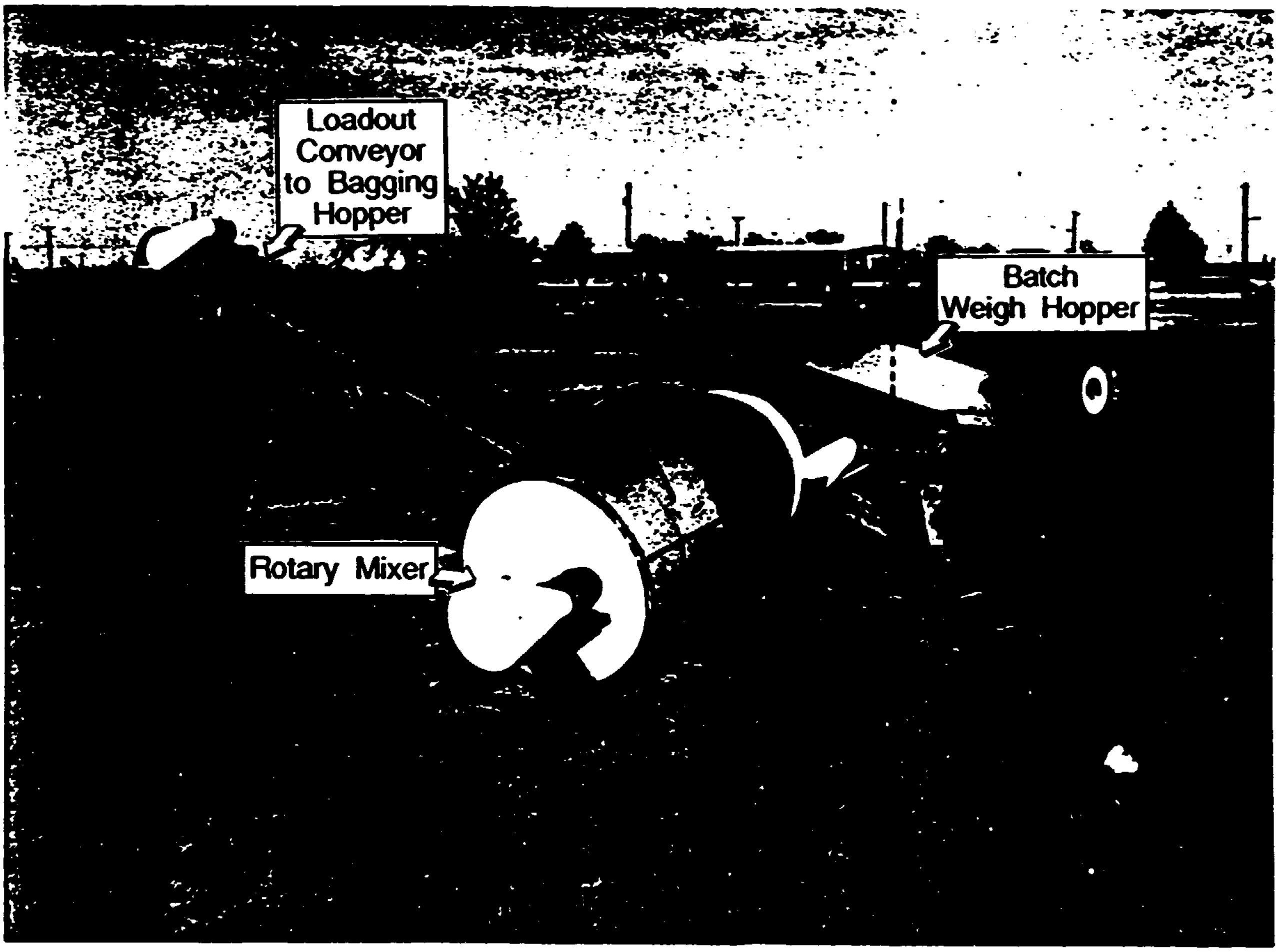


Figure 6-3. Blending Unit Used in Simple Plant Scenario.

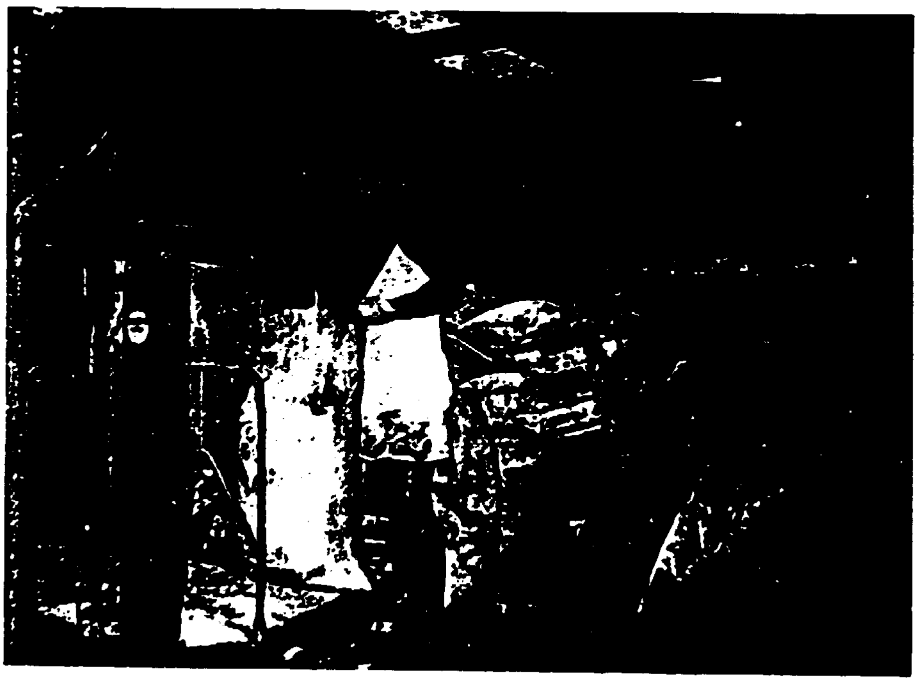


Figure 6-4. Manual Bagging Operation as Practiced in Many Developing Country Locations.

7.0 PLANT ORGANIZATION AND OVERHEAD COSTS

Due to the relative simplicity of this project and the low level of staffing, the only overhead cost specified is for the recurring annual land lease. The cost of this lease amounts to H $6,000/year and is indicated as "factory overhead" in the production cost summary.

8.0 MANPOWER

8.1 Project Staff Organizational Layout

An organizational layout for the full-time project staff is shown in Figure 8-1. The staff responsibility is divided into two major activities: (1) general administration and sales and (2) production. A description of the duties and responsibilities of these two staff categories follows.

8.1.1 General Administration and Sales

This staff, headed by the president-general manager, who is responsible for the entire project, carries out the following major functions:

1. Procurement and scheduling of all raw material and production inputs.
2. Marketing and sales, including technical assistance and services to dealers and farmers.
3. Scheduling of plant production program.
4. Dispatching of all products to dealers and other approved accounts.
5. Accounting, credit, and related financial activities.
6. Payroll, insurance, bookkeeping, and general administration.
7. Plant security, safety, and public relations.

8.1.2 Production

This staff, headed by a plant superintendent, who reports directly to the president-general manager, is responsible for material unloading, warehousing, blending and bagging, maintenance, and all other production-related activities including the procurement of short-term contract labor and services.

8.2 Annual Cost of Project Staff

The total full-time project staff shown in Figure 8-1 numbers 19. The estimated annual cost, including employee benefits and bonuses, for these full-time employees is shown in Table 8-1.

In addition to these full-time employees, a number of contract employees will be hired from time-to-time on a short-term basis to assist with unloading shipments of raw materials and otherwise assisting during peak periods of business activities. The cost of contract labor and related services is included in the cost of raw materials described in Tables 4-5 and 4-6.

Table 8-1. Estimated Annual Fixed Cost of Full-Time Project Staff (Manpower)

Staff Member (Position)	Number Required	Estimated Cost: Monthly Salary[a]	Estimated Cost: Total Annual
		- - - - - (H $) - - - - -	
Administration and Sales			
President and general manager	1	2,300	27,600
Technical sales representative	1	1,150	13,800
Finance manager/accountant	1	1,150	13,800
Cashier/bookkeeper	1	230	2,760
Secretary	1	575	6,900
Messenger	1	115	1,380
Security (guard)[b]	6	175	12,600
Subtotal	12		78,840
Plant Operations (Direct Labor)			
Plant superintendent	1	1,380	16,560
Foreman/operator	1	350	4,200
Mechanic/operator	1	400	4,800
Operator	2	230	5,520
Laborer (bag hauler)[c]	2	115	2,760
Contract labor[d]	-		
Subtotal	7		33,840
TOTAL			112,680

a. Includes 15% annual bonus.
b. Security personnel also assist with checking and monitoring raw material receipts and product dispatches.
c. In addition to indicated salary, bag haulers are paid H $0.03/bag for handling which is included elsewhere as a variable production cost item.
d. In addition to the indicated full-time project staff, it may be necessary on occasion to hire 5 to 10 short-term contract laborers to assist with the manual bagging operation during peak periods of production. The cost of this additional labor is not included in this analysis as it would be very small and uncertain.

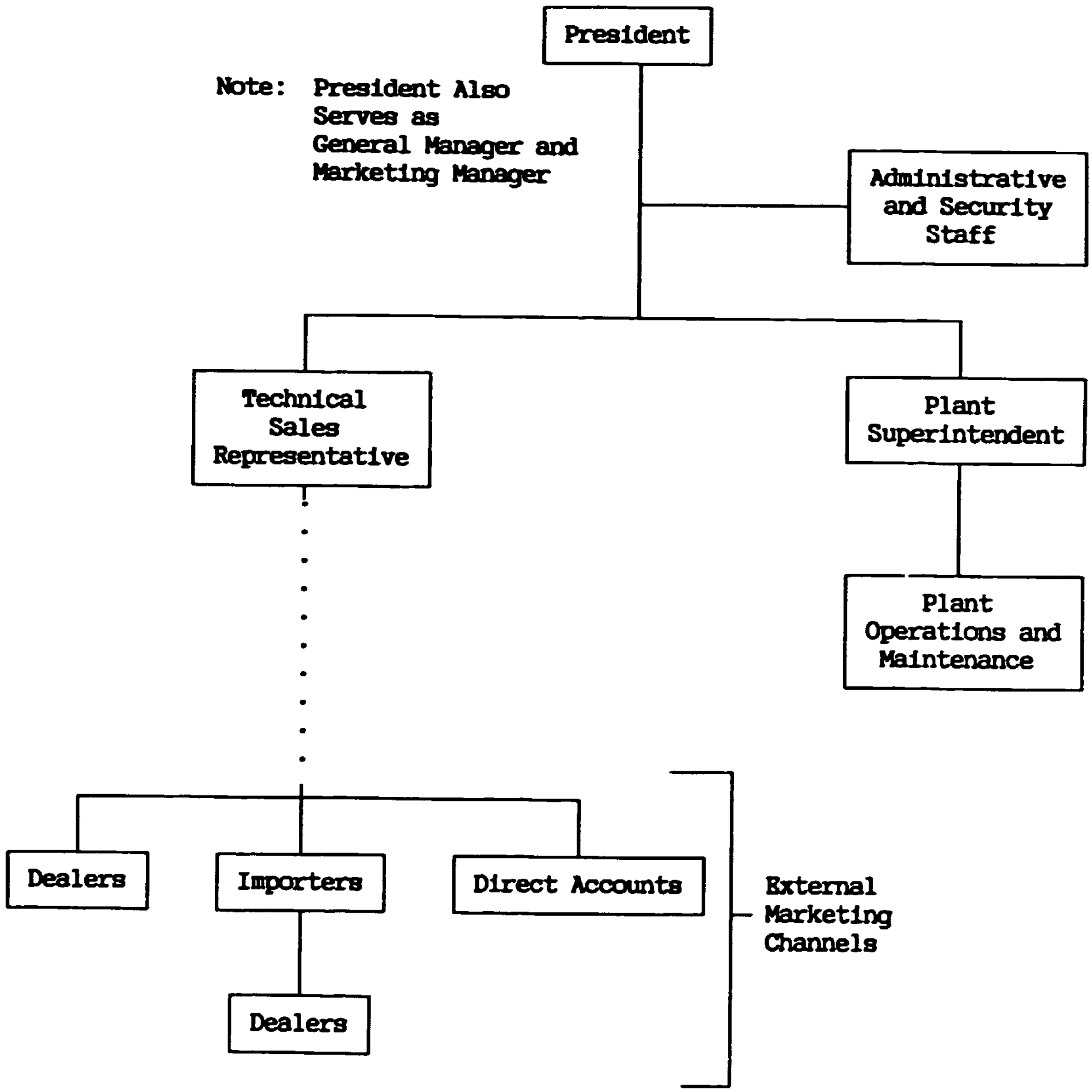


Figure 8-1. Organizational Structu.e for Proposed Fertilizer Plant.

9.0 IMPLEMENTATION SCHEDULING

9.1 Timeframe

A 1-year timeframe is estimated for the engineering, procurement, and construction of the facilities required for the project. Assuming project approval, including financing, is obtained by late 1991 and the appropriate company structure is formed, the plant will be ready for commercial operation in the beginning of calendar year 1992.

All expenditures required for construction of the plant facilities, including preproduction expenditures, will be disbursed during calendar year 1991. Revenue from the sale of products will begin to accrue in the beginning of calendar year 1992 according to the sales forecast described in Chapter 3.

10.0 FINANCIAL AND ECONOMIC EVALUATION

10.1 Evaluation Methodology

The financial and economic evaluation described in this chapter is performed according to UNIDO Guidelines for Preparation of Industrial Feasibility Studies using COMFAR© software (Computer Model for Feasibility Analyses and Reporting). Unless noted otherwise, all values are given in 1990 U.S. dollars. Refer to Table 10-1 for the basic assumptions used for preparing the financial analysis. Also refer to Volume II (Appendixes) for COMFAR© input data entry forms and output data tables.

10.2 Total Investment Cost

The total initial fixed capital investment required for the project (simple and optimum plant alternatives) is summarized in Table 10-2. The recurring investment required for the 15-year production program is indicated in Table 10-1 and the COMFAR© data tables in the Appendixes.

10.3 Project Financing

A relatively high equity-to-debt ratio of 1.0 is assumed for the project financing. This high equity ratio is assumed due to the lack of a stable government and, therefore, the lack of a stated government agricultural policy. Also, the general uncertainty of the Haitian market for fertilizers (including the impact of competition) adds to the risk of the project.

The project financial package is not final but is expected to consist of 50% equity provided by the project partners (promoters) with the remaining 50% secured from borrowed funds. While it may be possible to secure some donor equity, this source of equity funds is not considered in the analysis. However, the discounted cash flow calculations indicate, indirectly, the net present value of the project at which it is possible to achieve a specified discount rate of 15%. The difference between the actual value of the assets and the net present value indicates the level of donor funding that would be required to make the project achieve the specified return on equity of 15%.

10.4 Total Production Cost

10.4.1 Annual Production Cost (Composite of All Products)

The total annual cost of production, in U.S. dollars, for each year of the project beginning in 1992 is shown in Table 10-3. These costs are based on the product mix and annual tonnage described in Chapter 3.

10.4.2 Production Cost by Product

A summary of the production cost for each product in the production program for selected years of the project is shown in Table 10-4. The variation in cost from year 1 to year 5 is due to the cost structure which varies depending upon the amount of working capital and the loan repayment and depreciation schedule (refer to Table 10-4 for annual financial cost data).

10.5 Financial Evaluation

10.5.1 Commercial Profitability Criteria (15-Year Project Life)

Net Present Value and Internal Rate of Return--The following is a summary of the net present value and internal rate of return for the two project scenarios (simple and optimum plant) assuming a 15% discount rate and two levels of product selling price (to importers and dealers) f.o.b. factory gate.

	Simple Plant	Optimum Plant
Discounted Selling Price (List Price Less 5%, Less 5%)[a]		
Net present value	(-) US $1.59 million	(-) US $1.17 million
Internal rate of return	(-) 12.2%	2.1%
Maximum Selling Price (No Discount)[a]		
Net present value	(-) US $547,000	(-) US $131,000
Internal rate of return	6.7%	13.7%

a. Discounted price is more applicable to sales to existing importers than to sales to dealers.

Payback Period--In both project scenarios, the payback period exceeds the assumed project life of 15 years.

Simple Rate of Return--The simple rate of return for each year of the project is indicated as return on investment (ROI) in the COMFAR© net income tables.

For the simple plant scenario the ROI is negative throughout the 15-year project life. With the optimum plant scenario the ROI is (-)7.1% in the first year (1992), but it gradually improves to about 1.5% in the sixth year (1997) and levels off at about 4% in the eleventh year (2002) of the project.

Break-Even Analysis--According to the projected market share, estimated production cost profile, factory-gate selling prices, and desired minimum return on investment of 15%, both project scenarios (simple and optimum plants) do not reach the break-even point during the 15-year project life.

Sensitivity Analysis--Because the overall project cost structure is so highly dependent upon the cost of imported raw materials, there is little scope for decreasing the factory-gate production cost except by optimizing the landed cost of raw materials. The foregoing analysis already examined the financial impact of (1) fixed capital investment and (2) the base-case factory-gate selling price to importers and dealers.

The following analysis shows what f.o.b factory-gate selling prices would be required in the more cost-effective optimum plant scenario to obtain the desired internal rate of return of 15% and a cumulative net present value of zero for the project at the end of 15 years (assuming an exchange rate of H $1.5-to-US $1.0).

	Values Used for Base-Case Analysis[a]		
	Discounted f.o.b. Selling Price	List f.o.b. Selling Price (No Discount)	Required[b] f.o.b. Selling Price
	- - - - - - - - - -(H $/t) - - - - - - - - - -		(H $/t)
Urea	287	318	322 (35)[c]
Ammonium sulfate	221	244	248 (27)
20-20-10	314	347	352 (38)
12-12-20	287	318	322 (35)
14-14-14	307	340	344 (37)
Internal rate of return, %	2.1	13.7	15.0

a. Refer to page 69.
b. This price structure would result in an overall internal rate of return for the project of 15% and an accumulated net present value of zero at the end of 15 years.
c. Value in brackets indicates the increase in selling price per tonne over the discounted selling price.

10.5.2 Cash-Flow Analysis

The annual cash flow of the project for each year of the 15-year project life is given in the COMFAR© Cash Flow Tables for each plant scenario (refer to Appendix). A summary of the net cash flow for years 1, 6, and 15 of the project for the two plant scenarios using two levels of product selling prices (to importers and dealers) f.o.b. factory gate is shown below.

Year	Net Cash Flow	
	Simple Plant	Optimum Plant
	- - - -(thousand US $)- - - -	
Discounted Selling Price (List Price Less 5%, Less 5%)[a]		
Year 1	(-) 276.7	(-) 348.1
Year 6	(-) 139.5	1.74
Year 15 (end of project)	(-) 121.7	123.6
Cumulative discounted cash flow (at 15%) for 15-year project life	(-) 1,588.3	(-) 1,172.1
List Price (No Discount)[a]		
Year 1	(-) 209.0	(-) 280.5
Year 6	62.4	203.6
Year 15 (end of project)	108.7	425.9
Cumulative discounted cash flow (at 15%) for 15-year project life	(-) 547.4	(-) 131.2

a Discounted price is more applicable to sales to existing importers than to sales to dealers.

Table 10-1. Basic Assumptions Used for Preparing Financial Analysis of Proposed Haiti Fertilizer Plant Project Using COMFAR© [a]

Life of project	15 years
Duration of construction	1 year
Discounting rate for net present value	15%/year
Initial investment:	
Distribution between loans and equity for each currency (H $ and US $)	
Loans	50%
Equity	50%
Interest for loans	15%/year
Amortization period for loans	10 years
Investment for replacement of vehicles in Year 9:	
Amount borrowed	US $38,000
Interest	15%/year
Amortization period	7 years
All other money requirements handled through bank overdraft at interest rate of 22%/year	
Salvage value at end of 15-year project life	Zero
Recurring investment for machinery and equipment	US $2,000/year
Calculation of working capital:	
Accounts receivable	30 days
Cash-in-hand	30 days
Utilities	30 days
Energy	30 days
Spare parts	360 days
Work in progress	0 days
Finished product	2 days
Accounts payable	30 days
Raw materials:	
Simple plant scenario	90 days
Optimum plant scenario	180 days
Taxes on income and/or profit	None
Distribution of dividends to equity holders	None

a. Refer to Volume II (Appendix X) for additional COMFAR© input data.

Table 10-2. Summary of Total Initial Fixed Capital Investment

Item	Optimum Plant US $	Optimum Plant H $	Simple Plant US $	Simple Plant H $
Land (leased at H $6,000/year)	0	0	0	0
Site preparation and development	0	66,000	0	66,000
Structures and civil engineering	207,000	109,000	152,000	84,000
Incorporated fixed assets[a]	50,000	2,000	15,000	1,000
Plant machinery and equipment[b]	326,800	45,000	250,800	30,000
Preproduction expenditures[c]	166,300	0	139,400	0
Subtotal	750,100	222,000	557,200	181,000
Total Initial Fixed Investment (US $)[d]	898,150		677,880	

a. Made up of engineering, project management, and contractor's fee.
b. Includes mobile equipment.
c. Made up of US $60,000 feasibility study, contingency, and interest during construction.
d. Based on H $1.5-to-US $1.0 exchange rate. Values may not add due to rounding.

Table 10-3. Total Annual Production Cost for 15-Year Project Life

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
	(thousand US $)														
Simple Plant															
Raw materials[a]	598.2	936.6	1,200.2	1,512.8	1,628.6	1,762.0	1,903.0	2,041.9	2,174.7	2,294.1	2,397.6	2,481.3	2,545.9	2,594.4	2,638.7
Other[b]	210.6	231.9	247.4	266.3	271.0	276.0	281.0	287.9	293.4	293.7	291.6	296.9	300.8	303.4	305.5
TOTAL	808.8	1,168.5	1,447.6	1,779.1	1,899.6	2,038.0	2,184.0	2,329.8	2,468.1	2,587.8	2,689.2	2,778.2	2,846.7	2,897.8	2,944.2
Optimum Plant															
Raw materials[a]	540.1	845.6	1,083.7	1,366.4	1,471.3	1,591.8	1,719.2	1,844.7	1,964.6	2,072.5	2,166.0	2,241.6	2,300.0	2,343.8	2,383.8
Other[b]	238.2	258.6	273.3	291.0	294.5	298.1	301.4	306.4	309.8	307.6	302.7	308.0	311.8	314.4	316.5
TOTAL	778.3	1,104.2	1,357.0	1,657.4	1,765.8	1,889.9	2,020.6	2,151.1	2,274.4	2,380.1	2,468.7	2,549.6	2,611.8	2,658.2	2,700.3
Product Mix															
Granular urea	2,126	3,245	4,099	5,016	5,236	5,666	6,119	6,566	6,993	7,377	7,709	7,979	8,186	8,342	8,484
Standard ammonium sulfate	49	103	132	167	181	195	211	226	241	254	266	275	282	288	293
20-20-10	82	103	132	167	181	195	211	226	241	254	266	275	282	288	293
12-12-20	850	1,442	1,917	2,508	2,889	3,126	3,376	3,623	3,858	4,070	4,253	4,402	4,517	4,602	4,681
14-14-14	164	258	331	502	542	586	633	679	723	763	798	825	847	863	878
Total Annual Production, t[c]	3,271	5,151	6,611	8,360	9,029	9,768	10,550	11,320	12,056	12,718	13,292	13,756	14,114	14,383	14,629

a. Not including bags and miscellaneous operating supplies.
b. Includes all other factory operation, administration, marketing, depreciation, and financial costs.
c. Annual production values applicable to both plant scenarios.

Table 10-4. Total Production Cost by Product for Selected Years of Project

Year of Project	Urea	Ammonium Sulfate (Standard)	20-20-10	12-12-20	14-14-14
	(US $/t bagged product)				
Simple Plant					
Year 1 (1992)--3,271 t total production					
Raw materials[a]	192.9	107.8	199.8	164.0	163.8
Conversion cost[b]	39.6	39.6	39.6	39.6	39.6
Depreciation	9.3	9.3	9.3	9.3	9.3
Financial cost	15.5	15.5	15.5	15.5	15.5
TOTAL	257.3	172.2	264.2	228.4	228.2
Year 6 (1997)--9,768 t total production					
Raw materials[a]	192.9	107.8	199.8	164.0	163.8
Conversion cost[b]	21.6	21.6	21.6	21.6	21.6
Depreciation	3.2	3.2	3.2	3.2	3.2
Financial cost	3.5	3.5	3.5	3.5	3.5
TOTAL	221.2	136.1	228.1	192.3	192.1
Year 15 (2006)--14,629 t total production					
Raw materials[a]	192.9	107.8	199.8	164.0	163.8
Conversion cost[b]	18.6	18.6	18.6	18.6	18.6
Depreciation	2.2	2.2	2.2	2.2	2.2
Financial cost	0.1	0.1	0.1	0.1	0.1
TOTAL	213.8	128.7	220.7	184.9	184.7
Optimum Plant					
Year 1 (1992)--3,271 t total production					
Raw materials[a]	173.7	88.6	183.1	149.4	149.8
Conversion cost[b]	39.6	39.6	39.6	39.6	39.6
Depreciation	12.7	12.7	12.7	12.7	12.7
Financial cost	20.6	20.6	20.6	20.6	20.6
TOTAL	246.6	161.5	256.0	222.3	222.7
Year 6 (1997)--9,768 t total production					
Raw materials[a]	173.7	88.6	183.1	149.4	149.8
Conversion cost[b]	21.6	21.6	21.6	21.6	21.6
Depreciation	4.3	4.3	4.3	4.3	4.3
Financial cost	4.6	4.6	4.6	4.6	4.6
TOTAL	204.2	119.1	213.6	179.9	180.3
Year 15 (2006)--14,629 t total production					
Raw materials[a]	173.7	88.6	183.1	149.4	149.8
Conversion cost[b]	18.6	18.6	18.6	18.6	18.6
Depreciation	3.0	3.0	3.0	3.0	3.0
Financial cost	0.1	0.1	0.1	0.1	0.1
TOTAL	195.4	110.3	204.8	171.1	171.5

a. Indicated cost includes allowance for an overall shrinkage (loss) of 3.0%.
b. Includes all direct and indirect costs of production.

18751
(2 of 2)

Volume II
(Appendixes--Final)

Fertilizer Plant Feasibility Study – Haiti

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(Appendixes--Final)

Fertilizer Plant Feasibility Study – Haiti

Prepared for

United Nations Industrial Development Organization (UNIDO)

and

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UNIDO Contract No. 90/028/GYL
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Prepared by

International Fertilizer Development Center (IFDC)
Muscle Shoals, Alabama, U.S.A.

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APPENDIX I

Sales Promotion/Radio Advertising

Objectives	Materials	Mechanics
1. To promote sales of complex fertilizer grades and brand identity.	1. T-shirts printed front and back with the layout of complex NPK fertilizer bags.	1. (a) One (1) free T-shirt with purchase of five fertilizer bags. (b) Given together with the fertilizer purchased.
2. To promote fertilizer brand identity.	2. Red apron blouse for "marchands" printed with bold white letters "fertilizer sold here" in creole. Emphasis on the fertilizer brand/logo.	2. One (1) apron blouse given free to each marchand on market days. Record name/receipt to avoid duplications.
3. To promote fertilizer brand identity.	3. Cardboard 24 x 18 in "fertilizer sold here" sign in creole. Emphasis on the fertilizer brand/logo.	3. One sign posted for every dealer store selling company products.
4. To promote sales of fertilizer	4. 30-sec radio commercials in creole on fertilizer use on rice. Emphasis on the brand.	4. Choose most listened to radio station and program for airing radio spot commercials just before and during the planting season.

APPENDIX II

Forward Stocking Program

I. Objectives

1. To preempt competition and secure sales.
2. To utilize the warehouse facilities of the dealer.
3. To support the development of the dealer network and/or direct accounts.

II. Operating Guidelines/Conditions

1. Select reputable high potential sales volume dealers and accounts in the priority market target area that have warehouse facilities.
2. Establish a challenging fertilizer volume forecast (in bags) for 1 month which the market can absorb.
3. Prepare a forward stocking agreement which should specify:
   a. Fertilizer product in bags or tonnes forecasted for 1 month.
   b. Delivered price to dealer's warehouse.
   c. Scheduled invoicing every 2 weeks.
   d. Each scheduled invoicing will be supported with a postdated check.
4. Discuss the program with the dealer or account regarding participation and meeting the requirements.
5. Deliver the volume of products covered by the agreement to the dealer's or account's warehouse.

III. Program Evaluation

1. Check the movement of sales to determine whether forecast or scheduled volume for invoicing is realistic; make necessary adjustment.
2. Renewal will depend on the success of the program. In case of renewal, the deadline should be before the last scheduled invoicing is due to preclude competition's interest.

APPENDIX III

Cash Bond Program

I. Objectives

1. To establish secured credit line for dealers and accounts.
2. To facilitate withdrawal of products and payments.
3. To generate secured sales.

II. Operating Guidelines/Conditions

1. Offer to dealers or accounts to advance the payment for purchases by accepting these as cash bonds to secure a credit.
2. Allow the cash bond to earn interest at better rates than offered for a savings deposit.
3. Dealers and accounts can withdraw products against the cash bond.
4. The interest earnings will be computed on the unutilized amount at certain cut-off periods.
5. To maintain the credit line, the dealer or account has to deposit the same amount to replenish the cash bond utilized for purchases and maintain the credit line.

III. Program Evaluation

1. Evaluate the performance of the program and determine if it is necessary to increase the interest on cash bond to attract more dealers and accounts.
2. Evaluate the advantage and disadvantage of a joint program with a bank.

APPENDIX IV

Technical Services Programs

I. Soil Testing/Fertilizer Recommendation

A. Objectives

1. To provide farmers and operators of plantation and industrial crops with the correct rate and method of fertilizer application per hectare for crops with the involvement of dealers.
2. To encourage farmers to use fertilizer to improve the production of crops and increase the fertilizer market.

B. Operating Guidelines

1. Provide the soil sampling procedures for seasonal and permanent crops; use soil sample information form to record the background data of the farm where the samples were taken. The procedure should include submitting the samples to the soil testing laboratory and paying for the laboratory services.
2. Train the dealers to assist in soil sampling, submission of soil samples, and servicing the fertilizer recommended.
3. Subsidize part of the soil analysis cost and set the fee that is affordable by farmers.
4. Require dealers to monitor the farmer's crop yield resulting from the fertilizer recommendation.
5. Prepare testimonials from dramatic results of the recommendation to promote the program to farmers.

C. Program Evaluation

1. Evaluate dealer involvement as part of dealer performance; basis for dealer training and development.
2. Evaluate attainment of soil sample forecast and if the sampling is directed to priority areas/crops.

II. Farm Demonstration

A. Objectives

1. To demonstrate local proof of the desirability and profitability of fertilizer practice or series of practices.
2. To provide a nucleus for field days, field tours, farmers' meetings, and other activities.
3. To promote close relationship between the company's dealers and farmers.
4. To "sell" to the individual farmer on whose farm the demonstration is conducted and his neighboring farmers the effectiveness of company's products.

B. Operating Guidelines

1. Conducted on a cooperative basis between the farmer cooperator and the company's dealer.
2. Farmer-cooperator to provide the demonstration area, farm labor, and pay at harvest time for the cost of inputs used.
3. Dealer to advance the cost of inputs and assist in the technical supervision of the demonstration; utilize farm demonstration to conduct field days for neighboring farmers.
4. Company technical sales representative to provide overall planning, direction, and supervision, particularly:
   a. Selection of farmer-cooperation and farm site.
   b. Laying out the farmers' practice and the recommended practice.
   c. Proper application of inputs.
   d. Installing the signboard.
   e. Conduct of field days.
   f. Recording/documenting results.

C. Program Evaluation

1. The farm demonstration should be evaluated in terms of:
   a. Conduct.
   b. Economics of yield.
   c. Technical benefits to neighboring farmers.
   d. Testimonial material.
2. Dealer involvement and assistance and impact on sales.

APPENDIX V

Dealer Training

I. Objective

A. To update dealers in selling approaches, tools, and techniques applicable to their business so they can obtain better profits.

B. To enable dealers to understand their role in food production and servicing the farmers' needs for quality products and advances farm technology.

C. To enable dealers to fulfill their commitment to company policies and programs.

II. Operating Guidelines

A. Methodology consists of lectures and group presentation in the classroom and field trips to farm demonstrations, field days, and experiment stations. Training could be planned for 2 to 3 days; dividing the period into classroom and field trips.

B. The training courses should be designed in progression, i.e., course one will cover the fundamental subjects first.

An Example of a Progressive Training Course

Training Course	Subjects	Qualification of Dealer Participants
Course one	1. The company 2. Sales forecasting 3. Sources and administration of credit 4. Farm demonstration/soil testing programs 5. Sales tools/techniques 6. Fertilizer usage in crops	Newly appointed dealers
Course two	1. Handling competition 2. Fertilizer handling and inventory control 3. Financial management 4. Pests and diseases of major crops 5. Product knowledge/package of technology 6. Understanding the farmer client	Dealer who completed course one

III. Program Evaluation

A. Relate dealer sales performance evaluation with dealer training.

B. Utilize dealer training to upgrade the capability of dealer network.

C. Provide achievement awards to encourage good performance.

APPENDIX VI

COMFAR© Financial Tables for Simple Plant Scenario Using Currency Exchange Rate of H $1.5 to US $1.0

Haiti-Bulk Blend-Single Plant-1.5:1
August 30, 1990
Discounted Selling Price

1 year(s) of construction, 15 years of production
currency conversion rates:
foreign currency 1 unit = 1.0000 units accounting currency
local currency 1 unit = 0.6667 units accounting currency
accounting currency: Thousands of US Dollars

Total initial investment during construction phase

fixed assets:	677.58	79.664 % foreign
current assets:	0.00	0.000 % foreign
total assets:	677.58	79.664 % foreign

Source of funds during construction phase

equity & grants:	338.80	79.598 % foreign
foreign loans :	269.68	
local loans :	69.12	
total funds :	677.61	79.598 % foreign

Cashflow from operations

Year:	1	6	15
operating costs:	727.58	1973.02	2910.57
depreciation :	30.39	31.05	32.17
interest :	50.81	33.94	1.49
production costs	808.79	2038.02	2944.23
thereof foreign	75.11 %	83.85 %	85.12 %
total sales :	627.39	1871.78	2803.24
gross income :	-181.40	-166.24	-140.99
net income :	-181.40	-166.24	-140.99
cash balance :	-344.21	-207.34	-130.83
net cashflow :	-276.73	-139.53	-121.70

Net Present Value at: 15.00 % = -1588.02
Internal Rate of Return: -12.22 %
Return on equity1: not found
Return on equity2: -14.36 %

Index of Schedules produced by COMFAR

Total Initial Investment in Thousands of US Dollars

Year	1991
Fixed investment costs	
Land, site preparation, development	44.002
Buildings and civil works	208.003
Auxiliary and service facilities .	0.000
Incorporated fixed assets	15.667
Plant machinery and equipment . . .	270.801
Total fixed investment costs	538.473
Pre-production capital expenditures.	139.411
Net working capital	0.000
Total initial investment costs . . .	677.884
Of it foreign, in %	79.654

Total Current Investment in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
Fixed investment costs					
Land, site preparation, development	0.000	0.000	0.000	0.000	0.000
Buildings and civil works	0.000	0.000	0.000	0.000	0.000
Auxiliary and service facilities	0.000	0.000	0.000	0.000	0.000
Incorporated fixed assets	0.000	0.000	0.000	0.000	0.000
Plant, machinery and equipment	2.000	2.000	2.000	2.000	2.000
Total fixed investment costs	2.000	2.000	2.000	2.000	2.000
Preproduction capitals expenditures.	0.000	0.000	0.000	0.000	0.000
Working capital	174.515	72.107	71.721	85.125	31.594
Total current investment costs	176.515	74.107	73.721	87.125	33.594
Of it foreign, %	83.878	88.273	88.357	88.170	85.198

Total Current Investment in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
Fixed investment costs					
Land, site preparation, development	0.000	0.000	0.000	0.000	0.000
Buildings and civil works	0.000	0.000	0.000	0.000	0.000
Auxiliary and service facilities	0.000	0.000	0.000	0.000	0.000
Incorporated fixed assets	0.000	0.000	0.000	0.000	0.000
Plant, machinery and equipment	2.000	2.000	40.000	2.000	2.000
Total fixed investment costs	2.000	2.000	40.000	2.000	2.000
Preproduction capitals expenditures.	0.000	0.000	0.000	0.000	0.000
Working capital	36.259	39.379	37.801	36.127	32.496
Total current investment costs	38.259	41.379	77.801	38.127	34.496
Of it foreign, %	83.649	83.612	94.130	88.649	85.714

Total Current Investment in Thousands of US Dollars

Year	2002	2003	2004	2005	2006
Fixed investment costs					
Land, site preparation, development	0.000	0.000	0.000	0.000	0.000
Buildings and civil works	0.000	0.000	0.000	0.000	0.000
Auxiliary and service facilities .	0.000	0.000	0.000	0.000	0.000
Incorporated fixed assets	0.000	0.000	0.000	0.000	0.000
Plant, machinery and equipment . .	2.000	2.000	2.000	2.000	2.000
Total fixed investment costs	2.000	2.000	2.000	2.000	2.000
Preproduction capitals expenditures.	0.000	0.000	0.000	0.000	0.000
Working capital	28.166	22.754	17.569	13.201	12.070
Total current investment costs . . .	30.166	24.754	19.569	15.201	14.070
Of it foreign, %	53.811	25.993	59.241	39.596	35.718

Total Production Costs in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
% of nom. capacity (single product).	0.000	0.000	0.000	0.000	0.000
Raw material I	596.167	936.573	1200.164	1512.302	1623.604
Other raw materials	37.073	55.751	74.922	94.751	102.734
Utilities	4.598	5.355	6.821	9.002	9.448
Energy	4.685	4.994	5.235	5.522	5.633
Labour, direct	21.085	21.537	22.421	23.121	23.788
Repair, maintenance	0.000	0.000	0.000	0.000	0.000
Spares	2.833	2.833	2.833	2.833	2.833
Factory overheads	4.000	4.000	4.000	4.000	4.000
Factory costs	672.441	1034.494	1316.413	1651.031	1775.240
Administrative overheads	55.138	55.138	55.138	55.138	55.138
Indir. costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Direct costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Depreciation	30.390	30.523	30.656	30.789	30.922
Financial costs	50.221	48.318	45.439	42.129	38.322
Total production costs	808.790	1168.472	1447.646	1779.086	1899.622
Costs per unit (single product)	0.000	0.000	0.000	0.000	0.000
Of it foreign, %	78.114	81.059	82.344	83.319	83.871
Of it variable,%	79.041	85.695	88.644	90.928	91.706
Total labour	76.223	76.975	77.559	78.259	78.526

Total Production Costs in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
% of nom. capacity (single product).	0.000	0.000	0.000	0.000	0.000
Raw material 1	1761.559	1902.992	2041.903	2174.257	2274.076
Other raw materials	110.710	119.572	128.300	136.641	144.145
Utilities	8.942	9.465	9.920	10.472	10.914
Energy	5.755	5.557	6.010	6.121	6.240
Labour, direct	23.684	23.997	24.305	24.599	24.864
Repair, maintenance	0.000	0.000	0.000	0.000	0.000
Spares	2.833	2.833	2.833	2.833	2.833
Factory overheads	4.000	4.000	4.000	4.000	4.000
Factory costs	1917.283	2066.747	2217.330	2359.334	2487.072
Administrative overheads	55.138	55.138	55.138	55.138	55.138
Indir. costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Direct costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Depreciation	31.055	31.189	31.321	31.454	31.587
Financial costs	33.544	26.910	25.970	22.162	13.990
Total production costs	2038.020	2183.973	2329.760	2468.091	2587.787
Costs per unit (single product)	0.000	0.000	0.000	0.000	0.000
Of it foreign, %	83.865	84.135	84.339	84.607	84.768
Of it variable,%	92.472	93.205	93.751	94.250	94.826
Total labour	78.822	79.135	79.443	79.737	80.032

Total Production Costs in Thousands of US Dollars

Year	2002	2003	2004	2005	2006
% of nom. capacity (single product).	0.000	0.000	0.000	0.000	0.000
Raw material 1	2397.575	2481.302	2545.562	2594.371	2628.723
Other raw materials	150.650	155.909	159.967	162.015	165.574
Utilities	11.298	11.608	11.849	12.027	12.152
Energy	6.335	6.411	6.473	6.515	6.555
Labour, direct	25.093	25.279	25.422	25.530	25.628
Repair, maintenance	0.000	0.000	0.000	0.000	0.000
Spares	2.837	2.833	2.822	2.822	2.822
Factory overheads	4.000	4.000	4.000	4.000	4.000
Factory costs	2597.756	2687.744	2756.403	2808.232	2855.735
Administrative overheads	55.132	55.135	55.135	55.179	55.132
Indir. costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Direct costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Depreciation	31.720	31.553	31.555	32.119	32.165
Financial costs	4.593	3.911	3.123	2.227	1.191
Total production costs	2689.236	2778.246	2846.655	2897.776	2944.230
Costs per unit (single product)	0.000	0.000	0.000	0.000	0.000
Of it foreign, %	84.900	84.985	85.046	85.085	85.124
Of it variable,%	95.366	95.534	95.654	95.767	95.865
Total labour	80.231	80.417	80.560	80.668	80.726

Net Working Capital in Thousands of US Dollars

Year			1992	1993	1994	1995	1996
Coverage	mdc	coto					
Current assets &							
Accounts receivable	30	12.0	60.632	90.803	114.296	142.151	152.332
Inventory and materials	90	4.0	159.193	249.202	319.342	402.555	433.438
Energy	30	12.0	0.390	0.416	0.436	0.450	0.457
Spares	360	1.0	2.233	2.533	2.633	2.933	2.833
Work in progress	0	---	0.000	0.000	0.000	0.000	0.000
Finished products	2	180.0	4.042	6.054	7.620	9.479	10.169
Cash in hand	15	24.0	3.461	3.472	3.516	3.546	3.557
Total current assets			230.551	352.829	448.044	561.054	602.998
Current liabilities and Accounts payable	30	12.0	56.037	86.205	109.701	137.586	147.937
Net working capital			174.515	266.621	338.343	423.468	455.061
Increase in working capital			174.515	92.107	71.721	[illegible]	31.594
Net working capital, local			28.458	39.494	48.079	[illegible]	62.349
Net working capital, foreign			146.056	227.127	290.265	[illegible]	392.712

Note: mdc = minimum days of coverage ; coto = coefficient of turnover .

Net Working Capital in Thousands of US Dollars

Year			1997	1998	1999	2000	2001
Coverage	mdc	coto					
Current assets &							
Accounts receivable	30	12.0	164.415	176.990	189.372	[illegible]	[illegible]
Inventory and materials	90	4.0	463.912	506.4[illegible]	543.082	575.698	610.465
Energy	30	12.0	0.460	0.490	[illegible]	0.511	0.520
Spares	360	1.0	2.833	2.833	2.833	2.833	2.833
Work in progress	0	---	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Finished products	2	180.0	10.761	11.799	[illegible]	[illegible]	[illegible]
Cash in hand	15	24.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total current assets			651.174	[illegible]	753.703	800.[illegible]	847.4[illegible]
Current liabilities and Accounts payable	30	12.0	159.504	[illegible]	[illegible]	[illegible]	207.256
Net working capital			[illegible]	[illegible]	567.[illegible]	[illegible]	636.154
Increase in working capital			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Net working capital, local			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Net working capital, foreign			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Note: mdc = minimum days of coverage ; coto = coefficient of turnover .

Net Working Capital in Thousands of US Dollars

Year	mdc	coto	2002	2003	2004	2005	2006
Coverage							
Current assets &							
Accounts receivable	30	12.0	221.377	228.540	234.[illegible]	235.619	[illegible]
Inventory and materials	90	4.0	637.995	680.27[illegible]	677.445	690.249	70[illegible]
Energy	30	12.0	0.5[illegible]	0.5[illegible]	0.559	0.543	0.546
Spares	360	1.0	2.833	2.8[illegible]	2.8[illegible]	2.833	2.833
Work in progress	0	---	0.000	0.000	0.000	0.000	0.000
Finished products	2	180.0	14.73[illegible]	15.2[illegible]6	15.620	15.908	[illegible].172
Cash in hand	15	24.0	3.623	3.635	3.641	3.646	3.651
Total current assets			880.802	911.650	934.372	951.898	967.[illegible]
Current liabilities and							
Accounts payable	30	12.0	216.482	223.545	229.700	234.024	237.979
Net working capital			664.320	687.104	704.673	717.874	729.944
Increase in working capital			23.1[illegible]	22.784	17.569	13.201	12.070
Net working capital, local			87.418	90.147	92.253	93.834	95.281
Net working capital, foreign			576.902	596.957	612.420	624.040	634.663

Note: mdc = minimum days of coverage ; coto = coefficient of turnover .

Source of Finance, construction in Thousands of US Dollars

Year	1991
Equity, ordinary ..	338.803
Equity, preference.	0.000
Subsidies, grants .	0.000
Loan A, foreign .	269.680
Loan B, foreign..	0.000
Loan C, foreign .	0.000
Loan A, local....	69.123
Loan B, local....	0.000
Loan C, local....	0.000
Total loan	338.803
Current liabilities	0.000
Bank overdraft	0.277
Total funds	677.884

Source of Finance, production in Thousands of US Dollars

Year	1992	1993	1994	1995	1996	1997
Equity, ordinary ..	0.000	0.000	0.000	0.000	0.000	0.000
Equity, preference.	0.000	0.000	0.000	0.000	0.000	0.000
Subsidies, grants .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, foreign .	-13.282	-15.275	-17.566	-20.201	[illegible]	-26.712
Loan B, foreign..	0.000	0.000	0.000	0.000	0.000	0.000
Loan C, foreign .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, local....	-3.404	-3.715	-4.502	-5.178	[illegible]	-6.245
Loan B, local....	0.000	0.000	0.000	0.000	0.000	0.000
Loan C, local....	0.000	0.000	0.000	0.000	0.000	0.000
Total loan	-16.687	-19.190	-22.068	-25.378	-29.195	-33.562
Current liabilities	56.037	30.171	23.493	27.385	10.251	11.587
Bank overdraft	344.212	254.377	246.836	253.820	201.024	207.072
Total funds	383.562	275.555	248.258	261.029	182.459	185.[illegible]

Source of Finance, production in Thousands of US Dollars

Year	1998	1999	2000	2001	2002	2003
Equity, ordinary ..	0.000	0.000	0.000	0.000	0.000	0.000
Equity, preference.	0.000	0.000	0.000	0.000	0.000	0.000
Subsidies, grants .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, foreign .	-31.723	-35.331	-40.631	-46.725	0.000	0.000
Loan B, foreign..	0.000	33.000	-2.434	-2.749	-4.541	-5.222
Loan C, foreign .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, local....	-7.375	-9.056	-10.414	-11.976	0.000	0.000
Loan B, local....	0.000	0.000	0.000	0.000	0.000	0.000
Loan C, local....	0.000	0.000	0.000	0.000	0.000	0.000
Total loan	-39.593	-6.327	-54.179	-62.651	-4.541	-5.222
Current liabilities	12.572	12.792	11.571	10.545	9.226	7.467
Bank overdraft	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total funds	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Source of Finance, production in Thousands of US Dollars

Year	2004	2005	2006
Equity, ordinary ..	0.000	0.000	0.000
Equity, preference.	0.000	0.000	0.000
Subsidies, grants .	0.000	0.000	0.000
Loan A, foreign .	0.000	0.000	0.000
Loan B, foreign..	-6.006	-6.906	-7.942
Loan C, foreign .	0.000	0.000	0.000
Loan A, local....	0.000	0.000	0.000
Loan B, local....	0.000	0.000	0.000
Loan C, local....	0.000	0.000	0.000
Total loan	-6.006	-6.906	-7.942
Current liabilities	5.755	4.324	3.354
Bank overdraft	135.668	131.661	130.300
Total funds	135.419	129.079	126.644

Cashflow Tables, construction in Thousands of US Dollars

Year	1991
Total cash inflow . .	677.607
Financial resources .	677.607
Sales, net of tax . .	0.000
Total cash outflow . .	677.884
Total assets	652.473
Operating costs . . .	0.000
Cost of finance . . .	25.410
Repayment	0.000
Corporate tax . . .	0.000
Dividends paid . . .	0.000
Surplus (deficit) .	-0.277
Cumulated cash balance	-0.277
Inflow, local	138.247
Outflow, local	137.858
Surplus (deficit) .	0.389
Inflow, foreign . . .	539.360
Outflow, foreign . . .	540.026
Surplus (deficit) .	-0.666
Net cashflow	-652.473
Cumulated net cashflow	-652.473

Cashflow tables, production in Thousands of US Dollars

Year	1992	1993	1994	1995	1996	1997
Total cash inflow . .	683.426	1016.540	1289.442	1629.863	1740.536	1883.267
Financial resources .	56.037	30.171	23.493	27.885	10.381	11.587
Sales, net of tax . .	627.389	986.369	1265.949	1601.978	1730.156	1871.781
Total cash outflow . .	1027.638	1281.417	1536.273	1888.656	1941.830	2090.704
Total assets	232.551	124.278	97.215	116.010	43.945	53.176
Operating costs . . .	727.579	1089.632	1371.551	1706.169	1830.378	1973.021
Cost of finance . . .	50.821	48.318	45.439	42.129	38.022	33.944
Repayment	16.687	19.190	22.068	25.378	29.185	33.563
Corporate tax . . .	0.000	0.000	0.000	0.000	0.000	0.000
Dividends paid . . .	0.000	0.000	0.000	0.000	0.000	0.000
Surplus (deficit) .	-344.212	-264.877	-246.831	-258.825	-201.324	-207.036
Cumulated cash balance	-344.429	-609.366	-856.196	-1115.019	-1316.343	-1523.379
Inflow, local	636.444	990.104	1265.854	1605.465	1731.457	1873.251
Outflow, local	215.086	237.161	265.737	312.895	320.502	338.662
Surplus (deficit) .	421.359	752.943	1000.116	1292.570	1410.955	1534.589
Inflow, foreign . . .	46.982	26.436	23.588	24.397	9.069	10.416
Outflow, foreign . . .	812.552	1044.256	1267.535	1575.790	1621.328	1752.042
Surplus (deficit) .	-765.571	-1017.820	-1246.947	-1551.393	-1612.259	-1741.626
Net cashflow	-276.705	-197.370	-179.322	-191.316	-132.816	-139.529
Cumulated net cashflow	-929.178	-1126.548	-1305.871	-1497.186	-1630.003	-1770.531

Cashflow tables, production in Thousands of US Dollars

Year	1998	1999	2000	2001	2002	2003
Total cash inflow . .	2034.193	2215.561	2322.038	2447.713	2556.280	2643.425
Financial resources .	12.572	50.382	11.534	10.645	9.226	7.462
Sales, net of tax . .	2021.621	2165.179	2310.204	2437.068	2547.054	2635.963
Total cash outflow . .	2244.339	2433.010	2541.076	2663.992	2701.449	2783.862
Total assets	52.951	90.184	49.961	45.141	39.392	33.047
Operating costs . . .	2123.581	2272.469	2414.475	2542.210	2652.924	2742.482
Cost of finance . . .	22.910	25.970	22.162	13.990	4.593	3.911
Repayment	38.572	44.397	54.479	62.651	4.541	5.222
Corporate tax . . .	0.000	0.000	0.000	0.000	0.000	0.000
Dividends paid . . .	0.000	0.000	0.000	0.000	0.000	0.000
Surplus (deficit) .	-210.146	-213.449	-219.039	-216.280	-145.169	-140.437
Cumulated cash balance	-1730.525	-1946.973	-2166.012	-2382.292	-2527.461	-2667.898
Inflow, local	2023.177	2170.711	2311.668	2438.385	2548.196	2636.886
Outflow, local	357.674	375.969	393.276	408.504	407.745	417.960
Surplus (deficit) .	1665.503	1794.742	1918.392	2029.881	2140.451	2218.926
Inflow, foreign . . .	11.015	48.850	10.369	9.327	8.034	6.540
Outflow, foreign . . .	1886.665	2057.040	2147.800	2255.488	2297.705	2365.902
Surplus (deficit) .	-1875.649	-2008.190	-2137.431	-2246.161	-2289.671	-2359.363
Net cashflow	-142.639	-181.091	-142.398	-139.639	-136.076	-131.202
Cumulated net cashflow	-1915.170	-2096.262	-2238.659	-2378.298	-2512.374	-2643.677

Cashflow tables, production in Thousands of US Dollars

Year	2004	2005	2006
Total cash inflow . .	2710.330	2760.428	2807.197
Financial resources .	5.755	4.324	3.954
Sales, net of tax . .	2704.575	2756.104	2803.244
Total cash outflow . .	2845.595	2892.088	2938.031
Total assets	25.324	19.525	15.020
Operating costs . . .	2811.541	2863.430	2910.374
Cost of finance . . .	3.123	2.227	1.151
Repayment	6.006	6.906	7.942
Corporate tax . . .	0.000	0.000	0.000
Dividends paid . . .	0.000	0.000	0.000
Surplus (deficit) .	-135.265	-131.661	-130.833
Cumulated cash balance	-2843.566	-2975.227	-3106.060
Inflow, local	2705.237	2756.639	2803.733
Outflow, local	425.676	431.397	437.092
Surplus (deficit) .	2279.561	2325.242	2366.641
Inflow, foreign . . .	5.042	3.787	3.464
Outflow, foreign . . .	2420.322	2460.692	2500.939
Surplus (deficit) .	-2415.280	-2456.903	-2497.475
Net cashflow	-126.575	-122.527	-121.697
Cumulated net cashflow	-2770.171	-2892.698	-3014.395

Cashflow Discounting:

a) Equity paid versus Net income flow:
    Net present value .... -1324.38 at 15.00 %
    Internal Rate of Return (IRRE1) .. not found

b) Net Worth versus Net cash return:
    Net present value .... -1614.39 at 15.00 %
    Internal Rate of Return (IRRE2) .. -14.30 %

c) Internal Rate of Return on total investment:
    Net present value .... -1558.32 at 15.00 %
    Internal Rate of Return (IRR) .. -12.22 %

Net Worth = Equity paid plus reserves

Net Income Statement in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
Total sales, incl. sales tax	627.389	986.369	1265.949	1601.378	1730.156
Less: variable costs, incl. sales tax.	639.274	1001.327	1283.246	1617.264	1742.073
Variable margin	-11.885	-14.958	-17.297	-15.886	-11.918
As % of total sales	-1.894	-1.516	-1.366	-0.992	-0.689
Non-variable costs, incl. depreciation	118.695	118.828	118.961	119.094	119.227
Operational margin	-130.580	-133.786	-136.257	-134.980	-131.145
As % of total sales	-20.813	-13.563	-10.763	-8.426	-7.580
Cost of finance	50.821	48.318	45.439	42.129	38.322
Gross profit	-181.400	-182.103	-181.696	-177.108	-169.467
Allowances	0.000	0.000	0.000	0.000	0.000
Taxable profit	-181.400	-182.103	-181.696	-177.108	-169.467
Tax	0.000	0.000	0.000	0.000	0.000
Net profit	-181.400	-182.103	-181.696	-177.108	-169.467
Dividends paid	0.000	0.000	0.000	0.000	0.000
Undistributed profit	-181.400	-182.103	-181.696	-177.108	-169.467
Accumulated undistributed profit	-181.400	-363.504	-545.200	-722.308	-891.775
Gross profit, % of total sales	-28.914	-18.462	-14.353	-11.056	-9.795
Net profit, % of total sales	-28.914	-18.462	-14.353	-11.056	-9.795
ROE, Net profit, % of equity	-53.541	-53.749	-53.629	-52.275	-50.619
ROI, Net profit+interest, % of invest.	-15.752	-14.493	-13.669	-12.457	-11.735

Net Income Statement in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
Total sales, incl. sales tax	1871.751	2021.621	2169.179	2310.204	2437.068
Less: variable costs, incl. sales tax.	1884.716	2035.576	2184.164	2326.169	2453.905
Variable margin	-12.935	-13.955	-14.985	-15.966	-16.837
As % of total sales	-0.691	-0.690	-0.691	-0.691	-0.691
Non-variable costs, incl. depreciation	119.360	119.493	119.626	119.759	119.892
Operational margin	-132.295	-133.447	-134.610	-135.724	-136.729
As % of total sales	-7.068	-6.601	-6.206	-5.875	-5.610
Cost of finance	33.944	28.910	25.970	22.162	13.990
Gross profit	-166.239	-162.357	-160.581	-157.886	-150.719
Allowances	0.000	0.000	0.000	0.000	0.000
Taxable profit	-166.239	-162.357	-160.581	-157.886	-150.719
Tax	0.000	0.000	0.000	0.000	0.000
Net profit	-166.239	-162.357	-160.581	-157.886	-150.719
Dividends paid	0.000	0.000	0.000	0.000	0.000
Undistributed profit	-166.239	-162.357	-160.581	-157.886	-150.719
Accumulated undistributed profit	-1058.014	-1220.371	-1380.952	-1538.838	-1689.557
Gross profit, % of total sales	-8.881	-8.031	-7.403	-6.834	-6.184
Net profit, % of total sales	-8.881	-8.031	-7.403	-6.834	-6.184
ROE, Net profit, % of equity	-49.067	-47.921	-47.396	-46.601	-44.486
ROI, Net profit+interest, % of invest.	-11.446	-11.156	-10.566	-10.344	-10.153

Net Income Statement in Thousands of US Dollars

Year	2002	2003	2004	2005	2006
Total sales, incl. sales tax	2547.054	2535.963	2704.575	2756.104	2803.244
Less: variable costs, incl. sales tax.	2564.618	2554.177	2723.236	2775.125	2822.568
Variable margin	-17.565	-18.214	-18.661	-19.021	-19.324
As % of total sales	-0.690	-0.691	-0.690	-0.690	-0.689
Non-variable costs, incl. depreciation	120.025	120.157	120.291	120.424	120.471
Operational margin	-137.589	-138.371	-138.952	-139.445	-139.795
As % of total sales	-5.402	-5.249	-5.138	-5.060	-4.987
Cost of finance	4.593	3.911	3.128	2.227	1.191
Gross profit	-142.152	-142.283	-142.080	-141.673	-140.987
Allowances	0.000	0.000	0.000	0.000	0.000
Taxable profit	-142.152	-142.283	-142.080	-141.673	-140.987
Tax	0.000	0.000	0.000	0.000	0.000
Net profit	-142.152	-142.283	-142.080	-141.673	-140.987
Dividends paid	0.000	0.000	0.000	0.000	0.000
Undistributed profit	-142.152	-142.283	-142.080	-141.673	-140.987
Accumulated undistributed profit	-1831.740	-1974.023	-2116.103	-2257.776	-2398.762
Gross profit, % of total sales	-5.582	-5.393	-5.253	-5.140	-5.029
Net profit, % of total sales	-5.582	-5.393	-5.253	-5.140	-5.029
ROE, Net profit, % of equity	-41.965	-41.996	-41.936	-41.816	-41.613
ROI, Net profit+interest, % of invest.	-9.993	-9.873	-9.777	-9.702	-9.638

Projected Balance Sheets, construction in Thousands of US Dollars

Year	1991
Total assets	677.384
Fixed assets, net of depreciation	0.000
Construction in progress	677.384
Current assets	0.000
Cash, bank	0.000
Cash surplus, finance available .	0.000
Loss carried forward	0.000
Loss	0.000
Total liabilities	677.384
Equity capital	338.303
Reserves, retained profit	0.000
Profit	0.000
Long and medium term debt	338.803
Current liabilities	0.000
Bank overdraft, finance required.	0.277
Total debt	339.080
Equity, % of liabilities	49.950

Projected Balance Sheets, Production in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
Total assets	1061.445	1337.304	1585.559	1846.888	2029.377
Fixed assets, net of depreciation	647.494	618.971	590.315	561.526	532.604
Construction in progress	2.000	2.000	2.000	2.000	2.000
Current assets	227.091	349.337	444.525	557.508	599.441
Cash, bank	3.461	3.492	3.516	3.546	3.557
Cash surplus, finance available	0.000	0.000	0.000	0.000	0.000
Loss carried forward	0.000	181.400	363.504	545.200	722.308
Loss	181.400	182.103	181.696	177.108	169.467
Total liabilities	1061.445	1337.304	1585.559	1846.888	2029.377
Equity capital	338.803	338.803	338.803	338.803	338.803
Reserves, retained profit	0.000	0.000	0.000	0.000	0.000
Profit	0.000	0.000	0.000	0.000	0.000
Long and medium term debt	322.117	302.927	280.959	255.450	226.295
Current liabilities	56.037	86.208	109.701	137.536	147.937
Bank overdraft, finance required.	344.488	609.366	856.196	1115.019	1316.342
Total debt	722.642	998.500	1246.755	1508.085	1690.574
Equity, % of liabilities	31.919	25.335	21.368	18.345	16.695

Projected Balance Sheets, Production in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
Total assets	2214.703	2398.858	2618.301	2794.695	2958.965
Fixed assets, net of depreciation	503.550	474.062	445.341	433.557	[illegible]
Construction in progress	2.000	2.000	40.000	2.000	2.000
Current assets	647.635	698.543	743.714	796.662	839.752
Cash, bank	3.569	3.582	3.595	3.607	3.615
Cash surplus, finance available	0.000	0.000	0.000	0.000	0.000
Loss carried forward	891.775	1058.014	1220.371	1380.952	[illegible]
Loss	166.239	162.357	160.581	157.286	153.719
Total liabilities	2214.703	[illegible]	[illegible]	2794.695	2958.965
Equity capital	338.803	[illegible]	[illegible]	338.803	[illegible]
Reserves, retained profit	0.000	[illegible]	[illegible]	[illegible]	[illegible]
Profit	0.000	[illegible]	[illegible]	[illegible]	[illegible]
Long and medium term debt	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Current liabilities	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bank overdraft, finance required.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total debt	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Equity, % of liabilities	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

APPENDIX VII

COMFAR© Financial Tables for Optimum Plant Scenario Using Currency Exchange Rate of H $1.5 to US $1.0

COMFAR 2.1 UNIDO

Haiti-Bulk Blend-Optimum Plant-1.5:1
August 29, 1990
Discounted Selling Price

1 year(s) of construction, 15 years of production
currency conversion rates:
foreign currency 1 unit = 1.0000 units accounting currency
local currency 1 unit = 0.6667 units accounting currency
accounting currency: Thousands of US Dollars

Total initial investment during construction phase

fixed assets:	898.15	81.189 % foreign
current assets:	0.00	0.000 % foreign
total assets:	898.15	81.189 % foreign

Source of funds during construction phase

equity & grants:	448.94	81.133 % foreign
foreign loans :	364.24	
local loans :	84.70	
total funds :	897.87	81.133 % foreign

Cashflow from operations

Year:	1	6	15
operating costs:	669.53	1802.83	2655.99
depreciation :	41.42	42.09	43.16
interest :	67.34	44.98	1.19
production costs	778.29	1889.90	2700.34
thereof foreign	77.94 %	83.80 %	65.14 %
total sales :	627.39	1871.78	2803.24
gross income :	-150.90	-18.11	102.90
net income :	-150.90	-18.11	102.90
cash balance :	-437.57	-87.71	114.43
net cashflow :	-348.12	1.74	123.56

Net Present Value at: 15.00 % = -1172.10
Internal Rate of Return: 2.10 %
Return on equity1: -4.18 %
Return on equity2: 0.19 %

Index of Schedules produced by COMFAR

Total initial investment	Cashflow Tables
Total investment during production	Projected Balance
Total production costs	Net income statement
Working Capital requirements	Source of finance

Total Initial Investment in Thousands of US Dollars

Year	1991
Fixed investment costs	
Land, site preparation, development	44.002
Buildings and civil works	279.670
Auxiliary and service facilities .	0.000
Incorporated fixed assets	51.333
Plant machinery and equipment . . .	356.801
Total fixed investment costs	731.807
Pre-production capital expenditures.	166.338
Net working capital	0.000
Total initial investment costs . . .	898.145
Of it foreign, in %	81.180

COMFAR 2.1 UNIDO

Total Current Investment in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
Fixed investment costs					
Land, site preparation, development	0.000	0.000	0.000	0.000	0.000
Buildings and civil works	0.000	0.000	0.000	0.000	0.000
Auxiliary and service facilities	0.000	0.000	0.000	0.000	0.000
Incorporated fixed assets	0.000	0.000	0.000	0.000	0.000
Plant, machinery and equipment	2.000	2.000	2.000	2.000	2.000
Total fixed investment costs	2.000	2.000	2.000	2.000	2.000
Preproduction capitals expenditures.	0.000	0.000	0.000	0.000	0.000
Working capital	303.978	165.387	128.870	153.066	56.945
Total current investment costs	305.978	167.387	130.870	155.096	58.945
Of it foreign, %	86.065	88.522	98.573	88.394	88.176

COMFAR 2.1 - INTERNATIONAL FERTILIZER DEV. CENTER, ALABAMA

Total Current Investment in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
Fixed investment costs					
Land, site preparation, development	0.000	0.000	0.000	0.000	0.000
Buildings and civil works	0.000	0.000	0.000	0.000	0.000
Auxiliary and service facilities	0.000	0.000	0.000	0.000	0.000
Incorporated fixed assets	0.000	0.000	0.000	0.000	0.000
Plant, machinery and equipment	2.000	2.000	40.000	2.000	2.000
Total fixed investment costs	2.000	2.000	40.000	2.000	2.000
Preproduction capitals expenditures.	0.000	0.000	0.000	0.000	0.000
Working capital	65.212	68.965	67.929	64.917	58.396
Total current investment costs	67.212	70.965	107.929	66.917	60.396
Of it foreign, %	88.732	88.708	92.629	88.770	88.767

Haiti-Bulk Blend-Optimum Plant-1.5:1 --- August 29, 1990

Total Current Investment in Thousands of US Dollars

Year	2002	2003	2004	2005	2006
Fixed investment costs					
Land, site preparation, development	0.000	0.000	0.000	0.000	0.000
Buildings and civil works	0.000	0.000	0.000	0.000	0.000
Auxiliary and service facilities	0.000	0.000	0.000	0.000	0.000
Incorporated fixed assets	0.000	0.000	0.000	0.000	0.000
Plant, machinery and equipment	2.000	2.000	2.000	2.000	2.000
Total fixed investment costs	2.000	2.000	2.000	2.000	2.000
Preproduction capitals expenditures	0.000	0.000	0.000	0.000	0.000
Working capital	50.612	40.942	31.572	23.718	21.689
Total current investment costs	52.612	42.942	33.572	25.718	23.689
Of it foreign, %	68.821	88.923	59.070	59.287	69.357

Total Production Costs in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
% of nom. capacity (single product).	0.000	0.000	0.000	0.000	0.000
Raw material 1	540.120	845.606	1083.692	1366.361	1471.292
Other raw materials	37.073	58.381	74.928	94.751	102.334
Utilities	4.598	5.855	6.831	8.000	5.448
Energy	4.685	4.594	5.235	5.523	5.633
Labour, direct	21.085	21.837	22.421	23.121	23.388
Repair, maintenance	0.000	0.000	0.000	0.000	0.000
Spares	2.833	2.833	2.833	2.833	2.833
Factory overheads	4.000	4.000	4.000	4.000	4.000
Factory costs	614.394	943.507	1199.947	1504.569	1617.928
Administrative overheads	55.138	55.138	55.138	55.138	55.138
Indir. costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Direct costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Depreciation	41.420	41.553	41.666	41.819	41.952
Financial costs	67.341	64.024	60.210	55.827	50.779
Total production costs	778.293	1104.222	1356.980	1657.369	1765.798
Costs per unit (single product)	0.000	0.000	0.000	0.000	0.000
Of it foreign, %	77.938	80.687	82.207	83.223	83.466
Of it variable,%	74.686	82.442	85.954	88.721	89.748
Total labour	76.223	76.975	77.559	78.159	76.526

Total Production Costs in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
% of nom. capacity (single product).	0.000	0.000	0.000	0.000	0.000
Raw material 1	1591.771	1719.173	1844.674	1964.605	2072.469
Other raw materials	110.710	119.573	128.300	136.641	144.145
Utilities	8.942	9.465	9.980	10.472	10.914
Energy	5.755	5.883	6.010	6.131	6.240
Labour, direct	23.684	23.997	24.305	24.599	24.864
Repair, maintenance	0.000	0.000	0.000	0.000	0.000
Spares	2.833	2.833	2.833	2.833	2.833
Factory overheads	4.000	4.000	4.000	4.000	4.000
Factory costs	1747.694	1884.929	2020.102	2149.282	2265.485
Administrative overheads	55.138	55.138	55.138	55.138	55.138
Indir. costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Direct costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Depreciation	42.085	42.218	42.351	42.484	42.617
Financial costs	44.978	38.307	33.486	27.512	16.853
Total production costs	1889.896	2020.593	2151.077	2274.417	2380.093
Costs per unit (single product)	0.000	0.000	0.000	0.000	0.000
Of it foreign, %	83.795	84.083	84.350	84.582	84.754
Of it variable,%	90.721	91.645	92.369	93.040	93.791
Total labour	78.822	79.135	79.443	79.737	80.092

Total Production Costs in Thousands of US Dollars

Year	2002	2003	2004	2005	2006
% of nom. capacity (single product).	0.000	0.000	0.000	0.000	0.000
Raw material 1	2165.989	2241.628	2299.956	2343.773	2383.842
Other raw materials	150.650	155.909	159.967	163.015	165.804
Utilities	11.296	11.608	11.848	12.027	12.192
Energy	6.335	6.411	6.470	6.515	6.555
Labour, direct	25.093	25.279	25.422	25.530	25.628
Repair, maintenance	0.000	0.000	0.000	0.000	0.000
Spares	2.833	2.833	2.833	2.833	2.833
Factory overheads	4.000	4.000	4.000	4.000	4.000
Factory costs	2366.199	2447.670	2510.496	2557.694	2600.854
Administrative overheads	55.138	55.138	55.138	55.138	55.138
Indir. costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Direct costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Depreciation	42.750	42.883	43.016	43.149	43.158
Financial costs	4.593	3.911	3.128	2.227	1.191
Total production costs	2468.680	2549.603	2611.778	2658.209	2700.342
Costs per unit (single product)	0.000	0.000	0.000	0.000	0.000
Of it foreign, %	84.895	84.986	85.051	85.097	85.135
Of it variable,%	94.505	94.701	94.852	94.971	95.087
Total labour	80.231	80.417	80.560	80.668	80.766

COMFAR 2.1 UNIDO

Net Working Capital in Thousands of US Dollars

Year	mdc	coto	1992	1993	1994	1995	1996
Coverage	mdc	coto					
Current assets &							
Accounts receivable	30	12.0	55.794	83.220	104.590	129.977	139.422
Inventory and materials	179	2.0	288.980	452.481	579.882	731.222	787.517
Energy	30	12.0	0.390	0.416	0.436	0.460	0.469
Spares	360	1.0	2.833	2.833	2.833	2.833	2.833
Work in progress	0	---	0.000	0.000	0.000	0.000	0.000
Finished products	2	180.0	3.720	5.548	6.973	8.665	9.255
Cash in hand	15	24.0	3.461	3.492	3.516	3.546	3.557
Total current assets			355.178	547.991	698.231	876.704	943.093
Current liabilities and							
Accounts payable	30	12.0	51.199	78.626	99.996	125.382	134.827
Net working capital			303.979	469.366	598.236	751.321	808.266
Increase in working capital			303.972	165.387	128.870	153.086	56.945
Net working capital, local			42.639	61.853	76.807	94.807	101.776
Net working capital, foreign			261.339	407.513	521.429	656.515	706.490

Note: mdc = minimum days of coverage ; coto = coefficient of turnover .

COMFAR 2.1 - INTERNATIONAL FERTILIZER DEV. CENTER, ALABAMA

Net Working Capital in Thousands of US Dollars

Year	mdc	coto	1997	1998	1999	2000	2001
Coverage	mdc	coto					
Current assets &							
Accounts receivable	30	12.0	150.236	161.672	172.937	183.702	193.385
Inventory and materials	179	2.0	851.985	920.164	987.319	1051.496	1109.226
Energy	30	12.0	0.480	0.490	0.501	0.511	0.520
Spares	360	1.0	2.833	2.833	2.833	2.833	2.833
Work in progress	0	---	0.000	0.000	0.000	0.000	0.000
Finished products	2	180.0	10.016	10.773	11.529	12.247	12.892
Cash in hand	15	24.0	3.569	3.582	3.595	3.607	3.618
Total current assets			1019.119	1099.520	1178.713	1254.396	1321.475
Current liabilities and							
Accounts payable	30	12.0	145.641	157.077	168.342	179.107	188.791
Net working capital			873.478	942.443	1010.372	1075.289	1132.684
Increase in working capital			65.212	68.965	67.929	64.917	56.395
Net working capital, local			109.759	117.363	125.254	132.795	139.579
Net working capital, foreign			764.118	825.080	885.118	942.494	994.105

Note: mdc = minimum days of coverage ; coto = coefficient of turnover .

Net Working Capital in Thousands of US Dollars

	mdc	coto	2002	2003	2004	2005	2006
Year			2002	2003	2004	2005	2006
Coverage	mdc	coto					
Current assets &							
Accounts receivable	30	12.0	201.778	208.567	213.803	217.736	221.333
Inventory and materials	179	2.0	1159.261	1199.736	1230.948	1254.795	1275.839
Energy	30	12.0	0.525	0.534	0.529	0.543	0.546
Spares	360	1.0	2.833	2.833	2.833	2.833	2.833
Work in progress	0	---	0.000	0.000	0.000	0.000	0.000
Finished products	2	180.0	13.452	13.904	14.254	14.516	14.756
Cash in hand	15	24.0	3.628	3.635	3.641	3.646	3.650
Total current assets			1381.480	1429.211	1466.019	1493.670	1518.957
Current liabilities and							
Accounts payable	30	12.0	197.183	203.972	209.208	213.141	216.738
Net working capital			1184.297	1225.239	1256.811	1280.529	1302.219
Increase in working capital			50.612	40.942	31.572	23.719	21.690
Net working capital, local			145.461	150.215	153.885	156.640	159.161
Net working capital, foreign			1038.836	1075.023	1102.926	1123.889	1143.057

Note: mdc = minimum days of coverage ; coto = coefficient of turnover .

Source of Finance, construction in Thousands of US Dollars

Year	1991
Equity, ordinary ..	448.937
Equity, preference.	0.000
Subsidies, grants .	0.000
Loan A, foreign .	364.236
Loan B, foreign..	0.000
Loan C, foreign .	0.000
Loan A, local....	84.701
Loan B, local....	0.000
Loan C, local....	0.000
Total loan	448.937
Current liabilities	0.000
Bank overdraft	0.271
Total funds	898.145

Source of Finance, production in Thousands of US Dollars

Year	1992	1993	1994	1995	1996	1997
Equity, ordinary ..	0.000	0.000	0.000	0.000	0.000	0.000
Equity, preference.	0.000	0.000	0.000	0.000	0.000	0.000
Subsidies, grants .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, foreign .	-17.939	-20.630	-23.725	-27.284	-31.376	-36.083
Loan B, foreign..	0.000	0.000	0.000	0.000	0.000	0.000
Loan C, foreign .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, local....	-4.172	-4.797	-5.517	-6.345	-7.296	-8.391
Loan B, local....	0.000	0.000	0.000	0.000	0.000	0.000
Loan C, local....	0.000	0.000	0.000	0.000	0.000	0.000
Total loan	-22.111	-25.428	-29.242	-33.628	-38.672	-44.473
Current liabilities	51.199	27.426	21.376	25.787	9.445	10.814
Bank overdraft	437.573	269.115	209.457	202.286	91.507	87.715
Total funds	466.661	271.113	201.585	194.445	62.280	54.055

Source of Finance, production in Thousands of US Dollars

Year	1998	1999	2000	2001	2002	2003
Equity, ordinary ..	0.000	0.000	0.000	0.000	0.000	0.000
Equity, preference.	0.000	0.000	0.000	0.000	0.000	0.000
Subsidies, grants .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, foreign .	-41.495	-47.719	-54.277	-63.108	0.000	0.000
Loan B, foreign..	0.000	28.000	-3.434	-3.949	-4.541	-5.222
Loan C, foreign .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, local....	-9.649	-11.097	-12.761	-14.675	0.000	0.000
Loan B, local....	0.000	0.000	0.000	0.000	0.000	0.000
Loan C, local....	0.000	0.000	0.000	0.000	0.000	0.000
Total loan	-51.144	-30.816	-71.072	-81.733	-4.541	-5.222
Current liabilities	11.436	11.264	10.765	9.684	8.092	6.789
Bank overdraft	78.962	69.292	59.718	42.536	-63.972	-81.079
Total funds	39.254	50.740	-1.589	-29.513	-60.420	-79.512

Source of Finance, production in Thousands of US Dollars

Year	2004	2005	2006
Equity, ordinary ..	0.000	0.000	0.000
Equity, preference.	0.000	0.000	0.000
Subsidies, grants .	0.000	0.000	0.000
Loan A, foreign .	0.000	0.000	0.000
Loan B, foreign..	-6.006	-6.906	-7.942
Loan C, foreign .	0.000	0.000	0.000
Loan A, local....	0.000	0.000	0.000
Loan B, local....	0.000	0.000	0.000
Loan C, local....	0.000	0.000	0.000
Total loan	-6.006	-6.906	-7.942
Current liabilities	5.235	3.933	3.597
Bank overdraft	-96.235	-108.419	-114.429
Total funds	-97.005	-111.392	-118.774

Cashflow Tables, construction in Thousands of US Dollars

Year	1991
Total cash inflow . .	897.874
Financial resources .	897.874
Sales, net of tax . .	0.000
Total cash outflow . .	898.145
Total assets	864.475
Operating costs . . .	0.000
Cost of finance . . .	33.670
Repayment	0.000
Corporate tax . . .	0.000
Dividends paid . . .	0.000
Surplus (deficit) .	-0.271
Cumulated cash balance	-0.271
Inflow, local	169.402
Outflow, local	169.027
Surplus (deficit) .	0.374
Inflow, foreign . . .	728.472
Outflow, foreign . . .	729.118
Surplus (deficit) .	-0.646
Net cashflow	-864.475
Cumulated net cashflow	-864.475

Cashflow tables, production in Thousands of US Dollars

Year	1992	1993	1994	1995	1996	1997
Total cash inflow	678.539	1013.795	1287.019	1627.065	1779.600	1882.594
Financial resources	51.199	27.426	21.070	25.727	9.445	10.814
Sales, net of tax	627.339	986.369	1265.949	1601.378	1770.155	1871.781
Total cash outflow	1116.162	1282.910	1496.776	1829.651	1870.907	1970.319
Total assets	357.178	194.812	152.240	180.472	66.791	78.026
Operating costs	669.532	993.645	1255.035	1559.727	1670.066	1802.822
Cost of finance	67.341	64.024	60.210	55.820	51.779	44.978
Repayment	22.111	25.428	29.242	33.626	38.672	44.473
Corporate tax	0.000	0.000	0.000	0.000	0.000	0.000
Dividends paid	0.000	0.000	0.000	0.000	0.000	0.000
Surplus (deficit)	-437.573	-269.115	-209.457	-202.286	-91.307	-87.725
Cumulated cash balance	-437.844	-716.959	-916.416	-1118.702	-1210.009	-1297.733
Inflow, local	635.734	989.701	1268.542	1605.098	1771.363	1873.094
Outflow, local	223.137	234.675	260.789	301.801	303.747	319.812
Surplus (deficit)	412.597	755.026	1007.752	1303.297	1468.016	1553.282
Inflow, foreign	42.855	24.095	18.777	22.267	8.238	9.501
Outflow, foreign	893.025	1048.235	1235.987	1527.850	1567.561	1650.497
Surplus (deficit)	-850.170	-1024.140	-1217.210	-1505.583	-1559.323	-1640.997
Net cashflow	-348.121	-179.663	-120.006	-112.834	-1.855	1.777
Cumulated net cashflow	-1212.596	-1392.259	-1512.265	-1625.099	-1626.954	-1625.217

COMFAR 2.1 UNIDO

Cashflow tables, production in Thousands of US Dollars

Year	1998	1999	2000	2001	2002	2003
Total cash inflow	2033.058	2218.443	2320.969	2446.752	2555.447	2642.752
Financial resources	11.436	49.264	10.765	9.684	8.393	6.789
Sales, net of tax	2021.621	2169.179	2310.204	2437.068	2547.054	2635.963
Total cash outflow	2111.920	2286.735	2380.688	2489.288	2491.475	2561.673
Total assets	82.401	119.193	77.682	70.080	61.005	49.731
Operating costs	1940.067	2075.240	2204.420	2320.623	2421.337	2502.808
Cost of finance	38.307	33.466	27.513	16.853	4.593	3.911
Repayment	51.144	58.816	71.072	81.733	4.541	5.222
Corporate tax	0.000	0.000	0.000	0.000	0.000	0.000
Dividends paid	0.000	0.000	0.000	0.000	0.000	0.000
Surplus (deficit)	-78.863	-68.292	-59.719	-42.536	63.971	81.079
Cumulated cash balance	-1376.586	-1444.877	-1504.596	-1547.133	-1483.161	-1402.082
Inflow, local	2023.011	2170.547	2311.511	2438.244	2548.073	2636.787
Outflow, local	336.998	353.272	368.551	381.776	376.077	384.646
Surplus (deficit)	1686.012	1817.275	1942.960	2056.468	2171.997	2252.141
Inflow, foreign	10.047	47.896	9.458	8.507	7.373	5.965
Outflow, foreign	1774.922	1933.463	2012.137	2107.511	2115.398	2177.027
Surplus (deficit)	-1764.875	-1885.567	-2002.679	-2099.004	-2108.025	-2171.062
Net cashflow	10.589	-13.990	38.867	56.049	73.105	90.213
Cumulated net cashflow	-1614.628	-1628.618	-1589.751	-1533.703	-1460.598	-1370.385

Cashflow tables, production in Thousands of US Dollars

Year	2004	2005	2006
Total cash inflow . .	2709.810	2760.037	2806.840
Financial resources .	5.235	3.933	3.597
Sales, net of tax . .	2704.575	2756.104	2803.244
Total cash outflow . .	2613.575	2651.617	2692.412
Total assets	38.608	29.652	27.285
Operating costs . . .	2565.634	2612.832	2655.992
Cost of finance . . .	3.135	2.227	1.191
Repayment	6.006	6.965	7.942
Corporate tax . . .	0.000	0.000	0.000
Dividends paid . . .	0.000	0.000	0.000
Surplus (deficit) .	96.235	108.419	114.426
Cumulated cash balance	-1305.847	-1197.428	-1082.999
Inflow, local	2705.211	2756.581	2803.681
Outflow, local	391.006	395.666	400.637
Surplus (deficit) .	2314.205	2360.915	2403.044
Inflow, foreign . . .	4.599	3.456	3.160
Outflow, foreign . . .	2222.569	2255.951	2291.775
Surplus (deficit) .	-2217.969	-2252.496	-2288.615
Net cashflow	105.369	117.553	123.562
Cumulated net cashflow	-1265.016	-1147.463	-1023.901

Cashflow Discounting:

a) Equity paid versus Net income flow:

Net present value	-681.24	at	15.00 %
Internal Rate of Return (IRRE1) ..	-4.18 %		

b) Net Worth versus Net cash return:

Net present value	-1206.43	at	15.00 %
Internal Rate of Return (IRRE2) ..	0.18 %		

c) Internal Rate of Return on total investment:

Net present value	-1172.10	at	15.00 %
Internal Rate of Return (IRR) ..	2.10 %		

Net Worth = Equity paid plus reserves

Net Income Statement in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
Total sales, incl. sales tax	627.389	986.369	1265.949	1601.978	1730.156
Less: variable costs, incl. sales tax.	581.227	910.340	1166.780	1471.422	1594.761
Variable margin	46.162	76.029	99.169	130.556	145.394
As % of total sales	7.358	7.708	7.834	8.150	8.404
Non-variable costs, incl. depreciation	129.725	129.858	129.991	130.124	130.257
Operational margin	-83.563	-53.829	-30.822	0.432	15.137
As % of total sales	-13.319	-5.457	-2.435	0.027	0.875
Cost of finance	67.341	64.024	60.210	55.823	50.779
Gross profit	-150.903	-117.853	-91.031	-55.392	-35.642
Allowances	0.000	0.000	0.000	0.000	0.000
Taxable profit	-150.903	-117.853	-91.031	-55.392	-35.642
Tax	0.000	0.000	0.000	0.000	0.000
Net profit	-150.903	-117.853	-91.031	-55.392	-35.642
Dividends paid	0.000	0.000	0.000	0.000	0.000
Undistributed profit	-150.903	-117.853	-91.031	-55.392	-35.642
Accumulated undistributed profit	-150.903	-268.756	-359.788	-415.179	-450.821
Gross profit, % of total sales	-24.053	-11.948	-7.191	-3.458	-2.060
Net profit, % of total sales	-24.053	-11.948	-7.191	-3.458	-2.060
ROE, Net profit, % of equity	-33.613	-26.252	-20.277	-12.338	-7.939
ROI, Net profit+interest, % of invest.	-7.139	-4.024	-2.099	0.027	0.900

Net Income Statement in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
Total sales, incl. sales tax	1871.781	2021.621	2169.179	2310.204	2437.068
Less: variable costs, incl. sales tax.	1714.527	1851.762	1986.935	2116.115	2232.318
Variable margin	157.254	169.859	182.244	194.089	204.750
As % of total sales	8.401	8.402	8.402	8.401	8.401
Non-variable costs, incl. depreciation	130.390	130.523	130.656	130.789	130.922
Operational margin	26.863	39.336	51.588	63.300	73.828
As % of total sales	1.435	1.946	2.378	2.740	3.029
Cost of finance	44.978	38.307	33.486	27.513	16.853
Gross profit	-18.115	1.029	18.102	35.787	56.975
Allowances	0.000	0.000	0.000	0.000	0.000
Taxable profit	-18.115	1.029	18.102	35.787	56.975
Tax	0.000	0.000	0.000	0.000	0.000
Net profit	-18.115	1.029	18.102	35.787	56.975
Dividends paid	0.000	0.000	0.000	0.000	0.000
Undistributed profit	-18.115	1.029	18.102	35.787	56.975
Accumulated undistributed profit	-468.936	-467.908	-449.806	-414.019	-357.044
Gross profit, % of total sales	-0.968	0.051	0.835	1.549	2.338
Net profit, % of total sales	-0.968	0.051	0.835	1.549	2.338
ROE, Net profit, % of equity	-4.035	0.229	4.032	7.971	12.691
ROI, Net profit+interest, % of invest.	1.535	2.160	2.675	3.172	3.591

Net Income Statement in Thousands of US Dollars

Year	2002	2003	2004	2005	2006
Total sales, incl. sales tax	2547.054	2635.963	2704.575	2756.104	2803.244
Less: variable costs, incl. sales tax.	2333.032	2414.503	2477.329	2524.527	2567.657
Variable margin	214.022	221.460	227.246	231.576	235.556
As % of total sales	8.403	8.401	8.402	8.402	8.403
Non-variable costs, incl. depreciation	131.055	131.188	131.321	131.454	131.463
Operational margin	82.967	90.272	95.925	100.122	104.093
As % of total sales	3.257	3.425	3.547	3.630	3.713
Cost of finance	4.593	3.911	3.128	2.227	1.191
Gross profit	78.374	86.360	92.796	97.895	102.902
Allowances	0.000	0.000	0.000	0.000	0.000
Taxable profit	78.374	86.360	92.796	97.895	102.902
Tax	0.000	0.000	0.000	0.000	0.000
Net profit	78.374	86.360	92.796	97.895	102.902
Dividends paid	0.000	0.000	0.000	0.000	0.000
Undistributed profit	78.374	86.360	92.796	97.895	102.902
Accumulated undistributed profit	-278.669	-192.309	-99.513	-1.618	101.284
Gross profit, % of total sales	3.077	3.276	3.431	3.552	3.671
Net profit, % of total sales	3.077	3.276	3.431	3.552	3.671
ROE, Net profit, % of equity	17.458	19.237	20.670	21.806	22.921
ROI, Net profit+interest, % of invest.	3.934	4.195	4.390	4.528	4.658

Projected Balance Sheets, construction in Thousands of US Dollars

Year	1991
Total assets	898.145
Fixed assets, net of depreciation	0.000
Construction in progress	898.145
Current assets	0.000
Cash, bank	0.000
Cash surplus, finance available	0.000
Loss carried forward	0.000
Loss	0.000
Total liabilities	898.145
Equity capital	448.937
Reserves, retained profit	0.000
Profit	0.000
Long and medium term debt	448.937
Current liabilities	0.000
Bank overdraft, finance required	0.271
Total debt	449.208
Equity, % of liabilities	49.985

Projected Balance Sheets, Production in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
Total assets	1364.806	1635.919	1837.504	2031.549	2093.629
Fixed assets, net of depreciation	856.725	817.172	777.455	737.656	697.714
Construction in progress	2.000	2.000	2.000	2.000	2.000
Current assets	351.717	544.499	694.715	873.158	939.537
Cash, bank	3.461	3.492	3.516	3.546	3.557
Cash surplus, finance available	0.000	0.000	0.000	0.000	0.000
Loss carried forward	0.000	150.903	268.756	359.788	415.179
Loss	150.903	117.853	91.032	55.391	35.642
Total liabilities	1364.806	1635.919	1837.504	2031.549	2093.629
Equity capital	448.937	448.937	448.937	448.937	448.937
Reserves, retained profit	0.000	0.000	0.000	0.000	0.000
Profit	0.000	0.000	0.000	0.000	0.000
Long and medium term debt	426.825	401.398	372.156	338.528	299.856
Current liabilities	51.199	78.626	99.996	125.382	134.827
Bank overdraft, finance required.	437.844	706.959	916.416	1118.702	1210.009
Total debt	915.869	1186.982	1388.568	1582.612	1644.692
Equity, % of liabilities	32.894	27.442	24.432	22.098	21.443

Projected Balance Sheets, Production in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
Total assets	2147.684	2187.867	2263.680	2280.776	2272.452
Fixed assets, net of depreciation	657.629	617.411	577.659	574.575	533.958
Construction in progress	2.000	2.000	40.000	2.000	2.000
Current assets	1015.550	1095.938	1175.119	1250.798	1318.857
Cash, bank	3.569	3.582	3.595	3.607	3.619
Cash surplus, finance available	0.000	0.000	0.000	0.000	0.000
Loss carried forward	450.821	468.936	467.908	449.806	414.019
Loss	18.115	0.000	0.000	0.000	0.000
Total liabilities	2147.684	2187.867	2263.680	2280.776	2272.452
Equity capital	448.937	448.937	448.937	448.937	448.937
Reserves, retained profit	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Profit	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Long and medium term debt	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Current liabilities	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bank overdraft, finance required.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total debt	1698.747	[illegible]	[illegible]	[illegible]	[illegible]
Equity, % of liabilities	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Projected Balance Sheets, Production in Thousands of US Dollars

Year	2002	2003	2004	2005	2006
Total assets	2233.731	2162.295	2071.636	1965.343	1851.576
Fixed assets, net of depreciation	493.208	452.325	411.309	370.159	329.001
Construction in progress	2.000	2.000	2.000	2.000	2.000
Current assets	1377.852	1425.575	1462.377	1490.024	1515.306
Cash, bank	3.628	3.635	3.641	3.646	3.650
Cash surplus, finance available	0.000	0.000	0.000	0.000	0.000
Loss carried forward	357.044	278.669	192.309	99.513	1.618
Loss	0.000	0.000	0.000	0.000	0.000
Total liabilities	2233.731	2162.295	2071.636	1965.343	1851.576
Equity capital	448.937	448.937	448.937	448.937	448.937
Reserves, retained profit	0.000	0.000	0.000	0.000	0.000
Profit	78.374	86.360	92.796	97.895	102.902
Long and medium term debt	26.077	20.854	14.849	7.942	0.000
Current liabilities	197.193	203.572	209.208	213.141	216.728
Bank overdraft, finance required.	1483.160	1402.081	1305.846	1197.427	1082.999
Total debt	1706.430	1626.508	1529.903	1418.511	1299.737
Equity, % of liabilities	20.098	20.760	21.671	22.843	24.246

APPENDIX VIII

COMFAR© Financial Tables for Simple Plant Scenario Using Currency Exchange Rate of H $1.5 to US $1.0 and Maximum (Nondiscounted) Selling Price

Haiti-Bulk Blend-Single Plant-1.5:1
August 20, 1992
Maximum selling price

1 year(s) of construction, 15 years of production
currency conversion rates:
foreign currency 1 unit = 1.0000 units accounting currency
local currency 1 unit = 0.6667 units accounting currency
accounting currency: Thousands of US Dollars

Total initial investment during construction phase

fixed assets:	677.88	79.664 % foreign
current assets:	0.00	0.000 % foreign
total assets:	677.88	79.664 % foreign

Source of funds during construction phase

equity & grants:	338.80	79.598 % foreign
foreign loans :	269.68	
local loans :	69.12	
total funds :	677.61	79.598 % foreign

Cashflow from operations

Year:	1	6	15
operating costs:	727.59	1973.02	2910.87
depreciation :	30.39	31.05	32.17
interest :	50.82	33.94	1.19
production costs	808.79	2038.02	2944.23
thereof foreign	78.11 %	83.86 %	85.12 %
total sales :	695.06	2073.65	3105.59
gross income :	-113.73	35.64	161.36
net income :	-113.73	35.64	161.36
cash balance :	-276.54	-5.15	171.51
net cashflow :	-209.03	62.35	180.65

Net Present Value at: 15.00 % = -547.73
Internal Rate of Return: 6.65 %
Return on equity1: 6.53 %
Return on equity2: 4.36 %

Index of Schedules produced by COMFAR

Total initial investment
Total investment during production
Total production costs
Working capital requirements
Cashflow Tables
Projected Balance
Net income statement
Source of finance

Total Initial Investment in Thousands of US Dollars

Year	1991
Fixed investment costs	
Land, site preparation, development	44.002
Buildings and civil works	205.003
Auxiliary and service facilities .	0.000
Incorporated fixed assets	15.667
Plant machinery and equipment . . .	270.801
Total fixed investment costs	538.473
Pre-production capital expenditures.	139.411
Net working capital	0.000
Total initial investment costs . . .	677.884
Of it foreign, in %	79.664

COMFAR 2.1 - INTERNATIONAL FERTILIZER DEV. CENTER, ALABAMA

Total Current Investment in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
Fixed investment costs					
Land, site preparation, development	0.000	0.000	0.000	0.000	0.000
Buildings and civil works	0.000	0.000	0.000	0.000	0.000
Auxiliary and service facilities .	0.000	0.000	0.000	0.000	0.000
Incorporated fixed assets	0.000	0.000	0.000	0.000	0.000
Plant, machinery and equipment . .	2.000	2.000	2.000	2.000	2.000
Total fixed investment costs	2.000	2.000	2.000	2.000	2.000
Preproduction capitals expenditures.	0.000	0.000	0.000	0.000	0.000
Working capital	174.515	92.107	71.721	55.125	31.594
Total current investment costs . . .	176.515	94.107	73.721	57.125	33.594
Of it foreign, %	33.679	88.273	88.357	89.170	88.198

Haiti-Bulk Blend-Simple Plant-1.5:1 --- August 30, 19[illegible]

COMFAR 2.1 - INTERNATIONAL FERTILIZER DEV. CENTER, ALABAMA

Total Current Investment in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
Fixed investment costs					
Land, site preparation, development	0.000	0.000	0.000	0.000	0.000
Buildings and civil works	0.000	0.000	0.000	0.000	0.000
Auxiliary and service facilities .	0.000	0.000	0.000	0.000	0.000
Incorporated fixed assets	0.000	0.000	0.000	0.000	0.000
Plant, machinery and equipment . .	2.000	2.000	40.000	2.000	2.000
Total fixed investment costs	2.000	2.000	40.000	2.000	2.000
Preproduction capitals expenditures.	0.000	0.000	0.000	0.000	0.000
Working capital	36.299	38.379	37.801	36.[illegible]	32.496
Total current investment costs . . .	38.299	40.379	77.801	35.127	34.496
Of it foreign, %	88.649	83.612	94.180	88.649	88.714

Haiti-Bulk Blend-Simple Plant-1.5:1 --- August 30, 199[illegible]

Total Current Investment in Thousands of US Dollars

Year	2002	2003	2004	2005	2006
Fixed investment costs					
Land, site preparation, development	0.000	0.000	0.000	0.000	0.000
Buildings and civil works	0.000	0.000	0.000	0.000	0.000
Auxiliary and service facilities .	0.000	0.000	0.000	0.000	0.000
Incorporated fixed assets	0.000	0.000	0.000	0.000	0.000
Plant, machinery and equipment . .	2.000	2.000	2.000	2.000	2.000
Total fixed investment costs	2.000	2.000	2.000	2.000	2.000
Preproduction capitals expenditures.	0.000	0.000	0.000	0.000	0.000
Working capital	28.166	22.724	17.569	13.201	12.070
Total current investment costs . . .	30.166	24.724	19.569	15.201	14.070
Of it foreign, %	88.611	88.950	89.241	89.596	89.718

Total Production Costs in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
% of nom. capacity (single product).	0.000	0.000	0.000	0.000	0.000
Raw material 1	598.167	936.593	1200.164	1512.802	1628.604
Other raw materials	37.073	58.381	74.928	94.751	102.334
Utilities	4.598	5.855	6.831	8.000	3.448
Energy	4.685	4.994	5.235	5.523	5.633
Labour, direct	21.065	21.837	22.421	23.121	23.389
Repair, maintenance	0.000	0.000	0.000	0.000	0.000
Spares	2.833	2.833	2.833	2.833	2.833
Factory overheads	4.000	4.000	4.000	4.000	4.000
Factory costs	672.441	1034.494	1316.413	1651.031	1775.240
Administrative overheads	55.138	55.138	55.138	55.138	55.138
Indir. costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Direct costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Depreciation	30.390	30.523	30.656	30.789	30.922
Financial costs	50.921	48.318	45.439	42.129	38.322
Total production costs	808.790	1168.472	1447.646	1779.086	1899.622
Costs per unit (single product)	0.000	0.000	0.000	0.000	0.000
Of it foreign, %	73.114	81.059	82.344	83.319	83.571
Of it variable,%	79.941	85.695	88.644	90.938	91.706
Total labour	76.223	76.975	77.559	78.259	78.526

Total Production Costs in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
% of nom. capacity (single product).	0.000	0.000	0.000	0.000	0.000
Raw material 1	1761.957	1902.592	2041.903	2174.659	2294.076
Other raw materials	110.710	119.573	128.300	135.641	144.145
Utilities	8.942	9.465	9.980	10.472	10.914
Energy	5.755	5.823	6.010	6.101	6.240
Labour, direct	23.684	23.997	24.305	24.599	24.884
Repair, maintenance	0.000	0.000	0.000	0.000	0.000
Spares	2.833	2.833	2.833	2.833	2.833
Factory overheads	4.000	4.000	4.000	4.000	4.000
Factory costs	1917.883	2068.743	2217.330	2359.336	2457.072
Administrative overheads	55.138	55.138	55.138	55.138	55.138
Indir. costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Direct costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Depreciation	31.055	31.188	31.321	31.454	31.587
Financial costs	33.744	28.910	25.579	22.162	15.990
Total production costs	2038.020	2183.978	2329.760	2468.091	2597.787
Costs per unit (single product)	0.000	0.000	0.000	0.000	0.000
Of it foreign, %	83.865	84.135	84.339	84.607	84.783
Of it variable,%	92.478	93.205	93.751	94.250	94.526
Total labour	78.822	79.135	79.445	79.737	80.012

Total Production Costs in Thousands of US Dollars

Year	2002	2003	2004	2005	2006
% of nom. capacity (single product).	0.000	0.000	0.000	0.000	0.000
Raw material 1	2397.575	2481.302	2545.862	2594.371	2633.723
Other raw materials	150.650	155.909	159.967	163.015	165.304
Utilities	11.298	11.608	11.848	12.027	12.192
Energy	6.335	6.411	6.470	6.515	6.555
Labour, direct	25.093	25.279	25.422	25.530	25.628
Repair, maintenance	0.000	0.000	0.000	0.000	0.000
Spares	2.833	2.833	2.833	2.833	2.833
Factory overheads	4.000	4.000	4.000	4.000	4.000
Factory costs	2597.786	2687.344	2756.403	2806.292	2855.735
Administrative overheads	55.138	55.138	55.138	55.138	55.138
Indir. costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Direct costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Depreciation	31.720	31.853	31.986	32.119	32.166
Financial costs	4.593	3.911	3.128	2.227	1.191
Total production costs	2689.236	2778.246	2846.655	2897.776	2944.220
Costs per unit (single product)	0.000	0.000	0.000	0.000	0.000
Of it foreign, %	84.900	84.965	85.046	85.089	85.124
Of it variable,%	95.366	95.534	95.664	95.767	95.868
Total labour	90.231	90.417	90.560	90.668	90.766

Net Working Capital in Thousands of US Dollars

Year	mdc	coto	1992	1993	1994	1995	1996
Coverage	mdc	coto					
Current assets &							
Accounts receivable	30	12.0	60.677	90.800	114.296	152.151	152.532
Inventory and materials	90	4.0	159.190	249.232	319.342	402.555	433.408
Energy	30	12.0	0.390	0.416	0.428	0.460	0.469
Spares	360	1.0	2.830	2.800	2.800	2.802	2.803
Work in progress	0	---	0.000	0.000	0.000	0.000	0.000
Finished products	2	180.0	4.042	6.054	7.620	9.479	10.169
Cash in hand	15	24.0	3.461	3.492	3.516	3.546	3.557
Total current assets			230.551	352.829	448.044	561.154	602.998
Current liabilities and							
Accounts payable	30	12.0	56.037	86.006	109.701	137.686	147.937
Net working capital			174.515	266.621	338.343	423.468	455.061
Increase in working capital			174.515	92.107	71.721	85.125	31.594
Net working capital, local			28.459	39.494	48.078	58.385	62.349
Net working capital, foreign			146.056	227.127	290.265	365.083	392.712

Note: mdc = minimum days of coverage ; coto = coefficient of turnover .

Net Working Capital in Thousands of US Dollars

Year	mdc	coto	1997	1998	1999	2000	2001
Coverage	mdc	coto					
Current assets &							
Accounts receivable	30	12.0	164.413	176.593	189.372	201.205	211.851
Inventory and materials	90	4.0	465.912	506.439	543.382	578.592	610.465
Energy	30	12.0	0.480	0.490	0.501	0.511	[illegible]
Spares	360	1.0	2.800	2.800	2.800	[illegible]	[illegible]
Work in progress	0	---	0.000	0.000	0.000	[illegible]	[illegible]
Finished products	2	180.0	10.961	11.799	12.625	[illegible]	[illegible]
Cash in hand	15	24.0	3.569	3.582	3.595	[illegible]	[illegible]
Total current assets			651.174	702.128	752.315	[illegible]	[illegible]
Current liabilities and							
Accounts payable	30	12.0	159.924	172.095	184.773	[illegible]	[illegible]
Net working capital			491.750	529.770	567.571	[illegible]	[illegible]
Increase in working capital			36.689	38.079	37.801	[illegible]	[illegible]
Net working capital, local			76.635	[illegible]	75.600	[illegible]	[illegible]
Net working capital, foreign			414.615	458.405	[illegible]	[illegible]	[illegible]

Note: mdc = minimum days of coverage ; coto = coefficient of turnover .

Net Working Capital in Thousands of US Dollars

Year	mdc	coto	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Coverage	mdc	coto					
Current assets &							
Accounts receivable	30	12.0	221.077	226.540	234.255	[illegible]	242.573
Inventory and materials	90	4.0	637.999	660.270	677.445	690.749	[illegible]
Energy	30	12.0	0.523	0.534	0.539	[illegible]	[illegible]
Spares	360	1.0	2.633	2.833	2.833	[illegible]	[illegible]
Work in progress	0	---	0.000	0.000	0.000	0.000	0.000
Finished products	2	180.0	14.738	15.226	15.420	15.[illegible]	16.[illegible]
Cash in hand	15	24.0	3.625	3.675	3.741	3.645	3.650
Total current assets			850.802	911.050	934.070	951.598	967.922
Current liabilities and							
Accounts payable	30	12.0	216.482	223.945	229.700	234.024	237.978
Net working capital			634.320	657.104	704.677	717.574	729.944
Increase in working capital			23.166	22.784	17.559	13.201	12.370
Net working capital, local			57.419	90.147	92.253	93.634	95.[illegible]
Net working capital, foreign			576.902	596.957	612.420	624.040	634.[illegible]

Note: mdc = minimum days of coverage ; coto = coefficient of turnover .

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Source of Finance, construction in Thousands of US Dollars

Year	1991
Equity, ordinary ..	338.803
Equity, preference.	0.000
Subsidies, grants .	0.000
Loan A, foreign .	269.680
Loan B, foreign..	0.000
Loan C, foreign .	0.000
Loan A, local....	69.123
Loan B, local....	0.000
Loan C, local....	0.000
Total loan	338.803
Current liabilities	0.000
Bank overdraft	0.277
Total funds	677.884

Source of Finance, production in Thousands of US Dollars

Year	1992	1993	1994	1995	1996	1997
Equity, ordinary ..	0.000	0.000	0.000	0.000	0.000	0.000
Equity, preference.	0.000	0.000	0.000	0.000	0.000	0.000
Subsidies, grants .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, foreign .	-13.292	-15.275	-17.566	-20.201	-23.231	-26.715
Loan B, foreign..	0.000	0.000	0.000	0.000	0.000	0.000
Loan C, foreign .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, local....	-3.394	-3.915	-4.502	-5.177	-5.954	-6.848
Loan B, local....	0.000	0.000	0.000	0.000	0.000	0.000
Loan C, local....	0.000	0.000	0.000	0.000	0.000	0.000
Total loan	-16.687	-19.190	-22.068	-25.378	-29.185	-33.563
Current liabilities	56.037	30.171	23.493	27.865	10.351	11.887
Bank overdraft	276.541	158.486	110.283	56.059	14.716	5.153
Total funds	315.891	169.467	111.708	58.546	-4.118	-16.523

Source of Finance, production in Thousands of US Dollars

Year	1998	1999	2000	2001	2002	2003
Equity, ordinary ..	0.000	0.000	0.000	0.000	0.000	0.000
Equity, preference.	0.000	0.000	0.000	0.000	0.000	0.000
Subsidies, grants .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, foreign .	-30.722	-35.331	-40.631	-46.725	0.000	0.000
Loan B, foreign..	0.000	38.000	-3.434	-5.949	-4.541	-5.222
Loan C, foreign .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, local....	-7.875	-9.456	-10.414	-11.976	0.000	0.000
Loan B, local....	0.000	0.000	0.000	0.000	0.000	0.000
Loan C, local....	0.000	0.000	0.000	0.000	0.000	0.000
Total loan	-38.597	-6.787	-54.479	-64.651	-4.541	-5.222
Current liabilities	10.572	12.782	11.374	10.645	9.226	7.462
Bank overdraft	-7.395	-20.512	-28.672	-46.574	-129.546	-143.859
Total funds	-35.424	-14.517	-71.777	[illegible]	-124.861	-141.619

Source of Finance, production in Thousands of US Dollars

Year	2004	2005	2006
Equity, ordinary ..	0.000	0.000	[illegible]
Equity, preference.	0.000	0.000	[illegible]
Subsidies, grants .	0.000	0.000	[illegible]
Loan A, foreign .	0.000	0.000	[illegible]
Loan B, foreign..	-6.005	-6.976	-7.542
Loan C, foreign .	0.000	0.000	[illegible]
Loan A, local....	0.000	0.000	[illegible]
Loan B, local....	0.000	0.000	[illegible]
Loan C, local....	0.000	0.000	[illegible]
Total loan	-6.005	-6.976	-7.542
Current liabilities	5.755	4.324	3.95[illegible]
Bank overdraft	-156.037	-116.929	[illegible]
Total funds	-156.287	-119.5[illegible]	-3.5[illegible]9

Cashflow Tables, construction in Thousands of US Dollars

Year	1991
Total cash inflow . .	677.607
Financial resources .	677.607
Sales, net of tax . .	0.000
Total cash outflow . .	677.884
Total assets	652.473
Operating costs . . .	0.000
Cost of finance . . .	25.410
Repayment	0.000
Corporate tax . . .	0.000
Dividends paid . . .	0.000
Surplus (deficit) .	-0.277
Cumulated cash balance	-0.277
Inflow, local	138.247
Outflow, local	137.858
Surplus (deficit) .	0.389
Inflow, foreign . . .	539.360
Outflow, foreign . . .	540.026
Surplus (deficit) .	-0.666
Net cashflow	-652.473
Cumulated net cashflow	-652.473

Cashflow tables, production in Thousands of US Dollars

Year	1992	1993	1994	1995	1996	1997
Total cash inflow	731.097	1122.932	1425.990	1802.296	1927.114	2085.551
Financial resources	56.037	30.171	23.493	27.535	10.751	11.887
Sales, net of tax	675.060	1092.760	1402.497	1774.761	1916.760	2073.664
Total cash outflow	1027.638	1281.417	1536.277	1888.455	1941.530	2090.704
Total assets	232.551	124.278	97.215	115.010	40.945	53.176
Operating costs	727.579	1059.632	1371.551	1706.165	1836.278	1973.021
Cost of finance	50.821	48.018	45.457	42.129	73.022	73.944
Repayment	16.687	19.170	22.065	25.072	29.155	33.563
Corporate tax	0.000	0.000	0.000	0.000	0.000	0.000
Dividends paid	0.000	0.000	0.000	0.000	0.000	0.000
Surplus (deficit)	-276.541	-158.486	-110.287	-86.079	-14.716	-5.153
Cumulated cash balance	-276.618	-435.304	-545.587	-631.626	-646.342	-651.495
Inflow, local	734.115	1096.495	1405.401	1778.249	1918.104	2075.135
Outflow, local	245.086	237.161	268.738	312.395	320.502	338.662
Surplus (deficit)	489.029	859.334	1136.664	1465.854	1597.602	1736.473
Inflow, foreign	46.982	26.436	20.588	24.037	9.009	10.416
Outflow, foreign	812.552	1044.256	1267.535	1575.790	1621.323	1752.142
Surplus (deficit)	-765.571	-1017.820	-1246.947	-1551.753	-1612.313	-1741.825
Net cashflow	-209.724	-90.978	-42.776	-15.570	52.791	62.754
Cumulated net cashflow	-861.507	-952.486	-995.261	-1010.793	-961.002	-898.445

Cashflow tables, production in Thousands of US Dollars

Year	1998	1999	2000	2001	2002	2003
Total cash inflow	2253.237	2455.521	2571.206	2710.566	2831.995	2927.731
Financial resources	12.572	50.382	11.824	10.645	9.226	7.463
Sales, net of tax	2239.666	2403.139	2559.374	2699.921	2821.769	2920.268
Total cash outflow	2244.338	2403.010	2541.076	2663.992	2701.449	2783.862
Total assets	52.951	50.184	49.561	45.141	39.292	32.247
Operating costs	2123.880	2272.469	2414.475	2542.210	2652.924	2742.462
Cost of finance	28.910	25.970	22.162	13.990	4.593	3.911
Repayment	38.598	44.387	54.479	62.651	4.541	5.222
Corporate tax	0.000	0.000	0.000	0.000	0.000	0.000
Dividends paid	0.000	0.000	0.000	0.000	0.000	0.000
Surplus (deficit)	7.899	20.511	30.131	46.573	129.545	143.869
Cumulated cash balance	-640.598	-620.085	-592.954	-546.380	-416.835	-272.966
Inflow, local	2241.222	2404.671	2560.538	2701.239	2822.911	2921.191
Outflow, local	357.674	375.969	393.276	408.504	407.745	417.960
Surplus (deficit)	1883.548	2028.702	2167.562	2292.735	2415.166	2503.231
Inflow, foreign	11.015	45.850	10.769	9.727	8.084	6.540
Outflow, foreign	1886.665	2057.040	2147.800	2255.498	2293.705	2365.903
Surplus (deficit)	-1875.649	-2009.190	-2137.431	-2246.161	-2285.621	-2359.363
Net cashflow	75.406	52.869	106.773	122.214	138.679	157.002
Cumulated net cashflow	-823.242	-770.373	-663.601	-540.386	-401.707	-248.765

Cashflow tables, production in Thousands of US Dollars

Year	2004	2005	2006
Total cash inflow . .	3002.035	3057.690	3109.544
Financial resources .	5.755	4.324	3.951
Sales, net of tax . .	2996.280	3053.366	3105.593
Total cash outflow . .	2845.999	2892.089	2938.030
Total assets	25.324	19.523	18.023
Operating costs . . .	2811.541	2863.433	2910.873
Cost of finance . . .	3.128	2.227	1.191
Repayment	6.005	6.906	7.942
Corporate tax . . .	0.000	0.000	0.000
Dividends paid . . .	0.000	0.000	0.000
Surplus (deficit) .	156.037	165.601	171.513
Cumulated cash balance	-116.929	48.672	220.185
Inflow, local	2996.993	3053.901	3106.050
Outflow, local	425.676	431.397	437.092
Surplus (deficit) .	2571.316	2622.504	2668.958
Inflow, foreign . . .	5.042	3.789	3.464
Outflow, foreign . . .	2420.322	2460.692	2500.939
Surplus (deficit) .	-2415.280	-2456.903	-2497.475
Net cashflow	155.176	174.775	180.647
Cumulated net cashflow	-83.575	91.200	271.847

Cashflow Discounting:

a) Equity paid versus Net income flow:
- Net present value .... -233.42 at 15.00 %
- Internal Rate of Return (IRRE) .. 5.50 %

b) Net Worth versus Net cash return:
- Net present value .... -573.45 at 15.00 %
- Internal Rate of Return (IRRE) .. 4.26 %

c) Internal Rate of Return on total investment:
- Net present value .... -547.33 at 15.00 %
- Internal Rate of Return (IRR) .. 6.65 %

Net Worth = Equity paid plus reserves

Net Income Statement in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
Total sales, incl. sales tax	695.060	1092.760	1412.497	1774.761	1916.763
Less: variable costs, incl. sales tax.	639.274	1001.337	1293.246	1617.884	1742.073
Variable margin	55.786	91.423	119.251	156.878	174.690
As % of total sales	8.026	8.367	8.500	8.840	9.114
Non-variable costs, incl. depreciation	118.695	118.823	118.961	119.094	119.227
Operational margin	-62.909	-27.394	0.290	37.804	55.463
As % of total sales	-9.051	-2.507	0.021	2.130	2.894
Cost of finance	50.821	48.318	45.439	42.129	38.322
Gross profit	-113.730	-75.712	-45.149	-4.325	17.141
Allowances	0.000	0.000	0.000	0.000	0.000
Taxable profit	-113.730	-75.712	-45.149	-4.325	17.141
Tax	0.000	0.000	0.000	0.000	0.000
Net profit	-113.730	-75.712	-45.149	-4.325	17.141
Dividends paid	0.000	0.000	0.000	0.000	0.000
Undistributed profit	-113.730	-75.712	-45.149	-4.325	17.141
Accumulated undistributed profit	-113.730	-189.442	-234.590	-238.915	-221.774
Gross profit, % of total sales	-16.363	-6.929	-3.219	-0.244	0.894
Net profit, % of total sales	-16.363	-6.929	-3.219	-0.244	0.894
ROE, Net profit, % of equity	-33.569	-22.347	-13.026	-1.277	5.159
ROI, Net profit+interest, % of invest.	-7.539	-2.968	0.027	2.456	4.760

Net Income Statement in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
Total sales, incl. sales tax	2073.664	2239.666	2403.139	2559.374	2699.921
Less: variable costs, incl. sales tax.	1884.716	2035.576	2184.164	2326.169	2453.905
Variable margin	188.948	204.090	218.975	233.204	246.016
As % of total sales	9.112	9.113	9.112	9.112	9.112
Non-variable costs, incl. depreciation	119.360	119.493	119.626	119.759	119.892
Operational margin	69.589	84.597	99.350	113.446	126.124
As % of total sales	3.356	3.777	4.134	4.433	4.671
Cost of finance	33.944	28.910	25.970	22.162	13.990
Gross profit	35.644	55.687	73.379	91.283	112.134
Allowances	0.000	0.000	0.000	0.000	0.000
Taxable profit	35.644	55.687	73.379	91.283	112.134
Tax	0.000	0.000	0.000	0.000	0.000
Net profit	35.644	55.687	73.379	91.283	112.134
Dividends paid	0.000	0.000	0.000	0.000	0.000
Undistributed profit	35.644	55.687	73.379	91.283	112.134
Accumulated undistributed profit	-186.130	-130.443	-57.064	34.220	146.354
Gross profit, % of total sales	1.719	2.486	3.053	3.567	4.153
Net profit, % of total sales	1.719	2.486	3.053	3.567	4.153
ROE, Net profit, % of equity	10.521	16.436	21.658	26.943	33.097
ROI, Net profit+interest, % of invest.	6.021	7.072	7.798	8.646	9.366

Net Income Statement in Thousands of US Dollars

Year	2002	2003	2004	2005	2006
Total sales, incl. sales tax	2821.759	2920.263	2996.280	3053.365	3105.590
Less: variable costs, incl. sales tax	2564.609	2654.172	2723.236	2775.125	2822.568
Variable margin	257.150	266.091	273.044	278.240	283.022
As % of total sales	9.113	9.112	9.113	9.113	9.113
Non-variable costs, incl. depreciation	120.025	120.157	120.291	120.424	120.471
Operational margin	137.125	145.934	152.754	157.817	162.551
As % of total sales	4.860	4.997	5.098	5.169	5.234
Cost of finance	4.593	3.911	3.128	2.227	1.191
Gross profit	132.533	142.022	149.625	155.589	161.360
Allowances	0.000	0.000	0.000	0.000	0.000
Taxable profit	132.533	142.022	149.625	155.589	161.360
Tax	0.000	0.000	0.000	0.000	0.000
Net profit	132.533	142.022	149.625	155.589	161.360
Dividends paid	0.000	0.000	0.000	0.000	0.000
Undistributed profit	132.533	142.022	149.625	155.589	161.360
Accumulated undistributed profit	278.886	420.909	570.534	726.124	857.483
Gross profit, % of total sales	4.697	4.863	4.994	5.096	5.196
Net profit, % of total sales	4.697	4.863	4.994	5.096	5.196
ROE, Net profit, % of equity	39.119	41.919	44.163	45.923	47.626
ROI, Net profit+interest, % of invest.	9.960	10.412	10.749	10.987	11.227

Projected Balance Sheets, construction in Thousands of US Dollars

Year	1991
Total assets	677.884
Fixed assets, net of depreciation	0.000
Construction in progress	677.884
Current assets	0.000
Cash, bank	0.000
Cash surplus, finance available	0.000
Loss carried forward	0.000
Loss	0.000
Total liabilities	677.884
Equity capital	338.803
Reserves, retained profit	0.000
Profit	0.000
Long and medium term debt	338.803
Current liabilities	0.000
Bank overdraft, finance required	0.277
Total debt	339.080
Equity, % of liabilities	49.980

Projected Balance Sheets, Production in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
Total assets	993.775	1163.242	1274.949	1363.495	1376.513
Fixed assets, net of depreciation	647.494	613.971	580.715	561.526	532.604
Construction in progress	2.000	2.000	2.000	2.000	2.000
Current assets	227.091	349.707	444.523	557.595	599.441
Cash, bank	3.461	3.492	3.515	3.546	3.557
Cash surplus, finance available	0.000	0.000	0.000	0.000	0.000
Loss carried forward	0.000	113.730	189.442	234.590	238.915
Loss	113.730	75.712	45.149	4.325	0.000
Total liabilities	993.775	1163.242	1274.949	1363.495	1376.519
Equity capital	338.803	338.803	338.803	338.803	338.803
Reserves, retained profit	0.000	0.000	0.000	0.000	0.000
Profit	0.000	0.000	0.000	0.000	17.181
Long and medium term debt	322.117	302.927	280.859	255.480	226.295
Current liabilities	56.037	86.208	109.701	137.556	147.937
Bank overdraft, finance required.	276.815	435.304	545.586	631.626	646.342
Total debt	654.971	824.438	936.146	1024.692	1020.535
Equity, % of liabilities	34.093	29.126	26.574	24.848	24.613

Projected Balance Sheets, Production in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
Total assets	1378.495	1364.617	1357.793	1312.920	1269.411
Fixed assets, net of depreciation	503.350	474.062	445.041	453.587	424.000
Construction in progress	2.000	2.000	40.000	2.000	2.000
Current assets	647.805	698.543	749.714	795.662	839.792
Cash, bank	3.569	3.582	3.595	3.607	3.618
Cash surplus, finance available	0.000	0.000	0.000	0.000	0.000
Loss carried forward	221.774	186.170	130.447	57.064	0.000
Loss	0.000	0.000	0.000	0.000	0.000
Total liabilities	1378.498	1364.617	[illegible]	[illegible]	1269.411
Equity capital	338.803	338.803	338.803	338.803	338.803
Reserves, retained profit	0.000	0.000	[illegible]	[illegible]	[illegible]
Profit	[illegible]	55.607	[illegible]	[illegible]	[illegible]
Long and medium term debt	[illegible]	[illegible]	[illegible]	97.268	[illegible]
Current liabilities	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bank overdraft, finance required.	[illegible]	645.597	[illegible]	590.754	[illegible]
Total debt	[illegible]	[illegible]	[illegible]	[illegible]	784.250
Equity, % of liabilities	[illegible]	24.828	[illegible]	[illegible]	[illegible]

Projected Balance Sheets, Production :: Thousands of US Dollars

Year	2002	2003	2004	2005	2006
Total assets	1277.083	1277.477	1270.815	1306.894	1464.265
Fixed assets, net of depreciation	394.281	[illegible]	334.442	304.323	274.157
Construction in progress	2.000	2.000	2.000	2.000	2.000
Current assets	677.174	[illegible]	930.752	948.252	964.271
Cash, bank	3.629	[illegible]	3.641	3.646	3.650
Cash surplus, finance available	0.000	0.000	0.000	48.672	220.126
Loss carried forward	0.000	0.000	0.000	0.000	0.000
Loss	0.000	0.000	0.000	0.000	0.000
Total liabilities	1277.083	1277.477	1270.815	1306.694	1464.265
Equity capital	338.803	338.803	338.803	338.803	338.803
Reserves, retained profit	146.354	279.286	420.909	570.534	726.124
Profit	132.533	142.022	149.625	155.589	161.360
Long and medium term debt	26.077	20.884	14.849	7.942	0.000
Current liabilities	216.482	223.945	229.700	234.024	237.978
Bank overdraft, finance required.	416.834	272.965	116.929	0.000	0.000
Total debt	659.393	517.765	361.478	241.967	237.978
Equity, % of liabilities	26.529	26.521	26.660	25.924	23.138

APPENDIX IX

COMFAR© Financial Tables for Optimum Plant Scenario Using Currency Exchange Rate of H $1.5 to US $1.0 and Maximum (Nondiscounted) Selling Price

Haiti-Bulk Blend-Optimum Plant-1.5:1
August 29, 1990
Maximum selling price

1 year(s) of construction, 15 years of production
currency conversion rates:
foreign currency 1 unit = 1.0000 units accounting currency
local currency 1 unit = 0.6667 units accounting currency
accounting currency: Thousands of US Dollars

Total initial investment during construction phase

fixed assets:	698.15	81.160 % foreign
current assets:	0.00	0.000 % foreign
total assets:	698.15	81.160 % foreign

Source of funds during construction phase

equity & grants:	448.54	81.133 % foreign
foreign loans :	364.34	
local loans :	34.70	
total funds :	697.57	81.133 % foreign

Cashflow from operations

Year:	1	6	15
operating costs:	667.57	1802.53	2655.77
depreciation :	41.42	42.09	40.16
interest :	67.34	44.98	1.15
production costs	778.39	1889.90	2700.74
thereof foreign	77.94 %	83.80 %	85.14 %
total sales :	695.06	2073.65	3105.59
gross income :	-83.33	183.77	405.25
net income :	-83.33	183.77	405.25
cash balance :	-367.90	114.17	416.73
net cashflow :	-220.45	233.62	405.91

Net Present Value at: 15.00 % = -101.16
Internal Rate of Return: 13.65 %
Return on equity1: 22.27 %
Return on equity2: 10.99 %

Index of Schedules produced by COMFAR

Total initial investment	Cashflow Tables
Total investment during production	Projected Balance
Total production costs	Net income statement
Working Capital requirements	Source of finance

Total Initial Investment in Thousands of US Dollars

Year	1991
Fixed investment costs	
Land, site preparation, development	44.002
Buildings and civil works	279.670
Auxiliary and service facilities .	0.000
Incorporated fixed assets	51.333
Plant machinery and equipment . . .	356.501
Total fixed investment costs	731.507
Pre-production capital expenditures.	156.338
Net working capital	0.000
Total initial investment costs . . .	888.145
Of it foreign, in %	81.150

Total Current Investment in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
Fixed investment costs					
Land, site preparation, development	0.000	0.000	0.000	0.000	0.000
Buildings and civil works	0.000	0.000	0.000	0.000	0.000
Auxiliary and service facilities	0.000	0.000	0.000	0.000	0.000
Incorporated fixed assets	0.000	0.000	0.000	0.000	0.000
Plant, machinery and equipment	2.000	2.000	2.000	2.000	2.000
Total fixed investment costs	2.000	2.000	2.000	2.000	2.000
Preproduction capitals expenditures.	0.000	0.000	0.000	0.000	0.000
Working capital	303.978	165.387	128.873	153.056	56.945
Total current investment costs	305.978	167.387	130.873	155.056	58.945
Of it foreign, %	86.365	98.522	88.573	88.794	88.176

Total Current Investment in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
Fixed investment costs					
Land, site preparation, development	0.000	0.000	0.000	0.000	0.000
Buildings and civil works	0.000	0.000	0.000	0.000	0.000
Auxiliary and service facilities	0.000	0.000	0.000	0.000	0.000
Incorporated fixed assets	0.000	0.000	0.000	0.000	0.000
Plant, machinery and equipment	2.000	2.000	40.000	2.000	2.000
Total fixed investment costs	2.000	2.000	40.000	2.000	2.000
Preproduction capitals expenditures.	0.000	0.000	0.000	0.000	0.000
Working capital	55.212	68.965	67.929	54.917	58.396
Total current investment costs	57.212	70.965	107.929	56.917	60.396
Of it foreign, %	88.722	88.718	91.689	88.770	88.767

Total Current Investment in Thousands of US Dollars

Year	2002	2003	2004	2005	2006
Fixed investment costs					
Land, site preparation, development	0.000	0.000	0.000	0.000	0.000
Buildings and civil works	0.000	0.000	0.000	0.000	0.000
Auxiliary and service facilities	0.000	0.000	0.000	0.000	0.000
Incorporated fixed assets	0.000	0.000	0.000	0.000	0.000
Plant, machinery and equipment	0.000	0.000	0.000	0.000	0.000
Total fixed investment costs	0.000	0.000	0.000	0.000	0.000
Preproduction capital expenditures	0.000	0.000	0.000	0.000	0.000
Working capital	50.612	40.942	31.572	22.712	21.659
Total current investment costs	51.612	42.542	33.572	25.712	23.639
Of it foreign, %	65.221	63.928	59.070	59.227	59.357

Total Production Costs in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
% of nom. capacity (single product).	0.000	0.000	0.000	0.000	0.000
Raw material 1	540.120	845.606	1082.695	1366.360	1471.292
Other raw materials	37.073	58.381	74.529	94.751	102.334
Utilities	4.599	5.855	6.831	8.000	8.448
Energy	4.695	4.994	5.235	5.522	5.633
Labour, direct	21.085	21.837	22.421	23.121	23.788
Repair, maintenance	0.000	0.000	0.000	0.000	0.000
Spares	2.533	2.633	2.833	2.933	2.833
Factory overheads	4.000	4.000	4.000	4.000	4.000
Factory costs	614.394	943.507	1195.947	1504.585	1617.529
Administrative overheads	55.138	55.138	55.138	55.138	55.138
Indir. costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Direct costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Depreciation	41.420	41.553	41.686	41.819	41.952
Financial costs	67.341	64.034	60.210	55.623	50.779
Total production costs	778.293	1104.232	1356.980	1657.269	1765.798
Costs per unit (single product)	0.000	0.000	0.000	0.000	0.000
Of it foreign, %	77.938	80.857	83.207	83.520	83.486
Of it variable,%	74.687	82.443	85.924	88.781	89.743
Total labour	76.223	76.975	77.559	78.159	78.526

Total Production Costs in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
% of nom. capacity (single product).	0.000	0.000	0.000	0.000	0.000
Raw material 1	1591.771	1719.173	1844.674	1964.605	2072.469
Other raw materials	110.710	119.573	128.300	136.641	144.145
Utilities	8.942	9.465	9.920	10.472	10.914
Energy	5.755	5.863	6.010	6.131	6.240
Labour, direct	23.654	23.997	24.335	24.599	24.864
Repair, maintenance	0.000	0.000	0.000	0.000	0.000
Spares	2.833	2.833	2.833	2.833	2.833
Factory overheads	4.000	4.000	4.000	4.000	4.000
Factory costs	1747.654	1884.929	2020.102	2149.282	2265.465
Administrative overheads	55.138	55.138	55.138	55.138	55.138
Indir. costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Direct costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Depreciation	42.085	42.218	42.351	42.484	42.617
Financial costs	44.478	38.307	33.486	27.513	16.853
Total production costs	1889.356	2020.593	2151.077	2274.417	2380.073
Costs per unit (single product)	0.000	0.000	0.000	0.000	0.000
Of it foreign, %	83.795	84.080	84.350	84.582	84.754
Of it variable,%	90.721	91.645	92.369	93.040	93.791
Total labour	78.822	79.135	79.443	79.737	80.002

Total Production Costs in Thousands of US Dollars

Year	2002	2003	2004	2005	2006
% of nom. capacity (single product)	0.000	0.000	0.000	0.000	0.000
Raw material 1	2165.929	2241.623	2299.956	2340.773	2383.842
Other raw materials	150.650	155.909	159.967	163.015	165.604
Utilities	11.298	11.608	11.845	12.027	12.192
Energy	6.335	6.411	6.470	6.515	6.555
Labour, direct	25.093	25.279	25.422	25.533	25.626
Repair, maintenance	0.000	0.000	0.000	0.000	0.000
Spares	2.833	2.833	2.833	2.833	2.833
Factory overheads	4.000	4.000	4.000	4.000	4.000
Factory costs	2366.199	2447.670	2510.496	2557.694	2600.854
Administrative overheads	55.136	55.138	55.135	55.136	55.136
Indir. costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Direct costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Depreciation	42.750	42.883	43.016	43.149	43.153
Financial costs	4.593	3.911	3.128	2.227	1.191
Total production costs	2468.620	2549.603	2611.776	2656.209	2700.342
Costs per unit (single product)	0.000	0.000	0.000	0.000	0.000
Of it foreign, %	84.695	84.936	85.051	85.097	85.135
Of it variable, %	94.505	94.701	94.852	94.971	95.027
Total labour	80.231	80.417	80.560	80.658	80.756

Net Working Capital in Thousands of US Dollars

	mdc	coto	1992	1993	1994	1995	1996
Year			1992	1993	1994	1995	1996
Coverage	mdc	coto					
Current assets &							
Accounts receivable	30	12.0	55.794	93.220	114.570	125.977	139.422
Inventory and materials	179	2.0	288.931	452.481	579.882	701.222	787.517
Energy	30	12.0	0.393	0.416	0.436	0.461	0.469
Spares	360	1.0	2.800	2.807	2.823	2.838	2.873
Work in progress	0	---	0.000	0.000	0.000	0.000	0.000
Finished products	2	180.0	3.720	5.548	5.773	5.665	9.275
Cash in hand	15	24.0	2.461	3.492	3.516	3.546	3.857
Total current assets			355.178	547.991	695.221	876.794	940.392
Current liabilities and							
Accounts payable	30	12.0	51.199	78.626	99.996	125.382	134.827
Net working capital			303.979	469.365	595.226	751.321	808.265
Increase in working capital			303.979	165.387	125.870	155.086	56.945
Net working capital, local			42.679	61.853	75.807	94.807	101.776
Net working capital, foreign			261.299	407.512	521.429	656.515	706.490

Note: mdc = minimum days of coverage ; coto = coefficient of turnover .

Net Working Capital in Thousands of US Dollars

	mdc	coto	1997	1998	1999	2000	2001
Year			1997	1998	1999	2000	2001
Coverage	mdc	coto					
Current assets &							
Accounts receivable	30	12.0	150.216	161.672	172.977	183.702	193.085
Inventory and materials	179	2.0	861.925	920.164	987.719	1051.496	1109.226
Energy	30	12.0	0.487	0.495	0.501	0.511	0.520
Spares	360	1.0	2.810	2.833	2.830	2.832	2.877
Work in progress	0	---	0.000	0.000	0.000	0.000	0.000
Finished products	2	180.0	10.216	10.778	11.509	12.147	12.591
Cash in hand	15	24.0	3.559	3.581	3.595	3.607	3.613
Total current assets			[illegible]	1099.521	[illegible]	[illegible]	[illegible]
Current liabilities and							
Accounts payable	30	12.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Net working capital			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Increase in working capital			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Net working capital, local			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Net working capital, foreign			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Note: mdc = minimum days of coverage ; coto = coefficient of turnover .

Net Working Capital in Thousands of US Dollars

Year	mdc	coto	2002	2003	2004	2005	2006
Coverage	mdc	coto					
Current assets &							
Accounts receivable	30	12.0	201.776	206.567	213.803	217.736	221.333
Inventory and materials	179	2.0	1159.261	1199.736	1230.948	1254.396	1275.839
Energy	30	12.0	0.528	0.534	0.539	0.543	0.546
Spares	360	1.0	2.833	2.833	2.833	2.833	2.833
Work in progress	0	---	0.000	0.000	0.000	0.000	0.000
Finished products	2	180.0	13.452	13.904	14.254	14.516	14.756
Cash in hand	15	24.0	3.628	3.635	3.641	3.646	3.650
Total current assets			1381.480	1429.211	1466.019	1493.670	1516.957
Current liabilities and							
Accounts payable	30	12.0	197.183	203.972	209.208	213.141	216.738
Net working capital			1184.297	1225.239	1256.811	1280.529	1302.219
Increase in working capital			50.612	40.942	31.572	23.719	21.690
Net working capital, local			145.461	150.215	153.885	156.640	159.161
Net working capital, foreign			1038.836	1075.023	1102.926	1123.889	1143.057

Note: mdc = minimum days of coverage ; coto = coefficient of turnover .

Source of Finance, construction in Thousands of US Dollars

Year	1991
Equity, ordinary ..	448.937
Equity, preference.	0.000
Subsidies, grants .	0.000
Loan A, foreign .	364.236
Loan B, foreign..	0.000
Loan C, foreign .	0.000
Loan A, local....	84.701
Loan B, local....	0.000
Loan C, local....	0.000
Total loan	448.937
Current liabilities	0.000
Bank overdraft	0.271
Total funds	898.145

Source of Finance, production in Thousands of US Dollars

Year	1992	1993	1994	1995	1996	1997
Equity, ordinary ..	0.000	0.000	0.000	0.000	0.000	0.000
Equity, preference.	0.000	0.000	0.000	0.000	0.000	0.000
Subsidies, grants .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, foreign .	-17.939	-20.668	-23.725	-27.284	-31.376	-36.082
Loan B, foreign..	0.000	0.000	0.000	0.000	0.000	0.000
Loan C, foreign .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, local....	-4.172	-4.757	-5.517	-6.345	-7.296	-8.391
Loan B, local....	0.000	0.000	0.000	0.000	0.000	0.000
Loan C, local....	0.000	0.000	0.000	0.000	0.000	0.000
Total loan	-22.111	-25.425	-29.242	-33.628	-38.672	-44.473
Current liabilities	51.199	27.426	21.370	25.387	9.445	10.814
Bank overdraft	369.902	162.723	72.910	29.502	-95.300	-114.169
Total funds	398.990	164.724	65.038	21.261	-124.528	-147.828

Source of Finance, production in Thousands of US Dollars

Year	1998	1999	2000	2001	2002	2003
Equity, ordinary ..	0.000	0.000	0.000	0.000	0.000	0.000
Equity, preference.	0.000	0.000	0.000	0.000	0.000	0.000
Subsidies, grants .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, foreign .	-41.495	-47.719	-54.277	-63.105	0.000	0.000
Loan B, foreign..	0.000	38.000	-3.434	-3.949	-4.541	-5.222
Loan C, foreign .	0.000	0.000	0.000	0.000	0.000	0.000
Loan A, local....	-9.649	-11.097	-12.761	-14.675	0.000	0.000
Loan B, local....	0.000	0.000	0.000	0.000	0.000	0.000
Loan C, local....	0.000	0.000	0.000	0.000	0.000	0.000
Total loan	-51.144	-20.816	-71.072	-81.729	-4.541	-5.222
Current liabilities	11.436	11.234	13.765	9.654	8.392	6.789
Bank overdraft	-134.152	-155.606	-120.989	0.000	0.000	0.000
Total funds	-173.860	-165.188	-178.296	-72.075	3.851	1.567

Source of Finance, production in Thousands of US Dollars

Year	2004	2005	2006
Equity, ordinary ..	0.000	0.000	0.000
Equity, preference.	0.000	0.000	0.000
Subsidies, grants .	0.000	0.000	0.000
Loan A, foreign .	0.000	0.000	0.000
Loan B, foreign..	-6.006	-6.906	-7.942
Loan C, foreign .	0.000	0.000	0.000
Loan A, local....	0.000	0.000	0.000
Loan B, local....	0.000	0.000	0.000
Loan C, local....	0.000	0.000	0.000
Total loan	-6.006	-6.906	-7.942
Current liabilities	5.235	3.933	3.597
Bank overdraft	0.000	0.000	0.000
Total funds	-0.770	-2.973	-4.346

Cashflow Tables, construction in Thousands of US Dollars

Year	1991
Total cash inflow . .	697.874
Financial resources .	697.874
Sales, net of tax . .	0.000
Total cash outflow . .	698.145
Total assets	664.475
Operating costs . . .	0.000
Cost of finance . . .	33.670
Repayment	0.000
Corporate tax . . .	0.000
Dividends paid . . .	0.000
Surplus (deficit) .	-0.271
Cumulated cash balance	-0.271
Inflow, local	169.402
Outflow, local	169.027
Surplus (deficit) .	0.374
Inflow, foreign . . .	528.472
Outflow, foreign . . .	529.118
Surplus (deficit) .	-0.646
Net cashflow	-664.475
Cumulated net cashflow	-664.475

Cashflow tables, production in Thousands of US Dollars

Year	1992	1993	1994	1995	1996	1997
Total cash inflow . .	746.259	1120.167	1423.867	1800.148	1926.208	2084.478
Financial resources .	51.199	27.426	21.370	25.387	9.445	10.814
Sales, net of tax . .	695.060	1092.760	1402.497	1774.761	1916.763	2073.664
Total cash outflow . .	1116.112	1282.910	1496.776	1829.650	1830.907	1970.309
Total assets	357.178	194.810	152.140	151.472	65.390	78.026
Operating costs . . .	669.502	998.645	1255.055	1559.726	1673.066	1802.802
Cost of finance . . .	67.391	64.024	60.219	55.820	50.779	44.973
Repayment	22.111	25.428	29.242	33.626	38.672	44.473
Corporate tax . . .	0.000	0.000	0.000	0.000	0.000	0.000
Dividends paid . . .	0.000	0.000	0.000	0.000	0.000	0.000
Surplus (deficit) .	-369.902	-162.723	-72.910	-29.502	95.301	114.169
Cumulated cash balance	-370.173	-532.897	-605.817	-635.309	-540.008	-425.840
Inflow, local	703.405	1096.092	1405.059	1777.881	1917.570	2074.977
Outflow, local	223.137	234.675	260.739	301.500	302.947	319.812
Surplus (deficit) .	480.268	861.417	1144.320	1476.381	1614.624	1755.165
Inflow, foreign . . .	42.855	24.075	18.777	22.267	8.338	9.501
Outflow, foreign . . .	893.025	1048.235	1235.987	1527.850	1527.961	1650.497
Surplus (deficit) .	-850.170	-1024.140	-1217.210	-1505.583	-1519.623	-1640.997
Net cashflow	-180.453	-73.271	16.542	59.949	154.752	200.620
Cumulated net cashflow	-1144.925	-1218.197	-1201.655	-1141.706	-986.954	-786.333

Cashflow tables, production in Thousands of US Dollars

Year	1998	1999	2000	2001	2002	2003
Total cash inflow	2251.1[illegible]	2452.403	2570.139	2709.605	2830.161	2927.057
Financial resources	11.436	49.264	10.765	9.684	8.393	6.789
Sales, net of tax	2239.660	2403.139	2559.374	2699.921	2821.769	2920.268
Total cash outflow	2111.920	2286.735	2420.688	2459.288	2491.475	2561.673
Total assets	82.401	119.197	77.682	70.08[illegible]	61.0[illegible]	49.73[illegible]
Operating costs	1940.067	2075.240	2234.4[illegible]	2320.624	2421.037	2502.836
Cost of finance	38.307	33.466	27.517	16.853	4.593	7.5[illegible]
Repayment	51.144	58.816	71.072	81.703	4.541	[illegible]
Corporate tax	0.000	0.000	0.000	0.000	0.000	0.000
Dividends paid	0.000	0.000	0.000	0.000	0.000	0.000
Surplus (deficit)	139.182	165.668	149.451	250.317	338.686	365.385
Cumulated cash balance	-286.658	-120.989	28.462	278.778	617.464	982.849
Inflow, local	2241.085	2404.507	2561.681	2701.098	2822.755	2921.192
Outflow, local	336.998	353.272	368.551	381.777	376.077	384.646
Surplus (deficit)	1904.087	2051.235	[illegible]	[illegible]	[illegible]	[illegible]
Inflow, foreign	10.047	47.896	8.458	8.507	[illegible]	5.865
Outflow, foreign	1774.922	1933.463	[illegible]	[illegible]	[illegible]	[illegible]
Surplus (deficit)	-1764.875	-1885.567	-2043.679	-2069.004	[illegible]	-2171.162
Net cashflow	228.604	215.870	238.076	218.900	[illegible]	374.819
Cumulated net cashflow	-524.700	-304.730	-16.597	202.303	[illegible]	[illegible]

Cashflow tables, production in Thousands of US Dollars

Year	2004	2005	2006
Total cash inflow . .	3001.516	3057.199	3109.187
Financial resources .	5.235	3.933	3.597
Sales, net of tax . .	2996.283	3053.265	3105.590
Total cash outflow . .	2613.575	2651.618	2690.412
Total assets	38.338	29.652	27.286
Operating costs . . .	2565.624	2612.572	2655.992
Cost of finance . . .	3.128	2.227	1.191
Repayment	6.306	6.916	7.942
Corporate tax . . .	0.000	0.000	0.000
Dividends paid . . .	0.000	0.000	0.000
Surplus (deficit) .	387.941	405.681	418.775
Cumulated cash balance	1350.793	1756.471	2213.246
Inflow, local	2996.517	3053.843	3105.127
Outflow, local	390.016	395.666	401.237
Surplus (deficit) .	2606.911	2658.177	2705.891
Inflow, foreign . . .	4.999	3.456	3.160
Outflow, foreign . . .	2223.559	2255.951	2291.775
Surplus (deficit) .	-2217.959	-2252.495	-2288.615
Net cashflow	397.974	414.815	425.909
Cumulated net cashflow	1421.621	1836.436	2262.344

Cashflow Discounting:

a) Equity paid versus Net income flow:

Net present value	359.70	at	15.00 %
Internal Rate of Return (IRRE1) ..	20.27 %		

b) Net Worth versus Net cash return:

Net present value	-165.49	at	15.00 %
Internal Rate of Return (IRRE2) ..	12.99 %		

c) Internal Rate of Return on total investment:

Net present value	-131.16	at	15.00 %
Internal Rate of Return (IRR) ..	13.65 %		

Net worth = Equity paid plus reserves

Net Income Statement in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
Total sales, incl. sales tax	695.060	1092.761	1392.497	1774.761	1916.760
Less: variable costs, incl. sales tax	581.227	910.340	1156.780	1471.422	1584.761
Variable margin	113.833	182.421	235.717	303.340	332.002
As % of total sales	16.377	16.694	16.928	17.092	17.321
Non-variable costs, incl. depreciation	129.725	129.858	129.991	130.124	130.257
Operational margin	-15.892	52.562	105.726	173.215	201.744
As % of total sales	-2.286	4.810	7.593	9.760	10.525
Cost of finance	67.341	64.024	60.210	55.823	50.779
Gross profit	-83.233	-11.461	45.516	117.392	150.965
Allowances	0.000	0.000	0.000	0.000	0.000
Taxable profit	-83.233	-11.461	45.516	117.392	150.965
Tax	0.000	0.000	0.000	0.000	0.000
Net profit	-83.233	-11.461	45.516	117.392	150.965
Dividends paid	0.000	0.000	0.000	0.000	0.000
Undistributed profit	-83.233	-11.461	45.516	117.392	150.965
Accumulated undistributed profit	-83.233	-94.694	-49.178	68.214	219.179
Gross profit, % of total sales	-11.975	-1.049	3.269	6.615	7.876
Net profit, % of total sales	-11.975	-1.049	3.269	6.615	7.876
ROE, Net profit, % of equity	-19.540	-2.557	10.179	25.149	33.827
ROI, Net profit+interest, % of invest.	-1.358	3.929	7.199	16.867	11.989

Net Income Statement in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
Total sales, incl. sales tax	695.060	1092.760	1402.497	1774.761	1916.763
Less: variable costs, incl. sales tax.	581.227	910.340	1166.780	1471.422	1584.761
Variable margin	113.833	182.421	235.717	303.340	332.002
As % of total sales	16.377	16.694	16.807	17.092	17.321
Non-variable costs, incl. depreciation	129.725	129.855	129.991	130.124	130.257
Operational margin	-15.892	52.562	105.726	173.215	201.744
As % of total sales	-2.286	4.810	7.538	9.760	10.525
Cost of finance	67.741	64.124	60.210	55.823	50.779
Gross profit	-83.633	-11.461	45.516	117.392	150.965
Allowances	0.000	0.000	0.000	0.000	0.000
Taxable profit	-83.633	-11.461	45.516	117.392	150.965
Tax	0.000	0.000	0.000	0.000	0.000
Net profit	-83.633	-11.461	45.516	117.392	150.965
Dividends paid	0.000	0.000	0.000	0.000	0.000
Undistributed profit	-83.633	-11.461	45.516	117.392	150.965
Accumulated undistributed profit . . .	-83.633	-94.694	-49.178	68.214	219.179
Gross profit, % of total sales	-11.975	-1.049	3.245	6.615	7.876
Net profit, % of total sales	-11.975	-1.049	3.245	6.615	7.876
ROE, Net profit, % of equity	-16.580	-2.553	16.179	32.149	33.627
ROI, Net profit+interest, % of invest.	-1.739	3.909	7.199	11.667	11.939

Net Income Statement in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
Total sales, incl. sales tax	2073.664	2239.666	2403.139	2559.374	2699.921
Less: variable costs, incl. sales tax.	1714.527	1851.762	1986.935	2116.115	2232.318
Variable margin	359.137	387.903	416.204	443.259	467.603
As % of total sales	17.319	17.320	17.319	17.319	17.319
Non-variable costs, incl. depreciation	130.390	130.523	130.656	130.789	130.922
Operational margin	228.747	257.380	285.548	312.470	336.681
As % of total sales	11.031	11.492	11.882	12.209	12.470
Cost of finance	44.978	38.307	33.486	27.513	16.850
Gross profit	183.769	219.073	252.062	284.957	319.829
Allowances	0.000	0.000	0.000	0.000	0.000
Taxable profit	183.769	219.073	252.062	284.957	319.829
Tax	0.000	0.000	0.000	0.000	0.000
Net profit	183.769	219.073	252.062	284.957	319.829
Dividends paid	0.000	0.000	0.000	0.000	0.000
Undistributed profit	183.769	219.073	252.062	284.957	319.829
Accumulated undistributed profit	402.948	622.021	874.083	1159.039	1478.868
Gross profit, % of total sales	8.862	9.781	10.489	11.134	11.846
Net profit, % of total sales	8.862	9.781	10.489	11.134	11.846
ROE, Net profit, % of equity	40.934	48.798	56.146	63.474	71.241
ROI, Net profit+interest, % of invest.	13.072	14.135	14.804	15.657	16.774

Net Income Statement in Thousands of US Dollars

Year	2002	2003	2004	2005	2006
Total sales, incl. sales tax	2821.769	2920.268	2996.280	3053.365	3105.590
Less: variable costs, incl. sales tax.	2333.032	2414.503	2477.329	2524.527	2567.687
Variable margin	488.737	505.765	518.951	528.838	537.903
As % of total sales	17.320	17.319	17.320	17.320	17.320
Non-variable costs, incl. depreciation	131.055	131.188	131.321	131.454	131.463
Operational margin	357.682	374.577	387.630	397.384	406.440
As % of total sales	12.676	12.827	12.937	13.015	13.087
Cost of finance	4.593	3.911	3.128	2.227	1.191
Gross profit	353.089	370.665	384.502	395.157	405.249
Allowances	0.000	0.000	0.000	0.000	0.000
Taxable profit	353.089	370.665	384.502	395.157	405.249
Tax	0.000	0.000	0.000	0.000	0.000
Net profit	353.089	370.665	384.502	395.157	405.249
Dividends paid	0.000	0.000	0.000	0.000	0.000
Undistributed profit	353.089	370.665	384.502	395.157	405.249
Accumulated undistributed profit	1831.957	2202.622	2587.124	2982.281	3387.529
Gross profit, % of total sales	12.513	12.693	12.833	12.942	13.049
Net profit, % of total sales	12.513	12.693	12.833	12.942	13.049
ROE, Net profit, % of equity	78.650	82.565	85.647	88.021	90.268
ROI, Net profit+interest, % of invest.	16.962	17.408	17.738	17.970	18.182

Projected Balance Sheets, construction in Thousands of US Dollars

Year	1991
Total assets	898.145
Fixed assets, net of depreciation	0.000
Construction in progress	898.145
Current assets	0.000
Cash, bank	0.000
Cash surplus, finance available	0.000
Loss carried forward	0.000
Loss	0.000
Total liabilities	898.145
Equity capital	448.937
Reserves, retained profit	0.000
Profit	0.000
Long and medium term debt	448.937
Current liabilities	0.000
Bank overdraft, finance required.	0.271
Total debt	449.208
Equity, % of liabilities	49.985

Projected Balance Sheets, Production in Thousands of US Dollars

Year	1992	1993	1994	1995	1996
Total assets	1297.135	1461.657	1572.411	1665.548	1642.807
Fixed assets, net of depreciation	856.725	817.172	777.485	737.[illegible]	697.714
Construction in progress	2.000	2.000	2.000	2.000	2.000
Current assets	351.717	544.499	694.715	873.155	939.537
Cash, bank	3.461	3.492	3.516	3.546	3.557
Cash surplus, finance available	0.000	0.000	0.000	0.000	0.000
Loss carried forward	0.000	80.233	94.694	49.178	0.000
Loss	80.233	11.461	0.000	0.000	0.000
Total liabilities	1297.135	1461.657	1572.411	1665.548	1642.807
Equity capital	448.937	448.937	448.937	448.937	448.937
Reserves, retained profit	0.000	0.000	0.000	0.000	65.214
Profit	0.000	0.000	45.516	117.392	150.965
Long and medium term debt	426.826	401.595	372.156	[illegible]	299.856
Current liabilities	51.199	78.628	99.996	125.382	134.807
Bank overdraft, finance required.	370.173	532.697	605.806	675.309	540.025
Total debt	848.199	1012.920	1077.958	1099.219	974.691
Equity, % of liabilities	34.610	30.710	28.551	26.954	27.327

Projected Balance Sheets, Production in Thousands of US Dollars

Year	1997	1998	1999	2000	2001
Total assets	1678.748	1718.931	1795.773	1899.437	2147.212
Fixed assets, net of depreciatio	657.629	617.411	577.059	574.575	533.959
Construction in progress	2.000	2.000	40.000	2.000	2.000
Current assets	1015.557	1095.978	1175.119	1250.756	1326.657
Cash, bank	3.569	3.582	3.595	3.607	3.618
Cash surplus, finance available	0.000	0.000	0.000	65.462	268.779
Loss carried forward	0.000	0.000	0.000	0.000	0.000
Loss	0.000	0.000	0.000	0.000	0.000
Total liabilities	1678.748	1718.931	1795.773	1899.437	2147.212
Equity capital	448.937	448.937	448.937	448.937	448.937
Reserves, retained profit	219.179	[illegible]	[illegible]	[illegible]	[illegible]
Profit	190.769	[illegible]	[illegible]	[illegible]	[illegible]
Long and medium term debt	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Current liabilities	145.541	[illegible]	[illegible]	[illegible]	[illegible]
Bank overdraft, finance required.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total debt	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Equity, % of liabilities	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Projected Balance Sheets, Production in Thousands of US Dollars

Year	2002	2003	2004	2005	2006
Total assets	2504.153	2876.795	3263.115	3650.301	4053.204
Fixed assets, net of depreciation	493.208	452.305	411.309	370.159	329.001
Construction in progress	2.000	2.000	2.000	2.000	2.000
Current assets	1377.852	1415.575	1462.377	1490.124	1515.336
Cash, bank	3.628	3.675	3.641	3.645	3.657
Cash surplus, finance available	627.466	952.250	1359.731	1756.472	2203.245
Loss carried forward	0.000	0.000	0.000	0.000	0.000
Loss	0.000	0.000	0.000	0.000	0.000
Total liabilities	2504.153	2876.795	3263.116	3650.301	4053.204
Equity capital	448.937	448.937	448.937	448.937	448.937
Reserves, retained profit	1478.868	1831.757	2202.[illegible]	2537.124	2982.[illegible]
Profit	353.029	370.665	334.502	395.157	405.245
Long and medium term debt	26.077	21.254	14.849	7.[illegible]	0.000
Current liabilities	197.183	203.572	209.208	[illegible]	215.773
Bank overdraft, finance required.	0.000	0.000	0.000	0.000	0.000
Total debt	223.260	224.827	224.057	221.[illegible]	215.773
Equity, % of liabilities	17.928	15.608	13.771	12.292	11.076

APPENDIX X

COMFAR© Input Data Entry Forms

1. TEXT VARIABLES

COMFAR - DATEN

1 Project name: Haiti - Bulk Blend - Simple - 1.5:1

2 Date and time:

3 Remarks: Discounted Selling Price

4 Accounting units and currency: Thousands of US Dollars

5 Product name(s)

sub-menu

Product A:	Urea (Granular)
Product B:	Ammonium Sulfate (Standard)
Product C:	20-20-10
Product D:	12-12-20
Product E:	14-14-14
Product F:	

2. GENERAL VARIABLES

COMFAR - DATEN

1 Foreign currency conversion rate: 1.0

2 Local currency conversion rate: 0.6667

3 Duration of construction (in years): (maximum four years if half-yearly, otherwise maximum eight years) 1/2/3/4/5/6/7/8

4 Planning during construction: yearly/half-yearly

5 Cashflow discounting rate (in per cent)

sub-menu

1 Discounting rate for net present value: 15.0

6 Equity and subsidy conditions

sub-menu

	year disbursement starts
1 Foreign equity - o(rdinary):	1
2 Foreign equity - p(referred):	1
3 Foreign subsidy:	1
4 Local equity - o(rdinary):	1
5 Local equity - p(referred):	1
6 Local subsidy:	1

-- COMFAR - DATEN ----

7 Loan and overdraft conditions

-- sub-menu

foreign loan A

1 Year disbursement starts: 1

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): 10

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): 1

6 Interest rate (in per cent per year):

15%	from year	1	through	11
	from year		through	
	from year		through	

-- sub-menu

foreign loan B

1 Year disbursement starts: 9

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): 7

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): 1

6 Interest rate (in per cent per year):

15%	from year	9	through	16
	from year		through	
	from year		through	

-- sub-menu

foreign loan C

1 Year disbursement starts:

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years):

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years):

6 Interest rate (in per cent per year):

	from year		through	
	from year		through	
	from year		through	

-- sub-menu

foreign overdraft

1 Year disbursement starts: 1

6 Interest rate (in per cent per year):

22	from year	1	through	16
	from year		through	
	from year		through	

2. GENERAL VARIABLES

COMFAR - DATEN

local loan A — sub-menu

1 Year disbursement starts: [1]

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): [10]

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): [1]

6 Interest rate (in per cent per year):

15 %	from year	1	through	11
	from year		through	
	from year		through	

local loan B — sub-menu

1 Year disbursement starts:

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years):

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years):

6 Interest rate (in per cent per year):

	from year		through	
	from year		through	
	from year		through	

local loan C — sub-menu

1 Year disbursement starts:

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years);

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years):

6 Interest rate (in per cent per year):

	from year		through	
	from year		through	
	from year		through	

local overdraft — sub-menu

1 Year disbursement starts: [1]

6 Interest rate (in per cent per year)

22	from year	1	through	16
	from year		through	
	from year		through	

3.1 I N I T I A L   F I X E D   I N V E S T M E N T - (f)oreign

Lines	Columns / Description of investment	1 Depreciation % p. a.	2 Depreciation type	3 Sal. v. %	4 Depr.p. years	5 Construction phase ——> per. 1	6 per. 2	7 per. 3	8 Planning period = year/half-year *) per. 4	9 per. 5	10 per. 6	11 per. 7	12 per. 8
1	Land												
2	Site preparation and development												
3	Structures and civil engineering (a)	5.0	1	0	20	152							
4	Structures and civil engineering (b)												
5	Inc. fix. assets (a) constr., transport												
6	Inc. fix. assets (b) technology, start-up	6.67	1	0	15	15							
7	Inc. fix. assets (c) others												
8	Plant, machinery and equipment (a)	6.67	1	0	15	212.8							
9	Plant, machinery and eqipment (b)	12.5	1	0	8	38							
10	Auxiliary & service facilities												
11	Pre-production expenditures					102							
12	Inventory												

3.1 I N I T I A L   F I X E D   I N V E S T M E N T -   (l)ocal

Lines	Columns / Description of investment	1 Depreciation % p. a.	2 Depreciation type	3 Sal. v. %	4 Depr.p. years	5 Construction phase ——> per. 1	6 per. 2	7 per. 3	8 Planning period = year/half-year *) per. 4	9 per. 5	10 per. 6	11 per. 7	12 per. 8
13	Land												
14	Site preparation and development					66							
15	Structures and civil engineering (a)	5	1	0	20	84							
16	Structures and civil engineering (b)												
17	Inc. fix. assets (a) constr., transport												
18	Inc. fix. assets (b) technology, start-up	6.67	1	0	15	1							
19	Inc. fix. assets (c) others												
20	Plant, machinery and equipment (a)					30							
21	Plant, machinery and eqipment (b)												
22	Auxiliary & service facilities												
23	Pre-production expenditures					18							
24	Inventory												

3.3 CURRENT FIXED INVESTMENT - (f)oreign

Lines	Columns / Description of investment	1 Depreciation % p. a.	2 Depreciation type	3 Res. v. %	4 Depr.p. years	5 Production phase year 1	6 year 2	7 year 3	8 year 4	9 year 5	10 year 6	11 year 7	12 year 8	13 year 9	14 year 10	15 year 11	16 Production phase year 12	17 year 13	18 year 14	19 year 15
25	Land																			
26	Site preparation and development																			
27	Structures and civil engineering (a)																			
28	Structures and civil engineering (b)																			
29	Inc. fix. assets (a) constr., transport																			
30	Inc. fix. assets (b) technology, start-up																			
31	Inc. fix. assets (c) others																			
32	Plant, machinery and equipment (a)	6.67	1	0	15	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
33	Plant, machinery and equipment (b)	12.5	1	0	8								38.0							
34	Auxiliary & service facilities																			
35	Pre-production expenditures																			
36	Inventory																			

3.3 CURRENT FIXED INVESTMENT - (l)ocal

Lines	Columns / Description of investment	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		Depreciation % p. a.	Depreciation type	Res. v. %	Depr.p. years	Production phase year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	Production phase year 12	year 13	year 14	year 15
37	Land																			
38	Site preparation and development																			
39	Structures and civil engineering (a)																			
40	Structures and civil engineering (b)																			
41	Inc. fix. assets (a) constr., transport																			
42	Inc. fix. assets (b) technology, start-up																			
43	Inc. fix. assets (c) others																			
44	Plant, machinery and equipment (a)																			
45	Plant, machinery and equipment (b)																			
46	Auxiliary & service facilities																			
47	Pre-production expenditures																			
48	Inventory																			

3.3.1 ANNUAL PRODUCTION COSTS - (f)oreign

Lines	Columns / Description of cost and cost adjustment item	1 Inflat. % p. a.	2 Production phase year 1	3 year 2	4 year 3	5 year 4	6 year 5	7 year 6	8 year 7	9 year 8	10 year 9	11 year 10	12 year 11	13 Production phase year 12	14' year 13	15 year 14	16 year 15
52	Raw material (a)																
53	Raw material (b)																
54	Utilities																
55	Energy																
56	Labour, direct																
57	Maintenance, repairs																
58	Spare parts																
59	Factory overheads																
60	Administration, labour costs																
61	Administration, non-labour																
62	Marketing, labour																
63	Marketing, non-labour																

3.3.2 STANDARD PRODUCTION COSTS - (f)oreign

Lines	Columns / Description of production costs item	1 Product A value/a	2 vari. %	3 Product B value/a	4 vari. %	5 Product C value/a	6 vari. %	7 Product D value/a	8 vari. %	9 Product E value/a	10 vari. %	11 Product F value/a	12 vari. %
64	Raw material (a) 1)	1582.5	100	29.726	100	56.427	100	730.84	100	136.48	100		
65	unit cost 2)	1.0		1.0		1.0		1.0		1.0			
66	Raw material (b) 1)												
67	unit cost 2)												
68	Utilities p.a.												
69	Energy p.a.												
70	Labour, direct p.a.												
71	Maint. & repairs p.a.												
72	Spare parts p.a.												
73	Factory overhead p.a.												
74	Admin. labour p.a.												
75	non-lab. p.a.												
76	Marketing labour p.a.												
77	non-lab. p.a.												
78	total deprec. borne %												

1) enter either quantity (units consumed p. a.) or annual costs
2) enter "1" if annual costs are entered instead of quantity

3.3.1 ANNUAL PRODUCTION COSTS - (l)ocal

Lines	Columns / Description of cost and cost adjustment item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Infl. % p. a.	Production phase										Production phase				
			year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	year 12	year 13	year 14	year 15
82	Raw material (a)																
83	Raw material (b)																
84	Utilities																
85	Energy																
86	Labour, direct																
87	Maintenance, repairs																
88	Spare parts																
89	Factory overheads																
90	Administration, labour costs																
91	Administration, non-labour																
92	Marketing, labour																
93	Marketing, non-labour																

3.3.2 STANDARD PRODUCTION COSTS - (l)ocal

Lines (/l *)	Columns / Description of production costs item		1	2	3	4	5	6	7	8	9	10	11	12
			Product A		Product B		Product C		Product D		Product E		Product F	
			value/a	vari. %	value/a	vari. %	value/a	vari. %	value/a	vari. %	value/a	vari. %	value/a	vari. %
94	Raw material (a)	1)	144.27	100	3.924	100	5.365	100	84.794	100	16.188	100		
95	unit cost	2)	1.0		1.0		1.0		1.0		1.0			
96	Raw material (b)	1)	147.9	100	5.1	100	5.1	100	81.6	100	15.3	100		
97	unit cost	2)	1.0		1.0		1.0		1.0		1.0			
98	Utilities	p.a.	10.822	80.619	0.373	80.619	0.373	80.619	5.971	80.619	1.12	80.619		
99	Energy	p.a.	5.757	37.34	0.198	37.34	0.198	37.34	3.176	37.34	0.595	37.34		
100	Labour, direct	p.a.	22.425	23.277	0.773	23.277	0.773	23.277	12.372	23.277	2.32	23.277		
101	Maint. & repairs	p.a.												
102	Spare parts	p.a.	0.29	0	0.01	0	0.01	0	0.16	0	0.03	0		
103	Factory overhead	p.a.	3.48	0	0.12	0	0.12	0	1.92	0	0.36	0		
104	Admin. labour	p.a.	47.968	0	1.654	0	1.654	0	26.465	0	4.962	0		
105	non-lab.	p.a.												
106	Marketing labour	p.a.												
107	non-lab.	p.a.												

1) enter either quantity (units consumed p. a.) or annual costs
2) enter "1" if annual costs are entered instead of quantity

3.4 PRODUCTION AND SALES - (f)oreign

Lines	Columns / Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Inflat. % p. a.	Production phase											Production phase			
			year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	year 12	year 13	year 14	year 15
	PRODUCT A																
110	Quantity produced/sold																
111	Sales price per unit																
112	Total sales tax																
113	Total other direct sales costs																
114	Total other dir. non-var. costs																
115	Labour costs includ. in 114																
	PRODUCT B																
116	Quantity produced/sold																
117	Sales price per unit																
118	Total sales tax																
119	Total other direct sales costs																
120	Total other dir. non-var. costs																
121	Labour costs includ. in 120																
	PRODUCT C																
122	Quantity produced/sold																
123	Sales price per unit																
124	Total sales tax																
125	Total other direct sales costs																
126	Total other dir. non-var. costs																
127	Labour costs includ. in 126																

3.4 PRODUCTION AND SALES - (f)oreign

Lines	Columns / Description	1 Inflat. % p. a.	2 Production phase year 1	3 year 2	4 year 3	5 year 4	6 year 5	7 year 6	8 year 7	9 year 8	10 year 9	11 year 10	12 year 11	13 Production phase year 12	14 year 13	15 year 14	16 year 15
	PRODUCT D																
128	Quantity produced/sold																
129	Sales price per unit																
130	Total sales tax																
131	Total other direct sales costs																
132	Total other dir. non-var. costs																
133	Labour costs includ. in 132																
	PRODUCT E																
134	Quantity produced/sold																
135	Sales price per unit																
136	Total sales tax																
137	Total other direct sales costs																
138	Total other dir. non-var. costs																
139	Labour costs includ. in 138																
	PRODUCT F																
140	Quantity produced/sold																
141	Sales price per unit																
142	Total sales tax																
143	Total other direct sales costs																
144	Total other dir. non-var. costs																
145	Labour costs includ. in 144																

3.4 PRODUCTION AND SALES - (local)

Lines	Columns / Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Inflat. & p. e.	Production phase year 1	year 2	year 3	year 4	year 5	year 6	year 7	Production phase year 8	year 9	year 10	year 11	year 12	year 13	year 14	year 15
	PRODUCT A																
146	Quantity produced/sold	8700	2126	3245	4099	5016	5236	5666	6119	6566	6993	7377	7709	7979	8186	8342	8484
147	Sales price per unit		0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287
148	Total sales tax																
149	Total other direct sales costs																
150	Total other dir. non-var. costs																
151	Labour costs includ. in 150																
	PRODUCT B																
152	Quantity produced/sold	300	49	103	132	167	181	195	211	226	241	254	266	275	282	288	293
153	Sales price per unit		0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221
154	Total sales tax																
155	Total other direct sales costs																
156	Total other dir. non-var. costs																
157	Labour costs includ. in 156																
	PRODUCT C																
158	Quantity produced/sold	300	82	103	132	167	181	195	211	226	241	254	266	275	282	288	293
159	Sales price per unit		0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314
160	Total sales tax																
161	Total other direct sales costs																
162	Total other dir. non-var. costs																
163	Labour costs includ. in 162																

3.4 PRODUCTION AND SALES - (l)ocal

Lines	Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Inflat. % p. a.	Production phase year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	Production phase year 12	year 13	year 14	year 15
	PRODUCT D																
164	Quantity produced/sold	4800	850	1442	1917	2508	2889	3126	3376	3623	3858	4078	4253	4402	4517	4602	4681
165	Sales price per unit		0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287
166	Total sales tax																
167	Total other direct sales costs																
168	Total other dir. non-var. costs																
169	Labour costs includ. in 168																
	PRODUCT E																
170	Quantity produced/sold	900	164	258	331	502	542	586	633	679	723	763	798	825	847	863	878
171	Sales price per unit		0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307
172	Total sales tax																
173	Total other direct sales costs																
174	Total other dir. non-var. costs																
175	Labour costs includ. in 174																
	PRODUCT F																
176	Quantity produced/sold																
177	Sales price per unit																
178	Total sales tax																
179	Total other direct sales costs																
180	Total other dir. non-var. costs																
181	Labour costs includ. in 180																

3.5 WORKING CAPITAL REQUIREMENTS

Lines	Columns / Description of assets / liabilities	1	2	3	4
		Minimum coverage (in days)			
		Products/costs		Cash in hand	
		foreign	local	foreign	local

ASSETS

182	Accounts receivable/ /cash in hand:	3c	30	15	15

INVENTORIES

183	Raw material (a):	90	90
184	Raw material (b):	90	90
185	Utilities:	30	30
186	Energy:	30	30
187	Spare parts:	360	360
188	Work in progress:	0	0
189	Finished products:	2	2

LIABILITIES

190	Accounts payable:	30	30

3.6 SOURCES OF FINANCE - (f)oreign

Lines	Column / Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		Financial flow of funds (disbursements) by period										Financial flow of funds (disbursements) by period								
		per. 1	per. 2	per. 3	per. 4	per. 5	per. 6	per. 7	per. 8	per. 9	per. 10	per. 11	per. 12	per. 13	per. 14	per. 15	per. 16	per. 17	per. 18	per. 19
	EQUITY, SUBSIDIES AND GRANTS																			
191	ordinary shares	269.68																		
192	preference shares																			
193	subsidies & grants																			
	LOANS AND OVERDRAFTS																			
194	loan A	269.68																		
195	loan B	38																		
196	loan C																			
197	flow of funds drg. const., overdrafts																			

3.6 SOURCES OF FINANCE - (l)ocal

Lines	Column / Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		Financial flow of funds (disbursements) by period										Financial flow of funds (disbursements) by period								
		per. 1	per. 2	per. 3	per. 4	per. 5	per. 6	per. 7	per. 8	per. 9	per. 10	per. 11	per. 12	per. 13	per. 14	per. 15	per. 16	per. 17	per. 18	per. 19
	EQUITY, SUBSIDIES AND GRANTS																			
198	ordinary shares	103.68																		
199	preference shares																			
200	subsidies & grants																			
	LOANS AND OVERDRAFTS																			
201	loan A	103.68																		
202	loan B																			
203	loan C																			
204	flow of funds drg. const., overdrafts																			

3.7 INCOME, TAX AND CASHFLOW

Lines	Columns / Description	1 Income tax 0=constant 1=variable	2 Constant tax rate in % p. a.	3 Tax holidays in years	4 Period to c/f loss. in years	5 Period of tax cred. in years	6 Additional tax on profit distributed (in %) foreign	7 Additional tax on profit distributed (in %) local
205	Income tax descriptors	0	0					

Lines	Columns / Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Annual payments Production phase										Annual payments → Production phase				
		year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	year 12	year 13	year 14	year 15
206	Investment allowance															
207	Depreciation allowance															
208	Income tax adjustment															
209	Variable tax rate (%)															
	PROFIT DISTRIBUTED ON:															
210	preferred equity, foreign															
211	preferred equity, local															
212	ordinary equity, foreign															
213	ordinary equity, local															

1. TEXT VARIABLES

-- COMFAR - DATEN ----

1 Project name:	Haiti - Bulk Blend - Simple - 1.5:1
2 Date and time:	
3 Remarks:	Maximum Selling Price
4 Accounting units and currency:	Thousands of U S Dollars

5 Product name(s)

-- sub-menu -

Product A:	Urea (Granular)
Product B:	Ammonium Sulfate (Standard)
Product C:	20-20-10
Product D:	12-12-20
Product E:	14-14-14
Product F:	

2. GENERAL VARIABLES

-- COMFAR - DATEN ----

1 Foreign currency conversion rate:	1.00
2 Local currency conversion rate:	0.6667
3 Duration of construction (in years): (maximum four years if half-yearly, otherwise maximum eight years)	1/2/3/4/5/6/7/8
4 Planning during construction:	yearly/half-yearly

5 Cashflow discounting rate (in per cent)

-- sub-menu

1 Discounting rate for net present value:	15.0

6 Equity and subsidy conditions

-- sub-menu

	year disbursement starts
1 Foreign equity - o(rdinary):	1
2 Foreign equity - p(referred):	1
3 Foreign subsidy:	1
4 Local equity - o(rdinary):	1
5 Local equity - p(referred):	1
6 Local subsidy:	1

-- COMFAR - DATEN ----

7 Loan and overdraft conditions

-- sub-menu

foreign loan A

1 Year disbursement starts: [1]

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): [10]

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): [1]

6 Interest rate (in per cent per year):

15%	from year	1	through	11
	from year		through	
	from year		through	

-- sub-menu

foreign loan B

1 Year disbursement starts: [9]

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): [7]

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): [1]

6 Interest rate (in per cent per year):

15%	from year	9	through	16
	from year		through	
	from year		through	

-- sub-menu

foreign loan C

1 Year disbursement starts: [ ]

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): [ ]

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): [ ]

6 Interest rate (in per cent per year):

	from year		through	
	from year		through	
	from year		through	

-- sub-menu

foreign overdraft

1 Year disbursement starts: [1]

6 Interest rate (in per cent per year):

22	from year	1	through	16
	from year		through	
	from year		through	

2. GENERAL VARIABLES

COMFAR - DATEN

local loan A — sub-menu

1 Year disbursement starts: 1

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): 10

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): 1

6 Interest rate (in per cent per year):

15 %	from year	1	through	11
	from year		through	
	from year		through	

local loan B — sub-menu

1 Year disbursement starts:

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years):

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years):

6 Interest rate (in per cent per year):

	from year		through	
	from year		through	
	from year		through	

local loan C — sub-menu

1 Year disbursement starts:

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years):

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years):

6 Interest rate (in per cent per year):

	from year		through	
	from year		through	
	from year		through	

local overdraft — sub-menu

1 Year disbursement starts: 1

6 Interest rate (in per cent per year)

22	from year	1	through	16
	from year		through	
	from year		through	

3.1 INITIAL FIXED INVESTMENT - (f)oreign

Lines	Columns / Description of investment	1 Depreciation % p. a.	2 Depreciation type	3 Sal. v. %	4 Depr.p. years	5 Construction phase ⟶ per. 1	6 per. 2	7 per. 3	8 Planning period = year/half-year *) per. 4	9 per. 5	10 per. 6	11 per. 7	12 per. 8
1	Land												
2	Site preparation and development												
3	Structures and civil engineering (a)	5.0	1	0	20	152							
4	Structures and civil engineering (b)												
5	Inc. fix. assets (a) constr., transport												
6	Inc. fix. assets (b) technology, start-up	6.67	1	0	15	15							
7	Inc. fix. assets (c) others												
8	Plant, machinery and equipment (a)	6.67	1	0	15	212.8							
9	Plant, machinery and eqipment (b)	12.5	1	0	8	38							
10	Auxiliary & service facilities												
11	Pre-production expenditures					102							
12	Inventory												

3.1 INITIAL FIXED INVESTMENT - (l)ocal

Lines	Columns / Description of investment	1 Depreciation % p. a.	2 Depreciation type	3 Sal. v. %	4 Depr.p. years	5 Construction phase ⟶ per. 1	6 per. 2	7 per. 3	8 Planning period = year/half-year *) per. 4	9 per. 5	10 per. 6	11 per. 7	12 per. 8
13	Land												
14	Site preparation and development					66							
15	Structures and civil engineering (a)	5	1	0	20	84							
16	Structures and civil engineering (b)												
17	Inc. fix. assets (a) constr., transport												
18	Inc. fix. assets (b) technology, start-up	6.67	1	0	15	1							
19	Inc. fix. assets (c) others												
20	Plant, machinery and equipment (a)					30							
21	Plant, machinery and eqipment (b)												
22	Auxiliary & service facilities												
23	Pre-production expenditures					18							
24	Inventory												

3.3 CURRENT FIXED INVESTMENT - (f)oreign

Lines	Columns / Description of investment	1 Depreciation % p. a.	2 Depreciation type	3 Res. v. %	4 Depr.p. years	5 Production phase year 1	6 year 2	7 year 3	8 year 4	9 year 5	10 year 6	11 year 7	12 year 8	13 year 9	14 year 10	15 year 11	16 Production phase year 12	17 year 13	18 year 14	19 year 15
25	Land																			
26	Site preparation and development																			
27	Structures and civil engineering (a)																			
28	Structures and civil engineering (b)																			
29	Inc. fix. assets (a) constr., transport																			
30	Inc. fix. assets (b) technology, start-up																			
31	Inc. fix. assets (c) others																			
32	Plant, machinery and equipment (a)	6.67	1	0	15	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
33	Plant, machinery and equipment (b)	12.5	1	0	8								38.0							
34	Auxiliary & service facilities																			
35	Pre-production expenditures																			
36	Inventory																			

3.3 C U R R E N T   F I X E D   I N V E S T M E N T -   (local)

Lines	Columns	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Description of investment	Depreciation % p. a.	Depreciation type	Res. v. %	Depr.p. years	Production phase year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	year 12	year 13	year 14	year 15
37	Land																			
38	Site preparation and development																			
39	Structures and civil engineering (a)																			
40	Structures and civil engineering (b)																			
41	Inc. fix. assets (a) constr., transport																			
42	Inc. fix. assets (b) technology, start-up																			
43	Inc. fix. assets (c) others																			
44	Plant, machinery and equipment (a)																			
45	Plant, machinery and equipment (b)																			
46	Auxiliary & service facilities																			
47	Pre-production expenditures																			
48	Inventory																			

3.3.1 ANNUAL PRODUCTION COSTS - (f)oreign

Lines	Columns / Description of cost and cost adjustment item	1	2	3	4	5	6	7	8	9	10	11	12	13	14'	15	16
		Inflat. % p. a.	P r o d u c t i o n p h a s e ----------											P r o d u c t i o n p h a s e			
			year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	year 12	year 13	year 14	year 15
52	Raw material (a)																
53	Raw material (b)																
54	Utilities																
55	Energy																
56	Labour, direct																
57	Maintenance, repairs																
58	Spare parts																
59	Factory overheads																
60	Administration, labour costs																
61	Administration, non-labour																
62	Marketing, labour																
63	Marketing, non-labour																

3.3.2 STANDARD PRODUCTION COSTS - (f)oreign

Lines	Columns / Description of production costs item	1	2	3	4	5	6	7	8	9	10	11	12
		Product A		Product B		Product C		Product D		Product E		Product F	
		value/a	vari. %	value/a	vari. %	value/a	vari. %	value/a	vari. %	value/a	vari. %	value/a	vari. %
64	Raw material (a) 1)	1582.5	100	29.726	100	56.427	100	730.84	100	136.48	100		
65	unit cost 2)	1.0		1.0		1.0		1.0		1.0			
66	Raw material (b) 1)												
67	unit cost 2)												
68	Utilities p.a.												
69	Energy p.a.												
70	Labour, direct p.a.												
71	Maint. & repairs p.a.												
72	Spare parts p.a.												
73	Factory overhead p.a.												
74	Admin. labour p.a.												
75	non-lab. p.a.												
76	Marketing labour p.a.												
77	non-lab. p.a.												
78	total deprec. borne %												

1) enter either quantity (units consumed p. a.) or annual costs
2) ente[redacted] if a[redacted] cos[redacted]e en[redacted] ins[redacted] of q[redacted]ty

3.3.1 ANNUAL PRODUCTION COSTS - (l)ocal

Lines	Columns / Description of cost and cost adjustment item	1 Inflat. % p. a.	2 Production phase year 1	3 year 2	4 year 3	5 year 4	6 year 5	7 year 6	8 year 7	9 year 8	10 year 9	11 year 10	12 year 11	13 Production phase year 12	14 year 13	15 year 14	16 year 15
82	Raw material (a)																
83	Raw material (b)																
84	Utilities																
85	Energy																
86	Labour, direct																
87	Maintenance, repairs																
88	Spare parts																
89	Factory overheads																
90	Administration, labour costs																
91	Administration, non-labour																
92	Marketing, labour																
93	Marketing, non-labour																

3.3.2 STANDARD PRODUCTION COSTS - (l)ocal

Lines (/l *)	Columns / Description of production costs item	1 Product A value/a	2 Product A vari. %	3 Product B value/a	4 Product B vari. %	5 Product C value/a	6 Product C vari. %	7 Product D value/a	8 Product D vari. %	9 Product E value/a	10 Product E vari. %	11 Product F value/a	12 Product F vari. %
94	Raw material (a) 1)	144.27	100	3.924	100	5.365	100	84.798	100	16.188	100		
95	unit cost 2)	1.0		1.0		1.0		1.0		1.0			
96	Raw material (b) 1)	147.9	100	5.1	100	5.1	100	81.6	100	15.3	100		
97	unit cost 2)	1.0		1.0		1.0		1.0		1.0			
98	Utilities p.a.	10.822	80.619	0.373	80.619	0.373	80.619	5.971	80.619	1.12	80.619		
99	Energy p.a.	5.757	37.34	0.198	37.34	0.198	37.34	3.176	37.34	0.595	37.34		
100	Labour, direct p.a.	22.425	23.277	0.773	23.277	0.773	23.277	12.372	23.277	2.32	23.277		
101	Maint. & repairs p.a.												
102	Spare parts p.a.	0.29	0	0.01	0	0.01	0	0.16	0	0.03	0		
103	Factory overhead p.a.	3.48	0	0.12	0	0.12	0	1.92	0	0.36	0		
104	Admin. labour p.a.	47.968	0	1.654	0	1.654	0	26.465	0	4.962	0		
105	non-lab. p.a.												
106	Marketing labour p.a.												
107	non-lab. p.a.												

1) enter either quantity (units consumed p. a.) or annual costs
2) enter "1" if annual costs are entered instead of quantity

2.4 PRODUCTION AND SALES - (f)oreign

Lines	Columns / Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Inflat. % p.a.	Production phase year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	Production phase year 12	year 13	year 14	year 15
	PRODUCT A																
110	Quantity produced/sold																
111	Sales price per unit																
112	Total sales tax																
113	Total other direct sales costs																
114	Total other dir. non-var. costs																
115	Labour costs includ. in 114																
	PRODUCT B																
116	Quantity produced/sold																
117	Sales price per unit																
118	Total sales tax																
119	Total other direct sales costs																
120	Total other dir. non-var. costs																
121	Labour costs includ. in 120																
	PRODUCT C																
122	Quantity produced/sold																
123	Sales price per unit																
124	Total sales tax																
125	Total other direct sales costs																
126	Total other dir. non-var. costs																
127	Labour costs includ. in 126																

3.4 PRODUCTION AND SALES - (f)oreign

Lines	Columns / Description	1 Inflat. % p. a.	2 Production phase year 1	3 year 2	4 year 3	5 year 4	6 year 5	7 year 6	8 year 7	9 year 8	10 year 9	11 year 10	12 year 11	13 Production phase year 12	14 year 13	15 year 14	16 year 15
	PRODUCT D																
128	Quantity produced/sold																
129	Sales price per unit																
130	Total sales tax																
131	Total other direct sales costs																
132	Total other dir. non-var. costs																
133	Labour costs includ. in 132																
	PRODUCT E																
134	Quantity produced/sold																
135	Sales price per unit																
136	Total sales tax																
137	Total other direct sales costs																
138	Total other dir. non-var. costs																
139	Labour costs includ. in 138																
	PRODUCT F																
140	Quantity produced/sold																
141	Sales price per unit																
142	Total sales tax																
143	Total other direct sales costs																
144	Total other dir. non-var. costs																
145	Labour costs includ. in 144																

3.4 PRODUCTION AND SALES - (local)

Lines	Columns / Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Inflat. % p.a.	Production phase year 1	year 2	year 3	year 4	year 5	year 6	year 7	Production phase year 8	year 9	year 10	year 11	year 12	year 13	year 14	year 15
	PRODUCT A																
146	Quantity produced/sold	8700	2126	3245	4099	5016	5236	5666	6119	6566	6993	7377	7709	7979	8186	8342	8484
147	Sales price per unit		0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318
148	Total sales tax																
149	Total other direct sales costs																
150	Total other dir. non-var. costs																
151	Labour costs includ. in 150																
	PRODUCT B																
152	Quantity produced/sold	300	49	103	132	167	181	195	211	226	241	254	266	275	282	288	293
153	Sales price per unit		0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244
154	Total sales tax																
155	Total other direct sales costs																
156	Total other dir. non-var. costs																
157	Labour costs includ. in 156																
	PRODUCT C																
158	Quantity produced/sold	300	82	103	132	167	181	195	211	226	241	254	266	275	282	288	293
159	Sales price per unit		0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347
160	Total sales tax																
161	Total other direct sales costs																
162	Total other dir. non-var. costs																
163	Labour costs includ. in 162																

3.4 PRODUCTION AND SALES - (1)ocal

Lines	Columns / Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Inflat. % p. a.	Production phase year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	Production phase year 12	year 13	year 14	year 15
	PRODUCT D																
164	Quantity produced/sold	4800	850	1442	1917	2508	2889	3126	3376	3623	3858	4070	4253	4402	4517	4602	4681
165	Sales price per unit		0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318
166	Total sales tax																
167	Total other direct sales costs																
168	Total other dir. non-var. costs																
169	Labour costs includ. in 168																
	PRODUCT E																
170	Quantity produced/sold	900	164	258	331	502	542	586	633	679	723	763	798	825	847	863	878
171	Sales price per unit		0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340
172	Total sales tax																
173	Total other direct sales costs																
174	Total other dir. non-var. costs																
175	Labour costs includ. in 174																
	PRODUCT F																
176	Quantity produced/sold																
177	Sales price per unit																
178	Total sales tax																
179	Total other direct sales costs																
180	Total other dir. non-var. costs																
181	Labour costs includ. in 180																

3.5 WORKING CAPITAL REQUIREMENTS

Lines	Columns / Description of assets/liabilities	1	2	3	4
		Minimum coverage (in days)			
		Products/costs		Cash in hand	
		foreign	local	foreign	local

ASSETS

Lines	Description	1	2	3	4
182	Accounts receivable/ /cash in hand:	30	30	15	15

INVENTORIES

Lines	Description	1	2
183	Raw material (a):	90	90
184	Raw material (b):	90	90
185	Utilities:	30	30
186	Energy:	30	30
187	Spare parts:	360	360
188	Work in progress:	0	0
189	Finished products:	2	2

LIABILITIES

Lines	Description	1	2
190	Accounts payable:	30	30

3.6 SOURCES OF FINANCE - (f)oreign

Financial flow of funds (disbursements) by period

Lines	Columns	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Description	per. 1	per. 2	per. 3	per. 4	per. 5	per. 6	per. 7	per. 8	per. 9	per. 10	per. 11	per. 12	per. 13	per. 14	per. 15	per. 16	per. 17	per. 18	per. 19
	EQUITY, SUBSIDIES AND GRANTS																			
191	ordinary shares	269.68																		
192	preference shares																			
193	subsidies & grants																			
	LOANS AND OVERDRAFTS																			
194	loan A	269.68																		
195	loan B	38																		
196	loan C																			
197	flow of funds drg. const., overdrafts																			

3.6 SOURCES OF FINANCE - (l)ocal

Financial flow of funds (disbursements) by period

Lines	Columns	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Description	per. 1	per. 2	per. 3	per. 4	per. 5	per. 6	per. 7	per. 8	per. 9	per. 10	per. 11	per. 12	per. 13	per. 14	per. 15	per. 16	per. 17	per. 18	per. 19
	EQUITY, SUBSIDIES AND GRANTS																			
198	ordinary shares	103.68																		
199	preference shares																			
200	subsidies & grants																			
	LOANS AND OVERDRAFTS																			
201	loan A	103.68																		
202	loan B																			
203	loan C																			
204	flow of funds drg. const., overdrafts																			

3.7 INCOME, TAX AND CASHFLOW

Lines	Columns / Description	1 Income tax 0=constant 1=variable	2 Constant tax rate in % p. a.	3 Tax holidays in years	4 Period to c/f loss. in years	5 Period of tax cred. in years	6 Additional tax on profit distributed (in %) foreign	7 Additional tax on profit distributed (in %) local
205	Income tax descriptors	0	0					

Lines	Columns / Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Annual payments										Annual payments				
		Production phase										→ Production phase				
		year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	year 12	year 13	year 14	year 15
206	Investment allowance															
207	Depreciation allowance															
208	Income tax adjustment															
209	Variable tax rate (%)															
	PROFIT DISTRIBUTED ON:															
210	preferred equity, foreign															
211	preferred equity, local															
212	ordinary equity, foreign															
213	ordinary equity, local															

1. TEXT VARIABLES

-- COMPAR - DATEN ----

1 Project name:	Haiti - Bulk Blend - Optimum - 1.5:1
2 Date and time:	
3 Remarks:	
	Discounted Selling Price
4 Accounting units and currency:	Thousands of US Dollars

5 Product name(s)

-- sub-menu

Product A:	Urea (Granular)
Product B:	Ammonium Sulfate (Standard)
Product C:	20-20-10
Product D:	12-12-20
Product E:	14-14-14
Product F:	

2. GENERAL VARIABLES

-- COMFAR - DATEN ----

1 Foreign currency conversion rate: 1.0

2 Local currency conversion rate: 0.6667

3 Duration of construction (in years): 1/2/3/4/5/6/7/8
(maximum four years if half-yearly, otherwise maximum eight years)

4 Planning during construction: yearly/half-yearly

5 Cashflow discounting rate (in per cent)

-- sub-menu

1 Discounting rate for net present value: 15.0

6 Equity and subsidy conditions

-- sub-menu

	year disbursement starts
1 Foreign equity - o(rdinary):	1
2 Foreign equity - p(referred):	1
3 Foreign subsidy:	1
4 Local equity - o(rdinary):	1
5 Local equity - p(referred):	1
6 Local subsidy:	1

2. GENERAL VARIABLES

-- COMFAR - DATEN ----

7 Loan and overdraft conditions

-- sub-menu

foreign loan A

1 Year disbursement starts: [1]

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): [10]

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): [1]

6 Interest rate (in per cent per year):

15%	from year	1	through	11
	from year		through	
	from year		through	

-- sub-menu

foreign loan B

1 Year disbursement starts: [9]

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): [7]

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): [1]

6 Interest rate (in per cent per year):

15%	from year	9	through	16
	from year		through	
	from year		through	

-- sub-menu

foreign loan C

1 Year disbursement starts: [ ]

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): [ ]

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): [ ]

6 Interest rate (in per cent per year):

	from year		through	
	from year		through	
	from year		through	

-- sub-menu

foreign overdraft

1 Year disbursement starts: [1]

6 Interest rate (in per cent per year):

22	from year	1	through	16
	from year		through	
	from year		through	

2. GENERAL VARIABLES

--- COMFAR - DATEN ----

--- sub-menu

local loan A

1 Year disbursement starts: [1]

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): [10]

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): [1]

6 Interest rate (in per cent per year):

15 %	from year	1	through	11
	from year		through	
	from year		through	

--- sub-menu

local loan B

1 Year disbursement starts: [ ]

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): [ ]

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): [ ]

6 Interest rate (in per cent per year):

	from year		through	
	from year		through	
	from year		through	

--- sub-menu

local loan C

1 Year disbursement starts: [ ]

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): [ ]

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): [ ]

6 Interest rate (in per cent per year):

	from year		through	
	from year		through	
	from year		through	

--- sub-menu

local overdraft

1 Year disbursement starts: [1]

6 Interest rate (in per cent per year)

22	from year	1	through	16
	from year		through	
	from year		through	

3.1 I N I T I A L F I X E D I N V E S T M E N T - (f)oreign

Lines	Columns / Description of investment	1 Depreciation % p. a.	2 Depreciation type	3 Sal. v. %	4 Depr.p. years	5 Construction phase ⟶ per. 1	6 per. 2	7 per. 3	8 Planning period = year/half-year *) per. 4	9 per. 5	10 per. 6	11 per. 7	12 per. 8
1	Land												
2	Site preparation and development												
3	Structures and civil engineering (a)	5	1	0	20	207							
4	Structures and civil engineering (b)												
5	Inc. fix. assets (a) constr., transport												
6	Inc. fix. assets (b) technology, start-up	6.67	1	0	15	50							
7	Inc. fix. assets (c) others												
8	Plant, machinery and equipment (a)	6.67	1	0	15	288.8							
9	Plant, machinery and eqipment (b)	12.5	1	0	8	38							
10	Auxiliary & service facilities												
11	Pre-production expenditures					118							
12	Inventory												

3.1 I N I T I A L F I X E D I N V E S T M E N T - (l)ocal

Lines	Columns / Description of investment	1 Depreciation % p. a.	2 Depreciation type	3 Sal. v. %	4 Depr.p. years	5 Construction phase ⟶ per. 1	6 per. 2	7 per. 3	8 Planning period = year/half-year *) per. 4	9 per. 5	10 per. 6	11 per. 7	12 per. 8
13	Land												
14	Site preparation and development					66							
15	Structures and civil engineering (a)	5	1	0	20	109							
16	Structures and civil engineering (b)												
17	Inc. fix. assets (a) constr., transport												
18	Inc. fix. assets (b) technology, start-up	6.67	1	0	15	2							
19	Inc. fix. assets (c) others												
20	Plant, machinery and equipment (a)					45							
21	Plant, machinery and eqipment (b)												
22	Auxiliary & service facilities												
23	Pre-production expenditures					22							
24	Inventory												

3.2 CURRENT FIXED INVESTMENT - (f)oreign

Lines	Columns / Description of investment	1 Depreciation % p. a.	2 Depreciation type	3 Res. v. %	4 Depr.p. years	5 Production phase year 1	6 year 2	7 year 3	8 year 4	9 year 5	10 year 6	11 year 7	12 year 8	13 year 9	14 year 10	15 year 11	16 Production phase year 12	17 year 13	18 year 14	19 year 15
25	Land																			
26	Site preparation and development																			
27	Structures and civil engineering (a)																			
28	Structures and civil engineering (b)																			
29	Inc. fix. assets (a) constr., transport																			
30	Inc. fix. assets (b) technology, start-up																			
31	Inc. fix. assets (c) others																			
32	Plant, machinery and equipment (a)	6.67	1	0	15	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
33	Plant, machinery and equipment (b)	12.5	1	0	8								38.0							
34	Auxiliary & service facilities																			
35	Pre-production expenditures																			
36	Inventory																			

3.2 CURRENT FIXED INVESTMENT - (l)ocal

Lines	Columns / Description of investment	1 Depreciation % p. a.	2 Depreciation type	3 Res. v. %	4 Depr.p. years	5 Production phase year 1	6 year 2	7 year 3	8 year 4	9 year 5	10 year 6	11 year 7	12 year 8	13 year 9	14 year 10	15 year 11	16 Production phase year 12	17 year 13	18 year 14	19 year 15
37	Land																			
38	Site preparation and development																			
39	Structures and civil engineering (a)																			
40	Structures and civil engineering (b)																			
41	Inc. fix. assets (a) constr., transport																			
42	Inc. fix. assets (b) technology, start-up																			
43	Inc. fix. assets (c) others																			
44	Plant, machinery and equipment (a)																			
45	Plant, machinery and equipment (b)																			
46	Auxiliary & service facilities																			
47	Pre-production expenditures																			
48	Inventory																			

3.3.1 ANNUAL PRODUCTION COSTS - (f)oreign

Lines	Columns / Description of cost and cost adjustment item	1 Inflat. % p. a.	2 Production phase year 1	3 year 2	4 year 3	5 year 4	6 year 5	7 year 6	8 year 7	9 year 8	10 year 9	11 year 10	12 year 11	13 Production phase year 12	14 year 13	15 year 14	16 year 15
52	Raw material (a)																
53	Raw material (b)																
54	Utilities																
55	Energy																
56	Labour, direct																
57	Maintenance, repairs																
58	Spare parts																
59	Factory overheads																
60	Administration, labour costs																
61	Administration, non-labour																
62	Marketing, labour																
63	Marketing, non-labour																

3.3.2 STANDARD PRODUCTION COSTS - (f)oreign

Lines	Columns / Description of production costs item	1 Product A value/a	2 Product A vari. %	3 Product B value/a	4 Product B vari. %	5 Product C value/a	6 Product C vari. %	7 Product D value/a	8 Product D vari. %	9 Product E value/a	10 Product E vari. %	11 Product F value/a	12 Product F vari. %
64	Raw material (a) 1)	1439.1	100	24.813	100	52.141	100	671.240	100	125.76	100		
65	unit cost 2)												
66	Raw material (b) 1)												
67	unit cost 2)												
68	Utilities p.a.												
69	Energy p.a.												
70	Labour, direct p.a.												
71	Maint. & repairs p.a.												
72	Spare parts p.a.												
73	Factory overhead p.a.												
74	Admin. labour p.a.												
75	non-lab. p.a.												
76	Marketing labour p.a.												
77	non-lab. p.a.												
78	total deprec. borne %												

1) enter either quantity (units consumed p. a.) or annual costs
2) enter "1" if annual costs are entered instead of quantity

3.3.1 ANNUAL PRODUCTION COSTS - (l)ocal

Lines	Columns / Description of cost and cost adjustment item	1 Inflat. % p. a.	2 Production phase year 1	3 year 2	4 year 3	5 year 4	6 year 5	7 year 6	8 year 7	9 year 8	10 year 9	11 year 10	12 year 11	13 Production phase year 12	14 year 13	15 year 14	16 year 15
82	Raw material (a)																
83	Raw material (b)																
84	Utilities																
85	Energy																
86	Labour, direct																
87	Maintenance, repairs																
88	Spare parts																
89	Factory overheads																
90	Administration, labour costs																
91	Administration, non-labour																
92	Marketing, labour																
93	Marketing, non-labour																

3.3.2 STANDARD PRODUCTION COSTS - (l)ocal

Lines [/l *)	Columns / Description of production costs item	1 Product A value/a	2 Product A vari. %	3 Product B value/a	4 Product B vari. %	5 Product C value/a	6 Product C vari. %	7 Product D value/a	8 Product D vari. %	9 Product E value/a	10 Product E vari. %	11 Product F value/a	12 Product F vari. %
94	Raw material (a) 1)	107.53	100	2.657	100	4.236	100	69.118	100	13.362	100		
95	unit cost 2)	1.0		1.0		1.0		1.0		1.0			
96	Raw material (b) 1)	147.9	100	5.1	100	5.1	100	81.6	100	15.3	100		
97	unit cost 2)	1.0		1.0		1.0		1.0		1.0			
98	Utilities p.a.	10.822	80.619	0.373	80.619	0.373	80.619	5.971	80.619	1.120	80.619		
99	Energy p.a.	5.757	37.34	0.198	37.34	0.198	37.34	3.176	37.34	0.595	37.34		
100	Labour, direct p.a.	22.425	23.277	0.773	23.277	0.773	23.277	12.332	23.277	2.32	23.277		
101	Maint. & repairs p.a.												
102	Spare parts p.a.	0.29	0	0.010	0	0.010	0	0.160	0	0.030	0		
103	Factory overhead p.a.	3.48	0	0.12	0	0.12	0	1.92	0	0.36	0		
104	Admin. labour p.a.	47.968	0	1.654	0	1.654	0	26.465	0	4.962	0		
105	non-lab. p.a.												
106	Marketing labour p.a.												
107	non-lab. p.a.												

3.4 PRODUCTION AND SALES - (l)ocal

PRODUCT A

Lines	Description	1 Inflat. % p.a.	2 year 1	3 year 2	4 year 3	5 year 4	6 year 5	7 year 6	8 year 7	9 year 8	10 year 9	11 year 10	12 year 11	13 year 12	14 year 13	15 year 14	16 year 15
146	Quantity produced/sold	8700	2126	3245	4099	5016	5236	5666	6119	6566	6993	7377	7709	7979	8186	8342	8484
147	Sales price per unit		0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287
148	Total sales tax																
149	Total other direct sales costs																
150	Total other dir. non-var. costs																
151	Labour costs includ. in 150																

PRODUCT B

Lines	Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
152	Quantity produced/sold	300	49	103	132	167	181	195	211	226	241	254	266	275	282	288	293
153	Sales price per unit		0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221	0.221
154	Total sales tax																
155	Total other direct sales costs																
156	Total other dir. non-var. costs																
157	Labour costs includ. in 156																

PRODUCT C

Lines	Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
158	Quantity produced/sold	300	82	103	132	167	181	195	211	226	241	254	266	275	282	288	293
159	Sales price per unit		0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314	0.314
160	Total sales tax																
161	Total other direct sales costs																
162	Total other dir. non-var. costs																
163	Labour costs includ. in 162																

3.4 PRODUCTION AND SALES - (local)

Lines	Column / Description	1 Inflat. % p.a.	2 Production phase year 1	3 year 2	4 year 3	5 year 4	6 year 5	7 year 6	8 year 7	9 year 8	10 year 9	11 year 10	12 year 11	13 Production phase year 12	14 year 13	15 year 14	16 year 15
	PRODUCT D																
164	Quantity produced/sold	4800	850	1442	1917	2508	2889	3126	3376	3623	3858	4070	4253	4402	4517	4602	4681
165	Sales price per unit		0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287
166	Total sales tax																
167	Total other direct sales costs																
168	Total other dir. non-var. costs																
169	Labour costs includ. in 168																
	PRODUCT E																
170	Quantity produced/sold	900	164	258	331	502	542	586	633	679	723	763	798	825	847	863	878
171	Sales price per unit		0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307
172	Total sales tax																
173	Total other direct sales costs																
174	Total other dir. non-var. costs																
175	Labour costs includ. in 174																
	PRODUCT F																
176	Quantity produced/sold																
177	Sales price per unit																
178	Total sales tax																
179	Total other direct sales costs																
180	Total other dir. non-var. costs																
181	Labour costs includ. in 180																

3.5 WORKING CAPITAL REQUIREMENTS

Lines	Columns / Description of assets/liabilities	1	2	3	4
		Minimum coverage (in days)			
		Products/costs		Cash in hand	
		foreign	local	foreign	local

ASSETS

Lines	Description	1	2	3	4
182	Accounts receivable/ /cash in hand:	30	30	15	15

INVENTORIES

Lines	Description	1	2
183	Raw material (a):	180	180
184	Raw material (b):	180	180
185	Utilities:	30	30
186	Energy:	30	30
187	Spare parts:	360	360
188	Work in progress:	0	0
189	Finished products:	2	2

LIABILITIES

Lines	Description	1	2
190	Accounts payable:	30	30

3.6 SOURCES OF FINANCE - (f)oreign

Lines	Description	per. 1	per. 2	per. 3	per. 4	per. 5	per. 6	per. 7	per. 8	per. 9	per. 10	per. 11	per. 12	per. 13	per. 14	per. 15	per. 16	per. 17	per. 18	per. 19
	Columns	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		Financial flow of funds (disbursements) by period										Financial flow of funds (disbursements) by period								
	EQUITY, SUBSIDIES AND GRANTS																			
191	ordinary shares	364.236																		
192	preference shares																			
193	subsidies & grants																			
	LOANS AND OVERDRAFTS																			
194	loan A	364.236																		
195	loan B	39																		
196	loan C																			
197	flow of funds drg. const., overdrafts																			

3.6 SOURCES OF FINANCE - (l)ocal

Lines	Description	per. 1	per. 2	per. 3	per. 4	per. 5	per. 6	per. 7	per. 8	per. 9	per. 10	per. 11	per. 12	per. 13	per. 14	per. 15	per. 16	per. 17	per. 18	per. 19
	Columns	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		Financial flow of funds (disbursements) by period										Financial flow of funds (disbursements) by period								
	EQUITY, SUBSIDIES AND GRANTS																			
198	ordinary shares	127.046																		
199	preference shares																			
200	subsidies & grants																			
	LOANS AND OVERDRAFTS																			
201	loan A	127.045																		
202	loan B																			
203	loan C																			
204	flow of funds drg. const., overdrafts																			

[illegible].7 INCOME, TAX AND CASHFLOW

Lines	Columns / Description	1 Income tax 0=constant 1=variable	2 Constant tax rate in % p. a.	3 Tax holidays in years	4 Period to c/f loss, in years	5 Period of tax cred. in years	6 Additional tax on profit distributed (in %) foreign	7 local
205	Income tax descriptors	0	0					

Lines	Columns / Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Annual payments Production phase														
		year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	year 12	year 13	year 14	year 15
206	Investment allowance															
207	Depreciation allowance															
208	Income tax adjustment															
209	Variable tax rate (%)															
	PROFIT DISTRIBUTED ON:															
210	preferred equity, foreign															
211	preferred equity, local															
212	ordinary equity, foreign															
213	ordinary equity, local															

1. TEXT VARIABLES

-- COMFAR - DATEN ----

1	Project name:	Haiti - Bulk Blend - Optimum - 1.5:1
2	Date and time:	
3	Remarks:	Maximum Selling Price
4	Accounting units and currency:	Thousands of US Dollars

5 Product name(s)

-- sub-menu -

Product A:	Urea (Granular)
Product B:	Ammonium Sulfate (Standard)
Product C:	20-20-10
Product D:	12-12-20
Product E:	14-14-14
Product F:	

2. GENERAL VARIABLES

-- COMFAR - DATEN ----

1 Foreign currency conversion rate: 1.00

2 Local currency conversion rate: 0.6667

3 Duration of construction (in years): 1/2/3/4/5/6/7/8
(maximum four years if half-yearly, otherwise maximum eight years)

4 Planning during construction: yearly/half-yearly

5 Cashflow discounting rate (in per cent)

-- sub-menu

1 Discounting rate for net present value: 15.0

6 Equity and subsidy conditions

-- sub-menu

		year disbursement starts
1	Foreign equity - o(rdinary):	1
2	Foreign equity - p(referred):	1
3	Foreign subsidy:	1
4	Local equity - o(rdinary):	1
5	Local equity - p(referred):	1
6	Local subsidy:	1

2. GENERAL VARIABLES

7 Loan and overdraft conditions

foreign loan A — sub-menu

1 Year disbursement starts: 1

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): 10

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): 1

6 Interest rate (in per cent per year):

15%	from year	1	through	11
	from year		through	
	from year		through	

foreign loan B — sub-menu

1 Year disbursement starts: 9

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): 7

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): 1

6 Interest rate (in per cent per year):

15%	from year	9	through	16
	from year		through	
	from year		through	

foreign loan C — sub-menu

1 Year disbursement starts:

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years):

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years):

6 Interest rate (in per cent per year):

	from year		through	
	from year		through	
	from year		through	

foreign overdraft — sub-menu

1 Year disbursement starts: 1

6 Interest rate (in per cent per year):

22	from year	1	through	16
	from year		through	
	from year		through	

2. GENERAL VARIABLES

COMFAR - DATEN

local loan A — sub-menu

1 Year disbursement starts: 1

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years): 10

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years): 1

6 Interest rate (in per cent per year):

15 %	from year	1	through	11
	from year		through	
	from year		through	

local loan B — sub-menu

1 Year disbursement starts:

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years):

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years):

6 Interest rate (in per cent per year):

	from year		through	
	from year		through	
	from year		through	

local loan C — sub-menu

1 Year disbursement starts:

2 Amortization type: constant principal/annuity/profile

3 Amortization period (in years):

4 Amortization paid: yearly/half-yearly/quarterly

5 Grace period (in years):

6 Interest rate (in per cent per year):

	from year		through	
	from year		through	
	from year		through	

local overdraft — sub-menu

1 Year disbursement starts: 1

6 Interest rate (in per cent per year)

22	from year	1	through	10
	from year		through	
	from year		through	

3.1 INITIAL FIXED INVESTMENT - (f)oreign

Lines	Columns / Description of investment	1 Depreciation % p. a.	2 Depreciation type	3 Sal. v. %	4 Depr.p. years	5 Construction phase → per. 1	6 per. 2	7 per. 3	8 Planning period = year/half-year *) per. 4	9 per. 5	10 per. 6	11 per. 7	12 per. 8
1	Land												
2	Site preparation and development												
3	Structures and civil engineering (a)	5.	1	0	20	207.0							
4	Structures and civil engineering (b)												
5	Inc. fix. assets (a) constr., transport												
6	Inc. fix. assets (b) technology, start-up	6.67	1	0	15	50.0							
7	Inc. fix. assets (c) others												
8	Plant, machinery and equipment (a)	6.67	1	0	15	283.8							
9	Plant, machinery and equipment (b)	12.5	1	0	8	38.0							
10	Auxiliary & service facilities												
11	Pre-production expenditures					118.0							
12	Inventory												

3.1 INITIAL FIXED INVESTMENT - (l)ocal

Lines	Columns / Description of investment	1 Depreciation % p. a.	2 Depreciation type	3 Sal. v. %	4 Depr.p. years	5 Construction phase → per. 1	6 per. 2	7 per. 3	8 Planning period = year/half-year *) per. 4	9 per. 5	10 per. 6	11 per. 7	12 per. 8
13	Land												
14	Site preparation and development					66							
15	Structures and civil engineering (a)	5	1	0	20	109							
16	Structures and civil engineering (b)												
17	Inc. fix. assets (a) constr., transport												
18	Inc. fix. assets (b) technology, start-up	6.67	1	0	15	2							
19	Inc. fix. assets (c) others												
20	Plant, machinery and equipment (a)					45							
21	Plant, machinery and equipment (b)												
22	Auxiliary & service facilities												
23	Pre-production expenditures					22							
24	Inventory												

3.2 CURRENT FIXED INVESTMENT - (f)oreign

Lines	Columns	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Description of investment	Depreciation % p. a.	Depreciation type	Res. v. %	Depr.p. years	Production phase year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	Production phase year 12	year 13	year 14	year 15
25	Land																			
26	Site preparation and development																			
27	Structures and civil engineering (a)																			
28	Structures and civil engineering (b)																			
29	Inc. fix. assets (a) constr., transport																			
30	Inc. fix. assets (b) technology, start-up																			
31	Inc. fix. assets (c) others																			
32	Plant, machinery and equipment (a)	6.67	1	0	15	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0
33	Plant, machinery and equipment (b)	12.5	1	0	8								38.0							
34	Auxiliary & service facilities																			
35	Pre-production expenditures																			
36	Inventory																			

3.2 CURRENT FIXED INVESTMENT - (l)ocal

Lines	Columns / Description of investment	1 Depreciation % p. a.	2 Depreciation type	3 Res. v. %	4 Depr.p. years	5 Production phase year 1	6 year 2	7 year 3	8 year 4	9 year 5	10 year 6	11 year 7	12 year 8	13 year 9	14 year 10	15 year 11	16 Production phase year 12	17 year 13	18 year 14	19 year 15
37	Land																			
38	Site preparation and development																			
39	Structures and civil engineering (a)																			
40	Structures and civil engineering (b)																			
41	Inc. fix. assets (a) constr., transport																			
42	Inc. fix. assets (b) technology, start-up																			
43	Inc. fix. assets (c) others																			
44	Plant, machinery and equipment (a)																			
45	Plant, machinery and equipment (b)																			
46	Auxiliary & service facilities																			
47	Pre-production expenditures																			
48	Inventory																			

3.3.1 ANNUAL PRODUCTION COSTS - (f)oreign

Lines	Columns / Description of cost and cost adjustment item	1 Inflat. % p. a.	2 Production phase year 1	3 year 2	4 year 3	5 year 4	6 year 5	7 year 6	8 year 7	9 year 8	10 year 9	11 year 10	12 year 11	13 Production phase year 12	14 year 13	15 year 14	16 year 15
52	Raw material (a)																
53	Raw material (b)																
54	Utilities																
55	Energy																
56	Labour, direct																
57	Maintenance, repairs																
58	Spare parts																
59	Factory overheads																
60	Administration, labour costs																
61	Administration, non-labour																
62	Marketing, labour																
63	Marketing, non-labour																

3.3.2 STANDARD PRODUCTION COSTS - (f)oreign

Lines	Columns / Description of production costs item	1 Product A value/a	2 vari. %	3 Product B value/a	4 vari. %	5 Product C value/a	6 vari. %	7 Product D value/a	8 vari. %	9 Product E value/a	10 vari. %	11 Product F value/a	12 vari. %
64	Raw material (a) 1)	1439.1	100	24.813	100	52.141	100	671.24	100	135.76	100		
65	unit cost 2)	1.0		1.0		1.0		1.0		1.0			
66	Raw material (b) 1)												
67	unit cost 2)												
68	Utilities p.a.												
69	Energy p.a.												
70	Labour, direct p.a.												
71	Maint. & repairs p.a.												
72	Spare parts p.a.												
73	Factory overhead p.a.												
74	Admin. labour p.a.												
75	non-lab. p.a.												
76	Marketing labour p.a.												
77	non-lab. p.a.												
78	total deprec. borne %												

3.3.1 ANNUAL PRODUCTION COSTS - (l)ocal

Lines	Columns / Description of cost and cost adjustment item	1 Inflat. % p. a.	2 Production phase year 1	3 year 2	4 year 3	5 year 4	6 year 5	7 year 6	8 year 7	9 year 8	10 year 9	11 year 10	12 year 11	13 Production phase year 12	14 year 13	15 year 14	16 year 15
82	Raw material (a)																
83	Raw material (b)																
84	Utilities																
85	Energy																
86	Labour, direct																
87	Maintenance, repairs																
88	Spare parts																
89	Factory overheads																
90	Administration, labour costs																
91	Administration, non-labour																
92	Marketing, labour																
93	Marketing, non-labour																

3.3.2 STANDARD PRODUCTION COSTS - (l)ocal

Lines f/l *)	Columns / Description of production costs item	1 Product A value/a	2 Product A vari. %	3 Product B value/a	4 Product B vari. %	5 Product C value/a	6 Product C vari. %	7 Product D value/a	8 Product D vari. %	9 Product E value/a	10 Product E vari. %	11 Product F value/a	12 Product F vari. %
94	Raw material (a) 1)	107.53	100	2.657	100	4.236	100	69.118	100	13.362	100		
95	unit cost 2)	1.0	0	1.0		1.0		1.0		1.0			
96	Raw material (b) 1)	147.90	100	5.1	100	5.1	100	81.6	100	15.3	100		
97	unit cost 2)	1.0	0	1.0		1.0		1.0		1.0			
98	Utilities p.a.	10.822	80.619	0.373	80.619	0.373	80.619	5.971	80.619	1.12	80.619		
99	Energy p.a.	5.757	37.34	0.198	37.34	0.198	37.34	3.176	37.34	0.595	37.34		
100	Labour, direct p.a.	22.425	23.277	0.773	23.277	0.773	23.277	12.372	23.277	2.32	23.277		
101	Maint. & repairs p.a.												
102	Spare parts p.a.	0.29	0	0.010	0	0.010	0	0.160	0	0.630	0		
103	Factory overhead p.a.	3.48	0	0.120	0	0.120	0	1.92	0	0.36	0		
104	Admin. labour p.a.	47.968	0	1.654	0	1.654	0	26.465	0	4.962	0		
105	non-lab. p.a.												
106	Marketing labour p.a.												
107	non-lab. p.a.												

1) enter either quantity (units consumed p. a.) or annual costs
2) enter "1" if annual costs are entered instead of quantity

3.4 PRODUCTION AND SALES - (local)

Lines	Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Inflat. % p.a.	Production phase year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	Production phase year 12	year 13	year 14	year 15
	PRODUCT A																
146	Quantity produced/sold	2700	2126	3245	4099	5016	5236	5666	6119	6566	6993	7377	7709	7979	8186	8342	8484
147	Sales price per unit		0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318
148	Total sales tax																
149	Total other direct sales costs																
150	Total other dir. non-var. costs																
151	Labour costs includ. in 150																
	PRODUCT B																
152	Quantity produced/sold	300	49	103	132	167	181	195	211	226	241	254	266	275	282	288	293
153	Sales price per unit		0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244
154	Total sales tax																
155	Total other direct sales costs																
156	Total other dir. non-var. costs																
157	Labour costs includ. in 156																
	PRODUCT C																
158	Quantity produced/sold	300	82	103	132	167	181	195	211	226	241	254	266	275	282	288	293
159	Sales price per unit		0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347
160	Total sales tax																
161	Total other direct sales costs																
162	Total other dir. non-var. costs																
163	Labour costs includ. in 162																

3.4 PRODUCTION AND SALES - (1)ocal

Lines	Columns / Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Initial. p. e.	Production phase year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	Production phase year 12	year 13	year 14	year 15
	PRODUCT D																
164	Quantity produced/sold	4800	850	1442	1917	2508	2889	3126	3376	3623	3858	4070	4253	4402	4517	4602	4681
165	Sales price per unit		0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318
166	Total sales tax																
167	Total other direct sales costs																
168	Total other dir. non-var. costs																
169	Labour costs includ. in 168																
	PRODUCT E																
170	Quantity produced/sold	900	164	258	331	502	542	586	633	679	723	763	798	825	847	863	878
171	Sales price per unit		0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340
172	Total sales tax																
173	Total other direct sales costs																
174	Total other dir. non-var. costs																
175	Labour costs includ. in 174																
	PRODUCT F																
176	Quantity produced/sold																
177	Sales price per unit																
178	Total sales tax																
179	Total other direct sales costs																
180	Total other dir. non-var. costs																
181	Labour costs includ. in 180																

3.5 WORKING CAPITAL REQUIREMENTS

Lines	Columns / Description of assets/liabilities	1	2	3	4
		Minimum coverage (in days)			
		Products/costs		Cash in hand	
		foreign	local	foreign	local
	ASSETS				
182	Accounts receivable/ /cash in hand:	30	30	15	15
	INVENTORIES				
183	Raw material (a):	180	180		
184	Raw material (b):	180	180		
185	Utilities:	30	30		
186	Energy:	30	30		
187	Spare parts:	360	360		
188	Work in progress:	0	0		
189	Finished products:	2	2		
	LIABILITIES				
190	Accounts payable:	30	30		

3.8 SOURCES OF FINANCE - (f)oreign

Lines	Columns / Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		Financial flow of funds (disbursements) by period										Financial flow of funds (disbursements) by period								
		per. 1	per. 2	per. 3	per. 4	per. 5	per. 6	per. 7	per. 8	per. 9	per. 10	per. 11	per. 12	per. 13	per. 14	per. 15	per. 16	per. 17	per. 18	per. 19
	EQUITY, SUBSIDIES AND GRANTS																			
191	ordinary shares	364.236																		
192	preference shares																			
193	subsidies & grants																			
	LOANS AND OVERDRAFTS																			
194	loan A	364.236																		
195	loan B	38.0																		
196	loan C																			
197	flow of funds drg. const., overdrafts																			

3.8 SOURCES OF FINANCE - (l)ocal

Lines	Columns / Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		Financial flow of funds (disbursements) by period										Financial flow of funds (disbursements) by period								
		per. 1	per. 2	per. 3	per. 4	per. 5	per. 6	per. 7	per. 8	per. 9	per. 10	per. 11	per. 12	per. 13	per. 14	per. 15	per. 16	per. 17	per. 18	per. 19
	EQUITY, SUBSIDIES AND GRANTS																			
198	ordinary shares	127.045																		
199	preference shares																			
200	subsidies & grants																			
	LOANS AND OVERDRAFTS																			
201	loan A	127.045																		
202	loan B																			
203	loan C																			
204	flow of funds drg. const., overdrafts																			

3.7 INCOME, TAX AND CASHFLOW

Lines	Columns / Description	1	2	3	4	5	6	7
		Income tax 0=constant 1=variable	Constant tax rate in % p. a.	Tax holidays in years	Period to off loss. in years	Period of tax cred. in years	Additional tax on profit distributed foreign	(in %) local
205	Income tax descriptors	0	0					

PROFIT DISTRIBUTED ON:

Lines	Columns / Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Annual payments Production phase										Annual payments Production phase				
		year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	year 12	year 13	year 14	year 15
206	Investment allowance															
207	Depreciation allowance															
208	Income tax adjustment															
209	Variable tax rate (%)															
	PROFIT DISTRIBUTED ON:															
210	preferred equity, foreign															
211	preferred equity, local															
212	ordinary equity, foreign															
213	ordinary equity, local															