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**THE REGENERATION OF ZAMBIAN MANUFACTURING INDUSTRY
WITH EMPHASIS ON AGRO-BASED INDUSTRIES***

Special reports on industrial rehabilitation

No. i

Prepared by the
Regional and Country Studies Branch
Industrial Policy and Perspectives Division

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Preface

As part of the programme of the Industrial Development Decade for Africa, UNIDO's Regional and Country Studies Branch is issuing a series of studies determining both the major problems of African manufacturing and the potential for regenerating the sector. The aim is to outline policies and measures that may result in overall improvements and to identify individual plants for rehabilitation assistance. While earlier documents in the series deal with key issues and continent-wide analysis, this report is the first in a series of country-level diagnostic surveys on the rehabilitation of African manufacturing industry.

The surveys are economic and policy diagnoses of the industrial sector in selected countries. They provide estimates of resource requirements for selected industrial plant rehabilitation as well as assessments of expected results from such rehabilitation. The surveys also provide the basis for forming national policy measures and advisory services, and for the full feasibility studies which are needed as a follow-up.

This first report is the result of a UNIDO field mission to Zambia from 21 May to 17 June 1988. The members of the team were: Mr. George Assaf, UNIDO, Team Leader, and UNIDO consultants Messrs. Björn Almquist, Jan Björk, David Chitundu, Basil Igwe, Manenga Ndulo and Ms. Helen O'Neill. The mission's objective was to provide a diagnostic survey of plant rehabilitation needs in the agro-related branch of the Zambian manufacturing sector.

In order to ensure that all relevant issues are covered, a "top-down" approach was used.^{1/} The international context and the key characteristics of Zambia's administration and economy are described first. After examining Zambian manufacturing in general, the study concentrates on agro-related industries, particularly those belonging to the food manufacturing subsector. These industries are among the priorities for investment and rehabilitation in the SADCC region, and have received a high priority under the Interim National Development Plan (INDP).

The subsector is also examined at the branch level. Three branches - meat processing, stockfeeds manufacturing and oil seeds processing - are studied in detail. In addition, the package manufacturing branch is also discussed. This branch, while not strictly part of the food manufacturing subsector, is intimately linked to the various branches of the food manufacturing subsector.

Finally, at the plant level, a detailed analysis is made of the rehabilitation needs of four firms - Zambia Pork Products Limited (ZAPP), E.C. Milling Co. Limited (ECM), ZATCO Stockfeeds Limited (ZATCO), and Kabwe Industrial Fabrics Co. Limited (KIFCO).

^{1/} The "top-down" approach is described more extensively in the first volume of the present series, "Regeneration of African manufacturing industry: an approach".

The study provides recommendations for both the short and long term. The recommendations seek to rectify shortcomings (whether technical, financial, organization or market-oriented in nature) in the overall performance of the plants and the environment in which they operate.

The study is based on interviews and discussions with officials from the Ministries of Finance, Commerce and Industry, and Agriculture; institutional bodies and organizations such as the Foreign Exchange Management Committee (FEMAC) and the Zambian Industrial and Commercial Association (ZINCOM); representatives of the Industrial Development Corporation (INDECO Limited), the Development Bank of Zambia (DBZ); bilateral donor agencies such as the Norwegian Agency for International Development (NORAD) and U.S. Agency for Industrial Development (USAID); the Senior Industrial Development Field Adviser (SIDFA), Junior Professional Officer (JPO) and other staff at the UNIDO office in Lusaka as well as UNIDO Chief Technical Advisers at the National Commission for Development Planning (NCDP) and INDECO; selected companies and various Zambian businessmen. Reports and data available at UNIDO headquarters and acquired in Zambia were also used intensively. The most important of these latter sources have been listed in the References. The reports suggests that the recommendations be followed by detailed studies to guide appropriate implementation.

List of abbreviations

BoZ	Bank of Zambia
CFB	Commercial Farmers' Bureau
c.i.f.	Cost, insurance and freight
DBZ	Development Bank of Zambia
EBZ	Export Board of Zambia
EC	European Community
ERP	Effective Rates of Protection
Exim Bank (X-M) Bank	Export-Import Bank
FEMAC	Foreign Exchange Management Committee
f.o.b.	Free on board
GRZ	Government of the Republic of Zambia
IMF	International Monetary Fund
INDECO	Industrial Development Corporation
INDP	Interim National Development Plan
ISIC	International Standard Industrial Classification
MAWD	Ministry of Agriculture and Water Development
MCI	Ministry of Commerce and Industry
Min Fin	Ministry of Finance
MVA	Manufacturing value added
NCDP	National Commission for Development Planning
n.e.s.	not elsewhere specified
PIC	Prices and Incomes Commission
PTA	Preferential Trade Area
SADCC	Southern African Development Co-ordination Conference
SIDA	Swedish International Development Authority
SIDO	Small Industries Development Organization
SDR	Special Drawing Rights
UAPTA	Unit of Account PTA
UNIP	United National Independence Party
USAID	United States Agency for International Development
VDP	Value for duty purposes
ZCCM	Zambia Consolidated Copper Mines
ZIMCO	Zambia Industrial and Mining Corporation
ZINCOM	Zambian Industrial and Commercial Association
ZSI	Zambia Standards Institute

List of the people and firms contacted in Zambia
14 May - 17 June 1988

<u>Firm/Office</u>	<u>Person(s) met</u>
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3. Cabinet Office	Dr. Caleb Fundanga, Permanent Secretary
4. Development Bank of Zambia (DBZ)	Mr. G. Ngulube, Director of Projects Mr. L.M. Likulunga, Dep. Director/Projects Mr. W.R. Ndhlovu, Senior Projects Officer Mr. P. Mwanakatwe, Manager/Small-scale Unit Mr. A. Isaksen, Industrial Adviser
5. E.C. Milling Co. Ltd.	Mr. A.H. Hojane, General Manager Mr. C.W. Nyirenda, Sales & Distr. Manager Mr. K.D. Prasad, Chief Accountant Mr. Musenge, Production Manager
6. Export Board of Zambia	Mr. J.H. Muchaili, General Manager
7. European Community	Mr. D. Macrae, Economic Adviser
8. INDECO Ltd.	Prof. F.D. Yamba, Executive Director Mr. Menega, Executive Director Mr. Moatzwe, Executive Director(?) Ms. H.C. Chilupe, Corporate & Economic, Planning Manager
9. Kabwe Industrial Fabrics Ltd.	Mr. S. Shimukowa, General Manager
10. Lee Yeast	Mr. R. Limbada, Managing Director Mr. S.V. Shah, Admin. Manager Mr. J. Suleiman, Production Manager
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Mr. L. Munsele, Purchasing Officer
Mr. B. Warmsley, Production Manager
Mr. Mwauluka, Area Manager South
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18. **ZATCO**

**Mr. C.M. Kondolo, Company Director
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Mr. M.J. Kasaro, Production Manager**

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CHAPTER 1

KEY CHARACTERISTICS OF ZAMBIAN ECONOMY

A basic notion of the chosen approach to industrial rehabilitation is that successful efforts to rehabilitate manufacturing industry necessitate taking into account key characteristics of the national economy. The most characteristic feature of Zambia's economy is its dependence on copper. This chapter therefore outlines the nature of this dependence, and briefly shows how it has resulted in a need for restructuring. It also presents an assessment of overall economic development in Zambia.

1.1 The copper-dominated economy^{1/}

The Zambian economy is dominated by the production and export of one commodity - copper. Although a wide range of minerals is produced in Zambia - including cobalt, zinc, lead, nickel, silver and a range of gemstones - copper accounts for well over 90 per cent of the value of mineral production. Thus, the mining sector is almost identical with copper mining.

The mines are operated by Zambia Consolidated Copper Mines (ZCCM), 60.3 per cent of which is owned by the state through its parastatal holding company, the Zambia Industrial and Mining Corporation (ZIMCO). The remaining shares are almost totally held by subsidiaries of two groups that started mining in Zambia in the 1920s, the Anglo-American Corporation (27.3 per cent) and Roan Selection Trust (6.9 per cent).

Table 1.1 provides some indicators of the importance of mining in the economy throughout the last 20 years.

Table 1.1: Indicators of the importance of mining in the
Zambian economy, 1966-77 through 1987

	<u>1966-67</u>	<u>1970</u>	<u>1980</u>	<u>1984</u>	<u>1987</u>
Mineral output as % of GDP	39	37	16.4	13.7	15.3
Mineral taxes as % of gov. revenue	64	54	1	1	1
Mining exports as % of total exports	96	95	94	93	91
Employment in mining as % of total employment	18	16	16	16	16

During the first decade after independence the mines were major contributors to government revenues in Zambia. However, as can be seen from Table 1.1, they have made a relatively insignificant contribution since the collapse in copper prices in the mid-1970s. Apart from minor recoveries, copper prices have remained low since 1975; and despite heavy borrowing which the state undertook to finance their acquisition in the early seventies, the mines have proved expensive to service since then. Zambian mines have tended to be high-cost operations and, as world prices remained low, copper has been produced at a loss throughout most of the 1980s.

^{1/} For details on Zambia's political, administrative and social characteristics see Appendix 1.

The impact of copper extends to all sectors of Zambia's economy and society, most notably the location of the population and economic activities, the activity structure in the economy, income distribution, and the distribution of power between urban and rural areas.

Copper deposits are concentrated in northern Zambia. Rail and road connections transport it to ports east, west and south, resulting in the distinctive T-shaped transportation network. Not surprisingly, other economic activities such as commercial farming, manufacturing and services also tend to be located along this so-called line-of-rail.

The presence of the mines has also had a significant impact on the activity structure of the economy. The capital- and skill-intensive mining sector pays high wages and, because of the development of a strong trade union movement and general skill shortages, these high wages tend to be generalized throughout the modern sectors of the economy. The production of domestic goods and services has risen as higher incomes increased demand for them. Consequently, the construction industry and the production of various services expanded very significantly. Although manufacturing activity did develop, it was basically domestically-oriented import substitution. The sector had to be highly protected because of its high production costs. Manufacturing has remained highly dependent on imports of equipment, spare parts and certain raw materials. These imports have been financed by copper earnings.

The fact that copper exports still consistently earn almost all of Zambia's foreign exchange lies at the heart of the dilemma the Zambian Government faces in relation to its approach to restructuring the economy. The mining sector cannot be neglected since its exports provide the foreign exchange which is so vital for the rest of the highly import-dependent economy. Yet, because the mining industry is extremely capital-intensive, with quality standards, demand, and prices determined at the international rather than the national level, constant injections of capital are necessary to maintain the mines properly. Thus, despite the fact that successive National Plans since Independence have stressed the need to diversify the economy, a high proportion of funds has always been directed towards mining. This policy will continue, as illustrated in the 1987-88 Interim National Development Plan (INDP); the sectoral distribution of projected investment shows that the mining sector's share leads with 20 per cent. Manufacturing is allotted 19 per cent, and agriculture, forestry and fisheries 16 per cent.

1.2 Economic development trends^{1/}

Starting with the First National Development Plan (1966-70), the Government embarked upon a strategy of economic self-sufficiency involving massive Government investment in the manufacturing and processing of goods which had previously been imported from Rhodesia and the Republic of South Africa. The Plan also provided for huge investment in the development of

1/ In addition to discussions and material collected in Zambia, the most important sources for this section were: Zambia: Country study and Norwegian aid review, Bergen 1986; EIU, Country profile: Zambia 1987-88, London 1987; and H. O'Neill: Transforming a single product economy: an examination of the first stage of Zambia's Economic Reform Programme, Washington D.C. 1987.

alternative routes for Zambia's exports and imports through Lobito and Dar-es-Salaam. At independence, the Republics of South Africa and Rhodesia provided the bulk of Zambia's imports, and they ranked second, after the United Kingdom, as buyers of Zambia's exports.

Copper earnings provided the basis for rapid economic growth during the 1964-74 period. Massive investment took place in social and physical infrastructure. The manufacturing sector grew quickly as measures to reduce the dependence on manufactured imports from the Republic of South Africa were implemented. By 1974, the sector accounted for 22 per cent of GDP.

However, the favourable balance of payments situation did not encourage the establishment of industries dependent on domestic inputs. Even the new import-substituting industries relied heavily on imported raw materials, machinery and spare parts. The performance of the agricultural sector, a major potential supplier of raw materials, lagged behind that of other economic sectors as a result of inappropriate policies and a number of crop failures.

The recession that hit the economies of the industrialised world in the mid-1970s resulted in a depressed demand for Zambia's primary export commodity, copper. Copper prices, which averaged US\$ 0.93 per pound in 1974, declined to US\$ 0.59 per pound. The combination of low copper prices and the increased cost of imports produced balance of payments deficits of ZK 429.4 million in 1975 and ZK 648.5 million in 1981. Real GDP declined 0.2 per cent in 1975, 2.8 per cent in 1982, and 1.9 per cent in 1983.

Zambia never benefitted fully from the economic recovery that industrialized economies began to experience in 1983. While prices of primary commodities began to recover in the world market, copper prices generally remained depressed. In addition, bottlenecks in copper shipments severely limited Zambia's opportunities to take advantage of favourable price developments.

Since 1975, the manufacturing sector, with its heavy dependence on imported raw materials, machinery and spare parts, has experienced severe constraints due to foreign exchange shortages. As a result, the sector's share in GDP has never surpassed the peak reached in 1974. Overall capacity utilization decreased to 65 per cent in 1985 and 45 per cent in 1986/87.

Since 1975, in contrast to previous years, Government budget deficits have become a permanent feature of fiscal developments. The bulk of the deficits have been financed by bank borrowing. This has fuelled inflationary pressures and limited the ability of the monetary authorities to control the money supply. Reflecting the chronic balance of payments deficit, the debt service burden by 1985 had exceeded 120 per cent of total export earnings. Consequently, Zambia became unable to service her external obligations. This has severely eroded the country's creditworthiness and made it less attractive to foreign investment.

Between 1975-86 Zambia has had seven IMF-supported adjustment programmes; however, because of Zambia's failure to fulfil its repayment obligations to the IMF, only two stand-by arrangements were fully completed.

In 1985 the Government introduced measures aimed at correcting external and domestic imbalances by realigning relative prices in favour of the productive sectors of the economy. This involved:

- (i) the introduction of the foreign exchange auction system,
- (ii) relaxation of price controls,
- (iii) the gradual reduction of consumer and producer subsidies, and
- (iv) the decontrol of interest rates.

The main objective of the flexible exchange rate policy was to ensure that movements in the value of the Kwacha were kept consistent with movements in relative prices between Zambia and its principal trading partners. The policy was also aimed at reducing the scale of the parallel markets in essential commodities.

During the auction era which lasted from October 1985 to 30 April 1987, the Kwacha depreciated by 56 per cent at the first auction on 11 October, and by 85.5 per cent in November 1985. It was recognized that a combination of restrictive monetary measures and generous supply of foreign exchange was needed to stabilize the exchange rate, but the actual volume of foreign exchange was limited and erratic. It also became clear that monetary institutions and instruments were not adapted to controlling liquidity under such free market conditions. Authorities found the auction system inappropriate as a means to ensure the allocation of foreign exchange into priority sectors and toward essential imports.

The price liberalization measures resulted in social unrest, as the centralization of production and distribution of commodities in the hands of a few enterprises gave these enterprises a free hand in fixing prices at high levels.

Commercial bank lending rates, after being decontrolled in September 1985, soared from a fixed minimum of 17.5 per cent at the end of 1984 to 33.5 per cent at the end of 1986. In spite of the high cost of credit, loans to the private sector expanded by 49.9 per cent during 1986 compared to 11.4 per cent in 1985. The high levels of interest rates which were designed to reduce the demand for credit never achieved that objective. Instead, by pushing up the cost of credit to the Government and the private sector, interest rates only assisted in reinforcing inflationary pressures.

In mid-1986, the rapid depreciation of the kwacha and the decontrol of prices and interest rates became major factors accounting for a series of price increases on essential and non-essential commodities. The rate of inflation increased to 61 per cent by the end of September 1986.

In order to reduce social and political tensions, the Government abandoned the liberal policy measures in May 1987 together with the IMF-supported adjustment programme. As a consequence of that decision, Zambia reverted back to a fixed exchange rate system and pegged the kwacha to the US dollar at ZK 8 = US\$ 1. Price controls were reintroduced, although they applied only to 12 essential commodities. Interest rates were controlled and fixed at a maximum of 20 per cent for lending rates.

To conserve scarce foreign exchange for essential and productive uses, external debt service was limited to 10 per cent of foreign exchange earnings after netting out certain priority payments. A foreign exchange management committee (FEMAC) was introduced in place of the foreign exchange auction.

With these new policies and measures the Government ushered in the new economic recovery programme designed to stabilize the economy.

1.3 Assessment of recent trends

Zambia's dependence on copper for the bulk of her export earnings has made her extremely vulnerable to the vagaries of world copper markets. In recent years, the sharp fall in world copper prices has been a major blow to the country's foreign exchange earnings. This has led to severe contractions in industrial output and the growth of GNP. Unfortunately, the decline in Zambia's economic fortunes has not been arrested by earlier attempts to liberalize the economy. It is too early to assess the likely impact of Zambia's new economic recovery programme. It is clear, however, that the programme is unlikely to be successful unless particular attention is paid to the following three provisos:

First, measures will have to be taken to boost domestic food supply, increase reliance on local raw materials, and diversify the economy's export base in order to broaden sources of foreign exchange. To achieve this, attention must continue to be paid to pricing policy, particularly agricultural producer prices. Low agricultural prices, designed to reduce food costs in urban areas, have in the past kept rural incomes low and have proven detrimental to the goal of increased agricultural production. Through proper pricing of agricultural commodities, Zambia could increase exports, achieve self-sufficiency in food, and acquire a stable resource base for agro-related industries which are so important in supplying the domestic market with consumer goods. A more prosperous agricultural sector would also provide a larger market for industrial products. The results of agricultural policy reforms that have been implemented thus far are encouraging.

Second, measures should also be initiated for a gradual reduction of the Government deficit in order to accommodate the credit needs of the private sector. Current Government expenditure accounts for about 70 per cent of total expenditure. If investment and production are increased, then the private sector must command a substantial share of total domestic credit.

Third, the success of the programme will also depend on the degree of flexibility of the key policy measures initiated to cope with the changing economic situation. While a fixed exchange rate may be beneficial for the economy in a number of ways, it may inhibit the growth of exports and the promotion of the productive sectors of the economy.

CHAPTER 2

THE MANUFACTURING SECTOR

2.1 Overall characteristics

Zambia has a relatively large manufacturing sector, which accounted for 21 per cent of GDP in 1985 and 1986. Total output, in constant 1977 value terms, was ZK420 million in 1986 and ZK440 million in 1987. During the first decade after independence, manufacturing was the fastest growing sector (10 per cent per annum in real terms). However, with the fall in copper earnings from the mid-1970s, manufacturing value added began to fluctuate along a declining trend reflecting the unavailability of foreign exchange. Per capita value added decreased from US \$152 in 1975 to US \$110 in 1984. During the 1974-1984 period negative growth was registered in all branches of industry. Only in 1985 did industrial production again exceed the 1978 level.

The index of production (1973 = 100) increased from 103 in 1985 to 112.3 in 1987. In recent years production growth has been due mainly to the textiles sector. Non-metallic minerals, another growth sector, still has a limited role in manufacturing.

The manufacturing sector employed some 63,000 persons in 1985, or approximately 13 per cent of the total formal sector labour force. Another 500,000 are believed to work in small-scale enterprises in the informal sector.

The 1975 and 1985 shares of major sub-sectors in total manufacturing appear in Table 2.1. Less important but nonetheless significant manufacturing sub-sectors are paper and printing, rubber products, and non-metallic minerals.

Table 2.1: Shares of major sub-sectors in manufacturing (per cent)

	1975			1985		
	Output	Value added	Employment	Output	Value added	Employment
Food, beverage and tobacco	35.6	41.2	28.8	38.6	44.0	34.7
Textile and wearing apparel	9.7	7.8	17.3	12.1	10.9	17.3
Chemicals	12.4	9.7	8.3	11.4	8.8	8.2
Basic metals and metal products	19.8	18.4	20.8	19.0	18.2	17.2

Source: UNIDO data base.

The figures in the table show that consumer goods dominated the sector from 1975 to 1985. The figures also show that the food and textile sub-sectors account for more than 50 per cent of total manufacturing output, value added, and employment. In the food sub-sector, employment growth has been faster than the growth of output and value added, indicating a decline in productivity.

Between 1975 and 1985 output and value added per worker in the textile sub-sector increased, while chemicals and metals began to play a less important role in manufacturing. The relative decline of these sub-sectors follows their fast expansion during the early 1970s, when high copper revenues were used to initiate the modernization of the economy.

In 1980, 55 per cent of the total number of Zambian manufacturing establishments were located in the Copperbelt, and 30 per cent in the Central Province (including Lusaka). These two provinces, moreover, claim the widest range of industries, with all major manufacturing branches represented. Industrial establishments are concentrated in a narrow belt along the Chingola-Kafue "line-of-rail". A number of factors, including the wide range of industries, a good transport route, and a large percentage of Zambia's population, increases the likelihood of successful rehabilitation there. Inter-industry linkages are more easily established, and a considerable local market for consumer goods exists. Moreover, there is the advantage of access to the repair shops and metal working industries of the Copper Belt, which could be a major source of the "hardware" and expertise for rehabilitation. Although the repair shops concentrate on mining machinery, the accumulated expertise and part of the machinery could be utilized to expand the range of spare parts to cover the needs of other industries.^{1/}

The Industrial Development Corporation (INDECO) accounts for 75 per cent of all registered manufacturing enterprises; the remaining 25 per cent consists of private firms, a minority of which is foreign-controlled.^{2/}

Zambia is a member of the Southern African Development Co-ordination Conference (SADCC) and the Preferential Trade Area. These organizations promote regional co-operation and trade.^{2/} With regard to manufacturing, Zambia is to concentrate on basic needs industries in SADCC's proposed framework for complementary industries. The organization has also included Zambian enterprises in its selection of industries to be rehabilitated. PTA likewise has started to draw up rehabilitation programmes. Zambia will not benefit from these yet, but the programmes may become a factor in future industrial development in the country.

1/ Suggestions of this nature are made in a 1986 SADCC study entitled: "Mining machinery and spare parts manufacturing, repairing and reconditioning facilities".

2/ It has proven difficult to obtain information about distribution of private shares in parastatal and private companies. The registers of the Ministry of Commerce and Industry are very inaccessible and are not properly updated or classified.

3/ See Appendix 3 for a more extensive description of SADCC and PTA.

2.2 Major problems and constraints

Zambia's dependence on copper is a basic problem which is likely to remain into the 1990s. As described in sections 1.1 and 1.2, one aspect of this dependence is the high capital requirements of the industry. In the context of rehabilitation, this takes on a particular importance. In conjunction with the World Bank,^{1/} ZCCM prepared a five-year rehabilitation programme during 1986-90. In order to carry out this programme, ZCCM estimated it would require no less than US\$350 million per year in foreign exchange for operations and an additional US\$375 million for investment.

The global economic situation affects copper prices and export volumes, and therefore the availability of foreign exchange. However, it also influences the flow of foreign aid and the availability and cost of credit, which directly affects the manufacturing sector. Rising interest rates on outstanding debt in the early 1980s contributed significantly to current debt problems and scarcity of foreign exchange.

Zambia's terms of trade have been negatively affected by falling copper prices during the late 1970s and early 1980s. With 1980 as base year the index for commodity terms of trade stood at 75 in 1985, while the level in 1973 was 222.^{2/} Falling world market prices for copper are the major explanation for this. (During the 1980s import unit value has in fact also fallen but not as much as the export unit value). The end result was a serious shortage of foreign exchange.

It follows from the above that any comprehensive programme for industrial rehabilitation must take into account the consequences in terms of foreign exchange availability. As the problem will persist for many years, rehabilitation efforts must be limited to certain industries whose production processes require minimal amounts of foreign exchange. Moreover, the rehabilitation programme will have to be designed so that it will attract external finance.

Apart from these problems and constraints relating to Zambia's position in the global economy, the manufacturing sector also faces obstacles to development that are related to the regional and domestic situation:

The landlockedness of the country is a problem that is clearly beyond the control of the Government. Higher transportation costs theoretically could act as a natural shield of protection for the manufacturing sector. However, with the sector being heavily import dependent, the overall impact of the geographic location is negative.

Transportation problems are exacerbated by the regional political situation. Throughout its history, Zambia has been surrounded by political conflicts which have disrupted major transport arteries. The political climate also necessitates a high defence budget; negatively affects investment, especially foreign; and, via its impact on the creditworthiness of the country, contributes to the scarcity of foreign exchange.

1/ World Bank, Zambia, Country Economic Memorandum - Economic Reforms and Development Prospects, 1986.

2/ See I. Karmiloff, Industrialisation in Sub-Saharan Africa, Country Case Study - Zambia, Overseas Development Institute, London 1988.

Decreasing domestic demand for manufactured products has been one result of the decline of the national economy in recent years. This constraint is closely interrelated with past industrial and general economic policies. Those policies, or the lack thereof, help explain the current low levels of capacity utilization in the manufacturing sector.

The shortage of skilled manpower, especially middle-level managers, was found by this mission to be one of the most serious problems facing manufacturing enterprises. It was a major reason for a lack of efficiency or poor management.

Among policy-related constraints, in retrospect, a major policy error was allowing the manufacturing sector to become dominated by capital-intensive, import-substituting industries, and not sufficiently encouraging small- and medium-sized manufacturing enterprises based on national resources. Also contributing to this situation has been an overvalued exchange rate, duty-free imports of capital goods, and negative real interest rates. Other past practices which help explain present difficulties include unrealistic market assessments for industrial investment projects, imbalance between investments in industry and supportive infrastructure, and insufficient development of necessary labour skills and industrial services.

Political interference in the every day running of enterprises was found by this mission to be a problem in many manufacturing companies. It is partly a consequence of the ownership pattern and of the above-mentioned shortage of skilled managers.

2.3 Trade in manufactures

Manufactured exports have always accounted for less than 5 per cent of foreign exchange earnings. Table 2.2 shows major manufactured exports and imports for selected years in US dollars. Increasing the exports of manufactured goods is one of the key objectives of the 1987 Interim National Development Plan.

Table 2.2: Major manufactured imports and exports for selected years
(US\$ thousands)

	1984	1985	1986
<u>Exports</u>			
Textile waste	3,279	8,662	1,310
Non-metallic mineral products	5,762	3,374	7,512
Iron and steel	5,800	10,421	18,483
Machinery	5,792	5,275	6,214
Metal manufacturing n.e.s.	<u>1,886</u>	<u>2,022</u>	<u>2,832</u>
	22,519	29,854	36,351
<u>Imports</u>			
Petroleum products	2,316	1,478	2,159
Chemicals	58,159	98,886	137,379
Machinery	257,160	164,870	149,767
Transport equipment	<u>91,768</u>	<u>71,169</u>	<u>63,509</u>
	409,403	336,403	352,814

Source: ITC/UNCTAD.

Presently, Zambia's main trading partners are European Community (EC) countries and Japan.^{1/} In the mid-1980s, the EC countries purchased some 60 per cent of exports, and Japan approximately 30 per cent. To a small extent, African and Asian developing countries also play a role in exports.

Regional manufactured exports are not significant. However, under the 50 per cent Retention Scheme, which enables companies to retain foreign exchange earnings to purchase imported inputs and raw materials, many companies have recently been seeking export markets in neighbouring countries. Cement has been exported to Malawi and stockfeeds have been exported to Tanzania.

Zambia imports a much wider range and volume of manufactured products than it exports. If petroleum products are excluded, manufactured imports accounted for 60-70 per cent of total imports during the first half of the 1980s. The EC countries are the main suppliers, providing over 50 per cent of total imports.

Major manufactured imports are:

- petroleum products,
- chemicals,
- machinery,
- transport equipment.

The manufacturing sector is highly dependent on imported machinery, spare parts and industrial inputs. Import coefficients are highest in the chemicals and basic metals industries, which imported 72 per cent and 77 per cent, respectively, of their inputs in 1980. High import dependence has been a major reason for decreasing levels of capacity utilization in the manufacturing sector, because foreign exchange has become increasingly scarce during the 1980s.

2.4 Assessment of policies and institutions relating to the manufacturing sector

The Interim National Development Plan (INDP), from July 1987 to December 1988, set the following objectives for manufacturing: to give priority to parastatal and private sector firms which produce products which are essential to human life and the economy; to improve quality; to encourage import substitution and export promotion through domestic resource utilization; to improve capacity utilization of existing plants; and to promote small-scale and medium-sized firms.

The policies which affect the manufacturing sector most directly are industrial development policy and taxation policy. Other policies, of a macro rather than a sectoral nature, which also have an impact are trade policy, regional policy, tariffs, the exchange rate, interest rates and prices.

^{1/} This section is based on the May 1988 UNCTAD/ITC import and export estimation tables.

This section examines to what extent Zambia's policies and institutions succeed in promoting the objectives of manufacturing sector development.^{1/} In this regard, it is helpful to look at various performance indicators for the macroeconomy and its individual sectors, as well as the general and plant-specific findings of the present study.

According to the INDP, the economy's performance was disappointing during the period 1980-84. The main reason was a decline in investment levels and the volume of imports. The manufacturing sector was described as continuing to be highly import dependent for machinery, spare parts, raw materials and other inputs. The latest performance indicators, as published in the 1987 Economic Report, show that agricultural output declined in real terms in 1987 and that manufacturing sector output increased by only 1.3 per cent.

The findings of this study confirm the low capacity utilization of the manufacturing sector. Other important findings include:

- the level of company taxation on profits is high;
- imports of industrial machinery and spare parts are normally subject to high taxes (import duties plus sales taxes);
- capital requirements for rehabilitation are high relative to investible resources available out of after-tax profits.

Although aggregate performance indicators are indicative of the effect of Zambia's policies and institutions on the manufacturing sector, a clearer assessment can be made by examining specific policies and institutions as they affect the manufacturing sector.

(a) Industrial policy

The New Economic Recovery Programme's industrial policy emphasises the use of domestic inputs, linkages with the agricultural sector, promotion of non-traditional exports, encouragement of small-scale industry, and rehabilitation of existing plants. From an overall point of view, this policy approach is more likely to advance the development of both manufacturing and agriculture than the previous import-substitution policy. With regard to the specific issue of rehabilitation, the Programme is not very explicit. The available documentation and the mission's field experiences indicate that policy makers see rehabilitation not just in technical terms, but also in terms of increasing the availability of management and other skills, and a better supply of inputs.

If the national aspiration of development through greater use of "own resources" were to be applied at the plant level within the manufacturing sector, then the financial and skills shortages which affect so many companies would clearly constitute key constraints both to rehabilitation and to further development. Debts - often inherited from private sector owners bought out by INDECO - low reserves, shortages of working capital, and low after-tax profits preclude most companies in the parastatal sector from financing rehabilitation, let alone expansion, out of their "own resources".

^{1/} See Appendices 2 and 4 for a description of the policies and institutions and of the methodology used for the assessment.

Taking money in the form of taxes from financially weak companies and then giving money back to them to rehabilitate their plant seems needlessly complicated. In the opinion of the mission and the managers interviewed, company taxation in Zambia is high - at present, the rate is 40 per cent. If rehabilitation needs are to be tackled, even in part, by companies themselves, they must be allowed to accumulate sufficient funds for this purpose. Of course, in many cases massive doses of finance will be necessary; outside support will be crucial in this regard. But, as a start, and as an indication of intent on the part of Government to operationalize and generalize the "own resources" approach, the system of company taxation could be re-examined. This could, for example, involve the introduction of company rehabilitation funds. These funds would be gradually built up by accumulating (part of) the company tax due. The funds, under Government supervision, would be released for well-defined rehabilitation projects and would be supplemented by credits and services from other sources.

(b) Tariff policy and institutions

By the early 1980s, nominal tariffs ranged from a low of zero to a high of 150 per cent. In contrast to the common situation in sub-Saharan African countries, an extremely large range of goods entered Zambia duty-free. A World Bank study^{1/} of the ratio of import duty revenues to import values in thirty-two Sub-Saharan countries from 1972 to 1978 showed that Zambia was the lowest at 6.2 per cent. Whether intended or not, this provided some compensation for the landlocked location of the country. Nominal tariffs were generally lowest on intermediate and capital goods and highest on durable consumer goods; essential consumer goods entered at low or zero rates. The same structure was reflected in effective rates of protection (ERPs). In general, high ERPs have applied to non-food, import-substituting consumer goods, thus encouraging their production. In the absence of competing imports, ERPs raised domestic prices well above those of traded equivalents. According to the above mentioned World Bank study, the value added generated in 1975 in these industries was four times higher than would have been the case without protection. In the early 1980s trade policy was still biased in favour of final goods industries, while it offered considerably weaker incentives for the production of intermediate and capital goods and was unambiguously biased against some potential export industries.

Budgets from the early 1980s through 1988 attempted to respond to changing policy objectives. Customs duties were generally raised to reduce the number of zero-rated items and to increase Government revenues. Duties and sales tax typically account for about half of the budgetary revenues. Quite apart from policy considerations, the falling revenues from copper exports have therefore resulted in fiscal pressure to increase the customs duties. The import duty (and sales tax) on capital goods imports was raised and a minimum rate of 10 per cent was imposed on imports of raw materials and intermediate goods. The former increase was designed to lower capital intensities. While this may appear to be a good idea, increasing the cost of necessary machinery imports only succeeds in constraining rehabilitation still further. Moreover, the duties on spare parts and raw materials reduced ERPs on finished manufactured goods produced in Zambia. These disadvantages were

1/ World Bank, Zambia, Industrial Policy and Performance, 1984.

recognized in the 1988 Budget and, as a result, the duty rate on machinery was reduced from 20 to 10 per cent. However, the reduction was not as great as it might have seemed because all imported goods subject to a positive rate of duty also are subject to a sales tax. Therefore, the combined total rate remains high on imported machinery since it is made up of 10 per cent duty, 20 per cent sales tax, plus 2 1/2 per cent "value for duty purposes" uplift.

To encourage rehabilitation and facilitate the importation of necessary machinery and equipment, the Government might consider removing duties on machinery altogether for small-scale companies fulfilling the criteria of the new industrial policy - that is, companies that substitute domestic for imported raw materials and seek out new export markets. Indeed, this seems to be essential as a mechanism for promoting rehabilitation out of "own resources" and for companies seeking to break into the PTA or SADCC markets where some manufacturers, in Tanzania and Zimbabwe for example, already enjoy duty-free entry for industrial machinery.

With respect to duties on spare parts, the across-the-board reductions effected on these items in the 1988 Budget were not satisfactory. Zambia produces only a small percentage of the total amount of spare parts needed to maintain plants in good working order. However, progress is being made, especially in the production of less-sophisticated types of spare parts. In the short term, this activity deserves to be encouraged and protected by tariffs. (The length of the period will depend on the level of technical sophistication involved in individual products).

Taking into account the stated objectives and policies of the PTA and SADCC, imports of spare parts which cannot yet be produced in Zambia should enter duty-free. Thus, the tariff structure for spare parts should be differentiated, with high rates protecting import-competing spare parts and zero rates on imports of spares not produced in Zambia.

(c) Exchange rate policy and institutions

The allocation of foreign exchange to Zambia is currently performed by the Foreign Exchange Management Committee (FEMAC). There have been two previous types of administrative allocation. In the 1970s, excess demand for foreign exchange led to the introduction of a complicated system whereby importers had to obtain import licences from the Ministry of Commerce and Industry (MCI) and, separately, apply to the Bank of Zambia (BoZ) through their commercial banks for foreign exchange. These processes were not synchronized, and many more import licences were issued than there was foreign exchange available to purchase the matching imports.

Toward the end of this first period of administrative intervention in foreign exchange allocation, the exchange rate policy itself changed to that of a crawling peg against a basket of currencies. Thus, although firms had to apply for a licence to import, if successful they still were not assured of getting the matching amount of foreign exchange, and the rate itself was not fixed except for relatively short periods.

The auction, from October 1985 to May 1987, was the second period of administrative allocation of foreign exchange. In one important way it was a significant improvement over the first attempt to allocate foreign exchange.

Obtaining an import licence became an easy, almost on-demand process. However, the exchange rate floated according to the supply of foreign exchange available each week at the auction and the demand registered at various rates by the bidders.

There are a number of reasons why the auction failed. First, the administrative mechanisms themselves were changed too often, creating uncertainty regarding the Government's commitment to the auction. Second, the auction had been, since its inception in October 1985, the centre-piece of the structural adjustment programme. When the removal of subsidies on mealie-meal in December 1986 caused food riots, the whole adjustment programme, and the foreign exchange auction in particular, came under pressure. The auction was also blamed for the general price inflation, which resulted from the fall in the value of the Kwacha. However, the final and ultimate reason for the auction's failure was an inadequate supply of foreign exchange. The historic low of copper prices in the first quarter of 1987 severely restricted the amount of foreign exchange available from exports. Moreover, the amounts made available by the donor community fell short of expectations. Eventually, a "pipeline" of disbursement arrears built up. Pent-up demand became even greater during the two-month period between the end of January and the end of March 1987, when the auction was temporarily suspended. The system was finally abandoned, with the rest of the adjustment programme, in May 1987.

The FEMAC system of foreign exchange allocation differs from the auction in that the exchange rate is fixed at ZK8 to the US dollar.

Manufacturers have mixed reactions to the FEMAC system. Those in "sensitive" manufacturing sub-sectors and others who succeed in obtaining foreign exchange tend to prefer FEMAC to the auction since they obtain foreign exchange at ZK8 to the dollar. On the other hand, many other manufacturers do not succeed in getting selected by FEMAC for foreign exchange allocations. This is usually because they are in sub-sectors (such as trading or "non-essential" imports) which FEMAC considers low priority. Thus, although the price of foreign exchange is now lower than it had been for long periods during the auction, this low price is of no benefit to manufacturers if the overall foreign exchange shortage results in their exclusion from the allocation process altogether.

Since FEMAC was introduced, foreign exchange has become even more constrained because most of the donor support has disappeared. Indeed, given the fact that supply falls so short of registered demand - as evidenced by the differential between the official exchange rate and that obtainable on the parallel market - it is doubtful whether the present rate can be maintained much longer.

The FEMAC system itself, as an administrative mechanism, is working smoothly. The synchronization of the allocation of foreign exchange with the issuing of the necessary import licences is a distinct improvement over the way in which import licences had been issued during the period of the crawling peg. However, the advantage of that system was that while the exchange rate was fixed for certain periods, it was allowed to adjust steadily and periodically. The longer an exchange rate is prevented from adjusting to its equilibrium rate, the greater is the amount by which it has to be eventually adjusted. For this reason, the present fixed exchange rate accompanying the FEMAC allocation mechanism will probably have to give way to some form of adjustable peg before too long.

(d) Interest rate policy

With inflation running at over 50 per cent and interest rates fixed at 15 to 20 per cent, real rates of interest in 1988 are once again negative. This reduces incentives for private saving in the banking system and also tends to impede the development of financial intermediation. As a result, credit which could be used for self-financed rehabilitation will continue to be scarce. A more flexible interest rate policy would be an improvement. However, this will have to await a decision regarding the exchange rate regime.

(e) Pricing policy and institutions

Current pricing policy involves a number of important issues. The cost-plus system established by the Prices and Incomes Commission (PIC) may not promote efficiency or encourage companies to try to keep costs to a minimum. In addition, price controls and delays by PIC in processing requests for price increases have caused some parastatals to operate at a loss. Such losses prevent them from putting aside resources for plant rehabilitation.

Raising the prices of manufactured goods must be synchronized with increased prices of inputs. Sometimes this can involve a fairly long price-adjustment chain. For example, increases in the price of stockfeed concentrates usually necessitate a compensatory rise in the price of stockfeeds - especially if quality reductions are to be avoided. Increases in stockfeed prices, in turn, will raise the costs of producing pigs and other livestock. If pig prices are not raised, pig production will be discouraged. If pig prices are raised, this will result in increases in the raw material costs of pork producers. With a flexible pricing system, output prices adjust fairly quickly to compensate for increases in input prices. If prices are not allowed to adjust, or if their adjustment is unduly delayed, losses must be incurred at that stage in the chain. This tends to discourage production of the product involved. If this product is used in the production of another product along the line, stoppages occur, or increases in costs because more expensive inputs are substituted. At present, given the number of products subject to price control or requiring approval before prices can be raised, there is an urgent need to shorten the time lag in the processing of price increases.

There are a number of reasons why price increases are often subject to long delays, including attempts to contain inflation as well as staff inadequacies at PIC. The mission feels that delays must be investigated and that any staff inadequacies should be corrected. Because of the nature of the linkages between companies within the agro-related sub-sector of manufacturing, collaboration between MCI, PIC and MAWD in the adjustment of prices is essential. The present situation, while it may help to contain inflation by delaying some price increases, also tends to create cash flow problems for companies subject to such delays. This is a contributing factor to manufacturing problems and shutdowns. Also, it prevents firms from accumulating funds which could be used for plant renewal, and it may jeopardize necessary rehabilitation efforts. Pricing policies are thus an essential element of both overall industrial regeneration and successful rehabilitation projects.

CHAPTER 3

FOCUS ON AGRO-RELATED INDUSTRIES

Introduction

To reduce Zambia's dependence on copper, INDP objectives include a greater reliance on domestic raw materials to save foreign exchange, production of goods to meet basic needs, and promotion of non-traditional exports. In general there is a stronger focus on the agricultural sector. The country's abundant land resources permit considerable expansion in this sector, and the policy changes of recent years have already improved its performance. The sector is potentially capable of meeting domestic demand for all major foodstuffs and for many industrial raw materials. Oil seeds, tobacco, tea, coffee and poultry are among the agricultural products that could substantially raise export earnings. Meat products are another potential export.

The food industries, whose key role in manufacturing has been outlined in Chapter 2, and other agro-related industries are thus likely to play an even more important role in the future. Their growth would help Zambia become self-reliant in basic needs, while saving and earning foreign exchange. However, the agricultural sector needs increased amounts of tools and inputs, preferably produced locally.

The available documentation, discussions with Zambian Government officials and practical considerations such as time constraints resulted in the selection of the food-processing sub-sector as the sub-sector to study. Its characteristics, potential and problems are outlined below.

3.1 Food processing sub-sector

3.1.1 Overall characteristics

None of the branches of the food industry appear to be very well developed. Nonetheless, they do appear to satisfy to a large extent Zambia's national needs and they hold a large potential for the future.

Raw materials are mostly of domestic origin but there are notable exceptions. For instance, in the oils and fats sub-sector, much crude vegetable oil is imported and then refined in the country.

In the food manufacturing sector 78 per cent of firms are privately owned. The remaining 22 per cent are parastatal or partly controlled by INDECO.

3.1.2 Major problems and constraints

The major problems are related to poor capacity utilization, caused to some extent by non-availability of spare parts and insufficient supply of raw materials.

Several branches - such as flour milling, oilseed processing and stockfeed manufacturing - suffer considerable losses from breakdown of equipment and machinery. In the experience of the UNIDO mission, these breakdowns are in part due to excessive quantities of impurities in the raw materials, as well as inadequate plant design. For instance, cleaning equipment is usually not included in the process flow, and interlocking of electrical installations, as a protection against overloading and breakdown, is not included in installations. Hence, the poor performance of many processing plants is a consequence of inadequate plant procurement and contracting. Installed capacities are invariably not achieved. In fact, individual machinery is seldom tested, either for capacity or performance, prior to final takeover. In most cases, entire processing lines in the plants are not subject to tests required as a part of normal commissioning procedure.

3.1.3 Linkages

The backward and forward linkages in the food processing sub-sector are quite extensive. The stockfeed processing branch, for example, must have strong and reliable linkages to a number of branches, including oilseed processing, grain milling, meat processing, dairy processing, sugar processing and beverages. The inputs from these branches determine to a great extent whether the stockfeed industry is capable of supplying the livestock sub-sector with qualified formula feeds. The absence of linkages, or poor performance in other branches, implies dependence on imported ingredients. The oilseed processing branch and the meat processing branch have fewer linkages, but are of crucial importance with respect to supplying by-products to the stockfeed industry and various foodstuffs to the market.

3.1.4 Policies as they relate to the food processing sub-sector

The Government's emphasis on food processing is evident in the INDP (see Chapter 2.4), which encourages production by both parastatal and private sector firms of products which are "essential to human life". The INDP also specifically gives priority to the promotion of resource-based industries in an effort to promote inter-linkage, especially between agriculture and manufacturing. "Increased capacity utilization" and "improved quality control in locally-produced goods" are general objectives of particular relevance to the rehabilitation of food processing industries.

The Government's interest in supporting development of food processing is also demonstrated by INDP allocations for the sub-sector, accounting for 13 per cent of the total Priority A project finance, 58.6 per cent of Priority B project finance, and 2.7 per cent of Priority C project finance. In monetary terms these percentages correspond to ZK 21.9 million, ZK 23.5 million and ZK 2.8 million, respectively.

Since the 1988 budget, all industrial machinery is subject to 10 per cent import duty, and spare parts 20 to 25 per cent duty. In addition to import duty, a 20 per cent customs sales tax is also levied, plus a 2.5 per cent up-lift for "value for duty purposes" (VDP).

Policies more specific to the food-processing industries are the following:

- As regards access to foreign exchange, the so-called priority activities, including stockfeeds, vegetable oils and fats are given preference.
- "Sensitive" branches such as stockfeeds and edible oils receive a five-year tax holiday.
- Total embargo exists on imports of competing processed foodstuffs. Imports of such inputs as sausage casings and spices are allowed.
- A number of products from the food processing sub-sector are subject to price control. Since 23 May 1988, the controlled items are sugar, salt, mealie-meal, cooking oil, baby milk, and wheat products.
- In the case of food products subject to Statutory Instrument No. 1, 1988, which includes stockfeeds, PIC must grant permission before prices can be raised by producers.

CHAPTER 4

BRANCH PROFILES

Chapter 3 identified a number of branches in the food industry which play an important role in the sub-sector. An analysis of the documentation and discussions at the Ministry of Commerce and Industry resulted in the choice of four branches for further study: meat-processing, stockfeeds manufacturing, oilseeds processing and packaging materials. Processed meat is an important food item, and is one of the non-traditional exports that the Government wishes to stimulate. The stockfeeds industry provides essential products to livestock producers. In terms of access to foreign exchange, stockfeeds and vegetable oils are given priority. Well-developed and efficient oil seeds and meat processing again allow the stockfeeds branch to function without having to import protein and mineral raw materials. Although the packaging industry does not belong to the food processing sub-sector, it is closely related to it. Depending on the type of packaging, this branch has backward linkages to a number of agro-related sub-sectors. The packaging industry has forward linkages to all branches of the food-processing sub-sector.

4.1 Meat processing

4.1.1 Overall characteristics

The meat processing branch incorporates slaughtering and processing of cattle, pigs and poultry. In discussions at the Ministry of Commerce and Industry it was decided to focus on pork products; therefore, this section relates to those products only.

The various pig products, including processed products such as sausages, polonies, cured hams and bacon, account for about 7 per cent of total domestic meat consumption in Zambia. This has not changed substantially over the years. Table 4.1 shows the number of pigs slaughtered in 1986, by province. Slaughtering and processing of pork is primarily done along the 'line of rail'. It is concentrated in and around Lusaka and to some extent in the Copper Belt.

Table 4.1: Pigs slaughtered in 1986, by province

Province	1986	
	Graded	Un-graded
Central		509
Lusaka	22,792	2
Copperbelt	1,126	4,989
Southern	537	160
Western	40	9
NorthWestern	-	22
Northern	-	61
Luapula	-	6
Eastern	-	211
Total	24,495	5,969

Source: MAWD

4.1.2 Major problems and constraints

The greatest problem in the pork products branch at present is the shortage of slaughtering pigs. Another problem is shortage of spare parts for some essential equipment.

It appears that capacity utilization is low in some firms. Because it is a seller's market, whatever is produced is easily sold. Therefore, storage needs are limited at present. Once pig production increases, however, storage problems are likely to emerge.

It is Government policy to encourage the export of meat products. Major efforts are necessary to promote pig-production and processing and to make it economically viable. Data on pig production are fragmented and do not present a clear picture of current developments in pig farming. Statistics from the Ministry of Agriculture and Water Development's Annual Livestock Report indicate that the number of pigs in the traditional sector has been relatively stable, at around 170,000 head during the period 1983-86. Similar information does not appear to be available for the commercial sector. However, MAWD estimates show that the number of breeding sows in the commercial sector is about 5,200 at present, divided as follows: six large farms, one of them parastatal, with 200 to 600 sows; ten farms with 50 to 200 sows; and a number of medium-sized pig units with fewer than 50 sows. The number of small pig farms has declined in recent years.

Large White and Landrace are the only breeds of significance in the commercial sector. The efficiency of commercial pig production is low in Zambia, even by African standards. The average number of pigs slaughtered per sow each year is estimated to be 11 and the overall feed conversion (total feed consumed divided by total cold dressed weight) is reportedly 7.24. Similarly, the feed conversion ratio for slaughter pigs is reportedly four to one. The main reasons for this are low management standards, low quality of feed, and unreliable supply of feed.

Animal diseases occasionally prevent the transport of pigs or pig carcasses from the Southern Province to other parts of the country. For similar reasons, Eastern Province is presently not even a potential source of pork carcasses or pork products.

In the last ten years a number of programmes have been launched to promote small scale commercial pig farming under the so-called Integrated Pig Management Scheme. The policy is to organize groups of farmers into pig-producing co-operatives, each with a central management responsible for supply of feed and other inputs, as well as marketing and extension services.

The following projects were started under the Scheme:

1. An Israeli-sponsored project on the Copperbelt. The co-operative collapsed after Israeli technical assistance was terminated.
2. A German-sponsored integrated programme at Monze in the Southern Province which included management, extension and veterinary personnel, a complete stockfeed plant and a large number of vehicles. Lack of spare parts for the feed mill and for the vehicles resulted in deficient feed supplies and a general decline of the programme.

3. Two other Integrated Pig Management Schemes, one in Kumbi in the Central Province and one in Chipata, Eastern Province, never reached the stage where co-operatives were formed. At present a number of individual farmers are being assisted by MAWD in acquiring feedstuffs and in marketing their outputs.

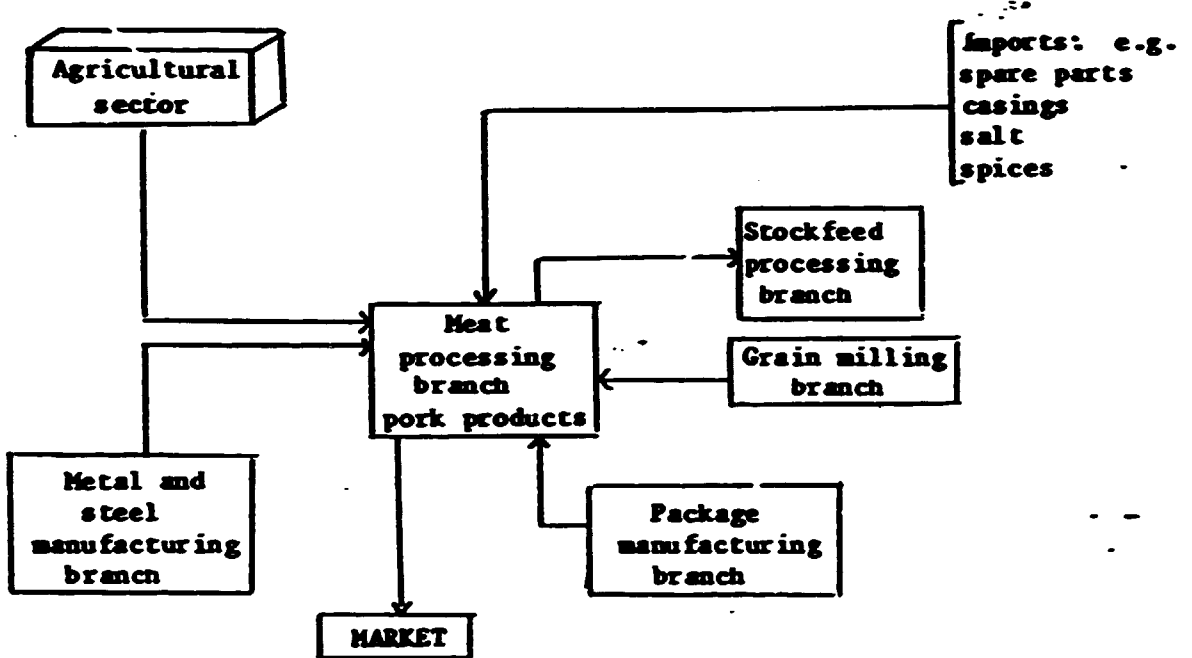
It appears that the Integrated Pig Management Scheme still provides some kind of support with respect to the supply of better bred pigs.

4.1.3 Linkages

The major linkages to other branches and sectors are illustrated in Figure 4.1.

Figure 4.1

Linkages of the meat processing industry



The meat processing industry has a number of backward linkages but the forward linkages in Zambia are few, and not very well developed.

4.1.4 Spatial distribution

The pork products branch is concentrated in the large population centres along the 'line-of-rail', with three model plants around the Copperbelt, Lusaka and Livingstone. These are Zambia Pork Products (ZAPP), Twikatane Farm Products and Lusaka Cold Storage Ltd. Twikatane Farm Products, ZAPP's major competitor, is a non-profit enterprise operated by a religious sect and located in Lusaka. Its slaughtering capacity is about 20 pigs per shift, some of which are supplied from its own piggery and the rest from sources that also supply ZAPP. There are indications that Twikatane may plan to set up a slaughtering and processing facility in the Copperbelt to supply the Northern area market.

The third-ranking pork producer is Lusaka Cold Storage Ltd., a subsidiary of Galaun Holdings Ltd., Lusaka, whose products are traded under the "Luscold" label. Like ZAPP, this firm procures its pigs from farmers within a 50 km radius of Lusaka, supplementing the output of its own small piggery.

Kyundu Ranch, in Lusaka, is a relatively small operation serving largely the needs of Lusaka's expatriate community. Kyundu Ranch is reported to have recently opened a small slaughter house about 35 km outside Lusaka.

Other significant pork product producers are located as follows:

- Buccaneer Products Ltd., Ngwerere, Lusaka Rural
- King Farm Products Ltd., Lusaka
- Mumpilo Products Ltd., Lusaka
- Zambia Cold Storage Ltd., Lusaka
- Lendor Agricultural Holdings, Lusaka
- Modern Meat Products, Chingola
- Lyons-Brocke Bond, Ndola
- Copper Harvest Foods Ltd., Ndola
- Mushima, Kitwe

In summary, as much as 90 per cent of Zambia's current output of pork products comes from Lusaka and its environs. This figure is quite consistent with ZAPP's market structure which shows that about 70 per cent of its output is marketed in the Southern area, with the remainder going to the relatively densely-populated Copperbelt.

4.1.5 Ownership patterns

Ninety-two per cent of the meat-processing branch is privately owned and the remaining 8 per cent is controlled by INDECO (percentages based on estimated output per employee). It has not been possible to obtain a breakdown of private ownership shares.

4.1.6 Policies and institutions as they relate to the meat processing branch

See Appendix 2.

4.2 Oilseeds processing branch

4.2.1 Overall characteristics

According to a 1987 USAID study,^{1/} the national oilseeds processing capacity is estimated to be about 214,000 tonnes. The largest processors, ROP and Premium Oils, account for 73 per cent of the total national oil extraction

^{1/} USAID, Study of the oil seeds in Zambia, Ministry of Commerce and Industry.

capacity of 157,000 tonnes per year. Medium-sized firms process about 50,000 tonnes of oil seeds per year, representing 24 per cent of total national oil seed processing capacity. The remaining 3 per cent, or approximately 6,000 tonnes per annum, are processed by about 40 small-scale artisanal processing units. Some of these processing units are hand operated, with capacities from 12.5 to 180 kg/h. In its strategy for industrial development, the Interim National Development Plan suggests that enterprises producing cooking oil should be encouraged, as they produce essential consumer goods. Additional quantities of oil cakes would then be available to farmers and the stockfeed industry. At present only about one third of the demand for oil seed-cakes in Zambia is satisfied by domestic sources.

4.2.2 Major problems and constraints^{1/}

The investment plan of the Ministry of Agriculture and Water Development's (MAWD) Task Force projected the production of oilbearing seeds to be some 106,000 tonnes by 1988. However, this figure differs from MAWD's final crop forecast which estimates the total crop yield of sunflower, soyabeans and cotton seed to be 82,000 tonnes in 1988.

The production of groundnuts for oil extraction appears to be about 1,000 tonnes per year. Sunflower production decreased during the first half of the 1980s from 40,000 tonnes per year to 10,000 tonnes, but is now gradually increasing again, stimulated by higher producer prices.

For the 1988-89 cropping season the producers' price for oil seeds increased substantially - by 80 per cent for hybrid and composite varieties of sunflower seed, 43 per cent for unclassified sunflower seed, 29 per cent for soyabeans, and 52 per cent for cotton. It is expected that this increase in producer prices will result in further increases in production. This again would allow for better capacity utilization in the oil-crushing industry. At present, large quantities of comparatively cheap crude vegetable oil are imported to supply the industry, but supply is not sufficient to cover the needs of industry.

In the present context, two issues with regard to domestically produced oilseeds are important: production will have to be stimulated in such a way that the domestic product can compete with the low-priced crude oil imports; and the quality of oilseeds supplied to mills will have to improve. At present the supply contains unacceptable quantities of impurities which cause damage and excessive wear and tear on all moving parts, especially the expeller screws. This invariably results in poor performance of the equipment, frequent breakdowns, and increased need for maintenance.

In sum, the major constraints to full capacity utilization are:
(i) inferior equipment, including non-existing or poor cleaning facilities,
(ii) lack of spare parts, (iii) poor working environment and (iv) periodic deficiency in raw material supply.

1/ See Oilseeds sub-sector annex, MAWD, July 1985, and MAWD, 2 May 1984.

4.2.3 Linkages

The pattern of technical linkages in the oil seeds processing sub-sector is quite straightforward. Good quality oil seed is extremely important for the successful performance and development of the stockfeeds sub-sector and hence for improved production of the livestock sub-sector. These major backward and forward linkages are illustrated in Figure 4.2.

Suggestions for future development

Vital ingredients for the stockfeeds industry - protein, minerals, trace minerals, vitamin supplements and veterinary additives - are presently imported.

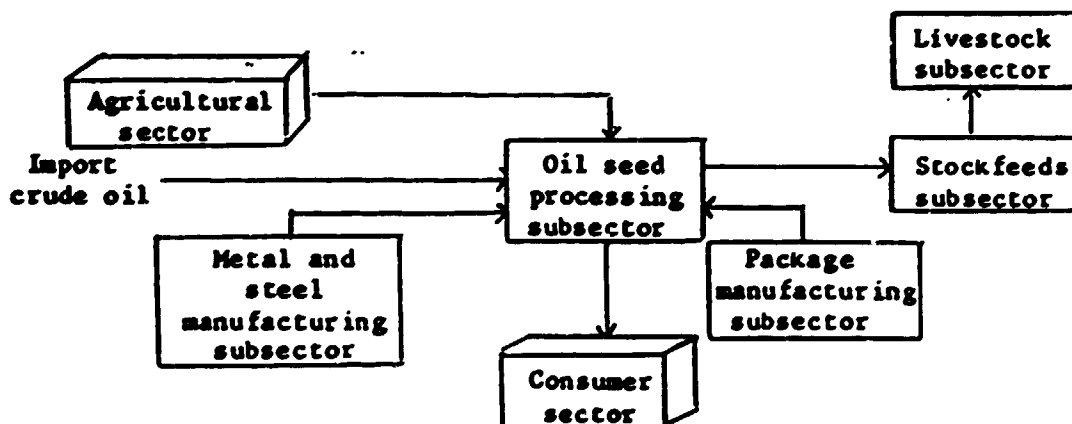
A substantial portion of the present imported feed ingredients could be substituted by local raw materials, such as high quality bone meal, meat meal, blood meal and lucerne meal.

The UNIDO team is of the opinion that efforts should be made, as soon as possible, to identify domestically available sources of animal proteins, mineral supplements and, to some extent, vitamins. It is thus suggested that a techno-economic feasibility study be carried out with the following objectives:

- (i) to investigate the scope of local bone meal processing to satisfy domestic demand for stockfeed manufacturing. All possible alternatives should be considered, including deboning carcasses at the larger abattoirs, which would also facilitate processing of beef concentrate from the bones before they are turned into bone meal.
- (ii) to determine input requirements for upgrading existing rendering plants and blood treatment installations in abattoirs for production of high quality bone meal, meat meal, and blood meal, and for installing rendering plants or blood treatment facilities in other abattoirs.
- (iii) to process local lucerne meal to be used as a source of vitamin A, and to some extent protein, in feed rations.

Figure 4.2

Linkages of the oilseed processing industry



4.2.4 Spatial distribution

According to the abovementioned USAID study of the oil seeds sub-sector in Zambia, about 89 per cent of the capacity for oil extraction is accounted for by a small number of enterprises located in the Lusaka and Copperbelt regions. One processing plant, located in Kalite in Eastern Province, has about 6 per cent of the national crushing capacity, while another in Choma, Southern Province, has about 2 per cent. Small-scale expellers concentrated in the Copperbelt, Central Province, and Lusaka claim the remaining 3 per cent. The percentage distribution of identified units is as follows:

Table 4.2: Distribution of oilseed mills

<u>Province</u>	<u>Per cent</u>
Lusaka	27
Central	15
Copperbelt	9
Southern	31
Western	1
North Western	5
Northern	<u>12</u>
	100

4.2.5 Ownership patterns

The oil seed processing branch is dominated by INDECO which accounts for 75 per cent of the branch; the remaining 25 per cent are privately owned.^{1/} A breakdown by enterprise within the private sector was not available.

4.2.6 Policies and institutions as they relate to the oilseeds processing branch

See Appendix 2.

4.3 Stockfeeds manufacturing

4.3.1 Overall characteristics

The Zambian stockfeed industry has not experienced any major development in years. The aggregate operational capacity of existing stockfeed plants in Zambia amounts to 244,000 tonnes per annum, with actual aggregate output at 140,000 tonnes per annum.

Production of stockfeeds declined substantially from 192,000 tonnes in 1980 to 140,000 tonnes in 1987, according to Danish experts studying the rehabilitation of maize and feed mills in Zambia.

The Zambian Standards Institute (ZSI) has established national standards for different types of stockfeeds although these are not yet enforced by regulations. The reason for this appears to be that there is no body to test and monitor a control system. The problems involved in implementing such a system at present would be substantial.

4.3.2 Major problems and constraints

The greater part of the stockfeed industry is dependent on imports of certain ingredients, mainly mineral supplements, trace elements, vitamins, medicated additives, and animal protein. Such imports necessitate foreign exchange and this makes the feed industry extremely vulnerable. Therefore, high priority must be given to substitution of most of the imported ingredients by domestic supplies. Domestic processing of slaughterhouse by-products such as bones, offal, blood, and to some extent condemned meat and carcasses could provide the stockfeed industry with considerable quantities of ingredients to cover the requirements of minerals and protein. However, by-product processing at the slaughterhouses appears not to have received sufficient attention, and existing rendering plants are reportedly not operating efficiently. In addition, product quality is generally sub-standard. The structure of the Zambian slaughtering industry, with comparatively small abattoirs, makes it difficult to attain economies of scale.

It is therefore imperative that the national stockfeed industry utilizes the slaughterhouse by-products and offal as a source of feed ingredients.

The potential for economic utilization of scrap fish and fish offal is less promising but should nevertheless be investigated. Lucerne meal, which can easily be produced in Zambia, is also a good source of vitamin A in stockfeeds.

In summary, some of the major material constraints that would seriously affect the stockfeed industry, in case of disturbances in the import of pre-mixes and concentrates, can be overcome. Reduced reliance on imported stockfeed raw materials would strengthen the backward linkages of the stockfeed manufacturing branch. This would contribute to further industrialization based on locally available raw materials and hence create job opportunities.

Shortage of spare parts creates constraints for the individual stockfeed processor. The lack of spare parts and plant maintenance as well has had an adverse impact on the quality of stockfeeds.

Laboratory facilities are non-existent in most stockfeed plants. Analyses of ingredients and finished products cannot be carried out to the extent that is necessary for effective control and monitoring of production processes. This is particularly important in Zambia where the quality of the feed ingredients varies considerably. The absence of adequate monitoring and quality control means that the quality of stockfeeds is not uniform, and an overly high fibre content is found in poultry and pig feeds. Quality also tends to be inferior because of deficiency in protein. The low quality of stockfeeds in turn has also had adverse effects on the quality of the animals which consume them.

At present there are no national standards for feed ingredients, with the exception of maize which has a nominal formula.

The prices of ingredients are set irrespective of quality, that is of impurities, or protein or fibre content. As a result, in an effort to keep costs down, quality usually suffers. If a national standard for feed ingredients were established, and the price of stockfeeds were related to

quality, the future of the stockfeed industry would be brighter. A prerequisite for enforcement of quality standards related to both raw materials and finished products is the establishment of a qualified independent laboratory. Such an establishment could serve the stockfeed industry as a whole since, in many cases, such equipment could not be justified at the plant level.

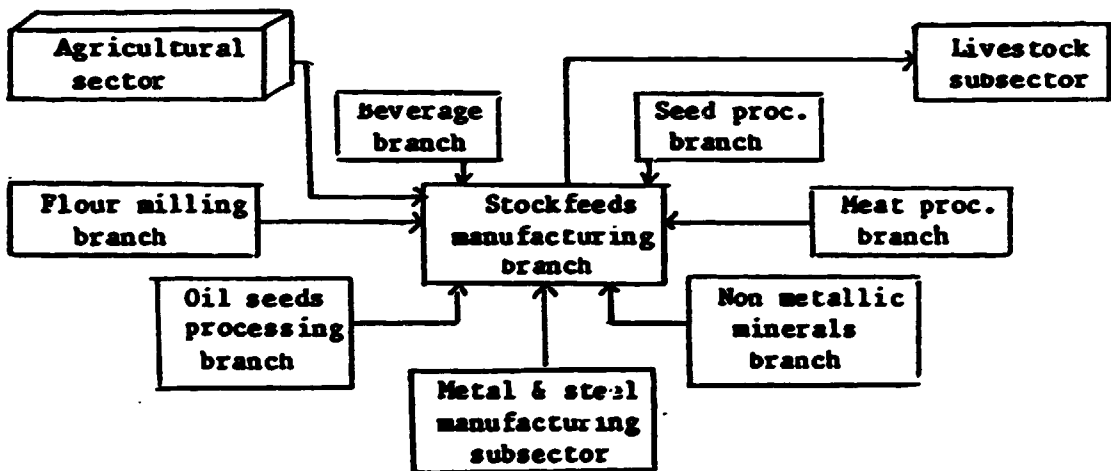
This complex set of constraints related to quality issues in the stockfeed industry have a significant influence on the development and performance of livestock farming. They also significantly affect the success of future efforts to export stockfeeds once domestic demand is satisfied.

4.3.3 Linkages

The stockfeed industry has backward linkages to the agricultural sector and other manufacturing sub-sectors, as illustrated in Figure 4.3. The performance of the stockfeed industry is influenced by that of several other branches, including flour milling, oilseed processing, and meat processing.

Figure 4.3

Linkages of the stockfeeds industry



4.3.4 Spatial distribution

Most of the stockfeed plants are found along the 'line-of-rail', with the exception of some small plants that belong to the Co-operative Unions located in other provinces.

Of the total processing capacity in Zambia, 50 per cent is located in Lusaka, 8 per cent elsewhere in Central Province, 30 per cent in the Copperbelt, 11 per cent in Southern Province, and 1 per cent in other parts of the country.

4.3.5 Ownership patterns

The stockfeed manufacturing branch is dominated by parastatal companies which account for 95 per cent of the branch; the remaining 5 per cent are private firms. (Percentages are based on estimated output per employee.) It has not been possible to acquire a breakdown of private shares in this branch.

4.3.6 Policies and institutions as they relate to the stockfeeds branch

The policies reviewed in Appendix 2 are applicable to the stockfeeds branch, except that there is no duty on imported machinery or raw materials.

4.4 Package manufacturing branch

4.4.1 Overall characteristics

The package manufacturing branch as a whole produces a wide variety of package materials and types of packages. However, this survey is concerned with bag manufacturing only. The availability of bags for agricultural commodities such as fertilizer and staple foods such as mealie meal and sugar is vital for the entire country.

Zambia's total annual demand for woven bags is estimated to be about 70 million. At present, 60 million of these bags are made from synthetics, and 10 million are made from natural fibre, mostly jute.

The overall domestic production of polypropylene bags appears to be in the range of 25 to 30 million per annum, or about 50 per cent of the demand. Jute bags are mostly imported, with domestic production at approximately 0.25 million.

Bags made from sheet polyethylene are less essential for agriculture and many of the agro-based industries. They are important, however, as lining for fertilizer bags and also for a wide range of packaged consumer foodstuffs. About 6,000 tonnes of polyethylene raw material is used annually in the Zambian bag manufacturing industry. Multi-wall paper bags are not commonly used, and manufacturing appears to be very small scale.

Woven polypropylene bags are manufactured by two firms and jute or kenaf bags by one firm only.

In summary, taking the bag manufacturing industry as a whole, about 98 per cent of the raw material is imported at present. The Government is making efforts to promote the production of kenaf, a fibrous plant which can be grown in Zambia and substituted for imported jute.

4.4.2 Major problems and constraints

The bag manufacturing industry depends almost entirely on imported raw materials, making it extremely vulnerable. The annual cost of foreign exchange is estimated to be about ZK 45 million at present.

The industry also relies on imports of spare parts for practically all equipment. This situation is likely to continue, except for simple parts which may be manufactured locally in the future.

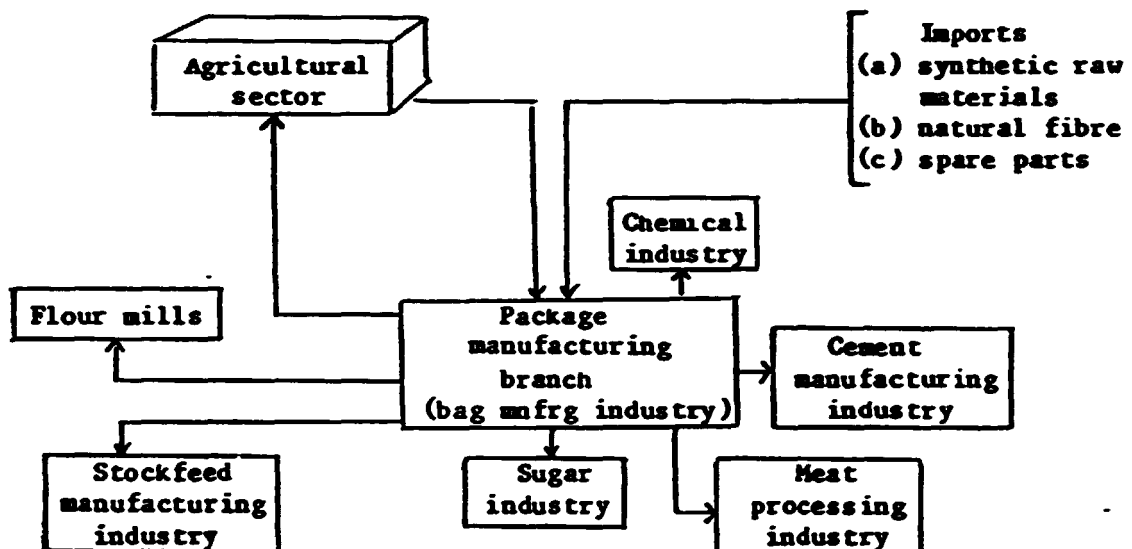
Dependence on imported spare parts has caused considerable constraints in the industry. When spare parts have not been available, some pieces of equipment have gradually been dismantled and the parts used as spares. As a consequence the capacity of the plants has been reduced, and bag imports have had to be increased to meet domestic demand.

4.4.3 Linkages

Bag manufacturing has a large number of forward linkages. However, backward linkages to domestic sectors or sub-sectors are extremely weak. Figure 4.4 illustrates the present situation and shows the importance of bag manufacturing to a comparatively large number of manufacturing sub-sectors.

Figure 4.4

Linkages of package manufacturing industry



4.4.4 Suggestions for future development

The present situation of almost complete dependence on imported raw materials is not acceptable for the long-term. Considering the amount of time necessary for switch-over to alternative sources of raw materials for bag manufacturing, policies and guidelines should be established as soon as possible.

An important step in reducing import dependence has been taken by the introduction of kenaf fibre as a substitute for imported jute fibre. The significance of this development cannot be sufficiently stressed.

Based on present experience with kenaf growing, about 12,000 hectares would be required to cover the national demand for hessian-type bags. As a prerequisite, sufficient quantities of seed will have to be produced. Kenaf production must, however, be synchronized not only with development of the national fibre processing industry, but also with production plans for other domestic crops. Subregional (SADCC, PTA) trade in possible substitutes, such as sisal, should also be taken into account.

The availability of suitable quality bags is crucial for the Zambian economy. It is the opinion of the UNIDO team that the long-term supply of bags in Zambia be subject to a comprehensive study to serve as a guideline for further investment.

Within a medium- to long-term perspective, the following issues should be examined to produce a plan of action:

- (i) The extent to which bulk-handling of certain products is likely to be introduced;
- (ii) Future demand for bags;
- (iii) (a) Raw material availability within Zambia and elsewhere in the subregion, (b) technical aspects of product development, (c) environmental considerations, (d) export potential, especially to the SADCC and PTA regions;
- (iv) Suggestions for the development of the Zambian bag manufacturing industry.

A study along these lines should be given high priority and be initiated as soon as possible.

4.4.5 Ownership patterns

In the package manufacturing branch 86 per cent of firms are privately owned. Parastatals, in which INDECO is majority shareholder, account for 14 per cent (percentages based on estimated output per employee). It has not been possible to obtain information about the distribution of private ownership shares.

4.4.6 Policies and institutions as they relate to the package manufacturing branch

The policies reviewed under Section 3.1.6 are applicable to bag manufacturing for essential products and fertilizers with the following amendments:

- there is no duty on imported machinery;
- there is no duty on imported synthetic granules or jute fibre.

CHAPTER 5

THE CHOICE OF PLANTS

5.1 The selection process

The choice of plants for this study was made by the mission after consultations with the Ministry of Commerce and Industry, the Industrial Development Corporation (INDECO), and the Zambian Industrial and Commercial Association (ZINCOM).

During these discussions the Zambian authorities presented the mission with an initial selection of some twenty enterprises, representing both the public and private sector in agro-related industries. The amount of information on individual firms varied greatly, and in making the final selection the mission took into account the information available. In general, in making the final selection of plants, the mission examined company annual and quarterly reports, budgets, plans and audited accounts. The mission also interviewed officials from the various Zambian bodies mentioned above and representatives of agencies such as the Swedish International Development Authority (SIDA), European Community (EC), U.S. Agency for International Development (USAID) and private financial institutions in Zambia such as Barclays Bank Ltd., Lusaka. These interviews were undertaken to gain additional information and insights with which to assess the candidate plants. For the final selection, the following criteria were applied:

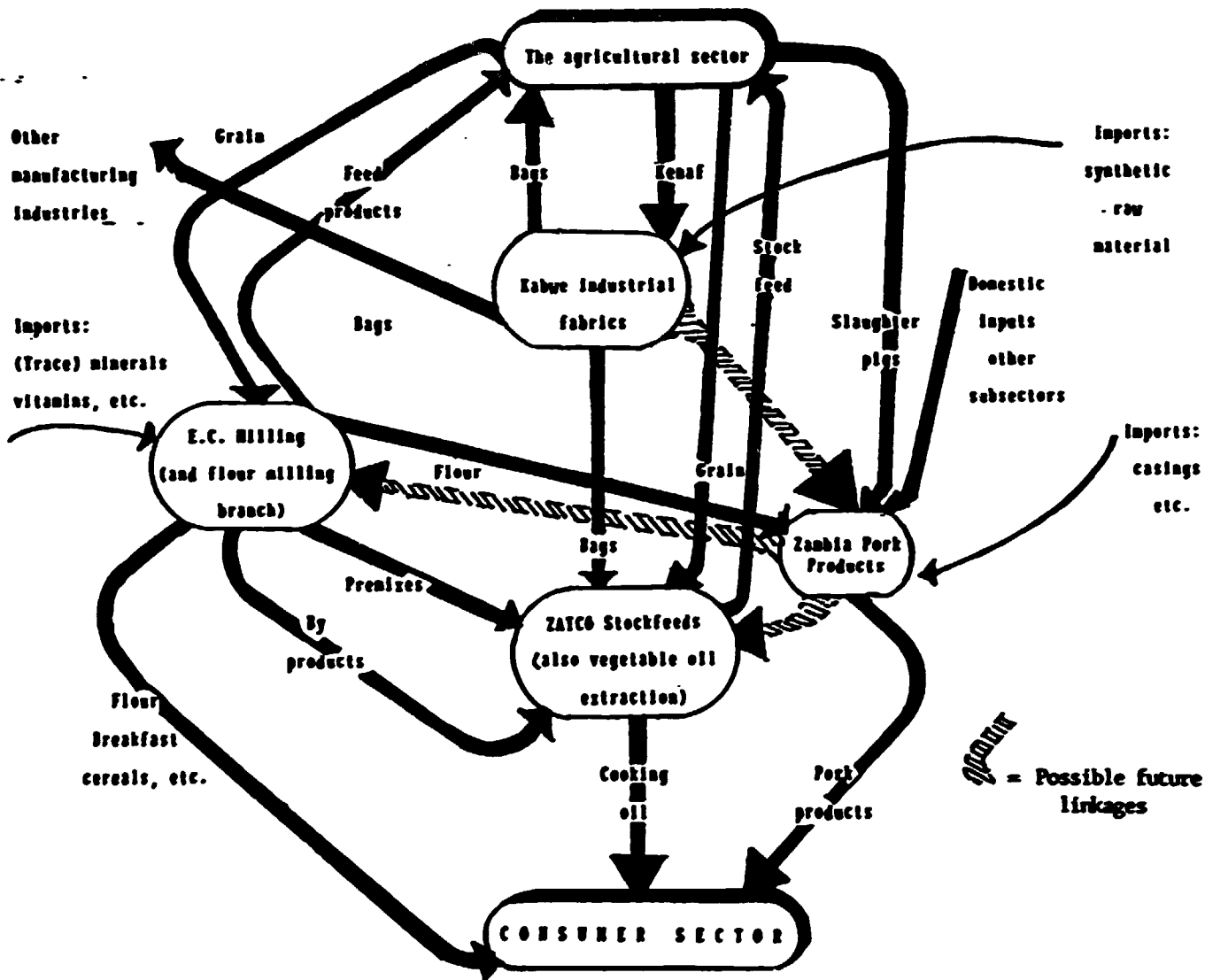
- (a) the plants should be centrally located, given time and transport constraints.
- (b) both the public and private sectors should be represented.
- (c) the plants should have good future economic potential and thus be viable rehabilitation projects.
- (d) in view of the shortage of domestic credit, the need to finance rehabilitation externally must be taken into account.
- (e) in order to enhance the impact of eventual rehabilitation efforts, the selected plants should exhibit a maximum number of interlinkages.

5.2 Selected firms

After further consultations with the Zambian authorities, the mission felt that only four companies could be properly examined in the time available for the plant visits. These were:

- | | |
|--|-----------|
| (a) Zambia Pork Products Ltd. (ZAPP) | (INDECO) |
| (b) E.C. Milling Company Ltd. | (INDECO) |
| (c) Kabwe Industrial Fabrics Company (KIFCO) | (INDECO) |
| (d) ZATCO Stockfeeds Ltd. | (private) |

Figure 5.1
Chosen companies, major linkages



(a) Zambia Pork Products Ltd. (ZAPP)

Zambia Pork Products Ltd. plays an important role in the supply of processed pork products in Zambia. The company's manufacturing covers a sufficiently broad range of products to attract consumers from a range of income groups. There are linkages to the agricultural sector, which supplies the major raw material, slaughtering pigs, and also to other agro-related sub-sector branch industries. More details on the linkages are given in Figure 5.1.

The ZAPP slaughterhouse and associated storage and processing factories are in urgent need of technical upgrading, both from a capacity utilization point of view and with respect to the unacceptable hygiene conditions on the premises. This is due to the design of the plant and wear and tear on the buildings over the years. With adequate funding the plant can be successfully rehabilitated. Finally, it was felt that there would be an interest on the part of bilateral donors to finance rehabilitation of the company.

(b) E.C. Milling Co. Ltd.

E.C. Milling produces both flour and stockfeeds, approximately 50 per cent of each. The conversion of E.C. Milling into a specialized pre-mix and concentrate feed processing operation is under consideration.

Stockfeeds generally are of inadequate quality in Zambia and the supply does not meet the demand. Adequate supply of compound feed is vital to maintain the production of animal products such as chickens, eggs, pork and milk. In this sense the production of stockfeeds has a strategic importance in Zambia's effort to provide the population with animal proteins.

The feed milling industry has strong backward and forward linkages. It also has implications for productivity in the agricultural sector, provided the industry is capable of producing the right qualities of feed in the required quantities (Figure 5.1).

E.C. Milling is in need of rehabilitation, which may prove to be quite substantial. If rehabilitated, the spin-off effects will be considerable, especially for the poultry and pig industries. The feed milling industry is generally attractive to donor countries, and thus E.C. Milling could be expected to attract donor finance.

(c) ZATCO Stockfeeds Ltd.

The ZATCO plant is located in Choma in Southern Province. It is engaged in oil extraction and the manufacturing of stockfeeds. The expellers from the cooker-extractor presses are used as a feed ingredient. Certain pre-mixes, trace minerals, and vitamins are imported.

The production profile of the company, with processing of oilbearing seeds on the one hand and manufacturing of stockfeeds on the other, makes the company strategically important for food supply within Zambia. There are also major linkages to other agro-based industries and to the agricultural sector (Figure 5.1).

The ZATCO plant has potential for rehabilitation involving upgrading of the plant as a whole. Considering the strategic importance of the company, it should be a good candidate to attract donor funding for identified rehabilitation requirements.

(d) Kabwe Industrial Fabrics Co. (KIFCO)

KIFCO manufactures bags for a variety of products for both the agricultural and manufacturing sectors. Large numbers of bags are necessary for grain, oilbearing seeds, coffee, and so on. Agro-based industries such as flour mills, stockfeed plants, and sugar mills need bags to store, transport, and distribute their products. Other strategically important industries like cement and petrochemicals use bags of suitable quality for their products. The KIFCO plant has two main products, synthetic bags and products manufactured from natural fibre (bags and twine).

The synthetic line was recently rehabilitated. The natural fibre line has a very limited capacity, due to the sale of some equipment in the early 1970s. The overall need for rehabilitation has already been identified.

Within the framework of a programme to grow and process larger quantities of natural fibres, the rehabilitation of the KIFCO natural fibre line is of paramount importance.

The rehabilitation of KIFCO's natural fibre line would reduce Zambia's present dependence on imports of jute and hessian bags for a large number of strategically important products. For this reason, it is believed that the project could be attractive to European donors.

CHAPTER 6

PLANT PROFILES

6.1 Zambia Pork Products Ltd. (ZAPP)

6.1.1 Existing situation

(a) Plant history

The company came into operation in 1964. It was originally a co-operative called Colcom owned by expatriate pig producers. The State took over in 1971 through the Rural Development Corporation. The last major expansion of the company was in 1980 when the cold rooms and boiler house were extended and a new refrigeration room was installed. In June 1984, the then holding company of ZAPP, Rural Development Corporation of Zambia (RDCZ), was dissolved. This led to the merger of ZAPP with the Poultry Development Company Ltd. (PDC), a fellow subsidiary within the RDCZ group. INDECO became the immediate holding company, with ZIMCO following as the ultimate holding company. However, during the financial year which ended 31 March 1986, before the formalities of a ZAPP - PDC merger could be final, INDECO completed a restructuring programme which reversed the merger decision. During the two-year period from 1 April 1985 to 31 March 1987, ZAPP's financial statements were prepared on the premise that it was two separate constituent companies under common management. From 1 April 1987, PDC has operated as an independent company; all of its assets and liabilities not specifically related to its independent operations were taken over by ZAPP or INDECO. As part of this reorganization, ZAPP repaid its long-term loan to INDECO. ZAPP's trading licence was granted in 1988.

(b) Management and organization

ZAPP is a subsidiary of INDECO which in turn belongs to the ZIMCO-group. The Board of Directors consists of the following persons:

Chairman:	D.H. Luzongo	Executive Director, INDECO
	T.H. Mtine	LONRHO, Zambia
	R. Asnong	Farmer, Commercial Farmers Bureau
	C. Shimanga	Managing Director, Zambia Cold Stores
	G.N. Zulu	Trade union representative
	A.D. Zulu	Managing Director, INDECO

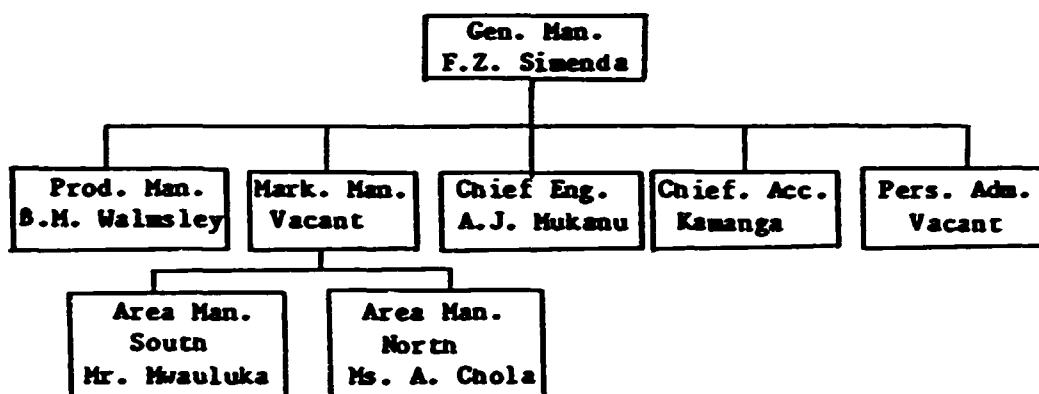
The following persons usually attend board meetings but are not formal Board Members:

F.Z. Simenda	General Manager, ZAPP
B.M. Walmsley	Production Manager, ZAPP
T.V. Ramanathan	Financial Director, INDECO

The membership of Zambia Cold Stores in the Board is hard to understand since this firm competes directly with ZAPP in some markets such as beef and products with pork content. Even more serious is the competition with respect to inputs due to the constant shortage of raw materials. According to ZAPP's management, Zambia Cold Stores, through its Board membership, has had direct and unfair knowledge of ZAPP's activities and capabilities. This leak of strategic information has apparently soured the relationship between the two firms and led to a marked decrease in co-operation between them.

Two important positions are current vacant - Marketing Manager and Manager of Personnel and Administration. According to the General Manager, these two vacancies will be filled within a month. In the meantime, Mr. Simenda has assumed part of the Marketing Manager's duties, assisted by Mr. Mwafuluka, area manager for the Southern region. Mr. Simenda also essentially runs the Department for Personnel and Administration.

Figure 6.1.1
Management Organizational Structure of Zambia Pork Products Ltd.



Meetings between the General Manager and department managers as a group are held once a month. Individual department managers provide daily reports to the General Manager from 8:30 - 10:00 a.m.

The General Manager walks through the entire plant three times a week, usually in the late morning and/or early afternoon. Ms. Mukosa is responsible for quality control and ensuring that mandatory health standards are met.

At the beginning of the year, each manager provides input to a company plan which covers budgets and future forecasts. After initial discussion and approval by the group of managers, the plan is put together by the Chief Accountant. The company plan is then submitted to the INDECO management which discusses the plan with ZAPP's General Manager. After final approval, the plan is presented to the Board of Directors.

The sales department is considered understaffed mainly because sales are made directly to the consumer/retailer, thus bypassing wholesalers. According to the General Manager, the cost of the extra personnel needed for sales is more than compensated for by the gains obtained by bypassing the wholesaler.

(c) Financial structure

ZAPP is a parastatal company wholly owned by INDECO, with the Government being the shareholder.

Table 6.1.1 shows the financial structure of the company, including total fixed assets and total capital employed between 1984/85 and 1987/88. Fixed assets are about 52 per cent of total assets. ZAPP does not have long term debt commitments. A long-term loan of ZK 1 million was taken over by the present company in 1985/86.

Table 6.1.1: ZAPP: Total fixed assets and capital employed:
1984/85-1987/88
(ZK thousands)

	1984/85	1985/86	1986/87	1987/88
Fixed assets	1,367	2,316	2,229	2,068
Share capital	2,155	2,155	2,155	3,155
Reserves(3,230)	(3,230)	(370)	(609)	(150)
Long-term debt	-	-	-	1,000

Source: ZAPP Annual Accounts, various years.

(d) Buildings, installations and production process

ZAPP's manufacturing plant is located in Lusaka's light industrial area on the Mumbwa Road (Plot 4817). The plant consists of the following major buildings:

Lairage	220 m ²
Abattoir and processing factory	7,800 m ²
Administration block	600 m ²
Boiler house	100 m ²

The premises also include security and retail outlet buildings. All exterior walls are constructed of concrete superstructures and clay brick.

Figure 6.1.2 depicts the material flows from the lairage for incoming pigs to the dispatch of pork products.

(i) Lairage:

ZAPP has a capacity for holding a maximum of 250 pigs. The actual number of pigs held at any one time varies according to their sizes. The space allotted for holding pigs consists of fourteen 2.2m x 1.80m pens and sixteen 3m x 1.8m pens. Each of the smaller pens is capable of accommodating up to five or six pigs; the larger pens can hold up to eight pigs, but at the moment four of them have been temporarily converted to offices. Each pen is provided with watering facilities.

(ii) Smoke generation unit:

The smoke generation unit is an old sawdust-fired furnace which is manually charged, with a feeder that is currently in disrepair.

(iii) Compressor room:

The processing plant is refrigerated via a system of 17 compressors (two TSMC 108s, one SMC 8-65, four Bitzer type VI, eight Frigidaire FM8, one Frigidaire F6, and one J & E Hall type 6H). The TSMC-108S compressors were installed in 1980 by SAMROE of Denmark as part of the cold room expansion project. They are designed to serve Cold Room No. 11 which is used for long-term storage of carcasses. The compressor serving Cold Room No. 10, which is used for chilling, uses ammonia as a refrigerant. The ammonia is usually supplied by Nitrogen Chemicals (Zambia) Ltd.

(iv) Liquid effluents:

All liquid effluents, including washwater from the lairage and slaughtering areas, blood, and so on, are drained, without any prior treatment, into an outside sedimentation pit. In this pit solids are separated and loaded into drums for collection and disposal by the local Council Sanitation Department. The overflow is discharged into the city sewage line for eventual treatment beyond the factory limits. There is also an outside cleaning area for recovery of casings.

(v) Rail connection:

The factory is connected to the national network by a Zambian Railways siding which has not been in use for at least two years. However, there are plans to rehabilitate it to deliver pigs from Southern Province.

(vi) Killing section:

The killing section has a capacity for handling about 200 pigs per 8-hour shift. It embraces the following activities: stunning, de-bleeding, scalding, de-hairing, singeing, de-gutting, washing, inspection and grading.

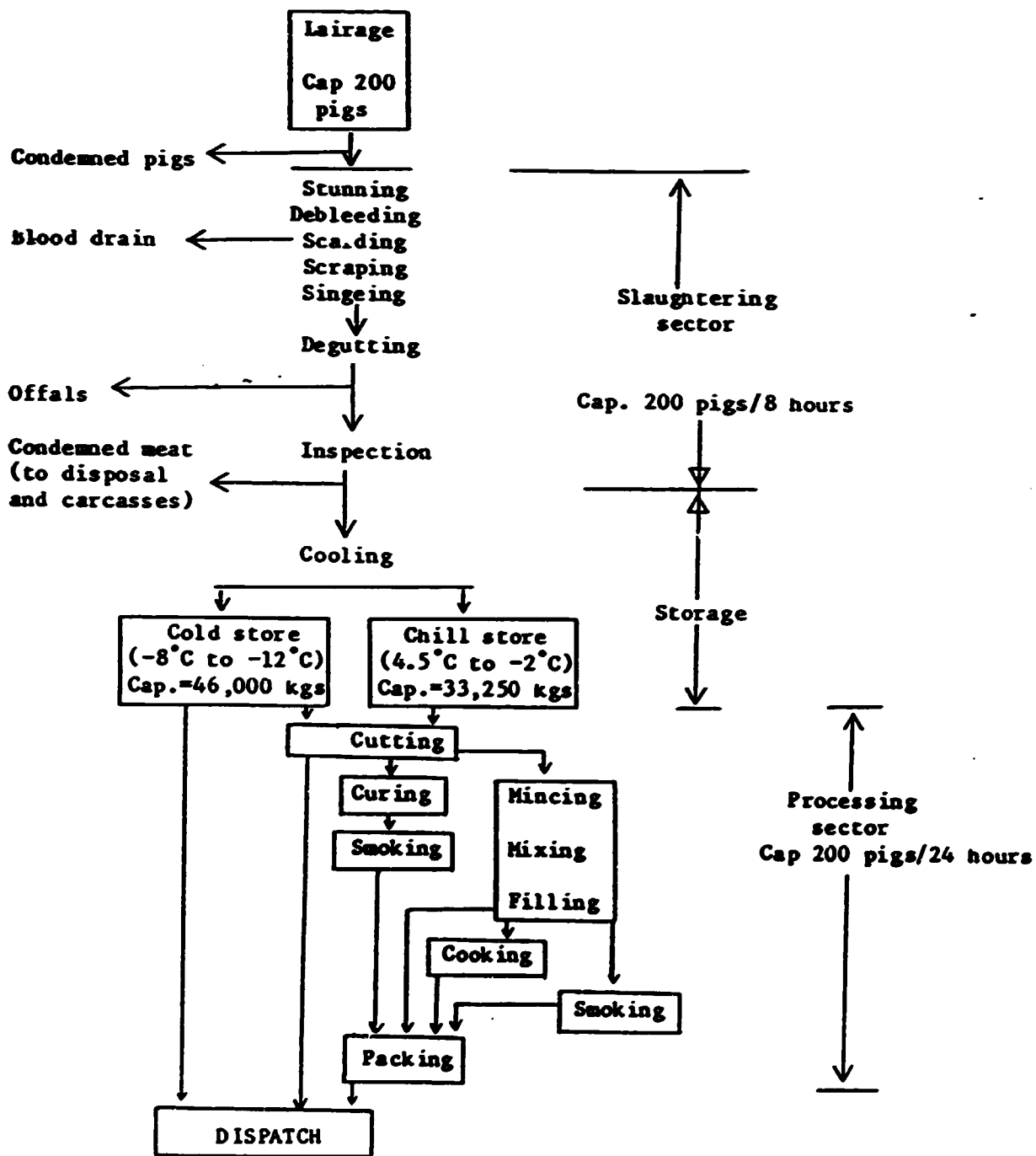
The pigs, ushered into the killing chamber, are stunned with a 90-volt stunning device, and then hoisted up. The pigs' throat blood vessels are then cut to drain the blood into the blood pit. At present, the mechanical hoisting device frequently malfunctions, due largely to the fact that the hoisting device's chain is worn out and needs replacing.

The carcasses are subsequently dumped into the scalding tank at about 75°C, although there is no thermometer for ensuring that this temperature is maintained. After three to four minutes in the tank, the carcasses are lifted into the de-hairing unit. The de-hairing unit is in fairly good condition, although the rubber fingers are in need of replacement. After de-hairing, the carcasses are torch-singed and de-gutted. The large intestines of the animals are generally disposed of; the small intestines are taken outdoors and cleaned for use as sausage casings; and the the liver, lungs and tongue (red offals) are sold. The carcasses are then ready for washing prior to weighing.

Figure 6.1.2

Zambia Pork Products Ltd.

Provincial Product flows
nominal capacities



In 1987, an average pig carcass at ZAPP had a warm-dressed weight of 67 kg. This figure is generally discounted by 2.75 per cent to obtain the equivalent cold-dressed weight. The accuracy of the weigh-scale is periodically certified by the Weights and Assizes Department of the Ministry of Commerce and Industry. Carcasses are now inspected by a City Council Health Inspector who determines if they are fit for human consumption. A Grader from the Ministry of Agriculture and Water Development then rates the various carcasses as either Grade A or B; this, along with the weight, provides the basis for payment to the pig suppliers. At present, only three suppliers, who own accurate scales on their farms, are paid on the basis of live-weight. In these cases, the weighing of the pigs is generally supervised by ZAPP personnel.

(vii) Storage:

The weighed and graded carcasses are taken from the killing section and moved into Cold Rooms either for overnight chilling at 4.5°C to -2°C, or for long-term storage at under -8°C. The storage facilities available are shown in Table 6.1.2

Table 6.1.2: Cold Room facilities and capacities

	<u>Cold Room No.</u>	<u>Design Temperature^{a/}</u>	<u>Design Capacity</u>
For chilling:	1	-2 °C	5,000 kg
	2	-2 °C	5,000 kg
	3 ^{b/}	-2 °C	3,500 kg
	4	4.5 °C	7,500 kg
	5	-1 °C	5,500 kg
	10	0 °C	6,750 kg
For cold storage	6 ^{b/}	-12 °C	1,500 kg
	7	-12 °C	5,000 kg
	8	-8 °C	2,500 kg
	9	-12 °C	5,000 kg
	11	-8 °C	32,000 kg

a/ These figures supplied by ZAPP are, if accurate, considered rather high for chilling and cold storage.

b/ Cold Rooms Nos. 3 and 6 are not functioning due to compressor problems; Cold Room No. 9 is also unusable due to a recent roof cave in. These cold rooms represent, in the aggregate, about 40 per cent of the plant's storage capacity.

(viii) Cutting sector:

From the chiller, the carcasses are delivered to the cutting room for de-rinding, although only one of the two machines for this purpose is currently functioning. Knives and choppers constitute the major cutting tools. A band-saw has been out of order for quite some time. Additionally, the refrigeration system has not functioned since 1986 due to compressor problems. Room temperature in this section is therefore only atmospheric.

There are likewise no washing facilities, and floors are cleaned at the end of the work day by rinsing with hot water from the small-goods section. There are also no means of sterilizing the knives and choppers.

The products of the cutting room are boneless pork meat. This meat is sent to the small-goods section for processing into sausages, bones, and skins which are subsequently sold. Fat, another cutting room product, is minced in the small-goods section before processing into lard; a portion is also used for sausage production. Finally, middles and legs from the cutting room are cured for hams and bacon.

(ix) Curing:

Curing is by manual or automatic brine injection. At present, the automatic device, which can be repaired locally, is inoperative due to blocked needles. A tumbler for accelerated curing within 24 hours (as opposed to 10 - 14 days) is similarly inoperative due to problems in the vacuum system and control box.

(x) Smoking, filling, cooking and packing

The cured middles and legs are subsequently smoked and sliced into ham and bacon, ready for packing - in the case of bacon - in heat-sealable polythene bags prior to dispatch for retail. Boneless meat and beef, up to 50 per cent of the mix, a portion of fat, fillers such as flour, and spices and flavourings are mechanically minced and mixed for automatic filling into sausages and polonies. Generally, cocktail-, Makumbi- (a ZAPP sausage brand) and beef-sausages require no cooking and are sold fresh; poloni and garlic poloni are cooked. Special smoked sausage, garlic sausage, Kariba (a ZAPP brand) sausage and barbecued sausage are both cooked and smoked. Vienna sausages (or hot dogs) are normally filled into synthetic casings and steam-cooked. Six cooking pots are currently in use, a number considered rather inadequate for the size of the plant. An Atmos smoke-cooker, capable of handling 800 kg of product per batch, completing the smoking-cooking cycle for sausages in 30 - 40 minutes, as opposed to 20 or more hours, is available. However, this smoke-cooker operates at well below capacity due to a shortage of trolleys. Only five trolleys are actually in use whereas 12 are required for full capacity utilization. As a result, only 12 to 13 tonnes per day (equivalent to about 18 batches) or one-half of the installed capacity of the equipment can be produced.

(xi) Quality control and general hygiene:

Quality control and general standards of hygiene can certainly be improved. Although ZAPP has procured the services of a Quality Control Superintendent, there are no laboratory facilities for determining the quality of raw materials and products. Quality control therefore consists of visually checking raw and packaging materials, and monitoring storage, shop hygiene and product-handling practices. There are plans for setting up a regular laboratory, particularly in view of ZAPP's long-range intentions to enter the export market. In the meantime, samples are periodically sent outside ZAPP for analysis of protein levels, bacteria content, and so on. Recent test results confirm that ZAPP products conform reasonably well to internationally accepted specifications.

With respect to general hygiene, there is need to install many more wash basins, equipped with both cold and hot-water taps, in the various meat-handling areas of the plant. The present practice of drawing water from the cooking pots for cleaning floors and gutters is not considered satisfactory. There is a mobile high pressure hot-water cleaner which is reportedly used but presently in for repair. Urgent consideration should also be given to furnishing all operatives (particularly those handling meat during any stage of processing) with disposable caps and gloves.

ZAPP's current practice is to clean shop floors with detergents and sterilizing agents such as TEEFOL. Bacteriocides are generally sprayed on all contact surfaces after each general daily cleaning. Lairage pens and condemned meat stands are also sprayed daily with insecticides. A local pest-control firm, Rentakill, is contracted to fumigate the plant once a month.

(xii) Maintenance:

It has not been possible to enforce a rigid routine maintenance schedule for most of ZAPP's machinery and equipment. This, no doubt, accounts for the poor condition of most equipment.

(e) Inputs

(i) Slaughtering pigs and beef

In recent years the supply of slaughtering pigs declined substantially due to reduced profitability in pig production. The main reason for this appears to be escalated feed costs which have not been followed by proportional increases in producer prices. Producers in the so-called emergent farmers sector have been forced to stop producing pigs since they cannot afford to buy feeds. The Zambian National Service also abandoned production of pigs on its farms. Only the larger commercial pig farms continued to produce pigs when the competition for slaughtering pigs increased - especially in the mid 1980s, when small processing ventures were established. Some of these processing firms were actually started by the owners of the larger pig farms. During this period ZAPP's financial situation was so bad that the price ZAPP could offer farmers fell to about half of what the competing companies paid their pig suppliers. Moreover, the lack of credits forced ZAPP to delay payments for unacceptably long periods. As a consequence, pig producers lost faith in the company, making the situation even worse for ZAPP.

With the coming of new management to ZAPP in May 1987, actions were taken to restore the confidence of the farmers. This has proved to be successful and the budgeted intake of slaughtering pigs during the period April 1987 to March 1988 was exceeded by approximately 5 per cent. However, the total cold-dressed weight of the carcasses has been 5.3 per cent below budgeted quantities, as shown in Table 6.1.3.

Table 6.1.3: Pig slaughtering, budgeted and actual figures

No. of pigs	Budgeted		No. of pigs	Actual	
	C.D.W. kg	Value ZK thousands		C.D.W. kg	Value ZK thousands
6,000	444,000	3,626	5,298	420,505	4,302
Average per pig, kg	74			67	
per kg, ZK		8.17			10.23

Source: ZAPP

To compensate for the inadequate supply of pig meat for further processing, beef has been introduced in some of the products and a pure beef sausage is also currently produced. However, according to the Corporate Plan (December 1987) beef is expected to be replaced by pork once the supply of slaughtering pigs is improved. The requirement for beef is thus expected to drop from 270 tonnes in year 1 to zero in year 5.

Of the quantity of beef budgeted for the period April 1987 to March 1988 (540,000 kg), only 255,495 kg or 53 per cent was actually purchased. The reason for the beef shortage appears to be an outbreak of foot and mouth disease in Southern Province, which prevents the transport of animals or carcasses to other areas of Zambia. The shortage is also caused by a failure to procure slaughtering stock in Western Province, another major supply area.

The cattle are slaughtered by Zambia Cold Storage (ZCS), a subsidiary of ZIMCO and hence linked to ZAPP via INDECO. ZCS has slaughtering facilities in various parts of the country including Lusaka (adjacent to ZAPP) and Livingstone where a new slaughterhouse was commissioned in late 1987. This slaughterhouse is equipped with a pig slaughtering line. ZCS has also slaughtered pigs from the Livingstone area and delivered the carcasses to ZAPP. However, ZCS has decided that the pigs slaughtered in their Livingstone abattoir are to be used in their own meat-processing department. This means that ZAPP's supply of pigs or pig carcasses from that area is likely to stop.

Due to inferior feed, the quality of the carcasses is generally poor. The texture of the meat is often coarse because of the age of the pig when slaughtered. A large number of pigs received reportedly never reach the normal size. Many carcasses, especially the heavy ones, are also overly fat.

As a consequence, payment strictly according to carcass quality is not practiced. This is despite the fact that the grading system for pigs considers only weight of the carcass and thickness of fat. No consideration is given to meatiness and structure of the meat.

Actions are being taken by the ZAPP management to improve the long-term supply of slaughtering pigs, from the Lusaka area in particular. This includes an agreement with Nkumba Farms Ltd., owned by ZIMCO through its subsidiary Zambia Agricultural Development Co., for supply to ZAPP of (at present) 70 slaughtering pigs per week, or 50 per cent of Nkumba's

production. Since both Nkumba Farms Ltd. and ZAPP are parastatal companies, with a common owner through the linkage between ZIMCO and INDECO, it would be reasonable that Nkumba Farms Ltd. deliver all their pigs to ZAPP. Efforts are also made to interest Zambia National Service in reviving pig production. Provisional plans are afoot and land has been acquired.

A Pig Production Assistance Project is being planned. This will be a very important project since all Government-sponsored pig production schemes have been closed down in the past five years.

The objectives of the Pig Production Assistance Project are to:

- reinstate small pig farmers and small-scale emergent pig producers
- establish reliable sources of pigs corresponding to at least 50 per cent of plant requirement (capacity)
- improve pig production through better management of piggeries
- stabilize pig producer prices, and
- utilize existing pig production infrastructure on the farms.

The project is intended to produce, on the average, 12,000 slaughtering pigs per year when in full operation. This will be attained through the use of 1,000 sows and 100 boars, initially located in the Lusaka area, before spreading to the Mazebuka/Monze area. The initial production target is set at 1.5 litters per sow per year resulting in 12 baconers per year of 65 kg CDW.

Selected farmers will be provided with breeding stock from reputable pig units and the necessary quantities of feed to meet the overall nutritional requirements of the pigs.

Each pig farmer participating in the project will benefit from the extension services, including on-farm management techniques with proper record keeping for effective control of performance. Veterinary service may also be part of the programme.

According to the project plans, ZAPP will finance the breeding stock and the feed. Upon delivery of the slaughtering pigs to ZAPP, the calculated "net" income will be subject to reduction of all levies and charges explained in an agreement to be signed between ZAPP and each individual pig farmer. It is anticipated that the sale of culled breeding stock will realize sufficient money to buy replacement gilts and boars.

The Pig Production Assistance Project is no doubt an important initiative in the effort to improve the current shortage of slaughtering pigs.

However, there are two objections to ZAPP's Pig Production Assistance Project, especially from the pig farmers point of view, which cast doubts on the efficacy of the project. First, it is not likely that the income from selling culled breeding stock is sufficient to buy replacements. The incentive for the farmer to end up with quality breeding stock of his own does not seem to exist. Second, farmers participating in the project cannot be expected to be given better breeding stock than other pig farmers. Therefore, they would not be given sufficient comparative advantage to improve their income and standard of living.

If Pig Production Assistance Project farmers were to be supplied with improved sows and boars, ensuring higher prolificacy and feed-conversion rates, the likelihood of success would be increased. Instead of producing 12 slaughtering pigs per sow per year it is quite realistic that production per sow would be 15-16, assuming the feed is of the appropriate formulation, providing the animals with sufficient energy, protein and other essential nutrients, and that the extension service is up to standard. Moreover, in this case, it is also realistic that a feed conversion ratio of 1:3.5 is attained instead of 1:4. This alone would improve the income per sow per year by about ZK 250 at current prices.

A more aggressive programme incorporating a breeding scheme based on superior stock would increase the likelihood of success considerably. Recommendations along this line are given in Section 6.1.2.

A sign of increased interest in pig production is the fact that the Zambian National Service is considering starting up their piggeries again.

The UNIDO mission concludes that the lack of slaughtering pigs is the one major constraint on better capacity utilization and development of ZAPP. The main reason for the shortage of pigs is the inadequate and unreliable supply of acceptable quality feed.

(ii) Casings and other inputs

(1) Imports

Most casings are imported. Only negligible quantities are of domestic origin, probably a few per cent of the total.

About 40 per cent are natural casings and the remaining 60 per cent are synthetic casings of different types and qualities. At present, all natural casings are imported from the Republic of South Africa and the synthetics from Europe. The supply of casings has not been a limiting factor in the production of sausages.

About 10 tonnes of spices are imported annually, mostly from spice producing countries Asia.

(2) Local sources

Local inputs, other than pork and beef, for manufacturing the pork and meat products, amount to about 250 to 300 tonnes per annum. The breakdown is as follows (1985):

	<u>Tonnes</u>
Salt	100
Flour	100
Milk powder	50
Rice	70

There are reportedly no problems involved in procurement of these commodities. Plastic bags and trays are supplied from local manufacturers. The value of annual purchases is of the order of ZK 150,000.

(f) Product range

Sausages are winners with regard to profitability. ZAPP aims to devote 60 per cent of its total production to sausages; 25 per cent to fresh meat, 10 per cent to cured, smoked and cooked meat; and 5 per cent to the rest of its product range.

Of its products, fresh meats earn the lowest profits. This is partly because present production methods result in much waste.

Fresh meat is to a certain extent used to compensate for low demand for sausage products. When the demand for sausage is low, fresh meat is sold directly rather than being processed into sausages, which suggests that marketing efforts are not sufficient. This results in poor profitability and is to be avoided if possible.

A canning plant has been contemplated to reach new markets outside the cities. Most of the potential market in the country is now impossible to reach with the present products, as they require cooling facilities for distribution. A canned product could easily be marketed in areas where these facilities are not available.

The following is a breakdown of investment required for these facilities:

Buildings	US\$ 100,000	100,000 ZK
Machinery and equipment	US\$ 250,000	
Working capital	US\$ 50,000	50,000 ZK
Preoperational expenses	US\$ 40,000	20,000 ZK
Provision for contingencies	US\$ <u>30,000</u>	<u>20,000</u> ZK
Total	US\$ 470,000	190,000 ZK

Another investment that has been discussed is a bakery for pies and other meat-based products. The amount of foreign currency required for this additional investment is estimated at US\$ 250,000. No breakdown of costs is available. The two projects for the cannery and bakery units have been discussed with INDECO which is in favour of both. One possibility is to create a joint-venture with a foreign company. Another consideration is to expand the present product range to include more expensive, better packed products in order to capture a share of the expatriate and diplomatic market. Due to the fact that very little advertising is done, ZAPP's products are practically unknown to the public. This could be changed by better advertising on radio, television and in the press, as well as by better labelling and packaging. The help of expatriate designers will be crucial to secure a better appearance and appeal of ZAPP's products.

(g) Plant performance/cost and price structure

In order to assess plant performance, it is useful to adopt ZAPP's own definitions of capacity utilization. As a measure of capacity utilization, ZAPP uses the term 'actual percentage production throughput'. This term is defined as a percentage of the theoretical target of 250,000 kgs of output per month (3 million kgs per annum) from a factory input of 40,000 pigs per annum (average CDW 75 kgs). Given the present condition of the plant and machinery, the optimum utilization possible is 45 per cent of installed capacity. Given these definitions, Table 6.1.4 shows actual plant performance over the four-year period 1984-85 through 1987-88.

Table 6.1.4: Total production and actual percentage production throughput for the years 1984-85 through 1987-88

	Total production (kgs)	Actual % production throughput
1984-85	915,712	30
1985-86	431,055	16
1986-87	660,231	22 ^{a/}
1987-88	585,788	19

Source: ZAPP, 73rd Board Meeting, 26 May 1988, Appendix 3E1 and Appendix 3E2.

a/ Calculated from 1987-88 ZAPP budget data where the figure 35 was given for a three-day week.

In addition to the condition of the plant and equipment, capacity utilization is also highly dependent on the supply of the major raw materials, namely, pigs and beef. The pig intake is the more important; beef, although used as an input in its own right, tends to be used depending on pig availabilities and movements in relative prices. Table 6.1.5 summarizes the situation regarding purchases of pigs and beef in quantity and value terms over the four-year period 1984-85 through 1987-88. It also gives information on the value of total output.

Table 6.1.5: Pig and beef purchases and value of total output for the years 1984-85 through 1987-88

	1984-85	1985-86	1986-87	1987-88
Pigs purchased (kgs m)	0.965	0.531	0.465	0.421
Pigs purchased (ZKm)	2.798	2.255	2.648	4.302
Beef purchased (kgs m)	n.a.	0.089	0.370	0.256
Beef purchased (ZKm)	n.a.	0.381	2.173	2.804
Total production (ZKm)	4.337	4.214	7.194	10.605

Source: ZAPP, as for Table 6.1.4.

Value added per employee also sheds light on plant performance.

**Table 6.1.6: Value added per employee for 1985-86 through 1987-88
(ZKm)**

	1985-86	1986-87	1987-88
Total value added	1.088	1.007	2.436
Total number of employees	191	148	144
Value added per employee	0.006	0.007	0.017

Source: ZAPP, Budget 1988-89.

(i) Import dependence

The main inputs used by ZAPP are pigs and beef, flour, salt petre, milk powder and soya nutrients, casings, spices, and packaging. Pigs and beef are all purchased domestically as are flour, salt petre, milk powder and soya nutrients. (The latter two are substitutable depending on availabilities and relative prices.) Import dependence on the remaining inputs is as follows: 97 per cent for casings, 80 per cent for spices, and 100 per cent for heat-sealed film used in packaging. Polythene and cardboard packaging are obtained locally. However, it is important to note that imported inputs are not quantitatively important as a proportion of total inputs. The percentages are as follows: casings, around 8 per cent; spices around 1 per cent, and heat-sealable film less than 1 per cent. In contrast, import dependence in the case of spare parts is very high with 85 per cent of ZAPP's total spare parts expenditure for imported spares.

(ii) Protection

In order to protect the processed-foods industry, there is a complete embargo on the importation of competing processed products. As regards inputs, there are no duties or taxes on imports of casings or spices. Spare parts are liable for duty, and since dutiable items also pay sales tax, spares are also liable for 20 per cent sales tax. Rates of duty vary depending on type of machinery, with 40 per cent for motor vehicles and 20-25 per cent for industrial machinery.

(iii) Profit and loss record

The company has a history of loss-making. It recorded a small profit, the first in eight years, during the financial year 1987-88. Table 6.1.7 shows the profit and loss record and additional data on annual turnover. Companies are liable for a 45 per cent corporation tax on profits and a selective employment tax on salaries paid to expatriate staff. When a company makes losses, no tax is payable. Instead, an equity levy is paid. The equity levy rate is 1.5 per cent of the portion of the nominal value of share capital which is beneficially owned by the Government of the Republic of Zambia, when this amount exceeds the amount of corporation tax payable by the company.

**Table 6.1.7: Turnover, profit and losses and levies
for the years 1984-85 through 1987-88**

	1984-85	1985-86	1986-87	1987-88
Turnover (ZKm)	4.724	4.628	7.877	10.482
Profits or losses (ZKm)	(1.310)	(0.381)	(0.207)	0.435
Profit or loss as % of turnover	27.7	8.2	2.6	4.1
Taxes or equity levies (ZKm)	(0.032)	(0.032)	(0.032)	n.a.

Source: ZAPP, Financial Statements for relevant years.

The loss-making history can probably be explained by erratic raw materials supply and by poor management since 1980. Indeed, during that time INDECO appears to have considered selling the plant to private interests whom they hoped might manage it better. It is interesting to note that during the financial year 1987-88 a profit was recorded after a change in top management.

(iv) Costs and pricing structure

ZAPP presently uses a cost-plus system to set its (wholesale) prices. Thus, to total costs is added a percentage to maintain a pre-tax profit of 15 per cent on sausages, 12 per cent on cooked meats and 10 per cent on remaining products. There is a 2 per cent differential between prices charged in the northern part of the country and those charged in Lusaka. Although the Production Department has carried out the pricing function until now, the Marketing Department will take it over and intends to modify the pricing approach to take account of prices charged by competitors.

Table 6.1.8 shows ZAPP's (wholesale) prices for its main product lines at various dates in the past three years.

**Table 6.1.8: Prices of principal product lines at various dates
in 1986, 1987 and 1988
(ZK per kg)**

	1-4-86	1-4-87	29-2-88
Sausages (pork and beef)	13.45	21.00	26.00
Bacon	15.78	36.00	46.00
Ham	19.12	36.00	46.00
Poloni	15.08	21.00	26.00
Fresh meat	7.83	11.00	15.00
Cooking fat	6.98	11.00	12.00

Source: ZAPP, Budgets for relevant years.

ZAPP's products are not classified as essential by the Government, so their prices are not controlled. However, the Prices and Income Commission (PIC) monitors its prices. ZAPP must notify PIC four weeks before the date ZAPP proposes to increase its prices.

(v) Liquidity and foreign exchange

The current ratio (that is, the ratio of current liabilities to current assets) was 3.37:1 during the 1987-88 financial year, giving a marginal safety of protection to creditors. However, there is an asymmetrical relationship between the payment periods pertaining to ZAPP's debtors and creditors. The major debtors, Government institutions, demand 30 days credit while the main creditors, pig suppliers, demand payment within 14 days. This creates liquidity problems. This could also impinge on the question of raising sufficient Kwacha cover for foreign exchange purchases. For example, during the financial year 1987-88, the company purchased foreign exchange valuing US\$42,000 through the Bank of Zambia which was utilized for the purchase of urgently required sausage casings, plant and machinery, and spare parts. However, this was not enough foreign exchange for the company's total import requirements, because ZAPP did not have sufficient Kwacha cover to obtain the amount of foreign exchange it wanted. Moreover, in its report to the 73rd Board Meeting on 26 May 1988, the company stated that cash flow problems had resulted in its present overdraft facility being inadequate to meet its working capital needs.

(h) Markets and competition

The market for ZAPP's products is geographically divided into four main regions. The first is the southern region in and around Lusaka along the railway down to Livingstone and from Chipata to Mongu Falls. The second is the northern region; the area office in Kitwe is responsible for the market in the Copperbelt and northward to Kasava and Solwezi. It is important to note that certain areas, especially in the eastern region, have not been possible to reach due to transport constraints. The Zambian market consists of institutions, Government agencies, hotels, and the general public. Expatriates and the diplomatic community comprise a small but lucrative segment of the market.

ZAPP has approximately 40 per cent of the national market with its strongest competitor, Twikatane, having a slightly larger 41-42 per cent market share. The remainder of the market is divided among 8-9 smaller producers. Figures are not available for the total volume produced by ZAPP's competitors or how production is divided between them. The local demand for ZAPP's products is considered high and is not satisfied. This is mainly due to constraints on the input side such as shortage of raw materials. Because ZAPP's competitors face the same constraint, strong competition exists for raw materials. The penetration of the market by ZAPP is rather poor. Up to the beginning of the eighties ZAPP was the only producer of importance in this branch. After 1980, competition mushroomed and succeeded in taking a larger and larger share of the total market. ZAPP's market is about the same as in 1980, but its competitors have managed to create niches with new types of products such as Hungarian sausages and other luxury products directed toward expatriates and diplomats. These products are generally more expensive but also better packaged and labelled.

ZAPP has developed the Kariba Sausage (Bockwurst) in order to counteract the competition of Hungarian sausages which had taken over the market for speciality smoked sausages. ZAPP's Kariba sausage is targeted toward take-away shops, kiosks and coffee shops and has been rather successful in this market segment. While many of the competitors cater to the higher-income market, ZAPP caters mainly to people of average income.

ZAPP's products are very price sensitive; a price increase always results in a decreased demand. Generally speaking, ZAPP's prices are lower than those of its main competitors. One reason why the competitors could take such a big portion of the market so quickly is that they have better, modern machinery and equipment. ZAPP, on the other hand, has old and worn out equipment in need of spare parts which have been difficult to obtain.

ZAPP is not selling its products through wholesalers but directly to retailers, institutions and other big consumers. The extra cost of storage, sales staff, and so on, is well compensated for by eliminating the middleman and keeping the mark-up in the company. A further step in this direction will be the opening of their own shop in Lusaka.

(i) Competition

Twikatane Farm Products

Twikatane Farm Products is a religious organization which has taken advantage of the cheap labour offered by its members to go into the production of meat products. As a religious organization they are also exempt from all taxes, which places them in a very favourable and competitive market position. They realized early on that ZAPP was unable to satisfy the market because of the poor quality of its speciality, smoked sausages, and decided to introduce the Hungarian sausage. They succeeded in taking over a big share of the fast foods market, until ZAPP's Kariba sausage came on the market last year. Twikatane supplies supermarkets and uses a personal selling method which includes free deliveries, enabling it to have continuous contact with its customers. Twikatane's transport system is considered very good. Apart from Hungarian sausages, they also produce very high quality beef sausages, which ZAPP has been unable to do until now. Like all other Lusaka based companies, Twikatane operates from Lusaka to Kabwe, Kafue, Ndola, and Kitwe. They now intend to expand by establishing a processing factory in the Copperbelt. Their own piggery supplies about 10 per cent of their pig requirements. To meet the demand for their products they must buy certain products from ZAPP. Twikatane also exports a part of their production, mainly to Zaire. Twikatane's weakness is the high prices it charges for its products. On the other hand, it offers discounts ranging from 5 to 15 per cent to cushion its high price.

Lusaka Cold Storage (1961) Ltd. (Luscold)

Luscold is a subsidiary of the privately owned Galaun Holding company which runs a number of concerns and farms. It operates a processing factory dealing in beef, pork, and chicken and has established forward linkages by operating two butcheries in Lusaka. Luscold dominates the institutional market, having taken over from ZAPP some 5 years ago. The fact that Luscold has a sound financial position and produces a substantial part of its raw materials from its own farms enables it to sell its products - whether processed or fresh meats - to Government institutions such as prisons and hospitals. These institutions take a long time to settle their bills which makes them an undesirable proposition to firms who do not have a sound financial base with a very diversified investment portfolio. The company produces a large number of low-priced products which are low-priced to keep their market share. Luscold has easy access to foreign exchange due to its 50 per cent retention earned from agricultural export. With this, it is able

to acquire machinery, transport and other necessary inputs. A good fleet of vehicles allows it to deliver its products cost-effectively. It also supplies a few hotels and supermarkets, and systematically replaces perished products in the supermarkets as an after sales service. Most of its products are in strong competition with ZAPP's but are not by any means superior in quality. Luscold operates almost like ZAPP in that it engages in personal selling in the south as well as in the Copperbelt.

Kyundu Ranch

This ranch, situated about 30 km from the city centre, has established a meat-processing plant under the management of a German production manager. Its excellent cooked ham has won the approval of several hotels in Lusaka. It also produces sausages for supermarkets. Generally the quality of their products is very good and packing is excellent. This has enabled it to capture expatriate and diplomatic markets. Kyundu Ranch has recently opened a butchery in Avondale Shopping Centre where their products are for sale. They also offer quantity discounts ranging from 15 to 25 per cent. Their prices are generally marginally higher than ZAPP's.

Buccaneer Products

Buccaneer operates a processing plant on its farm situated some 30 km from Lusaka. They produce high-quality sausages which have captured a large share of the market comprised of hotels, some embassies, and higher-income groups. Although their prices are slightly higher than ZAPP's, the quality of their products along with better packaging materials stimulates demand for their products.

King Farm Products

King Farm Products produces most of the lines ZAPP produces but of very low quality. They too supply supermarkets, hotels and take-away shops (fast foods). They are competitive in the market because they can afford to offer low prices due to their small size and low overhead. Their operations are concentrated in Lusaka, with very little activity in other towns. King Farm is not considered a threat to ZAPP.

Zambia Cold Storage Corporation Ltd.

This organization is owned by the state through ZIMCO. Although it operates a number of butcheries in all major towns in the country as well as two in Lusaka. It has recently acquired meat-processing equipment, it is unable to use this equipment effectively because of managerial problems and lack of technical knowledge. It also has persistent liquidity problems. As a result of these problems it has not yet made an impact on the market. Zambia Cold Storage's main weaknesses are poor quality products and high prices.

Lendor Agricultural Holdings

Lendor operates a number of cattle-raising or fattening farms. They produce high quality beef, like Luscold, and plan to eventually sell to institutions or abroad. The organization has a very sound cash position. Recently Lendor acquired some meat-processing machines and will soon go into sausage manufacturing. Until then, the only competition they pose is in fresh beef, and ZAPP cannot match the quality of the meat Lendor sells.

The following companies are active in the Copperbelt but very little is known about their meat products.

Lyons Brooke Bond

Its meat-processing activity specializes in canned products and it sells fresh beef sausages to hotels and supermarkets at ZK 37/kg.

Mushima

This company operates from Kitwe. It manufactures beef sausages which it sells for ZK33 per kg.

Modern Meat Products

This is a Chingola based company whose operations cover the entire Copperbelt and extend to Kapiri Mposhi, Kabwe and Lusaka. They sell their beef sausages at ZK24 per kg and pork sausages at ZK22 per kg. Due to the low cost of their sausages they have managed to capture the supermarket segment of the market.

B.C.M. Products

Very little is known about this company. It produces and sells the following products: beef sausages ZK24 per kg, French poloni ZK40 per kg, Garlic poloni ZK10 per kg.

(i) Constraints

At present, there do not appear to be any major personnel-related constraints. Suitable indigenous personnel are apparently available in sufficient quantities and at acceptable levels of expertise to fill the various positions in the company. There is only one expatriate employee - the Production Manager - who has a mandate to prepare one of his subordinates to eventually take over his position.

There are, however, several important production constraints, the most important of which is the inadequacy of pig supplies. As ZAPP does not operate its own piggery, it must depend on farmers located mainly within the Greater Lusaka area. Daily supplies are insufficient to satisfy the plant's installed capacity of 200 pigs per eight-hour shift. In fact, during the April 1987 to March 1988 period the peak month for supplies was March with a figure of 926 pigs; over the period, the average was only about 524 per month.

Because of the critical importance of adequate supplies of pigs, ZAPP is currently formulating a number of innovative schemes for guaranteeing future supplies. Among these is its Pig Production Assistance Project (see Section 6.1.1 (e)) whereby loans would be extended by commercial banks, under ZAPP's guarantee, to farmers to enable them to purchase breeding stock. Subsequently, when the pigs are ready for market, ZAPP would collect and slaughter them, repay the banks from the proceeds, and return the surplus to the farmer.

A second approach aims at strengthening the symbiotic linkage between ZAPP and Nkumba Farms Ltd., a sister-parastatal owned by ZIMCO through Zambia Agricultural Development Ltd. Nkumba Farms rears pigs, currently producing about 140 per week, of which 50 per cent are supplied to ZAPP. Third, ZAPP is making concerted efforts to interest the Zambia National Service in pig farming, for which land has already been allocated by the Government. In all these schemes, ZAPP's Farm Liaison Unit is expected to play a key role through the provision of extension services to farmers.

Another production-related constraint is the advanced age - up to 25 years in some cases - and poor condition of equipment in every section of the plant. Compounding this problem is the perennial shortage of spare parts which precludes routine maintenance and leads to regular cannibalisation of some equipment for the purpose of keeping others in operation. This problem is exacerbated by the fact that 85 per cent of the spare parts required are imported at a time when foreign exchange availability is severely restricted.

An additional, though secondary, production-related constraint is the apparent lack of quality control. This constraint has special importance in view of the fact that ZAPP plans to export its products and therefore must adhere to rigid quality and hygiene standards if it is to be successful.

Financial constraints have also been instrumental in inhibiting ZAPP's performance. Among the foremost of these is its record of loss-making since 1980, a trend that was only reversed in the 1987-88 year when it registered an after-tax profit of about ZK 435,000. ZAPP's record of loss-making generated a number of negative ripple effects, including a severe liquidity squeeze.

In terms of institutional constraints, ZAPP's membership in the INDECO group appears to have several advantages. A particularly useful benefit is that ZAPP receives a favourable audience from the Government bureaucracy. Similarly, ZAPP has not suffered unduly at the hands of the financial institutions. Its inability to procure foreign exchange for its imports derives, to a large degree, from its internal financial situation. Perhaps the only significant identifiable institutional constraint comes from the approval processes of the Prices and Incomes Commission (PIC) which tend to restrain the company's reaction time in passing on cost increases to the consumer. For instance, PIC has, in collaboration with the Commercial Farmers Bureau, recently approved a 20 per cent increase in producer prices paid to pig farmers. This price increase was to compensate for production cost increases, including a 30 per cent increase in the cost of stockfeed. Whereas ZAPP's competitors have already applied the producer price increases, with commensurate increases in their product prices, ZAPP is constrained to hold its prices until PIC conveys its approval. This could lead to an erosion of ZAPP's market share.

6.1.2 Rehabilitation requirements

(a) Management and organization

The first requirement is to fill the existing vacancies for Marketing Manager and Personnel and Administration Manager. The creation of a new position titled Operations Manager or Assistant to the General Manager would release the General Manager from many routine operational activities and would give him more time for strategic planning. Duties of such a position would include planning, with the Marketing Department, product development, and diversification of the product range.

(b) Physical plant

The age and maintenance status of ZAPP's physical plant constitute a major constraint to production and productivity. An appropriate rehabilitation programme should therefore focus on the following:

- restoring to full operation those machines and equipment (including mobile equipment) that are not now functioning by replacing worn-out and malfunctioning parts and components;
- replacing unsalvagable equipment;
- repairing and renovating walls, floors, and roofs, particularly in cold rooms, where tile or high-quality concrete-finished flooring is the accepted industry practice;
- installing hot-and-cold-water washbasins accessible to all production staff, in compliance with FAO recommendations;
- providing mobile or fixed cleaning and sterilization facilities for the premises, equipment, knives, and so on, in line with FAO design standards for abattoirs;
- improving and extending personnel hygiene and comfort facilities, including toilets, showers, wash rooms, and lockers, and protective clothing, including caps and gloves, for all production workers. Institute adequate laundry arrangements either at the plant or on a contract basis;
- establishing an adequate inventory of running and replacement spares, bearing in mind the problems and implications of running out of these critical imported items;
- putting into place an enforceable scheduled maintenance programme for all machinery and equipment; and
- training of relevant staff in proper maintenance practices and techniques.

Table 6.1.9 is a list of the equipment, machinery and buildings that require rehabilitation, along with the respective costs as estimated by ZAPP. The foreign exchange costs are largely for the importation of spare parts and components, while the local element is inclusive of service (installation/repair) costs. On the basis of ZAPP's estimates, the aggregate cost of rehabilitating the plant and equipment is ZK 1,563,500 as of 1 June 1988.

There are strong grounds to believe that this total is significantly underestimated. Certain essential equipment such as the mobile high-pressure high-temperature cleaners is not included. About five of these units are required, at a total cost of about ZK100,000 in foreign exchange. Other additional costs are estimated as follows:

- inventory of running and replacement spare parts - ZK 500,000
- development and installation of a scheduled plant maintenance programme - ZK 50,000
- staff training in maintenance planning and execution - ZK 50,000
- detailed study and planning of rehabilitation programme, including equipment supply contract negotiation, procurement, etc. - ZK 100,000 (possible UNIDO technical assistance project).

Thus, the total financial implication for physical plant rehabilitation would be about ZK 2,713,500, or \$US 337,100 at the exchange rate of \$1 US = ZK 8.05. These figures are merely indicative. A more detailed study would be necessary, entailing price quotations from contractors and equipment suppliers, to determine the final financial requirements of the ZAPP rehabilitation programme.

(c) Inputs

It should be stated right from the beginning that rehabilitation of ZAPP from a technical, financial, and marketing point of view is not realistic if considerable rehabilitation efforts are not made to ensure improvements of pig farming in Zambia.

An integrated approach is essential, embracing breeding, feeding, veterinary services, the price policy mechanism as related to feeds and other inputs, and producers' farm-gate price for pigs.

(i) Breeding

It is well-documented that a cross-breeding programme involving three breeds is superior in the production and rearing of slaughter pigs. Two breeds - Large White and Landrace, for example - are used to produce commercial breeding stock, hybrid gilts/sows, which are serviced by a third breed such as Hampshire or Duroc. It is important that the breeding animals of all three breeds are of improved stock with good genetic merits and high performance proved by progeny testing.

Table 6.1.9: ZAPP - Equipment/machinery/building/
rehabilitation requirements

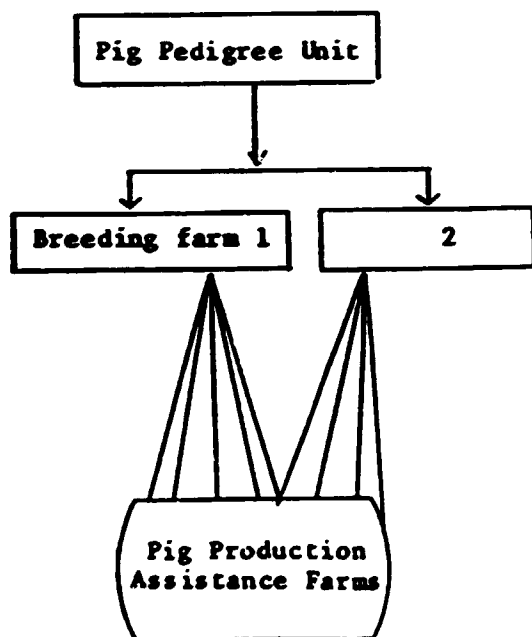
	Number	Estimated cost ('000 Kwacha)		Total
		Foreign	Local	
<u>Production machinery</u>				
Thompson boiler	1	150.0	100.0	250.0
Amesteam boiler	1	20.0	10.0	30.0
Dehairing machine	1	40.0	15.0	55.0
Elevation chains	2	10.0	5.0	15.0
Derinding machines	2	10.0	5.0	15.0
Brine injectors	2	10.0	5.0	15.0
Atmos smoke-cooker	1	100.0	10.0	110.0
Smoke blowers	3	-	20.0	20.0
Palmia mincer	1	-	10.0	10.0
Alexanderwerk mixer	1	60.0	10.0	70.0
Stock & Hammer mixer	1	10.0	10.0	20.0
500-litre bowl-chopper	1	40.0	10.0	50.0
200-litre bowl-chopper	1	20.0	5.0	25.0
100-litre bowl-chopper	1	10.0	2.0	12.0
Vemag-3000 Robot-filler	1	40.0	-	40.0
Vemag Cam-40 Robot-fillers	2	15.0	-	15.0
Handymann FA-70 Robot-fillers	3	60.0	-	60.0
Spooling machines	2	20.0	-	20.0
Toby slicer	1	15.0	-	15.0
Berkel slicer 180 GS	1	15.0	-	15.0
Berkel slicer Junior	1	5.0	-	5.0
Dixie Union Vacuum Packing	1	25.0	-	25.0
Swissvale Vacuum Packing	1	7.5	-	7.5
Cryovac Vacuum Packing	2	15.0	-	15.0
Air compressor	1	40.0	-	40.0
Water booster pump	2	-	10.0	10.0
Borehole water pump	1	60.0	15.0	75.0
Band saws	3	30.0	-	30.0
Ice flaking machine	1	7.5	-	7.5
Cooking pots	6	6.0	2.0	8.0
<u>Refrigeration plant</u>				
S/A TSMC 108S compressors	2	71.0	12.5	83.5
S/A SMC 8-65 compressor	1	48.0	8.4	56.4
Bitzer Type VI compressors	4	61.0	10.7	71.7
Bitzer Type V compressor	1	19.0	3.4	22.4
Frigidaire FM8 compressors	8	100.0	-	100.0
Frigidaire FM6 compressor	1	17.0	-	17.0
J & E Hall type V compressors	2	56.0	-	56.0
J & E Hall type 6H compressor	1	28.0	-	28.0

	Estimated cost ('000 Kwacha)			Total
	Number	Foreign	Local	
Buildings				
Rehabilitation of floors		-	10.0	10.0
Rehabilitation of roof		-	5.0	5.0
Rehabilitation of walls		-	5.0	5.0
Vehicles				
32-ton truck	1	6.0	-	6.0
10-ton trucks	2	5.0	-	5.0
5-ton trucks	2	6.0	-	6.0
Pick-up van	1	0.5	-	0.5
Passenger vehicles	4	6.0	-	6.0
Total				1,563.5

Note: The above estimates were supplied by ZAPP.

All farmers included in the scheme would benefit from the use of superior breeding stock selected for high fertility, superior carcass quality, and good feed conversion - all important traits to attain profitable pig production. The carcass quality will be of particular importance to ZAPP for the processing of competitive pork products.

An outline programme to be incorporated in the Pig Production Assistance Project is illustrated below:



Maintaining three purebred breeds of pigs, e.g. Large White, Landrace, Hampshire. Supply of breeding sows and boars, LW and LR, to breeding farms and boars, Hampshire, to pig farms. All culled animals to ZAPP for slaughter.

Breeding farm(s), initially at the Pig Pedigree Unit, later established at pig farms which have performed well. Supply of female breeders, gilts, to pig producer farms contracted within the Pig Production Assistance Project. All male pigs and culled gilts to ZAPP for slaughter.

Production farms of slaughtering pigs only. Gilts from breeding farms, boars from Pig Pedigree Unit. All progeny to ZAPP for slaughter. Replacement gilts from breeding farms.

The launch of a well monitored pig production programme at this stage must be linked to substantial improvement of the supply of stockfeed. This is discussed under section 6.2.2 (E.C. Milling Rehabilitation requirements).

Once the Pig Production Assistance Project, incorporating the proposed pig breeding programme, is implemented and the slaughtering pigs begin to be delivered to ZAPP, an improved grading system adapted to the requirements of ZAPP can be applied. Desired carcass quality can be monitored through differentiation of producers prices. This, in the medium- and long-term perspective, will be a vital instrument to attaining comparative advantage in the marketing of pork products.

The UNIDO mission proposes that the pig breeding programme be subject to detailed planning regarding organization, location, number of initial breeding stock, and procurement of desired herd development. From an organizational point of view it is suggested that ZAPP operate the Pig Pedigree Unit and that the activities later to be transferred to Breeding Farms are also carried out at the Pig Pedigree Unit.

It is expected that this programme will attract interest from donors in Western Europe. The advantage from receiving superior stock and technical assistance, including deep-frozen semen from progeny-tested boars, would in this case be obvious.

The rehabilitation plan for the ZAPP slaughterhouse and meat processing plant is scheduled according to the future supply of pigs. According to the Corporate Plan (1987-88) the number of pigs per year is expected to increase from the present level of approximately 7,000 pigs per year to 40,000 in the fifth year. Assuming that the Pig Production Assistance Project (PPAP) starts being implemented during the latter part of 1988, the UNIDO team estimates the number of slaughtering pigs in 1993 (year 5) will have increased to about 30,000 head.

The estimate is based on the following assumptions:

- 1988 average supply/mo 650 pigs
- from 1989, annual increase 15 per cent
- PPAP output 1989 25 per cent of project plan, 1990 50 per cent, 1991 100 per cent
- from 1992 PPAP output 15 per cent annual increase.

Table 6.1.10: Supply of pigs 1988-1993

Year	Corporate Plan		UNIDO estimate	
	Per year	Ave/mo	Per year	Ave/mo
1988	()		7,800	650
1989 (1)	12,000	1,000	11,800	980
1990 (2)	18,000	1,500	15,000	1,250
1991 (3)	30,000	2,500	20,000	1,650
1992 (4)	35,000	2,900	24,000	2,000
1993 (5)	40,000	3,300	30,000	2,500

The number of slaughtering pigs delivered to ZAPP is to a large extent determined by the success of the PPAP. In addition, the Corporate Plan includes the purchase of beef for manufacturing. For the purpose of calculation, the amounts of beef have been converted into "pig equivalents" simply by dividing the annual quantities of beef by 75 (assumed to be the average cold dressed weight of pigs).

	<u>Year</u>	<u>Tons</u>	<u>"Pig equiv."</u>	
			<u>Year</u>	<u>Ave/mo</u>
Beef in production	1989 (1)	270	3,600	300
	1990 (2)	150	2,000	160
	1991 (3)	75	1,000	80
	1992 (4)	25	300	30
	1993 (5)	-		

The indicative overall plan for ZAPP's rehabilitation is illustrated in Figure 6.1.3. In the short term, when essential equipment is rehabilitated to a capacity of about 30 pig ("equivalents") or 2.25 tonnes per shift, the processing sections would have to operate two shifts per day with 100 per cent capacity utilization. The slaughtering section at this stage is not utilized more than 25 per cent on an average.

By the end of 1990 (year 2), the plant is fully rehabilitated. At this stage 1.5 shift per day is sufficient and the capacity utilization is then about 75 per cent assuming a five day week.

Toward the end of 1991 (year 3), processing must be carried out in two shifts when the processing time is utilized to 100 per cent. At this stage about 125 pigs would be slaughtered per day, using the Corporate Plan projections, and the slaughtering line is utilized at about 60 per cent of its designed capacity. Taking the fluctuations in pig supply into account, the slaughtering line is likely to be used at full capacity during certain peak periods.

By mid 1990 the ZAPP slaughtering facilities and processing capacity is fully utilized, providing the supply of pigs develops according to the Corporate Plan.

Should the UNIDO estimates for pig supply be valid, full capacity utilization is reached about two years later, or around 1992.

(d) Cost and price structure

(i) Prices

Prices paid to millers and to pig producers are interrelated. Pig producers need to be paid attractive prices to encourage them to increase pig output. However, when stockfeed prices rise, pig producers must be compensated by setting higher prices for their pigs, and this price rise must occur immediately.

(ii) Protection

Significant import dependence occurs only in the case of machinery and spare parts. There does not seem to be any case for duty on machinery, since none of ZAPP's machinery is produced in Zambia. A recommended solution would be to include the machinery in the import duty rebate scheme.

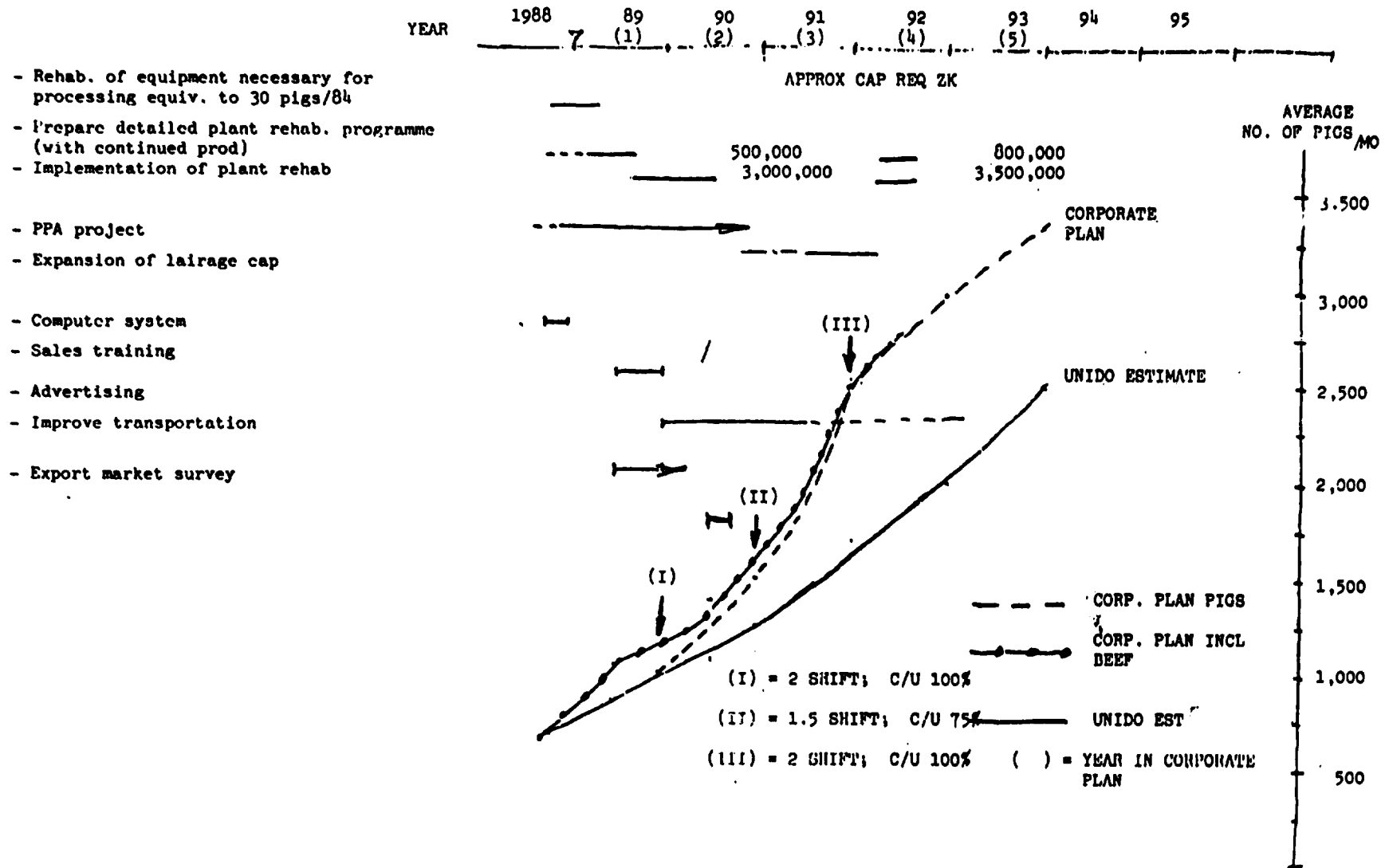
As regards spare parts, some protection is necessary in order to encourage the substitution of locally-produced spare parts at the expense of imports. However, a distinction should be made between those which are presently being produced in Zambia and those which at present can only be imported. It is suggested that a high duty should be imposed on competing imports and that non-competing imports of spare parts should be allowed in duty-free.

(e) Marketing

The present organization shows certain weaknesses in the sales department. It needs to be extended in order to keep abreast of market developments as they occur. The present number of sales personnel does not permit the aggressive personal sales activities that the situation calls for. The present sales people operate on the basis of a fixed salary, sales performance and collection of outstanding payments. It would be advisable to introduce a commission system for both sales and collecting payments as an incentive to increase both.

It appears that ZAPP's products are quite unknown to the public in spite of the fact that ZAPP once was the only producer of pork products. A well planned, extensive advertising campaign via the mass media is necessary and should be repeated for a significant period of time. Another very important step to increase sales would be to improve packaging and labelling. It is of the utmost importance that both advertising and designing of packaging is done by professionals to achieve the right effect.

Figure 6.1.3
Indicative overall time schedule for rehabilitation



6.2 E.C. Milling Co. Ltd.

6.2.1 Existing situation

(a) Plant history

E.C. Milling Co. Ltd. was incorporated in 1982 as a private enterprise with the objective of processing maize, Zambia's staple food crop. Commercial production began in November 1984 with equipment and machinery supplied by Lupton Engineering Company, Taiwan. However, it soon became apparent that the technology employed was inappropriate for the raw material and other resources from Zambia. This created substantial initial teething problems and eventually led to the procurement of supplementary equipment, including a degerminator, necessary for sustaining production.

In 1986, political and socio-economic developments raised some concern about the grain milling industry remaining in private hands. This led to the Government takeover of the private milling industry, including E.C. Milling Co., by presidential proclamation on 16 December 1986.

(b) Management and organization

E.C. Milling Co. Ltd. is a subsidiary of INDECO, a state-owned holding-company belonging to the ZIMCO group. The Board of Directors for E.C. Milling Co. Ltd. consists of the following members:

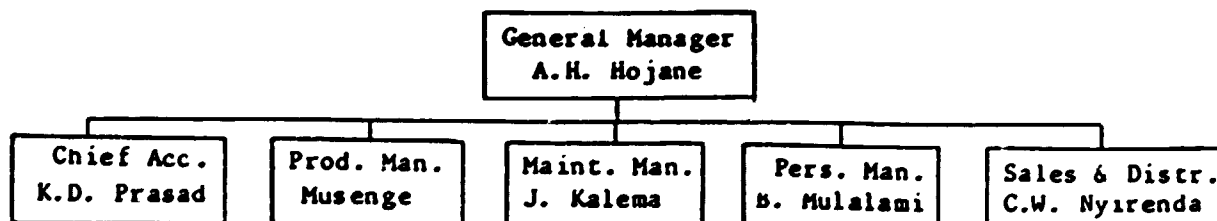
Chairman: Mr. M.S. Mulenga, Executive Director, INDECO
Mr. A.D. Zulu, Managing Director, INDECO
Mr. T.V. Ramanathan, Financial Director, INDECO
Professor F.D. Yamba, Executive Director, INDECO
Mr. C.M. Munasangu, Company Secretary, INDECO

Attending: Mr. A.H. Hojane, General Manager, E.C. Milling Co. Ltd.
Mr. K.D. Prasad, Chief Accountant, E.C. Milling Co. Ltd.

Mr. Hojane and Mr. Prasad usually attend board meetings, but are not formal members. Board meetings are held every three months when a quarterly report is presented.

E.C. Milling is given guidelines for the preparation of a Corporate Plan by INDECO. The Chief Accountant prepares a draft which is discussed and approved by the General Manager and Department Managers before being submitted to the Board of Directors. The same procedure is used to prepare the budget.

Figure 6.2.1
Management Organizational Structure of E.C. Milling Co. Ltd.



Middle management shows some weaknesses, and a re-organization involving the hiring of new personnel, is planned within one to two years. The General Manager takes an active role in the running of the plant. He has several meetings with his staff and makes two to three rounds of the plant each day. During these plant visits he checks maintenance and the flow of raw material and deliveries. By and large, the General Manager is able to delegate responsibility to his various departmental managers. Strategic planning is undertaken continuously during the year on a monthly basis.

According to the General Manager, the advantages of belonging to a big organization like INDECO are easier access to authorities, assistance when minor problems occur, and better financial services. Disadvantages are red tape and the rapid shuffling of managers in the past which caused dislocations.

(c) Financial structure

Table 6.2.1: ECM: Total fixed assets and capital employed: 1986-87 - 1987-88
(ZK'000)

	1986-87	1987-88
Fixed assets	4,677	5,129
Share capital	3,000	3,000
Reserves	14	1,174
Long term debt	<u>1,372</u>	<u>1,640</u>
	4,386	5,814

Source: ECM Annual Reports.

Fixed assets represent about 80 per cent of total assets.

(d) Buildings and installations

E.C. Milling Co. Ltd. is located at Plot 8537 along Mwembeshi Road in the Heavy Industrial Area, Lusaka. There are four major buildings - the seven-floor mill with a total floor area of 2,050 m², the intake warehouse (1,388 m²), the dispatch warehouse (906 m²), and the administrative offices/ workshop (172 m²). Minor buildings include the boiler house, the molasses/ fats tank shed, the ablution block, and the electrical substation.

The dispositions of the production machinery and equipment on the various floors of the mill are shown in Table 6.2.2.

As the stockfeed section of E.C. Milling Co. is of primary interest in the context of this study, the subsequent discussion will concentrate on this section of the mill.

Figure 6.2.2 illustrates the process and material flows in the plant's stockfeed production. Coarse intake material for grinding is lifted by a bucket elevator into a bank of four 10-ton bins, feeding two parallel hammer mills rated at five tonnes per hour. The ground material is screened at 3 mm and dumped into an appropriate number of ten blending bins. At the same time, fine materials not requiring grinding are delivered by another bucket elevator into the other bins in the bank. From the bins, metered quantities of coarse

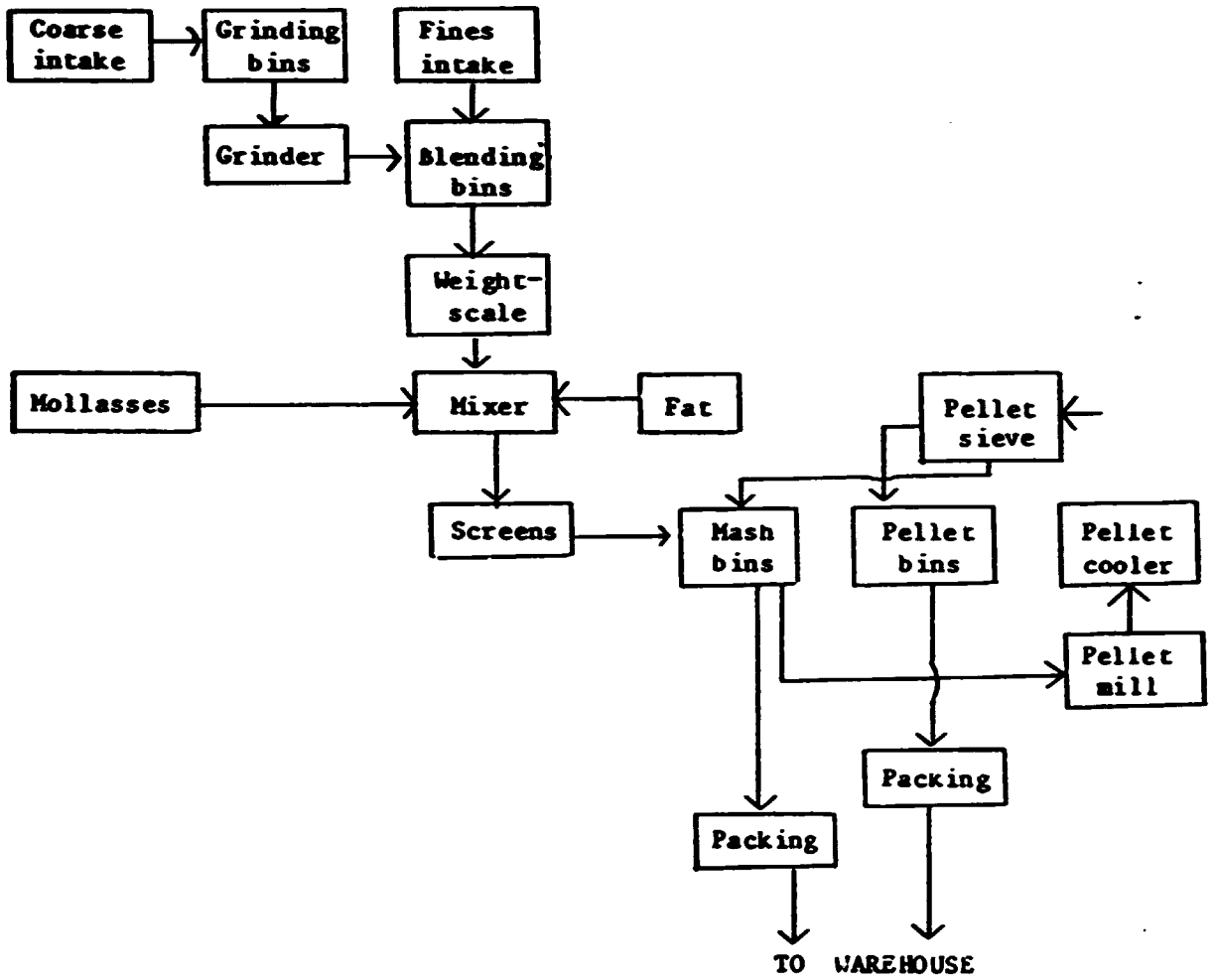
and fine materials are discharged into a two-ton horizontal weigh scale which feeds a two-ton mixer-hopper. Fat and molasses are piped into the hopper. The blend is conveyed by a screw-conveyor to a bucket elevator discharging, by way of a rotary sifter, into five-ton bulk packing bins for finished products.

From the bins, the mash is either channelled to the automatic packing machine for bagging, or to the pellet mill. In the latter case, the resulting pellets are first cooled before sieving and bagging. Bagged products are subsequently placed on belt conveyors for transport to the dispatch warehouse, where they are loaded into railway wagons or trucks for dispatch to customers.

Table 6.2.2: Disposition of milling and mixing equipment

<u>Disposition of production equipment</u>		
<u>Mill floor</u>	<u>Stockfeed section</u>	<u>Maize mill</u>
Basement	Raw material intake, screw-conveyors, hoppers and bucket elevators	Maize intake hopper and conveyor
Ground	Hammer mill, transformers, finished product hopper	Hammer mills, screw-conveyor
First	-	Packing machine, control panel
Second	Mixer, molasses plant, hammer mills, pellet cooler	Degerminators, packing bins
Third	Packing scale, control panel, additive mixer, pellet mill	Gravity table, storage bins
Fourth	Storage bins, temporary engineering store	Aspiration channels, conditioning bins, intake and water wheel dumper
Fifth	Shaker, screw conveyors, air compressor	Plansifter, air compressor, bag fitter, grain separator
Sixth	Bag filter, rotary sifter, cyclone	Cyclones, aspiration channels

Figure 6.2.2
Stockfeed process flow diagram



(e) Inputs

In 1987-88 a total of about 12,000 tonnes of raw material and ingredients were turned into compound stockfeed. This is only 50 per cent of the quantities budgeted. In the financial year 1988-89 some 30,300 tonnes of raw materials are expected to be processed into stockfeeds. The majority of raw materials - approximately 84 per cent - are available locally. The remaining 16 per cent of raw material concentrates and premixes for broiler, layer, pigs and dairy rations are imported from the Republic of South Africa or Holland.

No. 3 meal, a by-product from milling mealie meal, is the single largest ingredient of stockfeed. The annual demand, about 12,000 MT, is mainly supplied from the E.C. maize mill, supplemented if necessary by purchases from other mills.

The Lusaka Provincial Co-operative Union currently supplies 2,500 MT of maize per annum. Other domestically procured ingredients, (approximate quantities), and the sources of procurement, are as follows:

	<u>Tonnes</u>	<u>Source</u>
Wheatings	4,500	National Milling
Sunflower cake	3,600	Premium Oil; SAMEEA
Soybean cake	3,600	Premium Oil; Soy Nutrients; Lee Yeast
Limestone meal	1,400	Mineco Small Mines
Salt	150	National Milling

Bone meal is reportedly in scarce supply, with high costs on the domestic market. Hence E.C. Milling buys burnt scrap bones from private vendors at ZK 0.80/kg. The scrap bones are crushed in a hammer mill and the product is reportedly of good quality, both from a hygiene and analysis perspective.

On the whole, the reliability of supply is satisfactory. Normally no raw material samples are taken to determine the nutrient content. Instead, a standard pattern of properties in the ingredients has been established, and samples for analysis are taken only if there is reason to believe that there are significant deviations from the standard. This would apply mainly to sunflower cakes, and to an extent to soya cakes. In the past, both cakes frequently were subject to over- or under-treatment with residues of trypsin inhibitors. The impurities in maize are estimated to be not less than 5 per cent.

Since E.C. Milling has no laboratory of its own, the samples are sent to Zamcapitol Ltd., a Government enterprise located in Lusaka. There is a four-day lapse from the delivery date of the samples until the results of the analysis are available.

Although the suppliers of all ingredients are considered reliable at present, the reliance on imported ingredients for all feed formulas makes the manufacturing of stockfeed very vulnerable. Identification of domestically-available sources of animal protein, mineral supplements, and to some extent vitamins should be given high priority. This would reduce the dependence on imports and save scarce foreign exchange. This dependence applies to other stockfeed manufacturers in the INDECO group as well.

(f) Product range

E.C. Milling produces two main product lines, mealie meal products and stockfeeds. The three mealie meal products are roller meal, breakfast meal and mealie samp. A residual product of the mealie meal production process, No. 3 meal, is an intermediate product which goes into the production of stockfeeds. The plant produces 12 varieties of stockfeed covering poultry, cattle and pig feeds. Total sales in 1987/83 were 2K42 million.

(i) Stockfeeds

Table 6.2.1 gives the approximate quantities and percentages of the total annual output according to the 1988/89 budget and actual production during 1987/88.

Poultry feeds account for 67 per cent of the total amount of stockfeeds produced, with pig feeds at 22 per cent, and cattlefeeds at 11 per cent.

The various feed formulas are governed by the standards produced by the Zambian Standards Institute (ZSI). So far, these are considered as guidelines and cannot in practice be followed completely since no standard specification of stockfeeds ingredients exists.

Table 6.2.3: E.C. Milling Stockfeed outputs

Product	Budget 1988/89		Actual 1987/88	
	Per cent	Tonnes	Per cent	Tonnes
Broiler starter	8	2,430)		
Broiler finisher	24	7,280)		
Chick mash	2	600)-	76.6	8,984
Pig grower	5	1,520)		
Layers mash	23	6,980)		
Broiler mash	5	1,520)		
Pig creep	1	300)		
Trotover special	1	300)		
Porker finisher	15	4,550)-	9.7	1,134
Sow & boar ration	5	1,520)		
DMU tree	<u>11</u>	<u>3,330</u>	13.7	1,506
DMU plus				
Total	100	30,330		

Source: Budget 1988-89.

Any particular domestic raw material has the same price, regardless of protein level, fibre content, or fat percentage. As a consequence, if all the ingredients in a compound feed were to conform with ZSI recommendations, feeds would have to be made with other high-cost ingredients. This would make the feed far too expensive. Hence, when different feed formulas are computed, compromises are occasionally made with respect to the nutritional standard of the feed.

Since laboratory facilities are not available at the plant, samples of the finished products are sent to Zamcapitol Enterprises for analysis. This is done once a week, normally for eight samples. The analysis includes moisture content, protein, fat, free fatty acids, fibre ash calcium, and phosphorus. The feeds are not subject to any microtoxic analysis and there is no determination of the energy value.

Each bag is provided with a tag stating type of feed, net weight, manufacturer serial number, crude protein (min.) per cent, calcium (max.) per cent, and phosphorus (min.) per cent.

(ii) Maize meal

Maize meal is divided into three groups: roller meal, breakfast, and meal samp.

(g) Plant performance/cost and price structure

A serious technical problem exists in the mealie meal production unit. This results in extraction rates for both roller meal and breakfast meal which are significantly lower than the extraction rates obtained by other millers who compete with E.C. Milling in the mealie meal market. For example, the company's extraction rate for roller meal is only around 70 per cent, compared with over 90 per cent achieved by other millers. In the case of breakfast meal, the comparisons are even worse. E.C. Milling's extraction rate is only 55 per cent while the competitors get extraction rates of up to 75 per cent.

The installed capacity of the plant is 18 metric tonnes per hour for stockfeed and 10 tonnes per hour for mealie meal production. However, when trying to estimate capacity utilization it is unrealistic to relate output to installed capacity because, for technical reasons, the plant has never been able to achieve such production levels. Instead, the company has defined achievable capacities for the two sections of the plant - 6 metric tonnes for stockfeed and 4.5 metric tonnes for mealie meal production. During the year 1987-88, actual outputs achieved were 1.6 metric tonnes of stockfeed and 2.6 metric tonnes of mealie meal, or 27 per cent and 77 per cent respectively of achievable capacities in the two sections of the plant. (Had outputs been related to installed capacities, capacity utilization rates would have been as low as 8.9 per cent and 35 per cent respectively.)

Since the plant had been operating under INDECO ownership for only five quarters up to the end of the 1987-88 financial year, production data in Table 6.2.4 is given by quarter in order to show the trend in production.

Table 6.2.4: Production for each quarter January 1987 to 31 March 1988 and production for the financial year 1987-88 (in metric tonnes)

	<u>Jan-Mar</u> 1987	<u>Apr-Jun</u> 1987	<u>Jul-Sep</u> 1987	<u>Oct-Dec</u> 1987	<u>Jan-Mar</u> 1988	FY 1987-88
Mealie meal	2,627	2,609	5,082	4,943	5,942	18,576
Stockfeeds	2,696	3,143	3,015	2,792	2,966	11,916
Total	5,323	5,752	8,097	7,735	8,908	30,492

Source: E.C. Milling, Budget 1988-89.

Lack of adequate data points makes it difficult, if not impossible, to ascertain any quarterly trend in value added. However, with turnover for the financial year 1987-88 at ZK 42 million and costs of sales at ZK 38.286 million, value added for the year was ZK 3.714 million. Since the number of employees was 235, value added per employee was ZK15,800 in the last financial year.

(i) Inputs and import dependence

The main raw materials used in the production of both mealie meal and stockfeed are maize, sunflower cake and soyabean cake, wheatings, limestone flour, No. 3 meal, bonemeal and salt. These are all produced in Zambia and represent 84 per cent of the value of total raw materials used. The remaining 16 per cent of total raw materials are imported concentrates and pre-mixes.

For packaging, E.C. Milling uses both jute and poly bags purchased from Kabwe Industrial Fabrics. It is interesting to note that jute bags comprise only around 8 per cent of the value of total purchases of packaging. Table 6.2.5 gives estimates of average unit costs of the main inputs used by E.C. Milling as well as quantities purchased and total costs for the year 1987-88.

The company imports machinery and 25 per cent of its spare parts needs. The remaining spare parts, although not necessarily manufactured in Zambia, are acquired locally and thus do not require foreign exchange for their purchase.

(ii) Protection

There are normally no imports of mealie meal or stockfeeds into Zambia. As already noted, some raw materials are imported but these enter duty-free. Imports of spares carry a duty of 20-25 per cent. When the 2.5 per cent value for duty purposes and the 20 per cent sales tax are taken into account, the total tax rate is around 35 per cent.

Table 6.2.5: Estimates of average unit costs of raw materials and estimates of quantities purchased 1987-88 (ZK/tonne)

	Average unit cost	Quantity purchased (tonnes)	Total cost (ZK'000)
Maize	866.67	26,144	22,658
Sunflower cake	1,600.00	1,737	2,779
Soybean cake	2,200.00	1,609	3,541
Wheatings	240.00	469	112
Limestone flour	300.00	645	193
No. 3 meal	400.00	125	50
Bonemeal	400.00	534	213
Salt	1,912.00	57	109
Concentrates	5,727.50	378	2,165
Pre-mixes	15,772.00	15	235
Packing: Jute bags (ea)	4.50	61,000	275
Poly bags (ea)	2.43	1,270,456	3,089

Source: E.C. Milling, Budget 1988-89.

(iii) Profit record

For the year 1987-88 the company recorded profits before tax of ZK 912,000. After payment of equity levy, profits were ZK 890,000. All the profits were made on the mealie meal operations. Because of low stockfeed prices in 1987-88, stockfeed production was a loss-making activity last year. However, with the recent increases granted for stockfeed prices, the operation is expected to become profitable again during the current financial year.

(iv) Pricing system

The price of mealie meal is fixed by the Government. This price is significantly below the millers' costs of production, so the Government gives them a subsidy on each metric ton produced. The current rates of subsidy are ZK 682.08 per metric ton (ZK 17.07 per 25 kg bag) on roller meal and ZK 866.08 per metric ton (ZK 21.67 per bag) on breakfast meal. This enables the millers - including E.C. Milling - to sell a bag of roller meal for ZK 14.59 and a bag of breakfast meal for ZK 18.87, and still make a reasonable profit.

In the case of stockfeed, the mechanism for setting prices is governed by Statutory Instrument No. 1, 1988. The method is a cost-plus one, and producers are allowed a margin of 21 per cent over production costs. To this total is then added the cost of the bag, to give a final selling price.

E.C. Milling produces 12 varieties of stockfeed, each with its own formulation or mix of inputs. There is some flexibility in setting actual prices, although they have to be submitted beforehand for approval by the Prices and Incomes Commission (PIC).

Before Statutory Instrument No. 1, 1988 was introduced, E.C. Milling was taking different margins on each stockfeed line. In making their June 1987 submission to the PIC earlier this year, however, the company added a uniform margin of 21 per cent to the costs of production involved in making each type of stockfeed. The PIC approved the new selling prices on 9 March 1988 but stipulated that the price increases were to be implemented in two stages, 60 per cent of the increases on 9 March and the remainder on 1 September. Table 6.2.6 shows prices of the company's 12 varieties of stockfeed as they were before the price increase and the new prices which will prevail after 1 September. It can be seen that, although a uniform margin of 21 per cent was added to each variety's costs of production, in terms of the individual percentage price rises, margins range from 15 per cent on broiler mash to 54 per cent on dairy meal urea-free stockfeed.

As already noted, E.C. Milling made a loss on its stockfeed operations during 1987-88. This was due to the time lag of nine months involved in getting approval from PIC for its price increases.

(v) Liquidity and foreign exchange

At the time of INDECO's takeover of the company, E.C. Milling had a serious liquidity problem as it had no working capital. To facilitate its operations, other companies in the INDECO group which supplied it with inputs did so on a credit basis. At this stage, however, the company does not appear to be experiencing any liquidity problems. This satisfactory cash flow

position arises for two main reasons: first, because of the company's rapid turnover, and second, because although it receives two weeks' credit from NAMBOARD and one week's credit from KIFCO, the company gives credit of only one week and only on mealie meal.

Table 6.2.6: Prices of stockfeeds before and after price increases (ZK per 25 kg bag) and percentage price increases

	Old price	New price	% price increase
Broiler starter	40.75	53.80	32
Broiler finisher	35.75	46.90	31
Chick mash	35.00	47.20	35
Pig grower	32.75	42.95	31
Layers mash	34.50	42.60	23.5
Broiler mash	33.25	38.25	15
Pig creep	28.00	40.15	43
Porker feed	26.25	36.30	38
Trotover special	36.75	44.80	21.9
D.M.U. free	16.50	25.45	54
D.M.U. plus	16.50	24.70	49.7
Sow and boar	25.75	33.40	29.7

Source: E.C. Milling, Budget 1988-89.

However, the company inherited a debt of ZK 1.7 million from the previous owner of the plant. This debt is owed to Zambia National Building Society (ZNBS). At the time of the takeover, INDECO assumed responsibility for the inherited interest element which, at that date, totalled ZK 1.788 million. E.C. Milling has been servicing the principal of ZK 1.7 million on a regular basis. By the end of 1987 it had repaid ZK 488,000 of the loan.

There is a time lag of around 11 or 12 days between the date of application for the mealie meal subsidy and its receipt. However, this does not create cash flow problems because the receipts are regular. The only time E.C. Milling experiences tightness in its cash flow position is when it applies to FEMAC for foreign exchange and has to lodge the ZK cover in advance. E.C. Milling does not experience difficulties in getting foreign exchange because it is a parastatal and a priority industry. It has applied seven or eight times to FEMAC - twice to buy imported spare parts, and the other times to buy concentrates. During the financial year 1987-88, the company purchased foreign exchange to the value of US\$ 320,000.

(h) Markets and competitors

The market size for stockfeed is estimated to be 300,000 tons/year. E.C. Milling's market share is slightly under 20 per cent for stockfeed. No figures are available for maize meal regarding market size and market share. E.C. Milling's main competitors in stockfeeds are listed below:

	<u>Per cent^{a/}</u>
National Milling	30
E.C. Milling	19
Nkana Milling	13
INDECO Milling	9
Chimanga Changa	8
ZATCO	7.5
Robin Hood	3
Kabwe Milling	3
Antelope Milling	3
Jamas Milling	2.5
Northern Milling	2

a/ The percentages refer to a ranking system based mainly on the following:
(a) use of raw material, (b) labour utilization, (c) installed capacity,
(d) revenue to Government through taxation, (e) exports.

Source: Ministry of Commerce and Industry.

National Milling Co. Ltd. is the strongest competitor with an installed capacity of 130,000 tons/year and with more product lines than E.C. Milling. National Milling's greater number of product lines causes it to be less flexible in production which in turn affects competitiveness. National Milling's capacity utilization is said to be lower than that of E.C. Milling's other major competitors.

The market is to a great extent divided geographically (by province) between competitors, but there is also intra-provincial competition. E.C. Milling has its strongest position in Lusaka Province. The prices of stockfeed are about the same for all the companies, and competition is mainly in terms of availability, quality, and reliability of supply. All companies are facing the problem of underutilization of installed capacity.

At present, E.C. Milling does not export. However, the previous owner of E.C. Milling exported small quantities of stockfeed to Zaire. The export markets in the neighbouring countries are considered good, but for the short term no exports are contemplated. All sales are made directly to retailers and end users such as schools, hospitals, prisons, and state shops. Very small amounts are allocated for sales promotion in the 1988-89 budget.

E.C. Milling has no lorries of its own but hires them from a transport company. The company has budgeted for two lorries as it wants to lessen its vulnerability with respect to deliveries.

E.C. Milling provides free delivery within a radius of 25 km. The 25 km limit is due to the present state of the hired lorry which does not permit long-haul transportation. It was this fact which prompted the company to decide to arrange for its own transport.

(i) Constraints

The principal constraints affecting the stockfeed plant are as follows:

- a faulty design concept whereby the stockfeed plant is directly linked, in terms of supply of some raw materials, to the maize mill;
- a poor process scheme and under-designed machinery and equipment;
- import dependence for critical raw materials;
- occasional financial squeeze;
- lack of in-house quality control facilities;
- institutional constraints which periodically impose uneconomic prices on stockfeed.

(i) Faulty design

The direct linkage of the stockfeed section to the maize mill creates a dependence of such a nature that any operational problems in the latter could immediately immobilize the former. This constraint could have been alleviated if the basic design concept of the plants had been such that the rated capacity of the maize mill were significantly in excess of that of the stockfeed plant. This would permit the build-up of a stock of maize feedstock (No. 3 meal) with which to continue operations in the short-term even when the maize mill is out of use.

(ii) Process and equipment

Experience has shown that the claimed design capacity of the plant - 18 metric tonnes per hour - is unattainable in practice, given the various equipment bottlenecks in the system. These bottlenecks emanate from inappropriate plant design and equipment selection. For instance, equipment sizing and design specifications had been based on yellow maize as a raw material rather than the white Zambian variety. Other faults in the system are:

- hammer mills that are undersized, and that can only function one at a time as they both feed into a single undersized line;
- a rotary sifter of obsolete design;
- an undersized and manually-controlled weighing-scale between the raw material bins and the mixing hopper which is also undersized at two tonnes holding capacity;
- a pellet screen of obsolete design which should be replaced with a throw sieve;
- absence of interlocks between holding bins and their feeding and receiving equipment. Such interlocks would automatically shut off material flow and processing when the level of stock in a bin or hopper exceeds a pre-set point.

(iii) Finance

This constraint is now one of historical interest as the company's overall financial position appears to have improved since its take-over by the Government. It should, however, be stated that adequate liquidity and ready access to adequate working capital are critical in view of the need to regularly post the necessary ZK cover for any foreign exchange applications through FEMAC.

(iv) Quality control facilities

A detailed discussion of the importance of these facilities is given in Section 6.2.1(f). The company has no facility for in-house quality control analyses. Base-line compositions of ingredients are applied in the computation and formulation of mixes and, on a weekly basis and whenever else it is deemed necessary, samples are sent to Zamcapitol Enterprises in Lusaka for analysis.

(v) Institutional constraints

An important institutional constraint is posed by the relatively recent transition of the company from a private sector enterprise, with its own particular management structure and style, to a Government parastatal. The need for a reorientation away from the profit motive as a sole objective to encompass the pursuit of broader public socio-economic interests poses a major challenge to the management.

Additionally, the regulation of product prices by the Prices and Incomes Commission could result in uneconomic prices for the company's products.

6.2.2 Rehabilitation requirements

(a) Management and organization

While middle management is of reasonable quality, a few changes are desirable. One possibility would be to upgrade the Technical Manager to Production Manager and create a new post of Maintenance Manager to be filled from outside. The present Chief Engineer who deals with maintenance is trained in refrigeration techniques but since most of the problems in the plant are of a mechanical nature it is doubtful that he could fulfill the role of Maintenance Manager. A mechanical engineer is going to be recruited.

There is also a need for a Personnel and Administration Manager. In the present situation too much of the General Manager's time is devoted to administration and personnel matters. The present market situation does not call for a strong sales organization since it is a sellers market. When rehabilitation of the production plant and equipment is completed it will be necessary to employ a strong Marketing and Distribution Manager and to establish a well functioning sales organization. This sales organization should serve the domestic market and eventually the export market. The remaining posts, such as Chief Accountant and Production Manager, appear to be filled by very able and dedicated people.

It is also strongly advisable for the company to organize a computer system (PC), as soon as possible, in order to carry out routine work more efficiently. A personal computer would be extremely useful for accounting, purchasing, sales and administration.

(b) Physical plant

In a 1987 study, Booker Agricultural International Ltd. proposed the conversion of the E.C. Milling Co. plant to a feed mill producing concentrates and pre-mixes for satellite mills. This proposal was rationalised on the strength of improved stockfeed quality from all plants as well as foreign exchange savings.

It is the opinion of the UNIDO team that E.C. Milling should maintain the present concept of having one maize milling line and one stockfeed line. This gives the company a broader product range, more pronounced economies of scale and better control over a major stockfeed ingredient, No. 3 meal. The UNIDO team also recommends that a rehabilitated E.C. Milling should also manufacture and market complete compound feeds. This would allow for superior flexibility of operations with respect to market demand.

A development along these lines does not prevent E.C. Milling from functioning as a national supplier of pre-mixer and qualified concentrates to the Zambian stockfeed industry.

(i) Rehabilitation of existing plant

Following an assessment of the existing equipment and bottlenecks in the feed mill, the company obtained technical and price quotations from Buhler Brothers Ltd., Uzwil, Switzerland, for supply of the necessary equipment for rehabilitating the existing plant toward an achievable capacity of 18 tonnes per hour. The equipment list is shown in Table 6.2.7.

The total quoted price (f.o.b. European port) for this package is 189,895 Swiss francs, equivalent to ZK 1.045 million at the June 1988 exchange rate of 1 Swiss franc to 5.5 Kwacha.

Table 6.2.7: Equipment for rehabilitating present plant

1. One 12-tonne/hour centrifugal control sieve
2. One 4-tonne/hour throw sieve based on pellets
3. One automatic feeder/high-density parts separator
4. One electronic controller
5. One 15-ton/hour hammer mill with two-directional rotation, vibration dampers, etc.
6. One hammer mill pneumatic suction system comprising one centrifugal fan, one air-jet filter and one spare control board.

In addition to new equipment, other rehabilitation projects are considered essential for the achievement of the rated capacity as well as greater efficiency of the existing plant operation. The costs associated with these are shown in Table 6.2.8. A total outlay of about ZK 2.03 million is required. This is subject to confirmation by a more detailed study which should constitute the first stage of any proposed rehabilitation programme.

Table 6.2.8: Estimated cost of feed plant rehabilitation

<u>Item</u>	<u>Estimated cost (ZK)</u>
Imported equipment:	
f.o.b. European port	1,045,000
Freight, clearing, inland transport, duty (if any) and insurance - 15 per cent of f.o.b. price	157,000
Supervision of installation, commissioning and start-up - 10 per cent of f.o.b. price	105,000
Related civil, mechanical and electrical works - 10 per cent of f.o.b. price	105,000
Other rehabilitation works:	
Cover for intake and loading sheds and mill-to- warehouse conveyor	65,000
Extension of raw materials warehouse	50,000
Workshop and equipment	500,000
Total	<u>2,027,000</u>

(ii) Requirements for pre-mix/concentrates plant

The processing of pre-mixes and qualified concentrates requires a production plant unit which meets a number of requirements. These include:

- milling ingredients into products with, as much as possible, uniform particle size;
- proportioning ingredients by weight; micro ingredients weighed manually under satisfactory supervision and control; other ingredients weighed on automatic scales with arrangements for pre-setting required weights of different components to ensure that each batch is in conformity with the formula;
- design and performance of mixer must ensure that each batch is properly mixed for a predetermined number of minutes;
- the conveying system must be completely tight, designed to prevent separation of the product during conveyance and to allow for easy complete emptying between batches;
- bins and hoppers, including outlets and spouts, must be designed to minimize, or preferably prevent, separation of product;
- arrangements for easy sampling of product in line of production.

(iii) Installations

- The hammer mills should be subject to the appropriate tests and reconditioned to ensure acceptable particle size pattern.
- Investigation should be made of alternative solutions to provide the "weigher-proportioner" with installations either monitored through manual pre-setting of the weights or preferably by using a simple punch card system or a computerized programme; the weigher-proportioner should be up-graded.
- Complete overhaul of the conveying system should be undertaken including replacement of the present pneumatic system.
- If pelletized concentrates are to be included in the product mix, the following should be undertaken: reconditioning or replacement of pellet mill, and repair and up-grading of pellet cooler, conveying system and sieve to minimize pellet breakage.
- Overhaul of bagging-out and weighing equipment.

(iv) Action plan for physical plant

1. Test the performance of major equipment - hammer mills, mixer, pellet mill; replace if not satisfactory.
2. Investigate if present weigher/proportioner can be provided with a mechanical, punch-card or computerized system for monitoring and control of ingredient proportioning; if not, replace.

3. Redesign process flow as required and replace sub-standard conveying system.
4. Install high performance batch mixer for micro ingredients and the necessary weighing equipment (manual).
5. Equipment not acceptable in the rehabilitated multipurpose pre-mix/concentrate of compound feed plant should be used in a satellite feed plant or sold to a private or co-operative enterprise.

(d) Cost and price structure

E.C. Milling applied to PIC for approval of increases in stockfeed prices in June 1987 to compensate for increases in their costs of production. The price increases were not approved until March 1988 - and then only in two instalments, over six months. As a consequence, the stockfeed section of the company operated at a loss during 1987-88. There is a conflict here between the macro consideration - containing inflation - and the micro consideration, which is the profitable performance of the stockfeed production activity. INDECO's role also has to be considered. If a parastatal company, such as E.C. Milling, incurs continuing losses, it will have to be rescued by INDECO.

It is therefore suggested that PIC process applications for price increases from parastatals in priority industries within one month of their being submitted.

(e) Marketing

E.C. Milling Co. Ltd. has not made any serious marketing efforts. This is because the present local market is a sellers' market and the main constraints are on the production side (low capacity utilization). The national market is also a sellers' market with demand still far exceeding present production levels. The situation may change drastically when rehabilitation has been completed at E.C. Milling and at the plants of its competitors.

It will then be necessary to rely on a strong and effective sales organization, led by a strong Marketing and Distribution Manager, for both domestic sales and exports.

An interesting product that should be seriously considered for marketing is mealie samp. The product is inexpensive for the public, is more versatile than Nshima, and is very profitable for the producer. Since it is maize-based, it is a relative of the popular Nshima and will therefore not imply great changes in the eating habits of the population.

6.3 ZATCO Stockfeeds Ltd., Choma

6.3.1 Existing situation

(a) Plant history

ZATCO Stockfeeds Ltd. was incorporated in 1979 as a department of **Zambian Agricultural and Trading Co-operative Ltd. (ZATCO)**. It existed as such until 1982 when it became a limited liability company. The company was wholly owned by ZATCO, with an initial authorized share capital of ZK 1.5 million.

The formation of ZATCO Stockfeeds Ltd. had been motivated by the desire to overcome persistent difficulties encountered by the original members of the co-operative - mostly dairy farmers - in obtaining reliable supplies of high-quality stockfeeds for their animals from suppliers such as National Milling Company. As owners and promoters on behalf of ZATCO, the Chairman and Vice-Chairman of ZATCO became members of the Board of ZATCO Stockfeeds Ltd., each holding one share at the time of incorporation. Other Board members are drawn from the members of the co-operative.

The original plant and equipment, supplied by Kumar Metal Industries Ltd., Bombay, India, were installed in 1979 at the present site in a building belonging to the parent company. It is not clear whether the equipment supplied by Kumar was ever formally commissioned and accepted. If this was not done, it accounts in part for the sub-optimal performance of much of the original equipment still in use.

ZATCO Stockfeeds Ltd. has, since 1987, fully acquired all the original machinery and equipment, as well as all rights to building improvements, from its parent company, ZATCO Ltd. By the end of 1988, it plans to similarly acquire the land and all buildings thereon at a price of about ZK 250,000.

With the exception of the original hammer-mill which was scrapped and replaced with a locally-fabricated mill, no major modification or improvement of the physical plant has taken place since installation.

(b) Management and organization

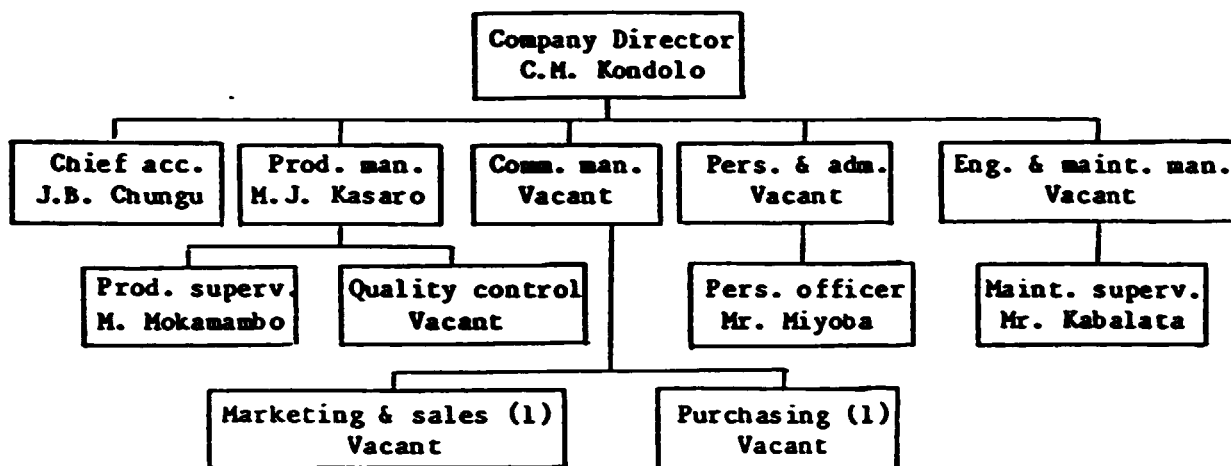
ZATCO Stockfeeds Ltd. is a limited company which is privately owned. The Board of Directors consists of the following members:

Chairman:	Mr. P. Combrink,	Commercial farmer
	Mr. P. Green,	Commercial farmer
		Chairman of Virginia Tobacco Association of Zambia
	Mr. B. Danckwerts	Commercial farmer
	Mr. D. Gosling	Commercial farmer
	Mr. C.M. Kondolo	Company Director of ZAPCO Stockfeeds Ltd.

All members except Mr. Kondolo are British expatriates. Board meetings are held every three months.

Share capital is ZK 500,002 and there are 500,002 shares issued, of which ZATCO owns 500,000 and the Chairman and Vice-Chairman hold one share each.

Figure 6.3.1
Management Organization Structure of ZATCO Stockfeeds Ltd.



(1) These duties are performed by the Company Director and the Chief Accountant.

The Company Director takes a very active role in all plant activities, with several daily rounds in the factory. He also deals with activities such as sales and purchasing of raw materials. The Production Manager and Maintenance Supervisor have daily meetings with the Company Director to discuss current problems. The Chief Accountant submits daily reports concerning product costing, sales and cashflow. Strategic planning and forecasting is done after working hours by the Company Director. In December of any given year the funding requirements and Budget are presented to the Board. A draft of the Budget is prepared by the Company Director and Chief Accountant between September and December. So far no formal Company Plan has been prepared. Before 1987 only a skeleton-budget was prepared.

(c) Financial structure

Table 6.3.1 gives the financial structure of the company as well as total fixed assets and total capital employed between 1984-85 and 1987-88.

Table 6.3.1: ZATCO Stockfeeds Ltd.: Total fixed assets and capital employed: 1984-85 - 1987-88 (ZK'000)

	1984-85	1985-86	1986-87	1987-88
Total fixed assets	428	403	526	890
Share capital	500	500	500	500
Reserves	216	775	864	2,974
Long term loans	-	-	-	-
Total capital employed	716	1,275	1,364	3,474

Source: ZATCO Stockfeeds Ltd. Annual Accounts, various years.

During the past four years, ZATCO Stockfeeds Ltd. has financed its operations without relying on long term finance. This can be explained in terms of its history with the present company, ZATCO.

(d) Buildings and installations

ZATCO's production equipment is housed in one building located at Plot 414/415 along Singani Road, Choma. A second structure within the premises serves as a grain warehouse when necessary. It is obvious, even on casual observation, that plant layout is deficient and that little consideration has been given to the provision of adequate storage space for raw materials, in-process goods, and finished products. As such, the factory building is severely congested.

The plant can be visualised as comprising three sections - the oil mill, the milling section and the feed plant.

(i) Oil mill

The oil mill consists of a seed decortication unit, two cooker/extruder press units, a conveying system for the oil expellers, and a system for pumping, single-filtering and storage of cooking oil before filling in 210-litre drums.

The seed crushing capacity of the plant ranges from 10.8 tonnes per 24 hours for soyabeans to 15 tonnes for sunflower seeds. Oil extraction from sunflower seeds amounts to 2.55 tonnes per day (or 17 per cent of capacity), while cake accounts for 6.6 tonnes (or 44 per cent). When the heat treatment is carried out by other expellers such as Soy Nutrients of Lusaka - which currently provides this service to ZATCO Stockfeeds Ltd. - the plant can handle up to 20 tonnes per 24 hours, reducing the cake's oil content from the 16 to 20 per cent range to about 7 per cent.

The cooker/expeller units are partially dismantled every week to clean the cookers and weld the expeller screws which are prone to rapid wear. The decorticator is similarly given a regular routine maintenance since sandy and metallic particles in the seed accelerate wear of moving parts and the hull-conveying system.

The mill is technically unsophisticated and local improvisations have been made in the interest of simplifying operations and increasing efficiency, particularly in the decortication unit and the cooker/extruder press units. The former, for instance, had in fact been designed for cottonseed rather than sunflower-seed processing.

On the other hand, the design of the cookers with a limited number of layers of steam piping and no steam jacketing restricts their heating capacity and throughput. Thus, while they may attain high enough temperatures for heat-treating sunflower seeds, they are totally inadequate for soyabeans. Additionally, no provision had been made for force-feeding cooked oilseed to the extruder press, although an improvised system has been installed to permit semi-continuous feeding of the press.

In general, the oil mill operates seven days a week, three shifts per day, typically averaging 20 hours per day. Along with the milling plant (to be discussed subsequently), the oil mill must be considered a bottleneck in the total plant's operation due to its apparent under-design. This under-designing in the oil mill results in an inability to process sufficient cake to match the capacity of the feed plant.

(ii) Milling section

The hammer mill, designed and fabricated locally, is powered by an 80-hp electric motor. It has a screen width of 300 mm. The ingredients to be milled are dumped into a hopper, lifted by a bucket elevator to a pre-bin which feeds the hammer mill by means of gravity. There is no magnetic separation.

Following milling, the product is pneumatically conveyed to a cyclone equipped with a fitter and bagging-out attachment. The capacity of the milling plant is 40 tonnes per 24 hours.

(iii) Mixing plant

In the feed mixing plant, the bagged produce from the milling section is weighed and dumped, along with other ingredients, into a hopper from where it is lifted by a bucket elevator to the mixer pre-bin. From here the batch of ingredients is emptied into the mixer and subsequently conveyed therefrom to a product bagging-out hopper equipped with a scale and necessary attachments. As with the oil mill, technical modifications have been made to the original equipment in the interest of operational efficiency. These apply to the weighing and material-handling systems.

The feed plant typically operates on a three-shift-per-day basis for about 300 days a year, although actual operations average only about 16 hours per day. The installed capacity of the plant is 90 tonnes per 24 hours.

(iv) Maintenance

The entire plant is operated as one unit as far as maintenance is concerned. The workshop is very poorly equipped, with only very basic hand tools and arc welding equipment. Thus its capability to fabricate spare parts is negligible. The Company Director supervises the repair and maintenance functions, assisted by a few mechanical and electrical fitters and craftsmen. In the face of scarcity of spare parts caused in part by the prevailing foreign exchange squeezes, the management's ingenuity in improvisation and local parts substitution where possible is to be commended.

(e) Inputs

Stockfeed ingredients are generally obtained from Southern Province. Maize, sunflower and soyabeans are purchased from the Southern Province Co-operative Marketing Union, or directly from farmers in the region. Flour milling by-products are mainly supplied by Choma Milling Ltd. which is located very near ZATCO Stockfeeds, and Anthelope Milling which is located in the Copperbelt. Meat/bone meal is bought from the Cold Storage Corporation and bone meal from Gameu in Lusaka.

Dicalcium phosphate and salt are imported from the Republic of South Africa, vitamin and trace elements pre-mixes from Europe or Zimbabwe, and additives from Europe. The total quantity of imported ingredients for stockfeeds is small. Flour milling by-products are sometimes short in supply. This also applies to maize and sunflower, especially during droughts. To avoid the detrimental effects of insufficient raw material for stockfeeds, efforts are made to purchase the annual requirement of maize and sunflower during and immediately after the harvesting period. Payment is made in advance and the suppliers are responsible for proper storage of the product. In addition, suppliers have to ensure that agreed quantities of raw materials are available to ZATCO.

Almost 10 per cent of the maize held in storage by the Southern Province Co-operative Marketing Union (SPCMU) reportedly suffers moisture damage due to inadequate coverage by tarpaulins. The Food and Drugs Act prohibits such moisture-damaged maize from being sold for human consumption. ZATCO buys it cheaply from SPCMU and uses it as an input in stockfeed production.

In 1987 the price paid for this maize was around ZK 480/tonne compared with the normal price for whole maize of ZK 870/tonne.

(i) Testing and quality

When new supplies of maize are received, samples are taken and the moisture content is established. Every second week the oil cakes are analysed to determine their protein, fat, free fatty acids, fibre, Ca, P and moisture contents. These analyses are carried out by Choma Mills Laboratory.

In the beginning of the season, when the newly-harvested crops begin to be used in the production of feeds, these ingredients are analysed in the United Kingdom. This includes crude protein, amino acids, energy, Ca, P, trace elements and vitamins, protein and phosphorous availability. Digestible energy is also determined. These analyses form the basis for formulating the different feeds. Under the present circumstances, the basis used by ZATCO for the design of compound feed cannot be faulted.

The variations in the nutrient values during the year and from different areas will for the time being have to be accepted. On average, the moisture content in the maize is 12 per cent. The hygiene status is reportedly satisfactory but the aflatoxine level is frequently 3 ppm and exceeded 5 ppm on one occasion during 1987.

The sunflower cakes are not very uniform since the quality and composition of the cakes depends on the inferior performance of the decortication machine and the expellers. Both the fat content and the fibre content fluctuates considerably throughout a day of operation. Efforts have been made to make adjustments in the formula as required but it is reasonable to assume that the quality of the feeds varies with regard to nutrient content.

Since the plant is not equipped with cleaning facilities for maize or oilbearing seeds, a portion of the impurities is included in the feeds.

Table 6.3.2 gives the approximate content of foreign matter, losses in husks, oil extraction and percentage cakes out of oilseed input.

Table 6.3.2

	Per cent <u>foreign matter</u>				
	<u>Large^{a/}</u>	<u>Small</u>	<u>Husks</u>	<u>Extr. fat</u>	<u>Oilcake</u>
Maize	10	NA	-	-	-
Sunflower	-	10	25	18	47
Soybeans	-	5	8	2	85

a/ Cobs, stalks, stones, etc.

Large foreign matter is removed prior to hammer milling but other impurities such as sand and dust remain. Although no information is available on this point, the amount of foreign matter of this type is likely to be a few per cent.

(ii) Losses

The handling of the bags from the point of purchase until they are emptied into the hammer mill pre-bin or into the decorticator feeder conveyor causes losses, resulting from broken bags and from spilling on the premises of the plant. These losses are estimated at 3 per cent of the total raw materials. In addition, about 1 per cent is lost for various reasons in the mixing/laying-out process.

At the present rate of production these losses are estimated at approximately 1,000 tonnes per annum. About 85 per cent of this, 850 tonnes, are reportedly recovered and sold as sweepings at ZK 600/tonne. At an estimated weighted average price of ZK 1,340/tonne (prices as from 25.4.88 less ZK 100/tonne per bag) the value of total losses are calculated at about ZK 800,000 during one year.

(f) Product range

The major products are various types of stockfeeds but limited quantities of cooking oil are also produced in the processing of oilbearing seed into oil cakes. There are 14 compound feeds in ZATCO's standard stockfeed product range. The quantities produced per month vary depending on demand. Table 6.3.3 shows the type of feeds and total quantities produced during the financial year 1987-88.

The majority, or 45 per cent, of all feeds are for poultry. Cattle feeds account for 42 per cent and pig feeds for 13 per cent of the total amount of stockfeed produced. Each type of feed is formulated according to the nutritional requirements for the class of animals for which they are intended. A declaration is attached to each feed stating type of feed, crude protein (min. percentage), fat (max. percentage) and crude fibre (max. percentage). Since ZATCO has no laboratory of its own, samples of all feeds are sent to Choma Mills Ltd. and the National Council for Scientific Research, Mount Makuru, every second week.

The analysis carried out by Choma Mills only includes tests for crude protein, fat and fibre levels, whereas the analysis at Mount Makuru also include sodium chloride and microtoxine tests, in particular aflatoxine. The results from the analysis made at Choma Mills are sent to ZATCO within a week and those made at Mount Makuru usually are received only after a period of about a month or more. This delay sometimes causes problems for instance in cases when the aflatoxine content is considered too high. By the time the results are available the feed has normally already been dispatched to the distribution agency, the stockist, or the end users. Whenever possible, however, the buyer is informed not to use the feed. The inferior feed is also replaced by ZATCO at no cost to the buyer.

Table 6.3.3: ZATCO outputs, 1987-88

<u>Type of feed</u>	<u>Tonnes</u>
Broiler starter	859
Broiler finisher	1,674
Chick mash	13
Layers mash	1,190
Poultry grower	53
Broiler breeder layer	100
Pig starter	453
Pig finisher	503
Sow meal	181
Dairy cow meal	3,598
Beef meal	48
Bull meal	3
Horse meal	<u>1</u>
Total	8,676

All ZATCO's feed is of a reasonable quality, considering the circumstances under which it is produced. The quality could be improved substantially by better control of the ingredients, the installation of cleaning facilities and routine analysis of finished products at closer intervals.

Higher quality feed is essential to exploit the potential for greater production of improved stock. At present no analysis is made for example, of energy or ash content. This information is important to the poultry, pig or dairy farmer. Mount Makuru reportedly can carry out energy analysis but their capacity appears insufficient and samples from ZATCO are not accepted. ZATCO's vegetable oil is simple filtered and appears to be of reasonable quality.

(g) Plant performance/cost and price structure

The plant produces two main types of products, stockfeeds and refined edible oil. These are produced jointly. The plant was built to produce mainly stockfeeds; edible oils are more or less a by-product. The oil-producing activity results in two outputs: refined edible oil, a final consumer good, and oilcake, which is an intermediate product and the main protein used in the production of stockfeeds.

Sunflower is normally the source of the seed used in making the edible oil. Soybeans can also be used but, given ZATCO's type of machinery, especially its poor heat-treatment capacity, the use of soybeans takes more time and is therefore more expensive. To minimize costs, ZATCO buys soyacake from ROP or sends its soybeans for crushing to Soy Nutrients, Lusaka. ZATCO operates a 24-hour day of three shifts. If all raw materials were available and all the machinery were working, it would be possible to produce 90 metric tonnes of stockfeeds per 24 hours. Thus, this can be considered as the nominal capacity of the plant. The plant normally produces around 30 metric tonnes each day although at periods of peak production it can produce much higher levels of output. For example, in November 1987 the average daily output for the month was 37 metric tonnes. As regards the oil-producing activity, normal production is around 2.5 metric tonnes per day. However, the plant is capable of producing 3.5 metric tonnes per day, provided sufficient seed of adequate quality is available.

Overall average capacity utilization for both stockfeeds and oil production is around 33 per cent. Table 6.3.4 shows outputs of stockfeeds and edible oils for the past four years.

Table 6.3.4: Output of stockfeeds and edible oils in metric tonnes for the years 1984-85 through 1987-88

	1984-85	1985-86	1986-87	1987-88
Stockfeeds	7,903.7	5,929.3	7,009.0	8,678.2
Edible oil	565.4	731.7	504.0	732.1

Source: ZATCO Stockfeeds Ltd., internal records.

Table 6.3.5 shows data relating to value added during the past four years, together with data on turnover, cost of sales, and total production.

Table 6.3.5: Turnover, cost of sales, value added and total production for the years 1984-85 through 1987-88

	1984-85	1985-86	1986-87	1987-88
Turnover (ZK)	5,041,064	5,969,154	7,454,195	16,228,466
Cost of sales (ZK)	4,166,201	5,109,733	6,752,717	12,552,641
Value added (ZK)	874,863	859,421	701,478	3,675,825
No. of employees	91	100	125	141
Value added per employee	9,613	8,594	5,611	26,069
Total production (tonne)	8,469	6,661	7,513	9,410

Source: ZATCO Stockfeeds Ltd., Annual Accounts for relevant years.

A number of comments can be made on the firm's performance under the above headings. While turnover and cost of sales have increased from year to year, value added has behaved erratically, falling in the two years 1985-86 and 1986-87 and then increasing quite dramatically during 1987-88. Value added per employee mirrors this performance. Of course, numbers of employees have increased steadily over the past four years. However, this cannot be taken as the only reason for the fall in value added per head because if total employment had remained constant, value added per employee would still have fallen. To explain the behaviour of value added per head, it is also necessary to look at what was happening to cost of sales, total production and profits. Sales costs expanded at an increasing rate year by year. Total production fell in 1985-86 and rose again in 1986-87. However, 1986-87 was also the year in which employment increased by 25 per cent. Reference to Table 6.3.6 shows that profits fell in 1985-86 and again in 1986-87, the years when total value added and value added per employee also fell. Thus, the fall in production accompanied by an increase in employment in 1985-86 and a further significant increase in employment in 1986-87 were the major contributing factors to the erratic behaviour of total value added and value added per employee in the two years 1985-86 and 1986-87.

In 1987-88, there were dramatic increases in turnover, total value added, value added per employee and profits.

(i) Inputs and import dependence

The principal raw materials used by ZATCO Stockfeeds are maize and maize meal by-products, sunflower seed, soyabeans, bonemeal, meat-and-bonemeal, cottonseed, limestone flour, and wheatbran. Together these represent about 90 per cent of raw materials and they are all purchased domestically. Other raw materials are vitamin and mineral pre-mixes, dicalcium phosphate, common salt and medicaments. These represent less than 10 per cent of total raw materials and they are all imported.

In the case of machinery and spare parts however, imports account for over 90 per cent of purchases while domestic sources supply less than 10 per cent.

(ii) Protection

Imports of stockfeeds are not allowed into Zambia. Normally, refined vegetable oil imports are also not allowed. Crude vegetable oil can be imported but it is subject to a duty of 20 per cent. Thus, ZATCO's two products, stockfeeds and refined vegetable oil, are well protected on the home market. The company, as already noted, imports pre-mixes and a few other raw materials. It also imports machinery and spare parts. However, it pays no duties on any of these imports and will not pay any such duties up to 1990 as it is classified as a priority industry.

(iii) Profit and loss record

In 1982-83, the first year in which ZATCO Stockfeeds operated as an independent company, it made a loss of over half a million Kwacha. Since then, the company has been recording profits. Table 6.3.6 shows the profit record for the past four years.

Table 6.3.6: Profits for the years 1984-85 through 1987-88
(ZK)

	<u>1984-85</u>	<u>1985-86</u>	<u>1986-87</u>	<u>1987-88</u>
Profits (before and after tax)	619,229	559,159	89,331	2,108,979

Source: ZATCO Stockfeeds Ltd., Annual Accounts for relevant years.

The reason why profits before and after tax are the same is because the company had been enjoying a tax holiday up until 31 March 1988. It is now subject to corporation tax and will pay it at the rate of 40 per cent this financial year unless it succeeds in its attempt to obtain further exemption from such taxes. According to the provisions of the January 1988 Budget, all companies will pay an education levy, from 1988-89 onward. ZATCO's assessment under this levy for the current year is ZK 15,000.

(iv) Pricing system

The mechanism for setting the selling price of stockfeeds is governed by Statutory Instrument No. 1, 1988. The method is a cost-plus one. Under it, producers are allowed a margin of 21 per cent over their costs of production. To this total the cost of the bag is added to give the final selling price. The company produces 14 varieties of stockfeed, each with its own formulation or mix of inputs. There is some flexibility in setting actual prices, all of which have to be approved, however, by the Prices and Incomes Commission. In setting prices for individual items, ZATCO Stockfeeds tends to vary its margins. The overall maximum, as already noted, is 21 per cent but on some lines it takes as little as 10 per cent.

There is a trade-off between cost and quality. ZATCO takes the low margin on high-cost but nutritionally-important products in order to encourage sales. For example, broiler starter contains expensive inputs but is vital to early growth of poultry; the company therefore takes a margin of only 10 per cent on this item. Sales of broiler finisher, which are twice as high in value terms as sales of broiler starter, are thereby encouraged. The company takes a higher margin on broiler finisher. By varying margins in this way, given the trade-off between cost and quality, the company attempts to maximize total profits. It also takes into account the prices charged by its competitors for similar products.

As regards cooking oil, its price is controlled. There is usually a timelag between the rise in sunflower seed prices and the granting of price increases for edible oils by PIC. Resulting losses on edible oil production have led to production stoppages by some producers. However, such losses are mitigated for ZATCO because of the joint production of edible oil and stockfeeds. Oilcake, the by-product of edible oil production is an input into stockfeed production and, as we have seen, the company has some flexibility in its pricing of stockfeeds. Thus, any losses made on the edible oil side can be absorbed in part in the setting of prices on the stockfeeds side of the plant.

(v) Liquidity and foreign exchange availability

During the past four years, the company does not appear to have had any liquidity problems. It has access in 1987-88 to overdraft facilities of ZK 1.9 million with Barclay's Bank. Moreover, its ratio of current liabilities to current assets was a healthy 0.46 during the year 1987-88. The liquidity position of the company would be even better were it not for the fact that it had outstanding obligations to ZATCO, its parent company, of which it was still a department up to March 1981. Since ZATCO Stockfeeds became a limited liability company in 1982 it has been repaying to ZATCO the latter's loan to the company of ZK 1.2 million. The last payment will be made this year.

As regards foreign exchange, ZATCO Stockfeeds does not appear to have any major problems, the main reason being its classification as a priority industry. It did not apply for any foreign exchange during the auction period because the exchange rates required too high a Kwacha cover. The company has applied for foreign exchange once since the inauguration of the FEMAC system, for an amount of ZK 540,000. It has also been able to acquire foreign exchange through the Export Retention Scheme, having exported 180 metric tonnes of stockfeeds worth over ZK 403,000 to Tanzania for the first time in 1988. The sale was effected through a Lusaka export agent with which it split, on a fifty-fifty basis, the export retention entitlement of \$30,000. The company intends to pursue other export possibilities so that it can earn abroad, rather than buy through FEMAC, the foreign exchange necessary to purchase its imports of concentrates and spare parts.

(h) Markets and competitors

At present prices and quality levels, the total demand for stockfeed is estimated to be about 300,000 tonnes/year. The demand is to a great extent dependent on the quality of the product and Government pricing policy.

ZATCO has received enquiries about its stockfeed from Botswana, Burundi and Zaire.

ZATCO markets its products partly through stockists such as ZATCO (Southern Province) and Midland Farmers Association (Lusaka) and partly direct to big farmers. The big farmers generally buy at least 30 tonnes and have standing orders. ZATCO imposes a minimum sales requirement of 1 ton for stockfeed and 210 litres for oil. During 1988 ZATCO exported 180 metric tonnes of stockfeeds to Tanzania. ZATCO's biggest market is Lusaka because of the concentration of population in that area.

The most important competitors on the domestic market are:

	<u>Production</u>
National Milling Ltd.	110 tonnes/24 hours
E.C. Milling Ltd.	120 tonnes/24 hours
INDECO Milling Ltd.	60 tonnes/24 hours
Chimanga	30 tonnes/24 hours
Kabwe Milling	30 tonnes/24 hours

According to informal ZATCO estimates obtained during interviews, ZATCO uses very little imported inputs, approximately 4-10 per cent, compared to 40-50 per cent for its competitors. No regular sales promotion is made at present. Some radio commercials of an educational nature were made two to three years ago. The company is contemplating advertising from time to time when it is necessary.

ZATCO's products have a potentially large export market. To this end, the company is planning some export promotion at the forthcoming PTA Trade Fair to be held in Lusaka. The main export targets will be PTA countries.

An important factor which limits the possibilities of a successful export drive is the fact that stockfeed is subject to export licensing from the Ministry of Commerce and Industry and clearance from the Ministry of Co-operatives which is time-consuming.

ZATCO's products are considered to be of good quality and compete well on domestic markets.

(i) Constraints

The major constraints to ZATCO Stockfeeds' effective and efficient performance arise from poor plant layout, ill-designed production equipment, occasional raw materials scarcity, the non-availability of in-house or readily accessible and reliable quality control, absence of laboratory facilities for analysis of raw materials and final products and for dynamic monitoring of in-process materials, and an apparent indifference to plant hygiene and personnel health, safety and comfort.

(i) Plant layout

The factory building, which was not specifically constructed for its present use, is under-designed in terms of space, and is not conducive to efficient equipment disposition and material flow and storage. This contributes to the very cluttered appearance of work-stations, as well as to unduly high losses of materials-in-process. Proper storage and retrieval of materials are also adversely affected by poor plant layout.

(ii) Production equipment

The condition and performance of some of the major production equipment have been detailed in Section 6.3.1(d). Basically, the original equipment package supplied by Kumar Metal Industries was unsuitable for the operating conditions at ZATCO Stockfeeds Ltd. In addition to the absence of after-sales services and spare parts soon after plant take-over, the following problems, many of which still persist, soon manifested themselves:

- inefficient separation of the products of the decorticator, giving rise to a high level of husk content in the cooker feed as well as excessive fibre content in the final product. Coupled with this was an inefficient aspirator system;
- under-designed cookers unable to achieve target temperatures, particularly for soyabeans;

- expellers without proper shaft cooling systems, and whose winding systems were unable to deliver constant and adequate pressure on the pressure cones. As a result, oil extraction efficiencies were low while residual oil content of cake was undesirably high and fluctuated wildly;
- excessive wear and tear of expeller screws and cake bars, exacerbated by the lack of seed cleaning facilities.

Further complications were introduced by the scarcity of imported spare parts - arising in part from the fact that Kumar was merely the seller, rather than designer/manufacturer, of the supplied equipment and machinery - and the lack of a well-equipped workshop where essential parts could be manufactured locally.

Production has been sustained at the present level through a combination of engineering inventiveness, crude improvisations and sound technical management of available resources.

(iii) Raw materials

Although ZATCO Stockfeeds is favourably located with respect to the availability of grains and oil seeds from their respective growing areas, occasional shortages do occur as a result of such natural disasters as drought and pest infestation.

(iv) Quality control and laboratory facilities

Ideally, a stockfeed producer should carry out continuous analyses of his raw materials and final products. Because ZATCO Stockfeeds does not have any laboratory facilities, it is difficult to establish the exact quality of any incoming or outgoing material. Base-line qualities and properties of different ingredients are therefore relied upon in the formulation of any particular batch while its exact analysis can be ascertained only after the fact. This is because ZATCO Stockfeeds must depend on organizations such as Choma Milling Co. for weekly analyses of crude protein, the National Council for Scientific Research, Mount Makuru, for bimonthly analyses of microtoxins, and even on UK laboratories for the yearly analysis of all raw materials. The high costs and undue delays involved in these analyses suggest an urgent need for a local full-scale analytical laboratory under the auspices of either ZATCO Stockfeeds, private entrepreneurs interested in commercial operation of such a facility, or the milling and stockfeed sub-sectors.

In any event, there is an urgent need for the Zambia Standards Institute to formulate relevant national standards for all stockfeeds produced in Zambia.

(v) Hygiene, health and safety

As stated previously, the standards of plant hygiene, occupational health and safety leave a lot to be desired. Shop floors are littered with materials, often restricting access and mobility. Safety devices such as masks and glasses have been provided to all workers but there is no enforcement of their use. Furthermore, social and comfort facilities are well below standards. All these affect employee morale and productivity and therefore represent constraints on efficient production.

6.3.2 Rehabilitation requirements

(a) Management and organization

When considering the company's development during the last two to three years in terms of turnover and sales, the present organization is dangerously understaffed. There are several vacancies that should be filled as soon as possible. These include: Commercial Manager, Engineering Manager and Personnel and Administrative Manager. This would relieve the Company Director for other important duties such as long-range and strategic planning.

Two very important posts which should be created as soon as possible are Quality Control and Safety Officer. Another very important improvement would be to install a computer system to improve the overall efficiency of the plant with regard to accounting, sales, purchasing and administration.

(b) Physical plant

There are several compelling reasons for rehabilitating and modernising ZATCO Stockfeeds' production system. Among the foremost of these reasons are the technical and engineering problems previously discussed which have rendered the plant virtually obsolete. There is also the necessity to enhance the processing versatility of the plant, making it possible to process cotton seeds. Furthermore, the complex should be oriented to fully exploit the economic and physical advantages deriving from its superior location within the area where its raw materials - sunflower, soyabeans, cotton seed, maize for feed processing and coal for energy - are readily available locally.

A two-phase rehabilitation programme is envisaged. The first would focus on upgrading the oil mill by installing missing but essential equipment such as a seed cleaner. It would also involve replacement of inefficient or obsolete machinery such as the decorticators and cookers.

Sufficient excess capacity would be designed into the system to cater for future rehabilitation of downstream stockfeed mixing and packaging operations. Accordingly, the rehabilitated oil mill would be designed with a capacity to process, in 24 hours, 40 tons of either decorticated cotton seed or sunflower seed or 30 tons of soyabeans.

In view of the problems encountered with spare parts, a workshop for fabrication of at least the simpler spare parts should be established and equipped in this phase.

The second rehabilitation phase to be implemented in the medium to long-term, and therefore excluded in subsequent analysis, would extend the equipment up-grading and replacement exercise to the stockfeeds' mixing plant. It would also involve a physical reconstruction and expansion of the factory building, with adequate provisions for storage space, a laboratory and social and personnel comfort facilities.

Table 6.3.7: Major equipment for first-phase rehabilitation

<u>Equipment description</u>	<u>No. required</u>	<u>Indicative cost (ZK)</u>
Multi-tray seed cleaning plant, complete with aspiration for assembly, clean seed discharge conveyor, and set of mechanical handling for conveying seed to decortivating unit	1	1,281,000
Decortication plant, complete with separator, air system, and set of mechanical handling for conveying of seed to the oil mill	1	1,927,000
Oil mill machinery, including:	1	6,360,000
One breaking/cracking roll		
Two five-stage cookers		
Two screw presses		
One metering bin		
One permanent magnet		
Oil tanks (for screened and filtered oil)		
Horizontal tank pressure leaf filter		
All necessary ancillaries and accessories		
Total equipment cost		9,568,000
Spare parts for two years' operation (10 per cent)		957,000
Other related mechanical, structural, electrical and civil works		1,500,000
Engineering services for installation of machinery and equipment		1,000,000
Construction and equipment of workshop		<u>4,000,000</u>
Total estimated rehabilitation cost		17,025,000

While a more detailed study would be required to determine the financial requirements of the first-phase programme, it is possible to present the general specifications of some of the equipment to be procured here, as well as the indicative figures of the corresponding financial involvement. These are shown in Table 6.3.7 and are based on an equipment vendor's specifications and price quotations (f.o.b. UK port in pounds) at January 1987, adjusted upwards by 5 per cent to account for inflation in the period up to June 1988. The resulting figure is increased by 15 per cent to account for freight, insurance, port clearing charges, customs duty (if any) and delivery charges to Choma. Conversion to Kwacha is at the June 1988 prevailing rate of £1.00 = K 14.25. Provision has also been made for other rehabilitation requirements such as the provision of spare and wearing parts for the maintenance of the plant for a period of two years of normal and stable

operation, related mechanical, civil, structural and electrical works, and engineering and supervision services for erection of plant and machinery. Further provision has also been made for construction and equipment of a small workshop.

The estimated total financial outlay for the first-phase rehabilitation programme is about ZK 17 million. This figure must be considered highly tentative and subject to confirmation by a detailed study which should be instigated as an integral element of the first-phase rehabilitation.

(c) Inputs

Rehabilitation of plant installations which would also include upgrading of the plant as a whole will to some extent reduce the present very substantial production losses.

Introduction of cleaning facilities would improve the quality of raw material input in the feeds by removing foreign material. The annual losses of K 800,000 at present production levels justify investment of approximately ZK 3.0 to ZK 3.5 million for improvement of storage and handling facilities. These investments would include, among others, bulk storage for maize and soybeans including appropriate conveying and cleaning equipment.

Proper monitoring and control of the feed-processing operations cannot be attained without a laboratory on the premises. The minimum requirement is to be able to determine moisture content and analyse crude protein, fat, and crude fibre and ash content. Other necessary analyses can be carried out at a central laboratory, preferably working as a separate independent unit. It is imperative to establish routines for transport of samples and submission of analysis results to avoid delays.

In the long term, the farmer should be rewarded for cleaned produce and for sorting out impurities at source.

(d) Costs and price structure

(i) Company taxation

ZATCO Stockfeeds, along with a number of other companies which have been enjoying tax holidays, is now liable to begin paying corporation tax. The thrust of Zambia's new industrial development policy is directed towards the encouragement of industrial rehabilitation, rural industrialization, increased use of domestic inputs, and increased capacity utilization. It is suggested that the Government might consider applying lower rates of corporation tax to companies which satisfy these criteria, provided the tax saving is applied to rehabilitation of plant and machinery.

(e) Marketing

The demand for stockfeed products exceeds by far the present production capacity in the country. It has therefore not been considered necessary to do a serious marketing effort - the products sell themselves. During an especially depressed period in the company's history, the Company Director found it necessary to do some promotional work on the radio but this was merely of an educational nature. Marketing and sales is not a bottleneck at

present and marketing efforts are not necessary in the short term. When capacity utilization has been improved it would be valuable to advertise the products nationally in order to increase ZATCO's market share. The present market share of 15-20 per cent is too small to ensure a steady growth of the company.

Provided export licences can be obtained without too much difficulty, the export potential for ZATCO's products in the PTA countries ought to be very good.

6.4 Kabwe Industrial Fabrics, Ltd. (KIFCO)

6.4.1 Existing situation

(a) Plant history

Kabwe Industrial Fabrics, Ltd. (KIFCO) is a subsidiary of INDECO. The company was incorporated in 1967 for the purpose of manufacturing bags for packaging, distributing and marketing grains. Its original product mix consisted exclusively of jute bags and twine based on raw materials imported from Bangladesh. However, the 1969 hostilities in Bangladesh cut off KIFCO's raw material supply and forced a strategic re-orientation of KIFCO's production to synthetic (polypropylene) fabrics. A plant for producing polypropylene fabrics was commissioned in 1971 and, since 1975-76, polypropylene woven bags have become the major product of KIFCO. In 1984-85, additional facilities were installed for the manufacture of heavy-duty polyethylene bags. These heavy-duty bags are used by Zambia Sugar Company Ltd. and Nitrogen Chemicals of Zambia as liners for polypropylene bags. The current manufacturing capacity for synthetic bags, largely for mealie meal, is about 300,000 units per week.

The emphasis on synthetic fabrics, difficulties in importing raw jute, and the consequent decline in the output of hessian fibre products, made some of the installed jute equipment redundant. Part of the machinery of this line has been sold to Taiwanese and local interests, the remainder has been heavily cannibalized. Currently, operating equipment is able to produce only about 30 per cent - 240,000 bags - equivalent per year of installed capacity.

KIFCO's synthetic fabrics plant has also been cannibalized - although to a lesser extent than the jute line. There is also a continuing rehabilitation programme, funded from internal KIFCO resources, and aimed at rehabilitating the No. 1 tape line, the 60 currently operating looms, and the 18 cannibalized looms, with the ultimate objective of restoring the plant to its original complement of 78 looms.

At present, there is also an expansion programme which entails the installation of one new tape line complete with winders and 30 new looms. This project is being financed by a loan of ZK 6.7 million from the Development Bank of Zambia. It is to be supplemented by a \$1 million aid grant from Japan, the likely suppliers of the new looms. With the completion of the rehabilitation and expansion projects, KIFCO should have the capacity to supply about 700,000 synthetic bags per week, representing 75 to 80 per cent of the national demand.

(b) Management and organization

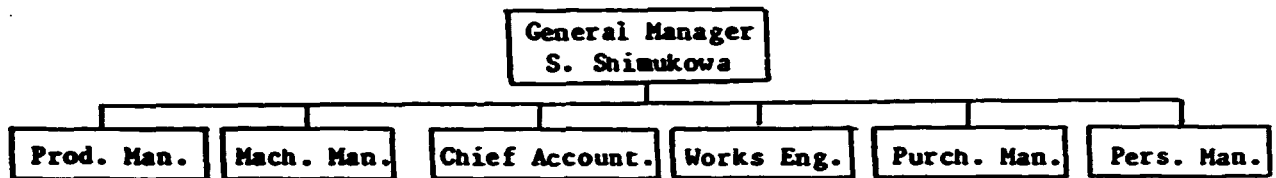
KIFCO is a subsidiary of INDECO, a state-owned holding company belonging to the ZIMCO group. KIFCO's Board of Directors consists of the following members:

Chairman: Professor F.D. Yamba, Executive Director (Technical), INDECO
Mr. M.L. Chipauta, Fairway Mechanics, Kitwe
Mr. M.W. Mbewe, Trade Union, Springbok How
Mr. S.A. Mkandawire, Behrens of Zambia
Mr. D.L. Chiterfiya, Alternate for Mr. A.D. Zulu

The following persons usually attend board meetings but are not formally members of the Board of Directors:

Mr. S. Shimukowa, General Manager, KIFCO
Mr. T.V. Ramanathan, Financial Director, INDECO

Figure 6.4.1
Management Organizational Structure of Kabwe Industrial Fabrics, Ltd.



Board meetings are held once every three months. Each year in November-December the budget for the coming year is discussed and drafted. The budget is then finalized in January. In addition, at the beginning of the year, all department managers are asked to prepare a list of the actions they wish to be taken with respect to their departments. All managers then meet in a brainstorming session when the various lists are discussed and finally approved. The formalized lists become the basis for the Corporate Plan for the coming year. Both the Budget and Corporate Plan are then presented to the Board of Directors for final approval.

The General Manager takes a very active part in the daily running of the factory, making several rounds in the different departments every day.

As one would expect, there are advantages and disadvantages to being a member of a large organization such as INDECO. The advantages of being part of the INDECO group include access to INDECO's Marketing and Accounting departments, legal services, and guarantees for loans. On the other hand, the disadvantages of being a member of the INDECO group include a heavy and slow bureaucracy in which many decisions are held up and delayed with detrimental effects on the performance of the company.

A computer system is contemplated to make certain routine work more efficient and less tedious. In this regard, a computer, especially a personal computer, would be useful for invoicing payments of wages and salaries, purchasing and sales, as well as keeping track of raw materials in stock.

(c) Financial structure

Table 6.4.1 shows the financial structure of the company as well as total fixed assets and the total capital employed between 1984-85 and 1987-88.

**Table 6.4.1: KIFCO Total fixed assets and capital employed:
1984-85 through 1987-88
(ZK'000)**

	1984-85	1985-86	1986-87	1987-88
Total fixed assets	<u>3,572</u>	<u>18,054</u>	<u>34,166</u>	<u>45,910</u>
Share capital	9,000	9,000	9,000	9,000
Reserves	(4,426)	(612)	14,551	20,157
Long term loans	<u>4,205</u>	<u>13,141</u>	<u>18,830</u>	<u>27,427</u>
Total capital employed	<u>8,779</u>	<u>21,529</u>	<u>42,381</u>	<u>56,584</u>

Source: KIFCO Annual Accounts various years.

Fixed assets are about 54 per cent of total assets. KIFCO has a large debt overhang. This debt is owed to both local and foreign companies and the creditors include INDECO Ltd., Zambia National Provident Fund, Development Bank of Zambia, and Coutinho Caro & Co. Ltd.

KIFCO had problems servicing the Coutinho Caro debt because of exchange control regulations over debt repayment remittances and the lack of Kwacha cover. However, with effect from 31 March 1987, the whole outstanding principal and interest payments were taken over by INDECO. This was later converted to a long-term loan by INDECO in December 1987.

(d) Buildings and installations

The jute plant is housed in one building which contains all the machinery and equipment for transforming raw jute (or kenaf) from fibre to printed bags. The major processing steps, in sequential order, are as follows: fibre softening, carding, drawing, spinning and winding, weaving, calendering and finishing.

First, the fibre is fed through the rolls of the machine where it is softened with the aid of a batching oil containing an emulsifying agent, mineral oil and water. The softened fibre is subsequently matured for three to four days in a storage bin. The material is combed into fibrous slivers in a four-stage sequence of teasing, breaking, intermediate carding and finishing. In the three-stage drawing operation, the carded fibre is further straightened along its axis and drafted to a suitable texture for feeding into the spinning frames. Drawn fibre is twisted to form yarn which is wound around large bobbins preparatory to pre-beaming. Pre-beaming is a process during which the yarns on the bobbins are transferred, in turn, to a sequence of rollers designed to fit the weaving looms. In the weaving process, yarn is transformed into cloth on weaving machines or looms. Calendering is synonymous with ironing the woven cloth straight so that it is ready for measurement. Under finishing are included such operations as measurement to determine the output per shift, cutting to bag dimensions, sewing and printing the sewn bags as may be required by the customer.

Table 6.4.2: Condition of major equipment and machinery in jute plant

Equipment	Installed equipment		Operational equipment	
	No.	Annual capacity	No.	Annual capacity
Batch mixer	1	1,382 m. litres	1	1,382 m. litres
Dust shaker	1	460.8 tonnes	1	460.8 tonnes
Thread teaser card	1	691.2 tonnes	1	691.2 tonnes
Softener	2	2,765 tonnes	1	1,382 tonnes
Breaker cards	2	1,475 tonnes	1	727 tonnes
Intermediate card	1	737 tonnes	1	737 tonnes
Finisher card	1	691 tonnes	1	691 tonnes
1st drawing frame	1	461 tonnes	1	461 tonnes
2nd drawing frame	1	461 tonnes	1	461 tonnes
3rd drawing frame	1	461 tonnes	1	461 tonnes
Spinning frame	5	442 tonnes	3	265 tonnes
Twisting frame	1	194 tonnes	1	194 tonnes
Winding frame	1	590 tonnes	1 ^{a/}	166 tonnes
Pre-beaming	1	230 tonnes	1	230 tonnes
Dressing	1	230 tonnes	1	230 tonnes
Looms	15	432 tonnes	8	230 tonnes
Power reel	1	184 tonnes	1	184 tonnes
Ball makers	2	69 tonnes	1	35 tonnes
Measuring machine	1	6,336 tonnes	1	6,336 tonnes
Calendering "	1	1,521 tonnes	1	1,521 tonnes
Lapping "	1	3,456 tonnes	1	3,456 tonnes
Cutting "	1	871 tonnes	1	871 tonnes
Sewing & stitching machines	3	138 tonnes	2	138 tonnes

a/ Only six of the 32 spindles of the winding frame are operational.

Table 6.4.2 lists the major production equipment in the jute plant, as well as the number of machines operational in June 1988, and the corresponding installed and operational capacities. The spinning frames constitute a bottleneck in the system. As a result of this bottleneck, the maximum production capability of the plant, following full rehabilitation of all equipment and machinery, is 442 tonnes per annum. Currently operating facilities can, at best, produce only 240 tonnes, equivalent to about 240,000 90-kg bags per annum.

(e) Inputs

(i) Synthetic products

Polypropylene and polyethylene granules are purchased from Europe. There has been a steady increase in the price of polypropylene from US\$ 950/tonne in 1983 to around US\$ 1,550/tonne in 1988. The corresponding prices for polyethylene are US\$ 650/tonne and US\$ 1,600/tonne respectively. Annual requirements, at present levels of production, are estimated to be 1,600 tonnes for polypropylene and 140 tonnes for polyethylene. Normally the stock at the plant is reportedly sufficient for three months operation of the polypropylene line and six months for the polyethylene line. It appears,

however, that the stock is gradually used and replenished when the quantity of raw material reaches a low level of four to six weeks reserves. Supply of raw material for the synthetic line poses no problems.

(ii) Natural fibre

The present demand for natural fibre is about 120 tonnes all of which is imported from Bangladesh as jute fibre. Since 1986 prices have increased by approximately US\$ 120 and US\$ 110 for BWC and BWD qualities respectively. The prices are at present US\$ 483/tonne for BWC quality and US\$ 452/tonne for BWD quality jute. In an effort to save foreign currency alternative sources of natural fibre have been investigated. Kenaf has been identified as the best suitable substitute for jute. Its fibre is of similar length, colour and smoothness, but it is stronger and more resistant against decomposition. It can be favourably grown under Zambian agro-climatic conditions and processed with the same kind of equipment as jute. A kenaf development programme, partly funded by KIFCO, has been elaborated. This coincides with the Government's view that Zambia should make efforts to be self-sufficient in natural fibres for manufacturing suitable bags for grain, coffee, hessian cloth and twine. The Government should however not engage in costly programmes to stimulate kenaf production before a study has been made of possibly cheaper alternative sources of raw materials (such as sisal) that may be available in the sub-region.

The production target for kenaf during Phase I of the plan (1987-88) is 360 tonnes which would require cultivation of kenaf on 450 hectares. During Phase II (1989-93) 1,500 tonnes of kenaf fibre would be produced on approximately 1,900 hectares of land. This is sufficient to supply KIFCO with all the necessary quantities of natural fibre for full capacity utilization of the jute processing line when rehabilitated. Of course this assumes KIFCO is the only buyer.

The rolled kenaf has hitherto been priced at ZK 3.50/kg for grade A fibre and ZK 2.5/kg for grade B fibre. During the past season farmers were paid ZK 3.60/kg regardless of quality in order not to discourage further interest in growing kenaf. Since the growing season 1988-89 the producer price has been set by the Government at ZK 6/kg kenaf fibre, equivalent to US\$ 0.67 at present rates of exchange. This figure is considerably higher than the present cost of imported jute. On the other hand, the introduction of kenaf as a cash crop for small farmers should lead to increased earnings in rural areas, as well as saving foreign exchange.

In 1987-88, 400 small scale farmers were recruited to grow kenaf on a total of 200 hectares. The total production is estimated at 160 tonnes, assuming an average crop yield of 800 kg/hectare. This is less than half of what was planned. The Kenaf Development Programme, to be successful, should also include the following elements: supply of seed and fertilizer, extension services and continued research.

The results of Phase I suggest a note of warning: the targets set for Phase II may also fall short of expectations if additional efforts are not made. The price increase for the next season is substantial, however, and this is likely to boost the small-scale farming community's interest in growing larger areas of kenaf. A close co-ordination is essential between the increase in kenaf cultivation and the finalization of rehabilitation of the KIFCO jute line. Failure to do so is likely to be costly.

(f) Product range

The main products of KIFCO are bags made of polypropylene, polyethylene and jute. Woven polypropylene bags are by far the most important product. The company has a market share of approximately 30 per cent of the national market. The total production is 300,000 bags/week. Production of polyethylene bags is not very significant, as is reflected in KIFCO's market-share of less than 1 per cent. Jute-based production is also very small. KIFCO's market share of jute products is only about 2 per cent of the total market. Production of jute bags for grain is approximately 240,000 bags or 240 tonnes per year. Total demand for jute grain bags is around 10 million bags per year or 10,000 tonnes per year.

(g) Plant performance/cost and price structure

This discussion on plant performance will examine a number of indicators, in each case distinguishing between the synthetic and jute lines.

(i) Synthetic products

The synthetic products section of the plant concentrates exclusively on producing bags for millers and producers of fertilizers and sugar. Total production at present is around 300,000 bags per week or 15 million per annum. This satisfies 30 per cent of national demand. The current capacity utilization of the synthetic plant is estimated at 75 per cent.

As regards the size of the plant, the original 96 looms were reduced over time to 60: 18 were scrapped and a further 18 machines cannibalized. Increase in plant capacity is currently taking place through rehabilitation of the cannibalized machines and acquisition of one new topline and 30 new looms. The rehabilitation programme is being carried out by KIFCO's own personnel and financed from KIFCO's own funds. The expansion programme is being financed by a loan from the Development Bank of Zambia (DBZ) and by a grant from the Japanese Government. On completion of the rehabilitation and expansion programmes, total output from the synthetic plant is expected to be around 18 to 20 million bags per annum. This should satisfy between 35 and 40 per cent of current national demand. Of course, national demand can be expected to increase over the years with rising population and improved agricultural performance. Capacity utilisation is then expected to be around 80 to 85 per cent.

(ii) Jute products

The installed capacity of the jute plant is 5 million bags per annum. Due to the sale of part of the machinery and cannibalization of some machinery, present output is around 260,000 to 300,000 bags per annum. Capacity utilization is estimated to be around 20 to 30 per cent of installed capacity. Because of shortage of raw materials, the plant has been idle since December 1987; however, in May 1988 the imminent arrival of a consignment - weighing 270 metric tonnes - of jute from Bangladesh together with purchases of kenaf - around 100 metric tonnes - from local farmers resulted in the plant returning to production. The total level of raw material was well above the amount required - around 300 metric tonnes - to keep the present plant in operation.

Table 6.4.3 shows total output in metric tonnes of the three main products and estimates of average capacity utilization for the years 1984-85 through 1987-88.

Table 6.4.3: Output and average capacity utilization for the years 1984-85 through 1987-88 (in metric tonnes)

	1984-85	1985-86	1986-87	1987-88
Polypropylene bags	1,505	1,447	1,192	1,585 ^{a/}
Polyethylene bags	178	223	89	137 ^{a/}
Jute bags	28	3	130	116 ^{a/}
Total	1,711	1,673	1,411	1,838 ^{a/}
Average capacity utilization	70	61	47	62 ^{a/}

Source: KIFCO, Budgets for relevant years.

a/ Estimated, according to 1988-89 Budget.

Another indication of plant performance is value added. Table 6.4.4 shows total value added and value added per employee for the years 1984-85 through 1987-88.

Table 6.4.4: Value added per employee: 1984-85 through 1987-88 (ZKm)

	1984-85	1985-86	1986-87	1987-88
Total value added	6.636	11.434	12.163	21.232 ^{a/}
Total number of employees	513	478	433	461 ^{a/}
Value added per employee	0.013	0.024	0.028	0.046 ^{a/}

Source: KIFCO Budgets for relevant years

a/ Estimated, according to 1988-89 Budget.

The jute plant faces two major constraints at present. These are the supply of raw material - jute on the world market and kenaf locally - and the condition of the plant, which requires both rehabilitation and expansion. There appears to be a further constraint relating to the financing of both rehabilitation and expansion. Because of the size of the loans undertaken to rehabilitate and expand the synthetic plant, the company appears to be limited in its ability to undertake the further borrowings that would be necessary to rehabilitate and expand the jute plant.

(iii) Import dependence

Given that kenaf production and use are still very low, it is safe to state that import dependence in the case of raw materials is almost total at present. The three major raw materials constitute the following percentages of total imported raw materials: polypropylene (PP) 36 per cent; polyethylene (PE) 11 per cent; and jute 3 per cent. Machinery, of course, is all imported. In the case of spare parts, the division between imports and domestic purchases is 70 per cent and 30 per cent respectively. KIFCO has its own workshops and plans to begin production of some spare parts. At present, such production is constrained by lack of a sufficiently large lathe, a universal drilling machine, a power saw, and a radial drilling machine.

There is a strong case for promoting domestic production of spare parts and raw materials since the Kwacha costs of KIFCO's total expenditure on imported and domestically-produced spare parts and raw materials are very high, as can be seen in Table 6.4.5.

Table 6.4.5: Expenditure on imported and domestically-produced raw materials and spare parts (ZK'000), during the financial year 1987-88

	<u>Foreign</u>	<u>Local</u>
PP and PE	20,273	
Jute/kenaf	900	93
Spare parts		
Foreign cost ^{a/}	2,838	
Local cost ^{b/}	<u>2,000</u>	<u>1,010</u>
	4,838	

Source: KIFCO, Budget 1988-89.

a/ C.I.F. landed cost at Dar-es-Salaam.

b/ Transport costs, import duties and sales taxes, etc.

(iv) Protection

As regards raw materials, there are now no duties on either PP or PE granules or on jute. However, in the case of granules, this was not always the case. Between 1983 and September 1986, these raw materials were duty free. In October 1986, a 15 per cent duty was imposed on granules. In December of that year, it was suspended, after KIFCO, supported by the private producers of PP and PE products, made a submission to the Government. Their argument was that unless the duty were removed, the price of bags would have to be raised by 10 per cent and since this cost would have been passed on to their customers, the millers, the price of mealie meal would, in turn, have had to be raised. Since the Government is always reluctant to raise the price of mealie meal, it suspended the duty. However, in December 1987, the duty was imposed again on imported granules. Then, after only one month, and for the same reason as above, the duty was removed again. Thus, the present position is that there are no duties (and thus no sales taxes) on KIFCO's imports of raw materials.

Imports of competing products, that is, finished bags are normally embargoed. However, if there is a shortage on the Zambian market of either synthetic or natural fibre bags, imports are allowed and, in that case, they come in duty-free.

One of the strongest arguments in favour of the continued importation of raw materials duty-free is that imports of the finished products, when allowed, come in duty-free. Another is that KIFCO is a significant local employer. Finally, KIFCO produces a strategic commodity which helps keep down the price of mealie meal.

As already noted, KIFCO imports all its machinery. Normally, industrial machinery carries a duty of 10 per cent, but because it is part of a "sensitive" industry, serving the agricultural sector and more or less forced to limit its marginal profit rate to a very low level, KIFCO pays no duty on its machinery imports, which are brought in under the import duty rebate scheme.

Imports of spare parts carry a duty of 10 per cent. When the 2 1/2 per cent value for duty purposes and the 20 per cent sales tax are taken into account, the total imposition is quite significant. In its own self-interest, KIFCO is not in favour of this duty, although it has never asked the Government to remove it. However, from a national perspective, the promotion of spare-part production could be expected to be advanced by the continuation of protection, or even by its increase. KIFCO would at present not be in favour of an increase in duties solely for this purpose as it is not convinced that the quality of domestically-produced spare parts is high enough yet. Indeed, to encourage improved quality, KIFCO favours competition through continued imports. Moreover, at present, the lack of local steel constrains the production of high quality domestically-produced spare parts.

(v) Profit and loss record of KIFCO

KIFCO was a loss-making concern until 1982-83. Since then it has made a profit each year. Table 6.4.6 shows the profit record for the years 1984-85 through 1987-88, profits as a per cent of turnover, and the amount paid in equity levy each year. Normally, when a firm makes a profit, it pays taxes but in KIFCO's case such taxes are not yet payable since accumulated losses available for offset are still greater than profits made to date.

Table 6.4.6: Turnover, profits and equity levy paid during the years 1984-85 through 1987-88

	1984-85	1985-86	1986-87	1987-88
Turnover (ZKm)	16.029	23.845	31.111	54.330
Profit before taxation (ZKm)	3.291	4.668	3.367	7.212
Profit as % of turnover	20.5	19.6	10.8	13.3
Equity levy	(0.105)	(0.105)	(0.105)	(0.105)

Source: KIFCO, Accounts for the relevant years.

An equity levy of 1 1/2 per cent of issued share capital has been paid each year. It will be noted that the profit before tax was lower for the financial year 1986-87 than it had been in the previous year. This was accounted for by increases in salaries and wages, voluntary retirement benefits, increases in input costs and higher than budgeted travel costs.

(vi) Costs and pricing system

KIFCO uses a cost-plus pricing system. Thus, to total production costs (raw materials, direct labour, production overheads and depreciations) is added a 54 to 56 per cent mark-up to cover fixed overheads (such as other labour costs, selling and distribution costs, and profit). However, prices charged by competitors are also taken into account. Competitors' costs tend to be lower than those of KIFCO, mainly because of their ability to control labour input and costs. As a result, competitors' prices tend to be lower but the difference is insignificant. Table 6.4.7 shows the wholesale prices of 25 kg bags of various sizes for the years 1985-86 through 1987-88.

Table 6.4.7: Prices of polypropylene bags in various sizes for the years 1985-86 through 1987-88 (in Kwacha)

	<u>1985-86</u>	<u>1986-87</u>	<u>1987-88</u>
90 kg bags	1.88	2.06	4.25
50 kg bags	1.37	1.51	3.50
25 kg bags	1.11	1.22	2.75

Source: KIFCO Budgets for relevant years.

As already noted, because KIFCO is a producer within a "sensitive" industry, linked to the food-producing sector, its prices, while not on PIC's controlled list, are nevertheless indirectly controlled. As already explained, increases in the price of bags would be passed on to the users - that is, the grain producers and millers - and since, for example, mealie meal prices are controlled, such controls exert an indirect control over the prices of KIFCO's bags. If KIFCO requests a price increase, it must send such a request through INDECO to the Prices and Incomes Commission (PIC). KIFCO has not submitted a request for a price increase since PIC introduced its new price control and monitoring system on 1 May 1987. However, because of significant cost increases since that date, it will probably need to make such a request during the current financial year.

(vii) Liquidity and foreign exchange availability

In general, KIFCO both gives and receives about 30 days credit. In the case of farmers producing kenaf, it pays cash on delivery. However, this asymmetry is not important as kenaf is only a very small proportion of total input costs at present. Nevertheless, because of KIFCO's significant dependence on imported raw materials, there is a continuous demand on liquid resources to provide Kwacha cover for foreign exchange purchases. To date, KIFCO has encountered no serious problems regarding foreign exchange allocations, especially for purchases of raw materials. However, it should be

pointed out that the company has access to bank overdrafts (totalling ZK 16 million during 1988) from a range of banks, including ZNCB, IZB, BCC (Zambia) and ACB. Such a significant use of overdraft facilities presents a company like KIFCO with serious financial implications such as its ability to finance any rehabilitation of the natural fibre plant, because of the high cost of borrowing and given the indirect price controls to which it is subject. Table 6.4.8 shows the amounts of foreign exchange which KIFCO applied for and obtained from its 14 applications to FEMAC between 1 May and 31 December 1987.

Table 6.4.8: Foreign exchange allocations to KIFCO at FEMAC between 1 May and 31 December 1987

<u>FEMAC no.</u>	<u>US \$</u>	<u>Bank</u>	<u>Purpose</u>
1	744,725	ACB	Raw material
2	272,959	ZNCB	Spares
5	209,240	IZB	Rehabilitation spares
6	411,655	ACB	Extruder
7	115,680	IZB	Jute fibre
8	342,000	ZNCB	Raw material
9	338,325	ACB	Winders
10	224,889	ZNCB	Rehabilitation
12	283,400	ZNCB	Raw material
13	60,374	ACB	Raw material
14	283,400	ZNCB	Raw material
15	224,889	ZNCB	Rehabilitation spares
16	97,118	ZNCB	Rehabilitation
17	283,400	ZNCB	Raw material

Of the total allocation of US\$ 3,892,054, 54 per cent was for raw materials including jute, 19 per cent was for machinery, and 27 per cent was for rehabilitation and spare parts. KIFCO's dependence on imports and thus on scarce foreign exchange to operate its plant is clearly very significant, if not excessive.

(h) Markets and competitors

The total demand for polypropylene bags in 1987 was around 61 million bags or 5,545 tonnes per year. Total value of these sales was ZK 228 million. They were sold to the following customers:

Millers of mealie meal	52 million bags/year
Nitrogen Chemicals of Zambia (NCZ)	4 million bags/year
Zambia Sugar Company Ltd. (ZSC)	3 million bags/year
ZAMSEEDS	2 million bags/year

The demand for polyethylene bags is about 6,000 tonne/year at a Kwacha value of 4 million.^{1/} The national demand for jute is estimated at 10 million bags/year at total value of ZK 120 million.

^{1/} Figure is believed to be too low as the price/bag would be only 0.05 ZK/bag.

KIFCO's only competitor in the polypropylene bags market is Polyethylene Products Ltd. which is a privately-owned company. According to KIFCO, these bags of a far lower quality than KIFCO's bags. They do not manufacture any jute products and both companies sell their bags for roughly the same price.

The national demand for polypropylene and jute bags is by no means met by these two companies and therefore imports are necessary to meet aggregate demand. The market for polypropylene bag exports is considered very good, especially in Zaire and Burundi during the three to four months when demand in Zambia is low. The market for jute products is considered to be very good in all neighbouring countries in the region. KIFCO can compete efficiently with India and Bangladesh both in quality and price. Sales of jute products are constrained not only by low capacity utilization but also by inefficient purchasing policies - world market prices, for example, are not closely followed to obtain the lowest input price. When KIFCO finishes its own rehabilitation efforts, it plans to undertake an advertising campaign to expand both domestic and export markets. KIFCO is even prepared to switch to export market promotion of polypropylene bags should the Zambian market decline. This would be done through the INDECO marketing department, trade fairs, and through Zambian embassies and consulates abroad. Marketing is urgently needed for jute products, as KIFCO is a virtually unknown producer.

The total sales value of all KIFCO's products is Kw 54,293,561, distributed in the following way:

Polypropylene	51,697,061	95.2 per cent
Polyethylene	1,651,738	3.05 per cent
Jute products	944,762	1.75 per cent

As stated earlier, polypropylene bags comprise by far the largest proportion of KIFCO's total sales.

(i) Constraints

The constraints discussed here are those pertaining only to the jute line. The main constraints include equipment and spare parts, raw materials, and capital for rehabilitation.

The current operational status of the equipment had been discussed in Section 6.4.1(d). Suffice it to add that the equipment constraint is the second most important factor, after raw materials, inhibiting the attainment of the realistic plant capacity of about 240 tonnes of hessian products per year.

With respect to raw materials, the plant has traditionally been vulnerable to interruptions in the supply of jute fibre by reason of either external problems such as international conflicts, or domestic problems such as shortages of foreign exchange. It is because of the critical nature of this factor that the company has formulated and is implementing the programme for promoting local production of kenaf as a substitute for jute.

The financial constraints include an unduly heavy dependence on long-term loans, and an inadequate working capital base. Because of the company's relatively large loan exposure, it is difficult for it to borrow any additional funds for the purpose of rehabilitation.

6.4.2 Rehabilitation requirements

(a) Management and organization

There is a need for a Kenaf Development Manager since this raw material will increase in importance for the company. A Technical Manager is also needed to deal with maintenance and other problems of a technical nature. Both positions will release the General Manager for more important duties such as long-range planning and product development. The General Manager now has to dedicate too much of his time to technical matters to keep production running efficiently. Computerizing major parts of the company's operations at this level is recommended to increase overall efficiency.

(b) Physical plant

The short-term rehabilitation programme should include the following modest objectives:

- to procure the necessary parts and components for rehabilitating and putting into operation all existing machinery;
- to purchase and install necessary additional equipment such as a roll former, friction dish-washing machine for cleaning felt bobs on the bobbin carriers of spinning frames, a damping machine for cloth humidification prior to calendering, and sliver and yarn testing equipment;
- to procure an adequate inventory of spares for the new and rehabilitated machinery.

In February 1985, James Mackie & Sons Ltd. of Belfast, Northern Ireland - the original suppliers of all the jute plant equipment - tendered technical and price proposals to Kabwe Industrial Fabrics Ltd. for the rehabilitation of the plant. It would be to the advantage of the company to engage James Mackie & Sons Ltd. as equipment suppliers and installation contractors for the rehabilitation.

For the present study, the original equipment price proposal has been updated to June 1988 by applying annual inflation rates of 7 1/2 per cent and 5 per cent for 1986 and 1987 respectively. Ocean freight to Dar-es-Salaam and inland transportation to Kabwe are each estimated at 5 per cent of the f.o.b. UK prices. Installation and consultancy charges are increased by 25 per cent of their respective 1985 values.

Table 6.4.9 summarises the various elements of the preliminary rehabilitation budget totalling about ZK 12.11 million. This figure needs to be confirmed by a detailed study which should be conducted as an integral element of the rehabilitation programme.

(c) Inputs

The input situation for the synthetic products is governed solely by external factors; a constant awareness of international developments within the petrochemical sector is vital. The search for alternative suppliers may be rewarding.

Table 6.4.9: Preliminary estimate of rehabilitation cost

<u>Item description</u>	<u>Estimated cost (ZK)</u>
Rehabilitation parts for all existing machinery	7,068,000
New (essential) machinery	656,000
Spare parts for all equipment	855,000
Testing equipment	96,000
Subtotal	<u>8,675,000</u>
Additional equipment (own estimate)	
Air compressor (15 m ³ /min)	500,000
30 KVA electric generator	75,000
	<u>9,250,000</u>
Ocean freight and insurance (5 per cent)	463,000
Inland transportation (5 per cent)	463,000
Installation and consultancy	831,000
Other costs and contingency (10 per cent)	<u>1,101,000</u>
Total rehabilitation cost	<u>12,108,000</u> =====

As far as the natural fibre is concerned, it is in the interest of KIFCO to closely monitor the extent to which the Kenaf Development Programme is followed. According to the 1987 Economic Report, progress in increasing kenaf output is hampered by the following factors:

- Poor financial support to kenaf research programme;
- Lack of proper extension services;
- Lack of organized seed production and distribution;
- Unclear policy on the role of KIFCO in production and marketing of the crop; and
- Low prices of kenaf relative to other field crops.

The KIFCO management agrees with this assessment although it is giving attention to the problems relating to seed production and distribution and the provision of extension services. KIFCO is however of the opinion that, if kenaf production is to be promoted in a significant way, the Government has to become centrally involved in the process, as it is in the case of other field crops. It could do so through higher prices and promotion of research. One problem is that commercial farmers have not yet begun to produce kenaf. There are about 400 small-scale farmers cultivating about 200 hectares and producing about 100 tonnes of the crop. As already noted, this represents about one-third of KIFCO's present natural fibre needs. If there is to be a serious attempt at replacing imported raw materials by domestically produced inputs,

the expansion of kenaf cultivation has to be pursued more vigorously than it has been to date. The expansion of kenaf cultivation also has to be accompanied by the rehabilitation and expansion of the natural fibre plant since, clearly, if farmers increase output beyond 300 tonnes - the present plant capacity - there will be a shortage of plant to process the crop.

(d) Costs and price structure

Given the total dependence of the synthetic plant on imported granules and the fact that it would not be economic to produce them domestically, the substitution of local for imported raw materials is only relevant for the natural fibre plant. As already emphasized, the promotion of kenaf production among Zambian farmers and the rehabilitation and expansion of the natural fibre plant must proceed simultaneously. The Government should take a strong lead in promoting kenaf production. It needs to promote research, both into growing kenaf as well as into the treatment of the fibre during processing. Extension services need to be improved; commercial farmers should be encouraged to produce the crop; and, most important, producer prices must be made attractive both absolutely and relative to those of other field crops. There are significant financial implications arising from these suggestions, both for kenaf production and for KIFCO's natural fibre plant.

Given the continuous and significant demands on liquidity and foreign exchange for the synthetic plant, it is unlikely that either KIFCO or the Government can raise such funds. External finance would seem to be necessary in order to promote this programme of input substitution.

Because of KIFCO's significant dependence on imports of spare parts, it is necessary to promote domestic production of high-quality spare parts both in Zambia generally and in KIFCO's own workshop. To promote the latter activity, finance is required to purchase necessary equipment already detailed. Again, because of internal financial constraints at KIFCO, it is likely that such finance will have to come from external sources.

As regards protection on raw materials, it is clear from recent experience that a clear, consistent policy allowing duty-free entry of granules (and duty-free entry of jute until kenaf has successfully replaced it) is necessary. The present policy towards machinery is satisfactory.

As regards protection on spare parts, there is a need to distinguish between those spares which can now, or in the near future, be produced in Zambia and those which have to be imported. The UNIDO team recommends that at least two rates of duty be established, a very high rate on competing spare parts imports and a zero rate on non-competing imports.

The cost-plus approach to pricing is acceptable but there is need for KIFCO to take account of the profitability of its two individual lines in both its costing and in the determination of wholesale prices. It is necessary to ascertain continuously whether one part of the plant may be subsidizing the other part.

(e) Marketing

KIFCO has not had to make any serious marketing efforts because national demand cannot be met even with the plant running at 100 per cent capacity utilisation. The combined production of KIFCO and its competitors is not sufficient to meet the country's demand for polypropylene and jute products. When the production lines are rehabilitated, extensive advertising should be undertaken to improve the company's image as a producer of high quality bags, especially jute bags.

At present all distribution is made directly from the factory: customers order their bags and pick them up at the factory. The UNIDO team recommends the creation of outlets through agents or representatives in the most important rural areas. Even if demand cannot be met, these marketing outlets are an important weapon in the struggle for market shares and as a platform for further expansion in the market. The market situation for exports of jute products is considered very good and all efforts should be made to overcome the present problems in the production line for jute bags.

Since jute bags can be a very efficient earner and saver of foreign exchange both in direct export and as a replacement of imports, the product should be given highest priority in the rehabilitation programme.

CHAPTER 7

GENERAL OBSERVATIONS AND RECOMMENDATIONS

7.1 Policy-making and administration of the public sector

General observations

Although this study focuses on issues connected with the rehabilitation of individual plants, the regeneration of Zambia's manufacturing industry depends on overall, long-term recovery of the economy. The applicability of many of the recommendations below must therefore be seen in light of this overall recovery.

At present, the country does not have sufficient resources to engage in large-scale rehabilitation. It is the mission's opinion that Zambia's regeneration and rehabilitation efforts deserve greater support from the international community than is presently the case. Even under the most favourable circumstances, however, external funds will be available for only a fraction of the potential rehabilitation projects. The success of the regeneration effort as a whole will therefore largely depend on renewed growth in major sectors of the economy.

Industrial regeneration will be determined to a large extent by the appropriateness of Government policies and the way they are executed. Specific policies, such as those relating to tariffs and other protectionist measures, could be improved.

The Zambian Government's ability to stimulate the manufacturing sector is highly dependent on its capacity to formulate and implement appropriate measures. This capacity is now being reinforced. UNIDO projects^{1/} provide assistance to the Investment Policy Department of the National Commission for Development Planning (IPD/NCDP) and support the strengthening and restructuring of the Industrial Planning Unit (IPU) in the Ministry of Commerce and Industry. IPD/NCDP is involved in pre-investment and project feasibility studies. IPU's activities now cover a wide range of activities, from overall sector plans to specific issues such as market analysis and remedial action assessment for individual industries and advising small-scale industries. It also co-ordinates the activities of parastatals such as INDECO.

Given the size of the public sector, INDECO will continue to be a key organization. Plants that are INDECO subsidiaries have the advantage of easier access to authority and support in legal, financial, accounting and marketing matters. On the other hand, the performance of these enterprises is negatively influenced by the heightened complexity of administrative procedures in the public sector and by the regular reshuffling of managers and other key personnel. The latter is an obstacle to continuity in business operations and to the accumulation of experience at the enterprise level.

1/ Projects DP/ZAM/85/007 and DP/ZAM/85/012.

Recommendations

(a) IPD/NCDP and IPU should continue to receive support to meet the expanding need for planning, support, and project monitoring in the manufacturing sector. IPU could be made the focal point for a full-scale rehabilitation study programme for the manufacturing sector.

(b) Managers in public enterprises should be allowed greater freedom in business decisions. Their employment should also be secure enough to allow them to bring long-term stability to plant management.

(c) Public enterprises would benefit from a stronger industrial advisory capacity in INDECO. This would include both advice with regard to rehabilitation projects and to new investment. INDECO's Economic Evaluation Unit, which has been monitoring the performance of INDECO units undergoing reorientation, and which is finalizing a manual for project implementation and plant diagnoses,^{1/} could become the core of such an advisory unit.

(d) Some restructuring of the system of protection (taxes, tariffs, subsidies) would help to stimulate industrial regeneration. Even if this is basically a domestic matter, international agencies with relevant experience (such as UNCTAD) could supply assistance.

7.2 Management and organization and marketing

General observations

(a) All of the companies visited suffer from some significant deficiencies at middle-management, foreman, and supervisory levels. Management and information systems are generally inadequate for routine tasks such as accounting, administration, purchases and sales.

(b) The four companies have a weak or non-existent sales organization both locally and regionally largely because it is a seller's market. Rehabilitation and expansion would require improvement in the sales organization.

(c) Institutions relating to foreign trade seem to function well, especially the Export Board of Zambia which was founded in 1985. The Board has presented fresh ideas and has demonstrated a very professional attitude in tackling existing problems.

(d) Zambia's export industry is not sufficiently represented abroad, mainly due to the high costs involved. At present Zambia has Trade Commissions in London, Harare, and Dar-es-Salaam and one Trade Attaché in Maputo, Mozambique. If funds are available another four will be established in Scandinavia, West Germany, the European Community in Brussels, and Geneva, Switzerland (UN Organizations); otherwise, regular embassy personnel handle questions regarding trade and exports. This is considered unsatisfactory.

(e) Budgetting, at all levels, often seems to be wishful thinking rather than a realistic assessment of a company's financial position.

1/ Supported by UNIDO under project DP/ZAM/85/004.

Recommendations

(a) The shortage of qualified personnel, professional training and on-the-job training is a key issue. With regard to the latter, company management should play an active role in promoting a continuous upgrading of skills.

As company management is becoming increasingly complex, it should be investigated whether computer training can be initiated. A good PC-computer system with printer and hard disk of 20-30 Megabyte can be purchased for as little as US\$ 5,000-6,000, with software included. If each company acquires such a system, the management would be freed from many routine tasks, and would be able to concentrate on more essential matters.

(b) The companies should make an effort to improve their sales organization. This investment should be carefully timed to coincide with the physical rehabilitation programme.

(c) The Export Board of Zambia should be given the strongest possible support from both the private and public sectors. Additionally, exporting companies should be allowed to use part of their retained foreign exchange for export marketing activities such as foreign sales promotion.

(d) The number of Trade Representatives abroad should be increased, especially in important neighbouring countries. Adequate funds and opportunities should be provided to actively promote Zambian exports. Representatives should be recruited from industry and have practical experience in international sales promotion.

(e) Budgetting should be realistic and done with the utmost care. Boards of Directors and management should ensure that the budget is closely followed and that deviations are analysed and corrected.

7.3 Physical plant

General observations

All the plants were operating below full capacity. In many cases the concept of capacity itself was described as "achievable capacity" meaning that, given the state of the plant, the starting point for measuring capacity utilization was much below original installed capacity because, for example, machinery had been cannibalized to provide spare parts for other equipment. Even then, in some cases, capacity utilization was well below achievable capacity.

(a) Much of the production equipment in the manufacturing sector is either old and obsolete, performing well below its purported design capacities, or totally out of use because of protracted lack of proper maintenance. There is also evidence that, in several cases, plant design and processes used were unsuitable, and that the design capacities stipulated by the original equipment suppliers were unrealistic and unattainable in practice. Common occurrences include low capacity of specific equipment or entire production systems, technical and operational bottlenecks, and deliberate exclusion of some equipment essential for more efficient operation. Lack of inputs and poor quality of inputs were also among the reasons for low capacity utilization. Markets were not a problem; it was more a question of trying to keep up with demand.

(b) Quality control programmes are either non-existent or hazardly implemented. A contributory factor in this connection is the general absence of in-house laboratory facilities for analysis of raw materials and finished products.

(c) In general there is a casual approach to plant hygiene, industrial health and safety, and waste treatment and disposal.

(d) In many instances, equipment or entire plants had not been specified properly from a technical point of view in the contracts, or properly commissioned on installation. Nor were they performance-tested and accepted in line with any applicable supply agreements. Accordingly, their attributed performance capabilities are largely fictitious.

Recommendations

(a) Bottlenecks in the production system should be removed through installation of equipment originally omitted, replacement of obsolete or under-sized production units, and redesign of processing schemes for greater efficiency and capacity.

(b) In order to minimize the drastic fluctuations in product quality, each plant should establish an in-house laboratory and implement a quality control programme for routine monitoring and controlling of its raw materials and final products. Existing specialist laboratories should be strengthened and central laboratories should be established in the major provinces and Lusaka to provide special analysis services.

(c) In the interest of personnel safety and health, workers should be provided with protective equipment and its use should be enforced.

Necessary manufacturing and house-keeping measures should be taken to minimize the generation of in-plant solid, liquid, and gaseous wastes. Where such wastes are unavoidable, adequate facilities should be installed for their treatment prior to discharge.

(d) Zambia needs to utilize professional expertise to a greater extent in order to more precisely define and select industrial equipment and processes, prepare and negotiate contracts, monitor and supervise installation and commissioning, and performance-test equipment and plants.

Spare parts

Shortage of spare parts is a constant problem for all the companies visited. As in most African countries, the shortage of spare parts is also a major problem for manufacturing industry in general. The resulting stoppages are a major source of economic loss.

There are many reasons for the shortage of spare parts in Zambia. First, the country has not built up sufficient domestic capacity for spare parts production. Thus major problems are experienced simply because most spare parts for machinery have to be imported, and because there is insufficient foreign exchange for that purpose. As a result, it is not uncommon in Zambia for parts of small value themselves to be unavailable and to cause partial or even total shut-down of a plant.

Second, the effects of wear and tear of machinery and equipment are generally greater under Zambia's climatic and environmental conditions than in the industrial countries where the machinery and equipment were originally made. This implies that Zambia requires more spare parts - and in the absence of domestic production has to import more spare parts - than would normally be the case. Moreover, imported machinery frequently does not incorporate design and technical considerations that take into account the conditions likely to be experienced in the Zambian manufacturing sector.

Third, the sector often lacks buyers of sufficient experience and technical sophistication to buy machinery and equipment suitable for Zambian conditions. This frequently results in purchases of machinery with inadequate technical documentation and improper codification to identify parts responsible for machinery failures. There is also the not uncommon problem that machinery documentation is often written in a foreign language. Spare parts requirements are not usually included for plant and equipment in feasibility studies or in purchasing contracts.

Fourth, there are often difficulties experienced in finding the right supplier of spare parts, and especially suppliers of spare parts for machinery that is no longer produced.

Fifth, there are difficulties in the timely importation of spare parts, due to payment terms and conditions (such as letters of credit and the necessity of obtaining firm quotations) in obtaining import licenses and other documentation, the length of time taken to deliver spare parts, the length of time taken to clear customs and other bureaucratic hurdles.

Sixth, even if spare parts are eventually obtained, they are frequently damaged or lost due to inadequate storage, handling or organizational control.

Seventh, there are difficulties due to the fact that equipment is often old, maintenance staff is unexperienced or inadequately trained, and planned maintenance procedures are lacking. The result of these factors is that there are frequent breakdowns of equipment which require the acquisition of spare parts.

Eighth, with very few exceptions, imported industrial machinery and spare parts are subject to customs duties. These customs duties increase the costs of maintaining plants in good working order. As a result, plant maintenance is discouraged and capacity utilization is reduced. However, at the same time, progress is being made in the production of some spare parts in Zambia.

Recommendations

(a) There should be an in-depth investigation and a detailed classification of spare parts production, supply and needs in Zambia. UNIDO could provide assistance to such an investigation.

(b) Production of spare parts should be encouraged and protected, where appropriate, in Zambia and in SADCC. Some protection is necessary in order to encourage the substitution of locally produced spare parts at the expense of imports. However, a distinction would be made between those which are presently being produced in Zambia and those which at present can only be imported. It is recommended that a high duty be imposed on competing imports and that non-competing imports of spare parts be allowed in duty-free.

(c) There should be an in-depth investigation into the possibility of establishing a Spare Parts Agency (SPA) within the SADCC countries. UNIDO could assist in the establishment of such an agency, in conjunction with an international network of experts.^{1/} The SPA would be run on profit-making lines and have the following objectives:

- to act as a focal point for suppliers of spare parts in SADCC countries;
- to assist member countries in solving the identification and documentation problems of stocks of spare parts;
- to locate appropriate suppliers of spare parts in SADCC and abroad;
- to provide and stock necessary spares at an economic cost and on a timely basis by using modern methods of "just in time" inventory control;
- to avoid communication problems due to cultural misunderstandings and language barriers in contracts and negotiations;
- to ensure the purchase of spare parts takes account of the conditions of SADCC countries;
- to act as a focal point for the harmonization of existing national standards, certification systems, inspection and testing of spare parts relevant to SADCC countries;
- to centralize the importation, where required, of essential spare parts and to minimize administrative burdens *inter alia* by seeking ways to harmonize the treatment of spare parts importations in SADCC;
- to ensure purchased spare parts are properly documented and codified, stored and handled;
- to offer advisory services in the form of training in appropriate maintenance procedures and especially planned maintenance.

Thus the SPA should have two major functions: procuring spare parts and distributing spare parts to industrial customers. It would operate in a similar, albeit a far more complex, manner as various successful food and pharmaceutical purchasing institutions which save retailers the trouble of having to purchase or store goods. The SPA would also be a central source of information about a wide variety of spare parts and thus save customers the difficulties of having to find and obtain spares from a myriad of sources. With appropriate feed-back from customers as to their needs, the SPA could deliver parts on the basis of a computer system with "just in time" inventory management techniques. These techniques would drastically reduce the need to store spare parts for long periods of time as thus greatly save on inventory costs.

1/ For details, see UNIDO, Securing Spare Parts Supplies for Industries: a New Concept to Support Productivity of Industrial Plant Primarily in Developing Countries. 1986

To be able to fulfil the functions mentioned above, the SPA would need appropriate computer hardware and software as well as a staff of experienced specialists in the required technical and economic areas and in the spare parts business.

(d) Within the limits of their resource availability, plants should introduce a workable routine preventive maintenance programme for machinery and equipment. Since spare parts availability is a recognized constraint in this regard, efforts should be made to establish and equip in-house workshops which could fabricate simpler parts and repair some components. The establishment of further central repair workshops for specialized equipment and machinery should be investigated in various provinces. In the Copperbelt, the mining equipment repair shops provide a basis for the strengthening of industrial repair services. Their hardware and experience could also be tapped for the establishment of spare parts production and repair services elsewhere in the country. Measures to improve the availability of spare parts should be co-ordinated with the Zambia/Italy Spare Parts Manufacturing Facility Project which is now under negotiation.

7.4 Inputs

General observations

An important step in reducing import dependence has been taken by the introduction of kenaf fibre as a substitute for imported jute fibre. The significance of this development cannot be sufficiently stressed. Kenaf production must, however, be synchronized not only with development of the national fibre processing industry, but also with production plans for other domestic crops. Subregional (SADCC, PTA) trade in possible substitutes, such as sisal, should also be taken into account.

Raw materials such as maize and sunflower seeds, supplied to industry, are of poor quality as far as cleanliness is concerned. In general, maize and sunflower contain 5 to 10 per cent impurities which result in substantial extra costs for transport, and handling, wear and tear, and breakdown of processing equipment. With the present system of payment, the producer has no incentive to deliver clean products.

If impurities were removed at source the benefits would include:

- (i) Reduced transport costs and savings of foreign exchange - ZK 5 million and ZK 1.5 million respectively.
- (ii) Reduced handling costs of about ZK 0.2 million.
- (iii) A saving of 50,000 m³ storage space in warehouses or under tarpaulins, which could be used for clean produce and not for waste.
- (iv) Reduced losses of produce during storage; although difficult to assess, this is likely to add up to several million Kwacha.
- (v) Reduced wear and tear and breakdown in industry. This can be assessed in terms of lower maintenance costs, lower import requirements of spare parts, and improved capacity utilization of processing industries. The total benefit here may be assessed in

terms of millions of Kwacha per annum, a substantial portion of which would be in foreign exchange.

Recommendations

(a) As part of a comprehensive study on the long-term supply of packaging material in Zambia, the raw material availability in Zambia and the region, and the various issues related to increased raw material production, should receive special attention.

(b) A plan should be devised as soon as possible to introduce a bonus system for clean farm produce within three to five years. One alternative is to equip the receiving points at co-operative society or district level (depending on payment routine) with simple air/screen grain cleaners, cleaning would be done before weighing for payment. This would give the farmer an incentive to deliver a better product. It would also be the first step in a long and slow process to gradually introduce payment for quality.

The price increase for clean produce should correspond, at least, to the percentage units of impurities removed. The grain cleaners should be manufactured in Zambia, preferably using a well-known simple design acquired from an established manufacturer. The demand for grain cleaners, the spare parts requirements over the years, and the future possibility for exporting cleaners suggest there is a sufficient basis for establishing a viable manufacturing enterprise.

7.5 Costs and pricing system

General observations

(a) Because Zambia pursued a strategy of import substitution industrialization, the manufacturing sector became extremely import-dependent over the years. Although the goal of industrial policy is now aimed at reducing such dependence, this will take some time to achieve. Meanwhile, companies in the manufacturing sector are dependent on imported machinery and spare parts - in many cases for the bulk of their raw materials as well - in order to keep their plants operating.

(b) The Zambian manufacturing sector is presently subject to a complex battery of price distortions. These distortions are due to the fact that some products are subsidized, some are subject to price controls, increases in the prices of others must be approved by PIC, while others have their prices determined freely in the market. The lack of synchronization between movements in the prices of the various categories of products creates serious problems for many manufacturers.

1/ According to Final Crop Forecasts 1983-84 to 1987-88 (MAWD, Statistics Section, 20 May 1988), actual sales of maize and sunflower seed in 1986-87 were 663,612 tons. Assuming an average of 5 per cent impurities, which could have been removed, 33,180 tons of waste were transported for no reason at all. The average transport distance may have been about 150 km, which, at a cost of ZK 1 per ton kilometre, adds up to a total transport cost for waste of close to ZK 5 million. About ZK 1 million to ZK 1.5 million of this directly relates to imports, that is, fuel and vehicles.

The repercussions spread throughout the sector, and back into agriculture. When input prices increase and output prices are fixed, profits shrink - or even turn into losses. In such cases, the reactions can vary, depending on the type of activity in question. Private sector companies are threatened with closure. Parastatal companies may survive longer with INDECO support but this can hardly be guaranteed indefinitely. Ultimately, selling prices have to cover costs and a level of profits that enable a firm to maintain its plant in good working order and replace its plant over time.

The cost-plus method of pricing manufactured products, which PIC has established, may encourage inefficiency in the parastatal companies and discourage such companies from minimizing their costs of production. Even if it is acceptable as an approach, it is clear that some parastatal companies are not sure whether or not they are maximizing profits. In the case of companies with more than one product line, individual costings and profits are often not calculated, thus making it difficult to know whether one line is subsidizing another. On the other hand, there are cases in which the Government is inadvertently subsidizing the production of some goods. This can occur when a plant with a number of product lines has at least one line whose price is subsidized and therefore may be easier to make a profit; another line, with prices subject to PIC approval, may suffer temporary losses because of delays in authorizing price increases. Such hidden subsidies, where they occur, should not be blamed on individual companies; rather, they may be a short-term method of survival. Their emergence is a reaction to the widespread existence of price distortions, the ultimate cause of which is an over-complex policy on pricing and an institutional mechanism which is incapable of coping with it.

(c) The level of company taxation, which was raised in the 1988 Budget, seems high for a newly-industrializing country. At 40 per cent of profits, especially in situations of tight liquidity and import dependence, the tax rate leaves too little to be set aside for reserves or for rehabilitation. The rate is also higher than in some neighbouring SADC countries with which Zambia competes for exports of manufactured goods.

(d) The overriding constraint in the Zambian economy in the short run is shortage of foreign exchange. This shortage affects the ability of manufacturing companies to import. Given the level of import dependence in the Zambian manufacturing sector, the foreign exchange constraint is impeding the import of essential transport and machinery.

The foreign exchange constraint was described by the management of the plants visited as not being of overriding importance. This can be explained by the fact that the plants in question were either in "sensitive" branches of the agro-related sub-sector, were parastatals, or both. Moreover, all the managers were more satisfied with the FEMAC method of foreign exchange allocations than they had been with the auction system. However, it was clear that it was not so much the system itself as the stability of prices at which foreign exchange was acquired that was the important reason for their preference. The price itself was not perceived to be a problem. However, given the shortage of foreign exchange it is also clear to the outside observer that the present fixed rate cannot hold for very much longer.

Recommendations

(a) As regards duties on industrial machinery, companies undertaking plant rehabilitation, which is being financed out of their own resources or by bank borrowings, should be exempt from paying duties on machinery essential to the rehabilitation.

(b) Increases in the prices of manufactured products should be synchronized with increases in the prices of inputs. The PIC and MAWD will have to collaborate in approving and implementing price increases. This will call for strengthening the operations of PIC. In turn, such strengthening may necessitate technical assistance from the donor community.

(c) Although the 1986 Investment Act offers incentives and tax rebates to many manufacturers, especially those who export, it would nevertheless be appropriate also to reduce the general level of company taxation. The greater the extent to which companies meet the criteria of substituting domestic for imported inputs, increasing capacity utilization, and producing non-traditional exports, the greater should be the reduction in their tax bills, provided they apply the tax savings to plant rehabilitation. Adequate controls should be imposed to ensure that the money is used appropriately.

(d) With regard to the foreign exchange policy regime, a return to a moving peg system would be preferable to any medium-term fixing. Such a change, which is probably inevitable, will create problems for manufacturing plants in terms of the price at which they will acquire foreign exchange. Liquidity will be tight as the Kwacha cover requirements rise. There will be further pressure to make greater profits in the short run. Of course, in the long run the only solution is to reduce the dependence on imports in Zambian manufacturing. The objectives of Government policy, as presently stated, indicate that the need to reduce import dependence is well understood. The Government and the economic ministries now have to follow through at the level of policy implementation. The international donor community needs to respond with increasing support in the form of foreign exchange and technical assistance.

CHAPTER 8

SUMMARY OF PLANT-LEVEL FINDINGS AND RECOMMENDATIONS

This chapter summarizes the findings and recommendations at the plant level. It is the opinion of the mission that the recommendations, if followed up, will ensure the economic viability of the plants.

8.1 Zambia Pork Products Ltd.

8.1.1 Management and organization

Findings

The present organization is clearly understaffed at the management level; Marketing Manager and Personnel and Administration Manager positions are vacant. Information is deficient.

Recommendations for the short-term

As soon as possible fill said vacancies; purchase and install computer system for routine work and management information.

8.1.2 Marketing

Findings

Very little serious marketing is done; packaging and labelling are sub-standard.

Recommendations for the short-term

As soon as possible improve packaging and introduce taste-stands in supermarkets and townships to make ZAPP's name known.

Short-term recommendations in terms of project concepts

1. Install computer system for routine work such as accounting, production and sales; provide training programme for users (UNIDO).
2. Train local sales staff and sales representatives in the provinces; the course should be programmed over a period of two years.

Medium- to long-term recommendations in terms of project concepts

1. Advertise extensively through Zambian press, radio and TV.
2. Provide refrigeration to improve the system of transportation and deliveries.
3. Perform a market survey in neighbouring PTA and SADCC countries.
4. Promote sales in neighbouring countries through the creation of sales outlets and a system of representatives.

8.1.3 Physical plant

Findings

1. Much of ZAPP's production equipment is either out-of-use or performing well below specifications due to poor maintenance over a protracted period and a scarcity of spare parts.
2. Adequate quality control standards have not been established.
3. An urgent need exists to improve hygiene standards for both the plant and production personnel. Similarly, it is important to modernise the plant's casing recovery and waste-disposal practices.

Recommendations

Short-term

1. Mobilize financial resources immediately for the procurement of spare and replacement machinery (e.g. sausage machinery) and equipment.
2. Acquire laboratory equipment and facilities for routine quality analysis of ZAPP's in-process materials and finished products.
3. Develop and implement an improved sanitation and hygiene programme incorporating both hardware (e.g. personal protective apparel, wash basins, mobile cleaning, high temperature cleaning equipment) and software (e.g. training) elements. Hygienic facilities should also be provided for pre-treatment and disposal of liquid and solid wastes.

Medium-term

Most production equipment has exceeded its technically optimal life. Plants should modernize, expand and diversify its equipment while improving the quality of its products.

Specific project concepts

1. Financing procurement of the necessary spare parts for rehabilitating all plant machinery and equipment.
2. Procuring equipment and supplies for an appropriate quality control laboratory.
3. Training laboratory technicians.
4. Conducting a hygiene and sanitation survey and implementing a satisfactory practice.
5. Studying ZAPP's waste-disposal practices and recommending environmentally acceptable solutions.

8.1.4 Inputs

Findings

1. Shortage of slaughtering pigs is a serious constraint and a major reason for poor capacity utilization of the slaughterhouse/meat processing plant. This situation implies that pig production costs are too high when compared to producer prices. This has forced the small to medium-sized pig farmers to abandon pig rearing due to lack of credit to buy feed.
2. Feed supply is inadequate and erratic. The quality of commercial feed is far below required standards; there appears to be no legislation forcing stockfeed manufacturers to declare and guarantee the nutrient content and composition of the feed.
3. Casings for sausages are predominantly imported; there have been no problems in obtaining the required quantities.

Recommendations

Short-term

1. Adopt necessary measures to make good quality stockfeed available at all times (for details see section 8.3).
2. Implement, as soon as possible, the Pig Production Assistance Project (PPAP) currently under review by ZAPP.
3. Incorporate in PPAP a breeding scheme organized and monitored by ZAPP or a Government body with an incentive to perform well in this capacity.
4. Review the current structure of prices to ensure that the setting and monitoring of input costs and farm gate prices for slaughter pigs are reasonably well co-ordinated.

Medium- to long-term

1. Establish and enforce more strict and detailed rules for grading pig carcasses; introduce payment according to grading.

Short-term project concepts:

1. Implement the Pig Production Assistance Project.
2. Prepare a detailed recommended pig improvement breeding programme.
3. Establish a pricing system which ensures collaboration between PIC and MAWD regarding synchronization of price increases for pigs and stockfeeds, and pigs and pork prices.

Medium- to long-term project concepts

1. Implement pig improvement breeding programme.
2. Prepare modified grading rules governed by relevant marketing criteria including carcass suitability for future processing.

Suggestions for UNIDO action

1. Attempt to provide short-term advisory services to companies.
2. Make more detailed assessments of the recommended actions.
3. Provide support to technical training on the basis of Government requests.

8.1.5 Costs and price structure

Findings

1. There is a very high import dependence on spare parts, with duties on all imported spare parts.
2. ZAPP's cash flow position is tight due to asymmetry between length of credit given and length of credit received. A shortage of Kwacha exists to buy foreign exchange.
3. ZAPP's accounting department displays some weaknesses; the production department is responsible for pricing.

Short-term recommendations

1. Change tariff structure relating to spare parts.
2. Reduce asymmetry between credit periods given and received to one week.
3. Upgrade skills in accounting department. Switch pricing function to accounting department.

Short-term project concepts

1. GRZ should develop differentiated tariff structure with rates high on competing imports and zero on non-competing imports.
2. Government institutions should settle accounts within 21 days.
3. ZIMCO should design training programme for accounting personnel.

8.2 E.C. Milling Co. Ltd.

8.2.1 Management and organization

Findings

The present organization needs some improvement at the middle management level. The following positions are particularly weak: Chief Engineer, Maintenance Manager, Marketing and Distribution Manager, and Personnel and Administration Manager.

Recommendations for the short-term

Recruit qualified personnel to replace above managers when their present contracts expire. Install computer system for routine work.

8.2.2 Marketing

Findings: Little or no marketing is done at present.

Recommendations for the short-term

Carry out a subregional marketing survey with the support of the International Trade Centre (ITC), Geneva.

Recommendations for the medium- and long-term

Organize a strong sales network. Promote sales through advertising in press, radio and TV as well as participating in trade fairs.

Short-term recommendations in terms of project concepts

Install computer system and provide training programme for users.

Medium- to long-term recommendations in terms of project concepts

1. Organize effective sales network.
2. Advertise extensively through nationwide press, radio and TV.
3. Perform market surveys in neighbouring countries.
4. Initiate sales promotion in neighbouring countries if market surveys are positive.
5. Acquire more trucks to improve the distribution system.

Recommendations for follow-up activity

A UNIDO follow-up mission should monitor the implementation of this study's recommendations. It may be advisable that the same UNIDO mission that conducted the rehabilitation study undertake the follow-up.

8.2.3 Physical plant

Findings

1. The stockfeed production scheme contains several design and equipment constraints which create technical and operational bottlenecks and which hinder flexibility and product diversification. The bottlenecks exist at the hammer mills, horizontal scale, and mixer levels. The effect has been to limit the plant's achievable production capacity to only about 35 per cent of the plant manufacturer's claimed design capacity of 18 tons of stockfeed per hour.
2. The identified bottlenecks are technically rectifiable either through modifications in the process scheme or through selective replacement of affected equipment with current models.
3. The high dependence on imported ingredients (concentrates and pre-mixes) in the stockfeed industry makes E.C. Milling and the industry in general very vulnerable to external events largely outside its control.

4. Bone meal is presently obtained through buying burned scrap bones from vendors. The scrap bones are then milled at the plant.

Recommendations

An important step in reducing import dependence has been taken by the introduction of kenaf fibre as a substitute for imported jute fibre. This kenaf production is an extremely significant development for the Zambian economy.

Based on present experience from growing kenaf, about 12,000 hectares would be required to meet the national demand for hessian-type bags. As a prerequisite, sufficient quantities of seed will have to be produced. Kenaf production must be synchronized with development of the national fibre processing industry.

The availability of bags of suitable quality is crucial for the Zambian economy. It is the opinion of the UNIDO team that the long-term supply of bags be the subject of a comprehensive study to serve as a guideline for further investment.

Medium- to long-term project concepts

The following issues should be examined to produce a plan of action:

1. The extent to which bulk-handling of certain products is likely to be introduced.
2. Future demand for bags. Raw material availability within Zambia; technical aspects of product development; environmental considerations; and export potential, especially to the SADCC and PTA regions.
3. Prepare suggestions for the development of the Zambian bag manufacturing industry.

8.2.4 Costs and price structure

Findings

1. Duties are levied on all imported spare parts.
2. 1987-88 stockfeed production operated at a loss because of excessive delays in getting price increase approval from PIC.

Recommendations

1. Change tariff structure with regard to spare parts.
2. (a) Process price increase applications within one month; investigate any delays.
(b) Price increases for final products should be synchronized with price increases for inputs.

Short-term project concepts

1. GRZ should develop differentiated tariff structure for spare parts with rates high on competing imports and zero on non-competing imports.
2. (a) PIC and MCI should take appropriate action following investigations.
(b) Collaboration should take place between PIC, MCI, and MAWD regarding synchronization of increases in input prices and prices of final products.

8.3 Kabwe Industrial Fabrics, Ltd. (KIFCO)

8.3.1 Management and organization

Findings

The General Manager spends too much of his time checking various sections of the plant, especially the maintenance and production sections, to ensure good performance. A management information system is lacking.

Recommendations for the short-term

Create a new Works Engineer position and improve quality and training of existing staff so that responsibility can be delegated. Install computer system for routine work.

8.3.2 Marketing

Findings

KIFCO does little or no marketing. The only sales outlet is at the factory where goods sold are picked up by customers.

Recommendations for the short-term

Although the present situation is satisfactory, advertising should be introduced so that sales will match production when rehabilitation is finished. Employ sales representative in the provinces.

Short-term recommendations in terms of project concepts

1. Install computer system and provide training programme for users.
2. Introduce training programme for sales staff and agents/representatives.

Medium- and long-term recommendations in terms of project concepts

1. Apart from an emphasis on direct personnel sales, undertake an extensive advertising campaign through press, radio and TV.
2. Perform market studies in neighbouring countries.
3. Promote export sales by participating in trade fairs and establishing sales outlets in neighbouring countries.

8.3.3 Physical plant

Findings

Poor maintenance and cannibalization have reduced the potential single-shift production capacity of the hessian fibre plant from about 440 tons to only 240 tons per year. Even this potential is not achievable due to non-availability of imported jute fibre or locally produced kenaf.

Recommendations

Short-term

The emphasis should be on full rehabilitation of all existing jute production equipment. Other equipment and spare parts essential for efficient production should also be procured and installed. In order to reduce dependence on imported inputs, the physical rehabilitation programme should be synchronized with the local raw materials production programme.

Preliminary estimates show that short-term capital outlay for rehabilitation is about ZK 12.11 million.

Medium-term

Zambia should become self-sufficient in hessian products (cloth, twine and bags); annual demand is estimated to be 20,600 million tons.

Project concepts

1. Financing a detailed study of the short- and medium-term rehabilitation programme, including both the physical plant and kenaf production.
2. Technical assistance in management of equipment specification, procurement, installation, commissioning, and start-up, as well as post-commissioning technical consultancy as necessary.
3. Financing the short-term rehabilitation programme is tentatively estimated at ZK 12.11 million.

8.3.4 Inputs

Findings

1. Raw materials for the synthetic line - polypropylene and polyethylene granules - are imported from Europe. KIFCO has developed firm business relations with only one supplier providing about 1,600 tonnes of polypropylene and 140 tonnes of polyethylene annually at present production levels. No problems have been encountered so far in procuring the required quantities, but the increase in the cost of granules has been substantial in the last few years.
2. The main source of natural fibre is jute imported from Bangladesh. Following a sharp decline in jute supplies due to war conditions in Bangladesh in the early 1970s, KIFCO sold many jute processing installations. The requirement for jute was therefore reduced.

3. Price escalation on the international jute market encouraged the substitution of domestically produced natural fibre imports. It also led to a programme to grow kenaf, with a production target of 1,500 tons of fibre for 1988. In 1987-88, the target of 450 hectares of kenaf fell short by 50 hectares. This target was estimated to yield a total crop of 120 tons of fibre, accounting for about 34 per cent of the total demand for natural fibre in 1988.

Recommendations

Short-term

1. Investigate alternative sources of synthetic raw materials, especially PTA manufacturers, rather than rely on international trading agencies.
2. The Kenaf Development Programme should take account of:
 - possible sources of natural raw materials, such as sisai, in other PTA/SADCC countries;
 - the (future) impact of the Programme on present natural raw materials trade patterns among PTA/SADCC countries;
 - the (future) impact of expanding kenaf production on other domestic crops.

Medium- to long-term

1. Provide experts to formulate a programme for development and monitoring of:
 - kenaf production system including extension services,
 - plant breeding to gradually improve the fibre, and
 - improved processing and bag manufacturing methods in an effort to widen the use of kenaf fabric bags to include their use for commodities such as mealie-meal and sugar.

Suggestions for UNIDO actions

1. Continuously follow and report to UNIDO Headquarters in Vienna (i) the progress of the Kenaf Development Programme and (ii) discussions and actions related to research and development in the kenaf industry so that appropriate technical assistance may be designed to remove any bottlenecks.
2. Consult and co-ordinate with FAO where appropriate.

8.3.5 Costs and price structure

Findings

1. There is a very high import dependence on spare parts, with duties on all imported spare parts.
2. Only the total profit figure is shown in annual accounts.

Recommendations

1. Change tariff structure with regard to spare parts.
2. Calculate profits on each individual product line.

Short-term project concepts

1. GRZ should develop differentiated tariff structure for spare parts, with rates high on competing imports and zero on non-competing imports.
2. KIFCO should upgrade accounting function.

8.4 ZATCO Stockfeeds Ltd.

8.4.1 Management and organization

Findings

The organization is severely understaffed at the middle management level; consequently, many of these duties are performed by the General Manager. There are vacancies for the posts of Commercial Manager, Engineering and Maintenance Manager, and Personnel and Administration Manager.

Recommendations for the short-term

Fill vacancies as soon as possible; purchase and install a computer system.

8.4.2 Marketing

Findings: Until now, very little marketing has been done.

Recommendations for the short-term

After rehabilitation of production facilities is completed, start a modest promotion programme via press and radio.

Recommendations for the medium- and long-term

Conduct market surveys in PTA countries and increase local sales promotion.

Short-term project concepts

1. Install computer system and provide training programme for users.
2. Advertise in press and radio.

Medium- and long-term project concepts

1. Conduct market surveys in PTA countries.
2. Advertise extensively in domestic press, radio and TV.

8.4.3 Physical plant

Findings

The production scheme, machinery and equipment are not capable of achieving the nominal stockfeed production capacity of the plant. This is due to the following engineering-related constraints:

- exclusion of several essential machines and facilities such as a seed cleaner and quality control laboratory;
- inappropriate choice of original equipment;
- undersized or under-designed equipment;
- obsolete equipment; and
- congested plant layout and equipment disposition which contribute to an unhygienic and unsafe working environment.

Short-term recommendations

1. Prepare an appropriate layout and process flow for the rehabilitation/upgrading of the plant.
2. Replace existing cooker/expellers.
3. Replace existing decorticating unit.
4. Replace associated vertical and horizontal conveying installations for solids (e.g. conveyor belts and bucket elevators) and liquids (pipes and pumps).
5. Install cleaning machinery for grains (maize, sorghum, etc.) and oilbearing seeds and associated conveying equipment to facilitate rational handling.
6. Establish an appropriately equipped plant laboratory and workshop capable of fabricating simple spare parts and repairing some components.

Medium-term recommendations

1. Install bulk storage facilities for grains and soybeans, with a capacity corresponding to about 50 per cent of annual demand for processing. Plan for later expansion.

8.4.4 Inputs

Findings

1. Ingredients such as maize, sunflower seed, and soybeans are sometimes in short supply. Efforts are made to overcome this by purchasing as much as possible during the harvest season.

2. Inferior storage at the Co-operative Union sometimes leads to poor hygiene quality of the raw material; for example, high levels of aflatoxine have been found.
3. Lack of laboratory facilities at the plant makes proper monitoring and quality control of the product almost impossible.
4. Losses during product handling are considerable and are estimated at 1,000 tons per year throughout the process (approximately 800,000 ZK).

Recommendations

Short-term

1. Introduce cleaning equipment for grains and oilbearing seeds.
2. Through negotiations, attempt to get better service from existing laboratories, especially with respect to the amount of time it takes to receive analytical results.
3. Investigate the consequences of investments in bulk storage and associated bulk conveying systems.

Medium- to long-term

1. Establish a laboratory in ZATCO.
2. Modernize the storage and handling of grains and oilbearing seeds.
3. Establish a central ingredient laboratory to operate on a commercial basis (not ZATCO's responsibility).
4. Improve the quality of grains and oilbearing seeds; specifically, remove impurities as early as possible in the handling chain.

Short-term project concepts

1. Procure and install cleaning equipment.
2. Conduct studies related to improvement/modernization of storage and handling of grains and oilbearing seeds.

Medium- to long-term project concepts

1. Train laboratory staff at all levels.
2. Plan, design, and implement central independent laboratory capable of analysing raw material feeds and compound feeds; also consider advantages of expanding services to materials as soil samples.
3. Provide training programmes for high, medium and junior-level laboratory staff; all personnel should be properly trained and competent by the time the laboratory is commissioned.

Suggestions for UNIDO action

1. CIA and NCDP should follow-up actions for short-term improvements and report to UNIDO Headquarters so that appropriate technical assistance may be designed, if necessary.
2. At the local level, assist in preparing recommended actions for the medium- to long-term, and report on the progress made to UNIDO headquarters.

8.4.5 Costs and price structure

Findings

1. ZATCO experienced long delays in obtaining approvals for price increases in stockfeeds and edible oil from PIC. The timing of increases in input prices and finished product prices was not synchronized.
2. ZATCO's tax holiday is over and the company is liable to pay company taxes during the 1988-89 financial year.

Recommendations

1. PIC should process price increase applications within one month. Delays should be investigated. PIC, MCI and MAWD should collaborate to synchronize price increases for inputs.
2. Companies should not be taxed at the full rate if they fulfill most of the following criteria: (a) undertaking rehabilitation, (b) increasing capacity utilization, (c) operating in a rural area, and (d) replacing imported inputs by local inputs.

CHAPTER 9

SUMMARY OF PROJECT CONCEPTS

(a) General

- Provide expertise to redesign tariff structure.
- Investigate reasons for PIC delays in implementing price increases in PIC. Provide expertise to synchronize changes in prices and costs for manufacturers.
- Modify company taxation policy to promote internal financing of rehabilitation.
- Expand the role of INDECO's Economic Evaluation Unit, and further strengthen the role of the Industrial Planning Unit of MCI and the Investment Policy Department of NCDP.
- Technical assistance in planning and design, including contracting and commissioning procedures and specification of equipment (UNIDO).
- Technical assistance in the development of maintenance procedures and training (UNIDO).
- Technical assistance in establishing spare parts production (UNIDO).
- Technical assistance for developing or purchasing standardized equipment, parts and components (UNIDO).
- Assistance in the establishment of provincial maintenance centres, workshops and laboratories (UNIDO).
- Assistance for in-house training of middle-management in manufacturing.
- Arrange study tours for middle-management in manufacturing (UNIDO).

(b) For all enterprises visited

- Install computer systems for routine work such as accounting, purchases and sales, and provide a training programme for users (UNIDO).

(c) Plant level projects

ZAPP

- Programmed course of training over a period of two years for local sales personnel as well as sales representatives in the provinces.
- Identifying the need for, and financing the procurement of, necessary spare parts for rehabilitating all plant, machinery and equipment.
- Assistance in procuring equipment and supplies for an appropriate quality-control laboratory, and training of laboratory technicians.

- Assistance in implementing proper waste-disposal techniques.
- Incorporate in the Pig Production Assistance Project a breeding scheme organized and monitored by ZAPP.
- Establish and enforce stricter and more specific rules for grading pig carcasses; introduce payment according to grade.

KIFCO

- Programmed course of training over a period of two years for local sales personnel as well as sales representatives in the provinces.
- Training programme in production and maintenance procedures.
- Study of potential raw material suppliers in the PTA area.
- Under the Kenaf Development Programme, expertise for kenaf production including provisions of extension services.
- Financing and assistance in the execution of the short- and medium-term rehabilitation programme, including both the physical plant and kenaf/jute production.
- Technical assistance in management of equipment specification, procurement, installation, commissioning and start-up, as well as post-commissioning technical consultancy as necessary (UNIDO).

E.C. Milling Co. Ltd.

- Provide new workshop building and selective replacement of equipment with modern and robust models.
- Assist management in preparing terms of reference for required studies and for procurement of necessary technical expertise; pending the result of the studies, assist in procurement procedures (UNIDO).
- Follow-up mission to monitor the implementation of the recommendations made by the UNIDO/REG consultants (UNIDO).

ZATCO Stockfeed Ltd.

- Rehabilitation of the oil mill including planning, execution and financing. Technical assistance for planning short-term rehabilitation.
- Technical assistance for negotiation of equipment supply contracts, including assistance in detailed specifications, procurement, installation, and commissioning.
- Construction and equipment of a workshop, including training of craftsmen in the operation of the workshop equipment.

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APPENDIX 1

GENERAL BACKGROUND INFORMATION

1.1 Basic structure of political and economic decision-making

The United National Independence Party (UNIP) is the sole legal political party. UNIP's Central Committee meets at least once a month and is the key policy-making body. The Central Committee consists of the President as Chairman, the Secretary-General of the party, the Prime Minister and 23 other members. It supervises the implementation of policies and party programmes. It also supervises and controls all party activities. The Central Committee has nine subcommittees; the Economic and Finance Subcommittee supervises and controls economic decision-making.

Parallel to the political structure, but subservient to it, is the Government system. This is usually viewed as a body to implement and co-ordinate party policies as formulated by the political process. The Government is headed by the Prime Minister who reports both to the party and to Parliament. However, Parliament's main role is to scrutinize the activities and decisions of the various Government ministries.

The Government's cabinet is presided over by the Prime Minister, and includes the President and the heads of various ministries. Ministries primarily responsible for economic issues include the Ministry of Commerce and Industry, Ministry of Finance, Ministry of Agriculture and Water Development, and the National Commission for Development Planning. The Central Committee and the cabinet meet regularly, sometimes meeting as a joint committee to discuss major policy decisions.

Subservient to this whole structure are two sets of institutions which are important in formulating and implementing economic policies. The first consists of autonomous Government agencies such as the Prices and Incomes Commission, the Bank of Zambia, the Export Board of Zambia and the Export-Import Bank. The second is the parastatal sector, dominated by ZIMCO. Most manufacturing parastatals within ZIMCO come under INDECO. The parastatals are especially important in determining the direction of industrial policy.

1.2 Demographic and social characteristics

Zambia's population is estimated at 7.2 million (1987), and is growing at an estimated 3.6 per cent per annum. The country is sparsely populated, with population density estimated at 8 per square kilometre in 1980. The Copperbelt and the provinces along the line of rail - Lusaka, Central and Southern Provinces - have the highest densities.

Zambia's population is young - 59.7 per cent of the total population in 1987 was under 19 years of age, and this group continues to expand. The dependency ratio is about 105 dependents per 100 productive adults. Estimated life expectancy has increased in recent years from 47.8 to 54.4 years for females and from 44.5 to 52.5 years for males.

Zambia's population is also highly urban by African standards, with approximately half the population living in urban areas in 1987. By the year 2000, urban areas should account for about 59 per cent of Zambia's population.

Enrolment in primary and secondary education grew from 785,806 in 1971 to 2.9 million in 1986. Enrolment in the country's two universities rose by 158.9 per cent between 1971 and 1980. In the field of technical education and vocational training, enrolment declined by 16.6 per cent between 1980 and 1986, from 5,338 to 4,449 students.

APPENDIX 2

POLICIES AND INSTITUTIONS RELATING TO THE MANUFACTURING SECTOR

2.1 Industrial policy

Until the early 1980s, an import substitution approach was followed. Since 1985, the focus has been on non-copper exports and other new manufactured exports. Industrial policy also aims to substitute local inputs for imported ones, implying increased linkages with other economic sectors, especially agriculture. Encouraging small-scale enterprises and rehabilitating existing plants are two important objectives of current policy.

The corporation tax rate for eligible manufacturing firms was raised to 40 per cent in April 1988. However, sub-sectors producing essential commodities such as stockfeeds and edible oils are allowed a 5-year tax deferment. A new education levy was introduced in the 1988 Budget. All manufacturing companies are required to pay this levy - to a maximum of ZK15,000 - which is a flat charge based on turnover.

2.2 Trade policy and tariff policy

Trade policy goals are to promote non-traditional exports and to discourage non-essential imports. The tariff regime is designed to help achieve these objectives as well as to raise revenue for the Government. A number of recent changes were made in duty rates, in some cases reversing increases in effect only a year or two. The most important change was reducing duties on industrial machinery from 20 per cent to 10 per cent. In addition to encouraging rehabilitation of existing plants, this reduction was designed to eliminate disincentives which earlier budgets had created for new investment in Zambia in comparison with neighbouring countries.

Duties on spare parts were also reduced in the 1988 Budget. The rates vary according to type of machine - 40 per cent for motor vehicles and 20-25 per cent for industrial machinery - plus the usual 2.5 per cent "uplift" and 20 per cent sales tax.

In order to contain rising transportation costs, the rate of duty on a chassis fitted with an engine was reduced from 10 per cent to 5 per cent in 1988. Other duties on transport equipment were left unchanged to encourage local vehicle assembly.

Two export promotion programmes are (a) the 50 per cent retention scheme, which allows exporters of non-traditional goods to retain half of their foreign earnings in order to import necessary inputs, and (b) the export drawback system which allows exporters to claim a refund of import taxes paid on materials used in the production of goods for export.

Zambia's regional trade policy is aimed at increasing trade links with the member states of the Preferential Trade Area and the southern African region.

2.3 Exchange rate policy

Excess demand for foreign exchange in the late 1970s led to the creation of a complicated administrative system involving the issue of import licences by the Ministry of Commerce and Industry and the allocation of foreign exchange by the Bank of Zambia. However, this system did not solve the allocation problem. A parallel foreign exchange market developed rapidly, where the devaluation of the Kwacha was even more marked. In October 1985, as part of a comprehensive structural adjustment programme with the IMF and the World Bank, a foreign exchange auction system was introduced. It lasted until May 1987 when Zambia broke with the IMF. Since then, foreign exchange has been allocated by the Foreign Exchange Management Committee (FEMAC) with the exchange rate fixed at eight Kwacha to the US dollar.

2.4 Interest rate policy

Interest rate policy, like exchange rate policy, underwent fundamental change after September 1985 when a more flexible interest rate regime was adopted. The treasury bill rate was raised significantly; by January 1986 it had reached 23.5 per cent. Commercial bank interest rates on deposits and loans were controlled, although they still moved in concert with movements in the treasury bill rate. The encouragement of savings, the switch away from capital-intensive to more labour-intensive technologies, and the dampening of aggregate demand were the main reasons given for the move to a more flexible interest rate regime, which produced high nominal rates and positive real rates of interest.

The era of a flexible interest rate policy and positive real rates of interest lasted until May 1987 when Zambia discontinued its IMF stabilization programme. As part of the new economic programme launched on this date, commercial bank interest rates were fixed at 15 to 20 per cent. Since inflation is at least 50 to 60 per cent, real rates of interest have once again turned negative. "Financial stabilization" and the diversification and restructuring of the economy are the stated objectives of fixing interest rates at such levels. It is the Government's intention not to review interest rates or exchange rates until "reasonable stability" has been attained.

2.5 Pricing policy

In addition to the price of money and foreign exchange, most consumer goods and agricultural producer prices were administratively controlled until December 1982. A general decontrolling of prices began after that date, which proved to be a very controversial political action. As soon as subsidies were removed on mealie meal in December 1986, food riots erupted, forcing the Government to again subsidize the product.

The 1988 Budget reiterated the Government's commitment to price controls on essential commodities in order to contain inflation and to ensure that the average citizen would be able to acquire the essentials of life. The May 1988 list of essential commodities subject to price controls contained 12 items: sugar, salt, mealie meal, tyres and tubes, cooking oil, soap and detergents, baby milk, candles, wheat and wheat products, blankets, batteries, and charcoal. While the last four items are likely to be decontrolled later, the remainder include a number of manufactured products of major importance in the agro-based sector of industry.

Institutions relating to the manufacturing sector

(a) Industrial policy institutions

The most important institutions of industrial policy are:

- the Ministry of Commerce and Industry (MCI),
- the Industrial Development Corporation (INDECO),
- the Zambia Industrial and Mining Corporation (ZIMCO),
- the Small Industries Development Organization (SIDO),
- the Zambian Standards Institute (ZSI),
- the Development Bank of Zambia (DBZ) and
- the Ministry of Finance.

(i) Ministry of Commerce and Industry (MCI)

The main function of this Ministry is to formulate and co-ordinate industrial policy. It supervises the operation of the 1986 Investment Act which provides tax incentives for new foreign investment based on the use of Zambian resources with high domestic value added. The Ministry issues manufacturing licences and import and export licences and is represented on the Foreign Exchange Management Committee (FEMAC), INDECO and ZIMCO are directed to execute the policies formulated by the MCI.

(ii) Industrial Development Corporation (INDECO)

INDECO is a state-owned holding corporation whose subsidiaries are parastatal industrial companies. Its functions include promotion of small-scale enterprises, industrial training and manpower development, provision of managerial personnel to its subsidiaries, and mobilization of financial resources. Of its 44 subsidiaries in 1985,^{1/} INDECO held 100 per cent equity participation in 25, and between 50 and 100 per cent equity participation in fifteen. INDECO and MCI co-operate to promote industrial projects.

(iii) Zambia Industrial Mining Corporation (ZIMCO)

ZIMCO was established under the Companies Act as a state-owned holding company. Under its umbrella are INDECO and its subsidiaries, as well as nearly 80 other corporations, companies and banks. Its interests extend to every sector of the economy, including agriculture. Measured in terms of total output produced by its subsidiary and associated companies, ZIMCO accounts for more than three-quarters of the Zambian economy.

(iv) Small Industries Development Corporation (SIDO)

SIDO was established to assist in the development of small-scale manufacturing enterprises and to promote entrepreneurial activity.

1/ INDECO subsidiary companies numbered 42 as of 31 June 1988.

(v) Zambian Standards Institute (ZSI)

ZSI was established to set quality standards and to provide technological data and information to the industrial sector. Its special technical committees consist of manufacturers, experts and professionals in various fields, and representatives from Government Ministries, local Government, research institutes, and consumer groups.

(vi) Development Bank of Zambia (DBZ)

DBZ is the main instrument for financing investment in Zambian industry and agriculture. It provides loans to both parastatals and firms in the private sector. Its funds come from both foreign and domestic sources. A major advantage of having inflows of foreign funds is that the DBZ can provide its borrowers with foreign exchange to purchase machinery and equipment. The bank co-operates with INDECO and the National Commission for Development Planning in project identification and appraisal. It also prepares feasibility studies and promotes various projects.

(vii) Ministry of Finance

Company taxation comes under the aegis of the Ministry of Finance as does the setting and administration of tariffs and other forms of industrial protection.

(b) Trade policy institutions

Two other Zambian institutions - the Export Development Board and the Export-Import Bank - as well as two regional institutions - the Preferential Trade Area (PTA) and the Southern African Development Co-ordination Conference (SADCC) - are important in the implementation of trade policy. (PTA and SADCC are described in detail in Appendix 3.) The Export Development Board (EDB) was established in 1986 to help exporters and potential exporters to identify new export products and markets. Its responsibility extends to both the agricultural and manufacturing sectors. EDB conducts market research and encourages companies to participate in international trade fairs both inside and outside Zambia. The Department of Foreign Trade in MCI also helps to promote exports by participating in international trade fairs.

The Export-Import Bank (Exim Bank) was established in 1987 as another means to promote and diversify exports. Its main function is to offer credit facilities to exporters.

(c) Institutions of foreign exchange policy

The Bank of Zambia is the main institution involved in the execution of exchange rate policy, although commercial banks and the MCI also play a role. During the IMF structural adjustment programme, foreign exchange was allocated through a weekly foreign exchange auction. Since May 1987, FEMAC has been the institution responsible for allocating foreign exchange.

(i) Foreign exchange auction

The auction was strongly supported by the World Bank and bilateral donors. Applicants made bids for foreign exchange through the commercial banks to the Foreign Exchange Committee of the Bank of Zambia (BoZ). Each applicant stated the amount of foreign exchange required, the purpose for which it was sought, and the Kwacha/dollar rate the applicant was willing to pay. The rate of exchange established for the following week was the lowest eligible bid, which exhausted the total amount of foreign exchange available at that auction.

(ii) Foreign Exchange Management Committee (FEMAC)

This committee is composed of 26 members from the Ministry of Finance, MCI, BoZ, Commercial Farmers Bureau, Zambia Industrial and Commercial Association (ZINCOM), the parastatal sector and the private sector. FEMAC has a Secretariat which is responsible for processing all applications for foreign exchange, including applications for import licences for goods not requiring foreign exchange remittances.

Foreign exchange allocations are made every two weeks on the basis of a foreign exchange budget prepared by the Bank of Zambia covering forecasts of sources and uses of foreign exchange in a particular calendar year. An amount of about US\$8 million is budgeted for general imports in a two-week period.

As a consequence of the scarcity of foreign exchange, its allocation among users is subject to apportionment. Zambia Consolidated Copper Mines (ZCCM), which earns about 90 per cent of the country's foreign exchange earnings, is permitted to retain 45 per cent of these earnings. Other exporters are permitted to retain 50 per cent of their export earnings and may apply for additional allocations of foreign exchange from FEMAC.

Payment of debt service is restricted to 10 per cent of foreign exchange earnings, net of ZCCM and preferred categories.

Successful applicants are immediately issued with import licences against foreign exchange allocations. These import licences are then presented to the commercial banks for Letters of Credit. (In the case of imports requiring no foreign exchange remittance, an import licence is required only for goods whose imported value is equal to or exceeds ZK10,000 c.i.f.)

(d) Institutions of interest rate policy

Interest rate policy is implemented by the Central Bank of Zambia (BoZ).

(e) Institutions of pricing policy

MCI controls pricing policy and prosecutes offenders. Producers of certain "sensitive" products in the manufacturing sector, such as stockfeeds, are obliged to apply to PIC to demonstrate there is good cause for a price increase. Only when PIC grants permission can the price increase go into effect.

APPENDIX 3

REGIONAL CO-OPERATION

Political developments in neighbouring countries have had a crucial impact on the pace of Zambia's economic development. Rhodesia's unilateral declaration of independence in 1965 and the subsequent Resolution by the United Nations to impose economic sanctions against Rhodesia compelled the Zambian Government to curtail all forms of economic relations with that country. The Zambian Government's stand against apartheid also forced a reduction of dependence on the Republic of South Africa. Further disengagement from Rhodesia and the Republic of South Africa became necessary as these countries engaged in aggression against Zambia.

Partly due to these political developments, two regional economic and trade groups were formed, the Southern African Development Co-ordinating Conference (SADCC) and the Preferential Trade Area (PTA).¹ Regional economic co-operation, as demonstrated by SADCC and PTA activities, provides "Third World" countries the opportunity to increase trade in manufactures without the hazards of attempting to enter international markets. The regional export potential of industries will therefore be an important factor when assessing the scope for rehabilitation. SADCC, moreover, has recognized the importance of industrial rehabilitation for the subregion. Zambia's Interim National Development Plan (INDP) recognizes that PTA represents a major opportunity for Zambia's exports. The Export Board and the Ministry of Commerce and Industry will be the key institutions involved in exploring the market potential in the PTA countries.

SADCC, founded in Lusaka in 1980, is an association of the nine so-called Frontline states in the region: Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe.

The aim of SADCC's industrialization programme is to foster specialisation and complementarities in production by setting up national and multi-national projects, with strong domestic and intra-regional linkages. By 1984, 83 projects had been presented to potential investors for implementation. SADCC is also involved in programmes for promoting food security, energy security, conservation, mining, trade, agriculture, and manpower development. Within the SADCC context, Zambia has been given responsibility for the mining sector.

1/ More extensive information may be found in SADCC, Industry and Trade Annual Conference (1988) Report, Lusaka 1988, SADCC Industrial Co-operation through the Southern African Development Co-ordination Conference, UNIDO/IS.570, Vienna 1985, and - for the iron and steel industries - A survey of the iron and steel sector in the PTA and SADCC countries, UNIDO/IS/R.44, Vienna 1986.

After Zimbabwe, Zambia is the most important importer from SADCC countries, with 19 per cent of total 1982 member imports from within the SADCC region. With regard to exports, Zambia ranked third in 1982, after Botswana and Zimbabwe. In SADCC's proposed complementary framework for the development of basic needs industries, Zambia is to concentrate on food processing, agricultural inputs, textiles and building materials. A 1986 SADCC/UNIDO conference on rehabilitation identified a series of projects in Zambia, the majority of them in agro-related industries. Also important is SADCC's project to improve the Tanzania-Zambia railways.

The PTA subregion comprises 20 countries, 15 of which have ratified the treaty to become members. The total population of the member countries is about 180 million, constituting a very large market by African standards. Together, the countries of the subregion produce most of the world's gold, diamonds, platinum, chrome, and manganese.

PTA's immediate task, since its inception in 1981, has been to the promote subregional trade in commodities originating in the subregion. Member states regularly hold trade meetings to promote awareness of the availability of tradeable commodities within the PTA region. A clearing house has been established to facilitate payments for goods traded among the member states.

The policy of trade liberalization, among other things, seeks to eliminate tariffs on a common list of commodities originating within the PTA region by the year 2000. This is being implemented through scheduled tariff reductions. An initial 10 per cent tariff reduction took place in 1987.

In the area of industrial co-operation, projects include rehabilitation of rolling mills in Tanzania, Mauritius, Uganda and Mozambique. Intra-regional trade arrangements for iron and steel products have been concluded. Programmes have also been drawn up for rehabilitating chemical and fertilizer plants and engineering industries in the PTA subregion.

APPENDIX 4

METHOD FOR ASSESSING POLICIES

The methodology used to assess policies and institutions relevant to the manufacturing sector is described in figure 1,^{1/} which shows in schematic form the relationships among constraints, policies, institutions, performance indicators and objectives of Zambia's manufacturing sector.

Beginning at the upper left-hand corner are the constraints, the "givens" or uncontrollable variables which can prevent even the best-designed policies and institutions from achieving development objectives. Constraints can be both internal and external. In Zambia's case, at present, the main external constraints are the level of world economic activity, the terms of trade along with the price of copper, the landlocked position of the country and the political situation in the Southern African region. The main internal constraint is the dependence of the manufacturing sector on the copper industry for foreign exchange.

The policies, or the "controllable variables", are in the middle of the left-hand side of the figure. The main policies directly related to the promotion of manufacturing industry in Zambia are industrial policy and industrial taxation policy. However, a number of agricultural and macroeconomic policies also affect development within the manufacturing sector in many significant ways. Agricultural sector policies promote the production of livestock and field crop inputs for manufacturing plants in the food-processing, textiles and packaging branches, and also relate to extension services, credit, agricultural research and producer prices. Relevant macroeconomic policies concern protection, exchange rates, interest rates, prices, and trade (both domestic and foreign).

At the lower left-hand corner are the institutions, both macro and specific to the manufacturing sector, which establish the framework within which the sector operates. The institutions can also be thought of as the operational arm of policymaking. The main institutions directly concerned with the promotion of the manufacturing sector are the Ministry of Commerce and Industry (MCI), the parastatal "umbrellas" INDECO and ZIMCO, the Small Industries Development Organization (SIDO), the Development Bank of Zambia (DBZ) and the Zambian Industrial and Commercial Organization (ZINCOM). At the macro level, the main institutions which influence developments within the manufacturing sector are the MCI, the Ministry of Finance (MinFin), the Foreign Exchange Management Committee (FEMAC), the Bank of Zambia (BoZ), DBZ, the Export-Import Bank (Exim Bank), the Export Board and the Prices and Incomes Commission (PIC).

1/ This figure is adapted from one developed for agricultural policy analysis by an OECD team. It comes from J. Lecaillon, C. Morrisson, H. Schneider and E. Thorbecke (1987), Economic Policies and Agricultural Performance of Low-income Countries, OECD, Paris, p.44.

Given the policies, some institutions form the controllable variables at the disposal of the policymaker. At the centre are the performance indicators which are affected by the policies and institutions; these indicate progress toward the achievement of objectives, shown in the righthand box. Depending on the extent to which the objectives for the manufacturing sector are being achieved, policies and institutions are maintained on course, or modified or replaced, as appropriate. To be useful, performance indicators should be expressed in quantitative terms. Those relating to the INDP are not quantified, but are expressed either as increases or as decreases in the target variables or objectives.

The arrows, finally, show how the relationships among variables operate as policymakers attempt to achieve objectives. In some cases, as the figure shows, these relationships are bi-directional. Arrow number shows the impact of policies on performance indicators in the manufacturing sector. Arrow 2 shows how institutions affect policies and, thereby, also impact performance indicators. Arrows 3a and b indicate the ways internal and external constraints affect the objectives and performance of the manufacturing sector. The fourth arrow shows the backward and forward linkages between the manufacturing sector and agriculture. Arrows 5a and 5b show that the choice of performance indicators is determined by the objectives set for the manufacturing sector. The indicators in turn are used to assess progress towards achieving those objectives; hence they are bi-directional. Finally, the sixth arrow shows that the objectives set for the manufacturing sector determine the design of the institutions which serve it and the policies which affect its performance.

Figure A-1

Relationships among constraints, policy measures, institutions performance indicators and objectives of manufacturing sector development

