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PROFILES OF KEY BRANCHES OF AGRO-INDUSTRIES IN AFRICA

Studies on the rehabilitation of African industry
No. 13

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PREFACE

As part of the programme for the Industrial Development Decade for Africa, UNIDO's Regional and Country Studies Branch is issuing a series of studies determining the major problems of African manufacturing and the potential for regenerating the sector. The studies are focused on the rehabilitation needs of agro-based industry. This is for a number of reasons.

First, the development of agro-based industries is seen by African Governments as a major vehicle for establishing an industrial tradition based on locally available raw materials.

Second, agro-industries currently dominate African manufacturing industry in terms of value added and play a key role in attempts to diversify exports and overcome foreign exchange constraints.

Third, and more important, agro-industries can provide the means by which African Governments can satisfy their basic needs, in particular their goals for self-sufficiency in food production and food security.

In recognition of the importance of the rehabilitation of key industries catering to basic needs in Africa, the studies concentrate on the food processing subsector. To date, four country case studies of the food-processing subsector in Sub-Saharan Africa (SSA) have been carried out.[1/]

A fifth study has also been undertaken in one North African country - Morocco. The countries selected represent the regional, geographical and linguistic groupings of Africa.

1/ The regeneration of Angolan manufacturing industry with emphasis on agro-based industries (PPD/R.21, 1988). The regeneration of Liberian manufacturing industry with emphasis on agro-based industries (PPD/R.23, 1989). The regeneration of Tanzanian manufacturing industry with emphasis on agro-based industries (PPD/R.26, 1989). The regeneration of Zambian manufacturing industry with emphasis on agro-based industries (PPD/R.19, 1988). Modernization and restructuring of Moroccan manufacturing industry with emphasis on agro-based industries (PPD/R.27, 1989).

A sixth study on Kenya - the regeneration of Kenyan manufacturing industry with emphasis on selected key industries (PPD/R.41, 1990) - another Sub-Saharan Africa is to be completed shortly. For a general survey of the rehabilitation potential of industry in the whole of Africa including agro-based industries, see Regenerating African manufacturing industry: Country Briefs (PPD.97, 1988).

This report brings together in convenient form, branch profiles - branch level analyses, findings and recommendations - drawn from the country surveys cited above. These branch profiles are offered as a first attempt to overcome the current dearth of information on African industry at the branch level. The profiles serve to illustrate the existing and potential linkages between various branches of industry. They also attempt to draw out common constraints and potentials across branches as an analytic input in the elaboration of more consistent and concerted national, regional and international development strategies and co-operation.

The report covers four food processing branches: meat and fish processing, fruit and vegetable processing, animal feed manufacturing and vegetable oil milling. In addition, two branches closely related to food processing are covered, wood processing and packaging materials.

The branch profiles must be seen as only a first round of analysis. They are based on month-long country survey missions to selected African countries by a multidisciplinary team of experts. There is also limited information available on Africa's industry at the branch level. For example, it was not always possible in the country surveys to examine the same branches in all the countries covered. This weakness clearly limits the generality of the analysis presented. It is clear therefore that subsequent more detailed and comprehensive analyses are required to provide the appropriate qualifications and perspective for the profiles presented. On the other hand, the profiles do identify the main areas in which future investigations should be focused.

In sum, the branch profiles presented in this report highlight a key range of issues in a number of key industries in a small but representative sample of African countries. They should not be seen as a comprehensive analysis of branches or industries but rather as a first step towards such analyses.

TABLE OF CONTENTS

TABLE OF CONTENTS
(continued)

LIST OF TABLES AND FIGURES

Chapter 1

Introduction

1.1 The importance of agro-processing in Sub-Saharan Africa[2/]

The most dramatic expression of the economic crisis in many SSA countries is the shortage of essential food products. Some estimates suggest that as many as 25 per cent of the total population of SSA suffers from undernourishment, compared with 21 per cent in South Asia and 7 per cent for East Asia and the Pacific region. While the good crop years bring temporary relief, most African countries have become dependent on food imports. Total cereal imports by SSA countries have to be paid for in scarce foreign exchange. One remedy would be a sustained increase in domestic food production. Many African countries have abundant land resources, and effective stimulation of agriculture would sharply curtail food imports and provide work in the sector that is the largest source of employment in Africa.

Food production covers both the production of crops and the processing of agricultural raw materials by the manufacturing sector. Domestic food processing has become an essential element in basic needs strategies. The food products subsector is the most important industrial subsector in the great majority of SSA countries, and sometimes accounts for as much as 50 per cent of manufacturing output and MVA.

Food processing is an important industry for several reasons. It tends to be labour-intensive, and can play a significant role in reducing unemployment, absorbing labour released by growing agricultural productivity and providing additional jobs during the slack season in agriculture. Also, its technology tends to be relatively unsophisticated. Small-scale processing is therefore often economically justified. It is also important because it creates value added from the processing of agricultural raw materials.

Demand for the products of the food processing branch is generally concentrated in the larger urban areas in the countries under review, with the exception of Morocco. Three centres have a better water and energy supply than the rest of the country, and are the focus of the transport network. When located on the coast, such as Dar-es-Salaam and Luanda, they are the leading ports. For these reasons the main branch processing units (employment in the plants studied was generally between 100 and 500) were situated in the large urban centres.

[2/] The term "agro-based industries" used in this report refers to manufacturing branches that use agricultural products as their raw materials. In Africa these branches tend to use local raw materials, and thus have important backward linkages with the agricultural sector. They also have significant forward linkages with agriculture, an obvious example being animal feed. As already noted, the profiles cover two branches that cannot definitively be categorized as agro-industries, namely wood processing and packaging materials.

Agricultural exports are directed to highly competitive markets, often in developed countries with a strong negotiating position on prices and a wide choice of interested sellers. The result has been low export prices, two examples at the end of the 1980s being coffee and cocoa. As nearly all African countries depend heavily on exports of goods for their foreign exchange revenue, there has been a deterioration in their balance of payments.[3/] Exporting processed agricultural goods would bring more value added to the economy and reduce vulnerability to the sharp fluctuations of the world commodity markets.

The food products subsector can only perform well if it has regular and balanced supplies of raw materials from the agriculture sector, which must therefore be provided with the necessary stimuli for the subsector to prosper. The development of the subsector also requires access to packaging materials, an indispensable element in processing.

Wood processing, like food processing, is based on vegetable raw materials, and has many common problems. Indiscriminate logging has been a major cause of desertification, which is one important reason for the agricultural crises in many west African countries. Exports still predominantly take the form of round logs, which, as with coffee and cocoa, leaves the producer exposed to the world markets. Processing is rarely efficient and equipment ageing, with the result that many African countries endowed with substantial forest resources import secondary wood products. These same producers must restructure their branches to increase their processing activities, thereby slowing the rate of deforestation and bringing more value added to their economies.

1.2 The structure of the branch profiles

The branch profiles are each divided into the following five sections: inputs, output and markets, spatial distribution, linkages, and major problems and constraints.

There are no sections on branch-specific policies and measures in this report since individual manufacturing branches are generally governed by government directives for the sector as a whole, albeit with certain strands common to agro-based industries. Recurrent elements in these policies are higher use of domestic inputs (allied to campaigns to boost agricultural output), improved local supplies of processed food within a basic needs strategy and encouragement for non-traditional exports, such as processed food. In the latter case many governments have given the exporters in question the right to retain a fixed percentage of their foreign exchange earnings. The rehabilitation country case studies have identified certain steps taken that are branch-specific, but in fact echo broader policies for the sector or the economy as a whole. Some examples are listed below:

[3/] Since 1985 the overall balance of payments deficit of the SSA countries has steadily increased from US $4.7 to US $10.8 billion, according to the World Bank's Annual Report 1988, Washington, D.C.

- The Government in Tanzania is committed to raising the nutritional standards of the population and reducing the wastage of fruit through spoilage. To this extent fruit canning is given priority among agricultural processing industries.

- For nutritional reasons the Government of Tanzania aims to increase the consumption of milk, eggs and meat. Accordingly, it encourages the production of stockfeeds.

- Liberian-owned firms in the wood products branch have been encouraged by the Government to form a professional association, the Liberian Wood and Carpentry Industry Association (LWCIA). The Association receives government and external backing, and its principal aim is the development of secondary wood processing.

- The Government in Liberia has decided to lower the duties on imported cereals and vegetable oil, with the aim of improving the flow of inputs to the processing branches which cannot secure adequate supplies on the domestic market.

- In Angola, manufacturers of plastic bags pay only 50 per cent of the duty on imported plastic raw material. This part exemption has been in place since 1975, although it is thought that tariff policies will be revised to remove subsidies within the current SEF programme of economic and financial restructuring.

- In Zambia the Government has embarked on an extensive programme of removing price controls. The programme has not covered certain sensitive commodities, such as cooking oil, which adversely affects the revenue of the oil-milling branch.

Chapter 2
Meat and fish processing

2.1 Characteristics of the branch

2.1.1 Inputs

The meat and fish processing branch was studied in Angola, Liberia and Zambia, but not in Morocco and Tanzania. In the three countries under survey, this branch is dominated by the processing of beef, pork and poultry, and the major species of seafish and crustaceans. Although some fishing takes place on inland waters in Zambia, the available data do not point to any processing activity. In the three countries the branch derives the greater part of its supplies from traditional farming and fishing operations.

In ***Angola***, the raw materials for meat processing have been scarce since the late 1970s as a consequence of the war, which has caused massive displacement of farming communities, and destroyed a major part of the road and railway network. The critical impact of the war is evident from Ministry of Planning statistics, which show that the tonnage of cattle slaughtered fell from 24,500 tonnes in 1973 to 3,700 tonnes in 1985. Within the government's fishing research programme, a method has been developed to replace beef and pork with fish as the basis for sausage production.

The scarcity of beef and pork has forced many meat factories to close down or switch to the use of fish. Commerce & Industria de Huila now produces only canned fruit. The two most important meat companies still in operation are (Fabrica de Alimentados) FAL in Luanda and BUCACO in Huambo. For a decade, FAL has based its products on fish, while BUCACO depends on stray pigs, a necessarily irregular source of supplies that is supplemented, when possible, with imported pork.

However, fresh fish appears to be in abundant supply and is found in the many markets surrounding Luanda at parallel market prices (of Kz 5,000-6,000/kg in September 1988). Dried fish, which local fishermen land and dry in the open air by the roadside, is similarly sold in Luanda.

In ***Liberia***, the development of intensive animal production and meat processing in urban areas has been slow, partly because of a tradition of fish production and processing, which was the principal source of protein for the urban population. However, since 1980 fish processing in the modern sector has come virtually to a standstill as a result of mismanagement at the leading enterprise in the sector, the Mesurado Fishing Complex.

Meat processing firms have been unable to fill this gap. The traditional livestock herd is small. The Ministry of Agriculture estimated a total of only 260,000 head in 1987-88, consisting 50 per cent of goats, 23 per cent of sheep, 21 per cent of pigs and 6 per cent of cattle. The Ministry also estimated a total of 800,000 poultry on traditional farms, of which 95 per cent were chickens and 5 per cent were ducks. Assuming off-take rates of 10 per cent for cattle, 75 per cent for pigs, goats and sheep, and 100 per cent for poultry, and using a base of prevailing average carcass rates, this suggests a current equivalent meat supply of just 4,150

tonnes. With the population estimated at 2.29 million in 1987-88, this implies an annual average consumption of about 1.8 kg meat from indigenous traditional livestock. With few exceptions the meat off-take of traditional farms is consumed in the villages.

In the peak years of 1979 and 1980, commercial, intensive poultry and pig farming supplied an additional 2,200 tonnes of meat per year. Poultry processing appeared the most promising industry in the branch, but most of the large integrated poultry slaughtering units then in operation have since closed. Commercial operations are now reduced to two relatively large units and some 30 small farms which sell the greater part of their poultry production live. Low level capacity utilization is the norm, and there is an emphasis on laying rather than slaughtering. Demand for meat and meat products in the towns cannot be met by these local suppliers. In 1982-85 annual imports of meat, constrained by foreign exchange shortages, averaged 215 tonnes of meat and edible offal, 3,650 tonnes of preserved meat and 6 tonnes of chickens. Data from the Ministry of Agriculture show that in 1986-87 import levels increased to 10,000 tonnes of pork ribs, 5,400 tonnes of frozen poultry, 12,500 tonnes of frozen beef and about 8,000 tonnes of processing meat products.

Pork is the principal input of meat processing firms in ***Zambia***. Pig products, including processed items such as sausages, polonies, cured hams and bacon, account for about 7 per cent of domestic meat consumption in the country. This is a long established trend. Statistics on pig production are incomplete, being largely confined to the traditional sector. The Annual Livestock Report of the Ministry of Agriculture and Water Development show that the number of pigs in the traditional sector remained relatively stable in 1983-86, at around 170,000 head. Estimates by the Ministry put the number of breeding sows in the commercial sector at about 5,200. This total is divided into six large farms, one of them parastatal, with 200-600 sows, ten farms with 50-200 sows, and a number of smaller units with under 50 sows. Recent years have seen a fall in the number of the smaller farms.

Large White and Landrace are the only breeds of significance in the commercial sector, which is characterized by low levels of efficiency. The average number of pigs slaughtered per sow each year is estimated at 11, and the overall feed conversion (defined as the total feed consumed divided by total cold dressed weight) at 7.24. Equally, the feed conversion ratio for slaughtered pigs is put at four to one. The principal reasons for this poor performance are inadequate management standards, and feed that is low quality and in irregular supply.

In the past decade a number of programmes have been launched in the commercial sector within the Integrated Pig Management Scheme. This aims to organize groups of farmers into co-operatives, each with a central management responsible for the supply of feed and other inputs, and marketing and extension services. The following projects were started under the Scheme:

1. An Israeli-sponsored project in the Copperbelt. This co-operative collapsed when Israeli technical assistance was withdrawn.

2. A German-sponsored integrated programme at Monze in Southern province, incorporating management, veterinary and extension personnel, a stockfeed plant and a large number of vehicles. Shortages of spare parts for the feed mill and the vehicles resulted in deficient feed supplies and a general decline in the programme.

Two other Integrated Pig Management Schemes, at Kumbe in Central Province and Chipata in Eastern province, did not progress to the formation of co-operatives. Some individual farmers are currently being supported by the Ministry in acquiring feedstuffs and marketing their production. It appears that the Scheme still provides some assistance with the supply of better bred pigs.

2.1.2 Output and markets

In ***Angola***, total processing capacity of the major firms is about 1,000 tonnes. Detailed statistics are only available for FAL (Fabrica de Alimentados, Luanda), which has a capacity of 465 tonnes of processed products per year. Its output in 1987 amounted to 45 tonnes of fish sausages and 208 tonnes of smoked fish. FAL's total production is said to have averaged 180 tonnes annually for an unspecified period in the 1980s. The domestic market, however, has been estimated at 2,400 tonnes per year, with sales predominantly effected at the factory gate.

In ***Liberia***, meat and poultry processing is currently limited to the artisanal sector. The scale of the domestic market is indicated by imports of 8,000 tonnes of processed meat in 1986-87 (the then fiscal year starting on 1 July), although foreign exchange constraints and informal crossborder trade are both significant factors. Section 2.1.3 provides an indication of the potential capacity of the poultry processing industry.

Output of the branch in ***Zambia*** is not known, although the slaughter of 30,000 pigs in 1986 gives a starting point for an estimate. Two enterprises, ZAPP and Twikatane Farm Products, control about 80 per cent of the market. The report of the UNIDO field mission to Zambia in May-June 1988[a/] concluded, in the absence of a statistical series, that domestic demand is "not satisfied".

2.1.3 Spatial distribution

Until recently, the security situation in ***Angola*** was such that the two areas of branch activity had to be regarded as autonomous regions. It appears that competition between the two areas has not yet resumed. Against the background of these constraints, new investment in any form must be viable both in the present circumstances and in a normalized situation, when massive changes in the competitive environment are inevitable.

[a/] The regeneration of Zambian manufacturing industry with emphasis on agro-based industries, PPD/R.19, 1988.

The principal area is Luanda and its surrounds, where FAL has no serious competitor for its products, notably fish sausages and smoked fish. Other producers are local fishermen, who supply fresh fish directly to the local market.

The second area of activity for the meat and fish processing branch in Angola is the South-western and Southern region. PROTEICA, a meat processing business located in Lubango, used to operate with a large workforce and ageing machinery, and had a rated capacity of 7,000 tonnes per year. However, it was forced to close since farmers were no longer willing to sell their livestock at the official prices. Another enterprise in the branch in the region is BUCACO, which continues to produce a range of sausages and other meat products. Its slightly different range, tailored to the Portuguese taste, and the isolation of the region as a result of the war means that it is not a competitor to FAL.

Data on the geographical distribution of inputs for meat processing (cattle, pork and poultry) are not available. As already indicated, processing plants partly rely on stray pigs. Virtually all operational plants are Government-owned.

In ***Liberia*** subsistence farmers throughout the country are the principal owners and breeders of cattle, pork and poultry. Only a fraction of this production is supplied to the market.

In the Monrovia area, the Baker hatchery had a capacity of 24,000 day-old chicks per week, but ceased to operate in 1980. Its broiler farm, with a capacity of 500,000 broilers per year, closed in 1984. In the Gbarnga area, the Baker unit, as well as the Sangai laying and broiler farm, and broiler processing plant, with a capacity of 1,000 birds per hour, halted production in 1980. A hatchery unit at Sangai was completed, but never commissioned. The only remaining commercial operation is the Bright layer farm at Kakata, which produces about 26,000 eggs per day. A broiler production unit is currently planned for the same site. All poultry processing plants are privately-owned.

In ***Zambia***, slaughtering and processing of pork is concentrated in the Lusaka area, with some activity in the Copperbelt. Animal diseases occasionally prevent the transport of pigs and pig carcasses out of Southern Province. Eastern Province is not currently a source of supplies for the same reason.

The three main producers operate along the 'line-of-rail' in the large population centres, the Copperbelt, Lusaka and Livingstone. As already noted, Zambia Pork Products (ZAPP) and Twikatane Farm Products dominate the market. The latter is a non-profit making enterprise run by a religious sect and based in Lusaka. Its slaughtering capacity is about 20 pigs per shift, supplied both from its own piggery and from sources that also meet the needs of ZAPP. There are reports that Twikatane plans to establish a slaughtering and processing facility in the Copperbelt to supply northern areas. The third producer in question is Lusaka Cold Storage Ltd., a subsidiary of Galaun Holdings Ltd. that trades under the "Luscold" label. Like ZAPP, this company procures its pigs from within a 50 km radius of Lusaka, supplementing the output of its small piggery.

Kyundu Ranch in Lusaka is a smaller operation which largely serves the needs of the expatriate population in the capital. It has reportedly opened recently a small slaughterhouse about 35 km from Lusaka. Other important enterprises in the pork products industry are listed below:

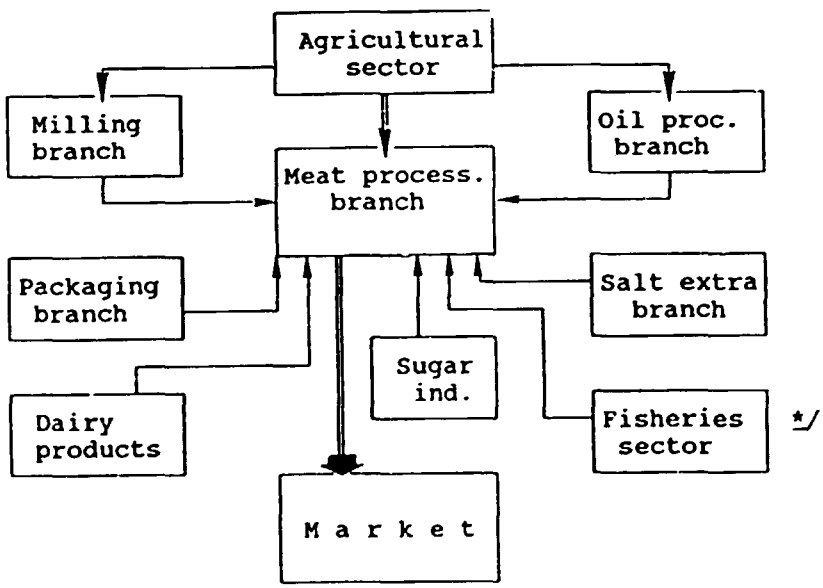
- Buccaneer Products Ltd., Ngwerere, Lusaka Rural
- King Farm Products Ltd., Lusaka
  Mumpilo Products Ltd., Lusaka
- Zambia Cold Storage Ltd., Lusaka
- Lendor Agricultural Products Ltd., Lusaka
- Modern Meat Products, Chingola
- Lyons-Brooke Bond, Ndola
- Copper Harvest Foods Ltd., Ndola
- Mushima,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

It is estimated that Lusaka and its environs account for as much as 90 per cent of Zambia's current output of pork products. Privately-owned enterprises are responsible for virtually all production.

2.1.4 Linkages

The previous sections have illustrated the major backward linkages of the meat and fish processing branch to animal husbandry and fisheries. Other inputs for the branch include spices, vegetable oil, sugar, salt and other preservatives, flour, vegetables, dairy products, casings and packaging materials. Forward linkages are normally with the consumer, although some products of the branch serve as inputs for other industries.

Figure 2.1: Angola - linkages in meat and fish processing



Source: *Report of the UNIDO field mission to Angola in September 1988, The regeneration of Angola manufacturing industry with emphasis on agro-based industries, PPD/R.21, 1988, p.50.*

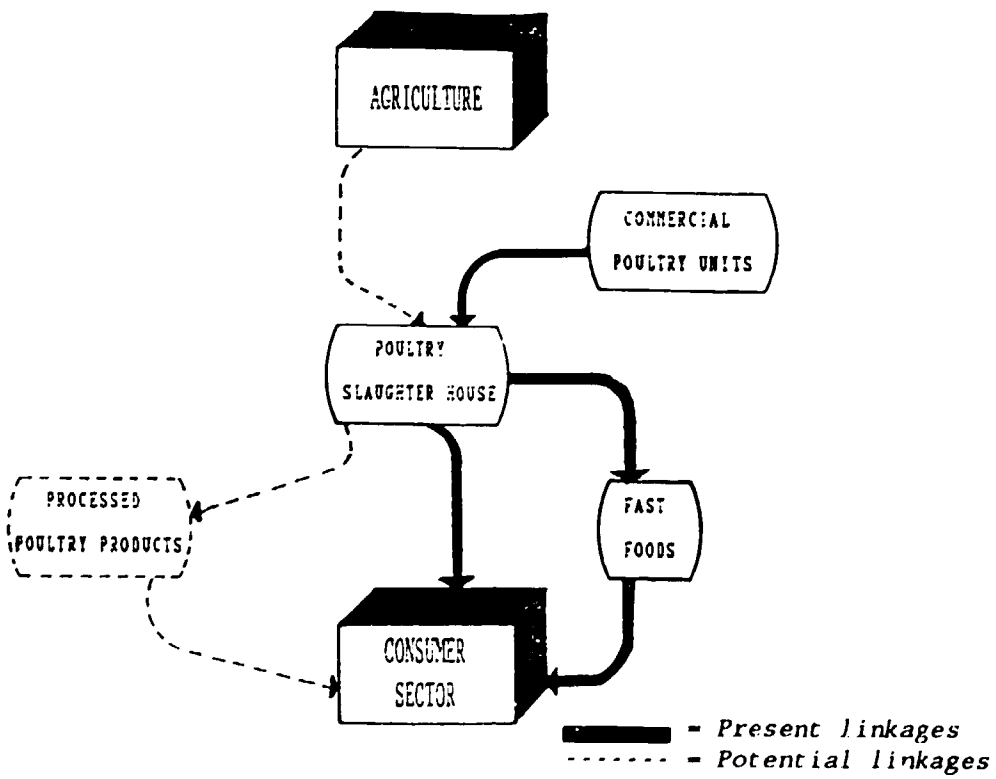
*/*Note:* *This is the temporary supplier of raw materials to the branch until meat and fish are again available on the Angolan market.*

By way of examples, fish and bone-meal can be used by the stockfeed industry, while processed meat and fish can be ingredients for canned soups and deep freeze dinners. The first example is a realistic way of reducing imports where local alternatives exist, but the second will have limited application, in the short term, given the low income levels and the stage of economic development currently prevailing in Sub-Saharan Africa (SSA).

Figure 2.1 highlights the linkages of the meat and fish processing branch in ***Angola***. Almost all inputs required can potentially be provided by the domestic agricultural sector and other manufacturing branches, but this is not currently possible in view of the massive dislocation caused by the war.

The domestic economy is currently able to provide fish and some supplies of pork, salt, flour, vegetable oil and sugar. The limited output of the branch is such that it can broadly manage with the low level of other inputs. Casings are provided by another industry within the branch, slaughterhouses, but synthetic casings, spices, emulsifiers and preservatives are not available. The small volume of importer inputs required by the branch has largely been provided. A substantial proportion of sales are effected at the factory gate, so the shortages of packaging are not currently a constraint. The forward linkage is predominantly direct to the consumer.

Figure 2.2: Liberia - linkages in poultry processing



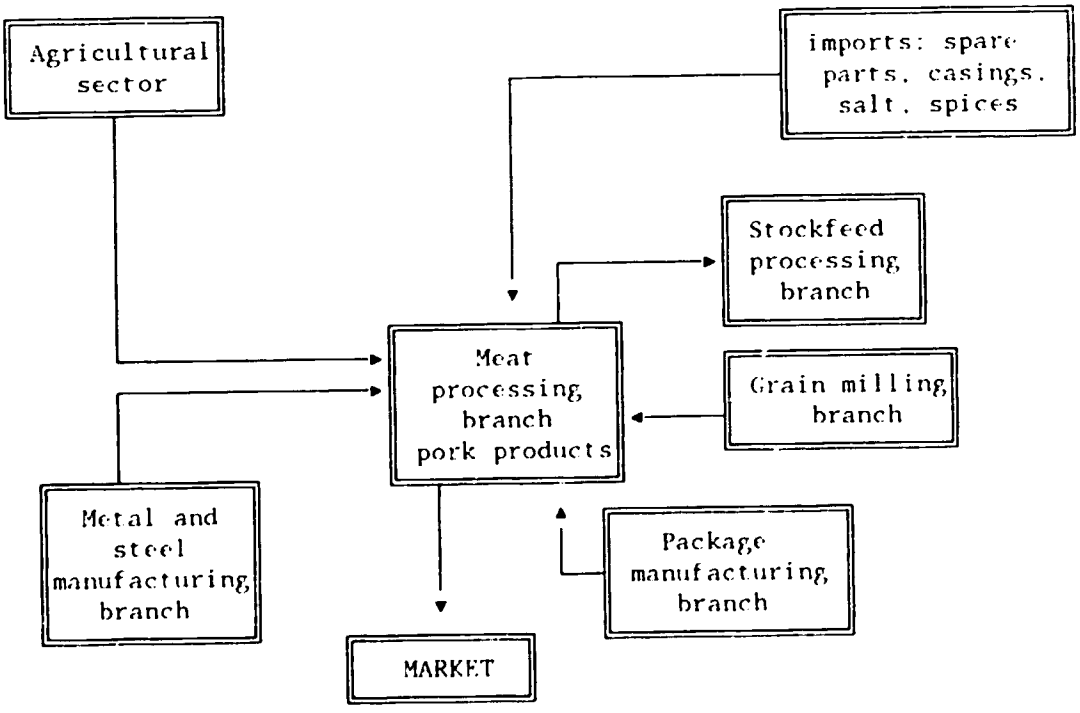
Source: *Report of the UNIDO field mission to Liberia in January-February 1989, The regeneration of Liberian manufacturing industry with emphasis on agro-based industries, PPD/R.23, 1989, p.62.*

Figure 2.2 shows the backward and forward linkages in the ***Liberia*** poultry slaughtering industry. The only commercial enterprise in this industry is at present non-operational. The backward linkages of the industry are with poultry units, with direct links with domestic agriculture. In the long term, the market for live birds is expected to be replaced by one for dressed birds. At that stage the slaughtering industry will most likely draw from sources of broilers and spent hens from egg production on small and medium-sized poultry operations within integrated farms.

The branch would remain relatively independent of other manufacturing branches, as slaughtering, deep freezing and packaging would be its only significant operations. It could perhaps use domestic paper, given the forestry resources, and plastic manufactured locally for its packaging needs, provided that products were tailored for its specific requirements. The forward linkages are both directly to the consumer and to catering enterprises, which are shown as "fast foods" in Figure 2.2. A future forward linkage could be the supply of offal to stock feed plants, which are partly integrated in the branch.

Figure 2.3 illustrates the major linkages of the ***Zambian*** meat processing branch.

Figure 2.3: Zambia - linkages of the meat processing branch



Source: *Report of the UNIDO field mission to Zambia in May-June 1988. The regeneration of Zambian manufacturing industry with emphasis on agro-based industries. PPD/R.19, 1988, p.21.*

Other than meat, the branch produces salt, flour, milk powder, rice, casings and bags for packaging. A limited volume of casings, salt and spices needs to be imported. This branch, in common with others in Zambia, is constrained by the shortage of foreign exchange, but its import requirements are modest and it appears that it is not currently experiencing major problems. As in the other countries under survey, the irregular availability of foreign exchange does adversely affect branch performance when spare parts are required. Forward linkages are both to the consumer and the stockfeed processing industry, which uses offal as an input.

2.2 Major problems and constraints

Two constraints common to the development of the branch in all the countries under review are shortages of raw materials and spare parts. The latter problem is generally a result of foreign exchange shortages, since spare parts have to be imported in the majority of cases. The same constraint, compounded often by low levels of agricultural production, explains the inadequate supply of raw materials.

In ***Angola***, the acute shortage of pigs and cattle is the major problem. This is largely the result of the continuing war which has prevented the raising of animals in many areas, and has seriously disrupted communications between producing regions and the densely populated areas where manufacturers and consumers are concentrated. In certain central areas there is a large surplus of animals. However, this surplus is not marketed because of transport problems and the fact that potential buyers cannot offer acceptable goods, let alone cash, in payment.

Pig supply has also been limited by frequent outbreaks of swine fever, which is said to be caused by the poor state of hygiene prevailing in the state slaughter houses. A further constraint lies in the regular power cuts which damage not only the products and inputs stored in refrigeration chambers, but also the installations themselves since sharp temperature fluctuations create cracks in walls. Moreover, certain production processes require a long and complicated restarting procedure even after a short loss of power. This, in turn, necessitates diesel generator plants, which have to be imported.

In addition the branch must struggle against the high level of pilfering. Cash can buy little, since consumer goods are in very short supply. As a result, raw materials, packaging, spare parts and finished goods are stolen on a large-scale since they offer the means of barter. One factory reports that it receives, on average, 45 per cent less fish for processing than it is invoiced for. It is not uncommon for a factory to lose up to 35 per cent of its stocks.

In ***Liberia*** several poultry slaughtering and processing firms closed after 1982-83 due to mismanagement, inadequate working capital, irregular feed supply and shortages of bank credit. These enterprises still operating encounter major difficulties in importing their principal raw materials (feeds, day-old chicken, packaging and spare parts) because of the scarcity of foreign exchange.

Prior to 1981 the branch was protected by a ban on the import of chickens. Subsequent liberalization of imports brought competition from very low priced European chickens, forcing many poultry operations out of business. This remains a major problem for the surviving firms. Private producers are initiating local contract farming of feed and the establishment of new hatcheries, in an effort to reduce their imports of inputs. This trend is constrained by difficult access to credit at acceptable terms.

The pork products branch in ***Zambia*** suffers from a shortage of slaughtering pigs and, to a lesser extent, inadequate spare parts for essential equipment. These two problems explain the low capacity utilization reported in some firms. In the current sellers' market meat is sold without difficulty but new storage space and equipment, and packaging facilities will be needed once pig production increases significantly

Chapter 3
Fruit and vegetable processing

3.1 Characteristics of the branch

3.1.1 Inputs

The fruit and vegetable processing branch was surveyed in Morocco and Tanzania, but not in Angola, Liberia and Zambia. In ***Morocco*** regional variations in climate, topography and soils, combined with a farming sector that is far more integrated within the modern economy than that in most African countries, have made for a wide range of crops offered for sale. For example, Marrakesh is an important centre for apricots and olive processing, accounting for 75 per cent and 69 per cent of the national total respectively. Larache cans or concentrates 58 per cent of Moroccan tomato output, while Casablanca is the principal centre for vegetable concentrate and fruit juice, with 50 per cent of national capacity. The branch only exploits the raw material base in part, because sales of fruit and vegetables direct to consumers are often more attractive for the farmer. Nonetheless, it manufactures a wide range of food products, and has become an important source of foreign exchange revenue.

Inputs are generally procured through the market, either directly from farmers (often contract growers) or via intermediaries. The latter is the usual source of procurement in the large urban centres such as Fes and Casablanca. However, easily damaged crops (grapes and mushrooms are two examples) and those that must be fresh (like spinach) tend to be procured direct from the farmer. Integrated agro-industrial production accounted for only 10 per cent of total output volume in the later 1980s.

The most important inputs for the branch are citrus fruit, olives, tomatoes, apricots, string beans, cucumbers and dates. Tomatoes are the only crop for which integrated production is significant: this form of production consumed 42 per cent of total inputs used by tomato processors in 1984-85. With the exception of dates, a desert oasis product, the majority of inputs are grown in he North West. Although the agricultural sector can produce high quality inputs, the branch sometimes has difficulties in acquiring adequate quantities because of the already noted advantage to farmers of selling direct to the consumers. The seasonality of inputs and a lack of diversification are other problems for processing firms.

In ***Tanzania***, fruit and vegetable farming is dominated by subsistence farmers, each cultivating a few hectares. Large-scale operations are very few in number, and commercial contract cropping has barely developed. None of the factories in the branch has a significant land area of its own to act as a supply nucleus.

Apart from occasional shortages, however, there is generally an adequate seasonal supply of fruits for processing, such as oranges, mangoes, pineapples, passion-fruit and tomatoes. The problem lies in supplying the factories with fruit regularly and in good condition. There is severe shortage of lorries, none of which are converted for refrigeration and fruit transport. The outlying roads are in a very poor state. This extends the journey time from harvesting to arrival at the factory gate to more than two days on occasions, besides causing extensive damage and losses, which reportedly reach 50 per cent in extreme cases.

3.1.2 Output and markets

Total production capacity of the branch in ***Morocco*** amounted to 773,284 tonnes in 1984. However, utilization averages about 60 per cent of capacity, mainly because of the seasonality of inputs. Since the 1970s, Morocco has greatly increased its exports of fruit and vegetable products, which now account for about one-third of all food exports. Table 3.1 shows the major exports of the branch, illustrated both in tonnes and value (Dirhams = DH). France is the principal export market, with other EEC members importing the greater part of the balance. The domestic market for branch output is relatively limited, since most consumers prefer fresh produce.

Table 3.1: Fruit and vegetable products exported

	January-September 1987		*January-September 1988*	
	(tonnes)	*(1000 DH)*	*(tonnes)*	*(1000 DH)*
Canned vegetables	*40,300*	*373,060*	*42,110*	*410,785*
fruit/vegetable juice	*8,523*	*77,569*	*21,414*	*316,222*
Fruit preserves/jam	*10,572*	*91,326*	*9,472*	*69,497*
Other fruit/vegetable products	*153,437*	*781,724*	*141,546*	*716,549*

Source: Banque Marocaine du Commerce Exterieur.

The Moroccan example is not representative of Africa, although changes are underway in certain African countries. Agricultural exports (principally coffee, cocoa, and tea) dominate foreign exchange earnings for most African countries, but the products in question generally undergo primary processing. Fruit and vegetables are consumed domestically, with output often falling short of demand. However, since the mid-1980s horticulture has developed rapidly in a number of countries, and it has become common to see exotic fruit and vegetables from Kenya, Nigeria and Zambia on the shelves of western supermarkets. In Kenya, it is widely thought that horticultural products will replace coffee as the leading merchandise export by the end of the century. The next step towards the development of the branch on the Moroccan scale will be the manufacture of preserves, jams, chutneys, fruit drinks, pickles and other products for export.

Output statistics on the fruit and vegetable industry in ***Tanzania*** are very limited. Shortages of spare parts and losses of raw materials are known to constrain output. Research has identified export demand for Tanzanian fruit products, but this could only be converted into sales if the quality of the products and packaging is improved, and supply becomes more reliable.

3.1.3 Spatial distribution

The canned vegetable and fruits sector in **Morocco** consisted of 85 privately owned industrial units in 1985, located along the Atlantic coast, and in or near large urban centres in the interior. Many of the units are situated near ports due to the heavy dependence of the branch on the export market, with the exception of condiments which are also sold in bulk domestically. The branch produces:

- condiments
- canned vegetables
- canned fruit
- frozen and deep frozen fruits and vegetables
- fruit juice and vegetable juice
- dried and dehydrated fruits and vegetables

As illustrated in Table 3.2, Marrakesh is the leading production centre, with 26 units, followed by Casablanca with 13. The provinces of Fes and Agadir each have 10 units. Measured by canning capacity, the distribution between the provinces assumes a very different picture. Total annual capacity of 773,284 tonnes divides into about 9,000 tonnes per enterprise. Casablanca, Marrakesh and Larache (the latter the most important area for the canning of tomatoes) account for 33 per cent, 17 per cent and 13 per cent of national canning capacity respectively, with average capacity per enterprise of 19,000 tonnes, 5,200 tonnes and 81,000 tonnes.

Table 3.2: Morocco - distribution of canning factories

Province	*Number of units*	*Products*
Larache	*5*	*vegetables, condiments*
Kenitra	*3*	*green beans, citrus fruits*
Casablanca	*13*	*condiments, vegetables, citrus and other fruits*
Mohammedia	*1*	*vegetables*
Rabat	*1*	*vegetables*
Agadir	*10*	*tomatoes, fruits, gherkins, carobs, bitter almonds*
Taroundant	*1*	*vegetable juice, tomatoes*
Fes	*10*	*olives, capers, fruits*
Meknes	*5*	*olives, vegetables, fruits, gherkins*
Marrakesh	*26*	*condiments, pimentos, fruits, carobs*
El Kelaa	*2*	*fruits, olives, pimentos*
Safi	*3*	*fruits, vegetables*
Sidi Kacem	*1*	*olives*
Oujda	*3*	*vegetables, fruits, dried and dehydrated fruit*
Khemisset	*1*	*dried prunes and raisins*
Total	***85***	

Source: Ministry of Agriculture, Situation de secteur des conserves vegetables, September 1988.

All these units identified in Table 3.2 would appear to be privately owned.

Date palms are principally grown in the Ouarzazate and Errachida regions, which have attracted date processing. Yields and output levels have fallen by an estimated 50 per cent since the late 1960s due to disease and other factors in both regions, particularly Errachidia.

Date processing has encountered severe difficulties in both valley regions. The company Dattes de Zagora was established in the Ouarzazate region in 1981, but collapsed within two years despite support from UNIDO at the planning and feasibility stages and with the commissioning of the factory. It has since operated intermittently and is now almost at a standstill. In the Errachidia region another processing unit was set up in 1977, but closed down in 1983 under the weight of technical, marketing and financial problems. Attempts are now being made to revive the company. In addition to these operations, the date processing industry consists of numerous small farmers, located in all the date producing areas and processing by traditional means.

The UNIDO survey identified seven of the 26 reported fruit processors in operation in ***Tanzania***. Three are situated in and around Dar-es-Salaam, with one at Korogwe, some 290 km to the north, and a fifth at Dabaga, 500 km to the south-west. The survey also identified a small factory at Mbeya in the far south-west, which has been closed in recent years, and a unit in Zanzibar, which was installed in 1981 but has never functioned.

One of the 26 reported units, many of which are not operating, six are registered as public companies and 20 as private enterprises.

3.1.4 Linkages

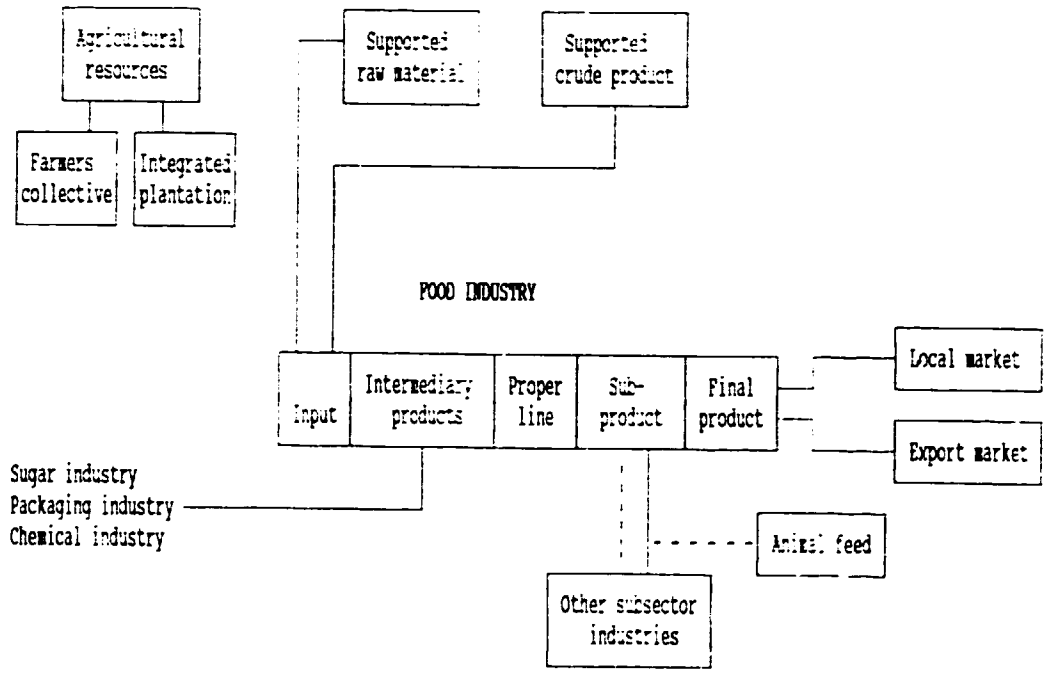
The ***Moroccan*** branch has strong linkages, although these could be improved. The domestic manufacturing sector has access to a substantial raw material base and provides certain intermediates, such as sugar and some preservatives. Some packaging materials are produced locally, as shown by Figure 3.1. However import dependence is greater at this level, with tin cans and glass jars, for example, often imported.

Forward linkages are principally direct to the consumer, both Moroccan and foreign. Some products serve as inputs for other industries, often within the same branch. The latter is the case with tomato paste and condiments, while fruit juice and dried fruits are used by other branches of the food industry. A potential linkage which appears worth exploring is that to the animal feed branch. Wastage is very common in this branch and opportunities to recycle are now hardly exploited. Vegetable waste, for example, can be used in feed for domestic animals.

The fruit and vegetable processing branch in ***Tanzania*** has backward linkages to domestic agriculture and to the packaging branch. Commercial fruit farming takes place on a very limited scale, so processing plants are almost entirely dependent on small-scale subsistence farmers for their supplies. During the off-season they rely on imported supplies. Special ingredients, such as preservatives, are all imported, as indicated in Figure 3.2.

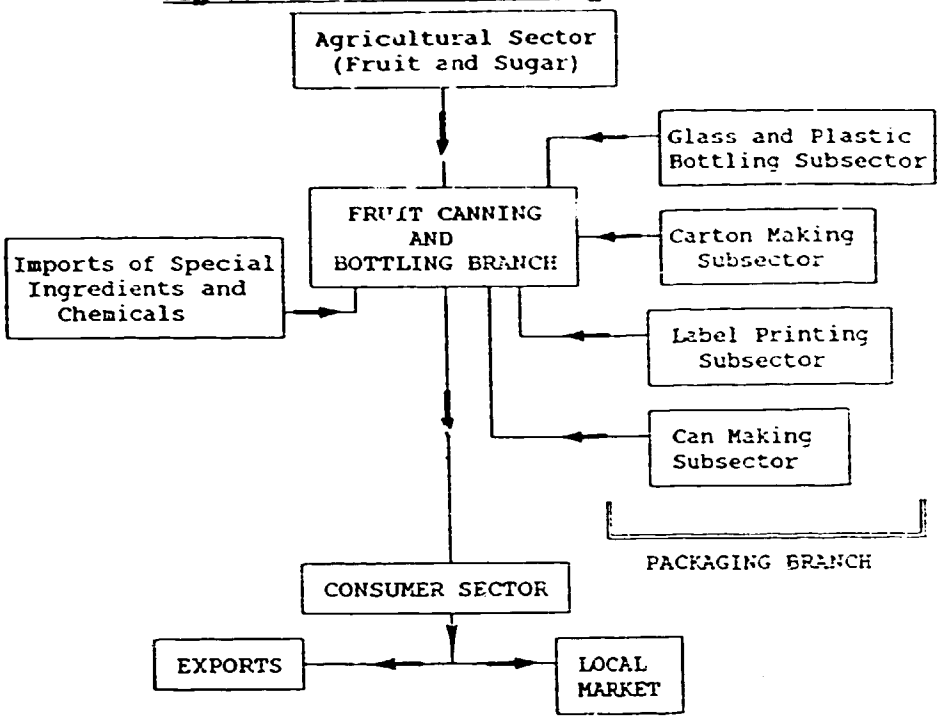
The country boasts only one supplier of cans and one of glass bottles, but neither can meet peak demand for their products. Squash and sauce bottles, for example, must be bought at least six months in advance. Moreover, the quality of the cans is poor, and there are no pilfer-proof, recloseable caps of local manufacture for the glass bottles, which are required by the regulations of the Tanzania Bureau of Standards. The crown caps used for beer and soft drinks bottles are not suitable for squashes and sauces. The processing units have therefore started to use moulded plastic bottles, made from imported granules and sealed with imported aluminum roll-on caps or locally made plastic flip-top closures. Carton tend to be expensive, and their quality is inadequate. The poor quality of packaging materials is a major constraint to the development of exports by the branch.

Figure 3.1: Morocco - linkages of the branch



Source: *Report of the UNIDO field mission to Morocco in March 1989, Modernisation et Restructuration des Industries Manufacrières du Maroc, en particulier des Industries Agro-alimentaires, PPD/R.27, 1989, p.47.*

Figure 3.2: Tanzania - linkage in the branch



Source: *Report of the UNIDO field mission to Tanzania, in February-March 1988, The regeneration of Tanzanian manufacturing industry with emphasis on agro-based industries, PPD/R.26, 1988, p.49.*

3.2 Major problems and constraints

The branch in ***Morocco*** encounters constraints in terms of inputs, production, cost and price structure, and markets. The liberalization of agricultural prices has given the producer the alternatives of selling to the food industry or the free market. The ensuing competition for raw materials between the industry and dealers has had a speculative effect on prices, and thus on the cost structure of branch products. The main production constraint is that technology and processing lines do not attain international standards. Also the seasonality of inputs means that the capacity utilization rate is only 60 per cent.

As for pricing, the cost structure of some canned vegetables is too high, principally due to high packaging costs. This has reduced export possibilities. The European market is essential for the branch, since, as already noted, Moroccan families generally consume fresh products. The canning industry has given little attention to the development of new products: this could prove a costly oversight in terms of foreign exchange earnings, since the competition of other Mediterranean countries in fruit and vegetable processing is expected to intensify.

The main constraints facing the branch in ***Tanzania*** are the poor quality, irregular supply and high price of its primary packaging materials (cans, and ends, glass and plastic bottles, caps and labels). The same problems apply to cartons. None of the processing units has cold storage facilities, an indispensable requirement because of the irregular

deliveries of inputs. Shortages of foreign exchange severely limits imports of otherwise unobtainable inputs such as preservatives, analytic reagents for quality control, plastic granules for bottles and caps, boiler water treatment chemicals and mechanical spare parts.

Shortages of well trained and qualified management, and of all other higher level staff (accountants, technologists, engineers, and chemists), as well as the lack of training facilities, pose serious problems for the branch.

There is also a critical shortage of double refined sugar, which is required for conservation. It has been reported that its production may cease altogether. Fruit processors would therefore need to import white sugar to maintain their standards. Domestically produced single refined sugar could be used by the branch, but this is also in short supply.

Chapter 4
Animal feed manufacturing

4.1 Characteristics of the branch

4.1.1 Inputs

This branch was covered in Liberia, Tanzania, and Zambia, but not Angola and Morocco. It uses a wide range of inputs, including cereals and cereal bran, oil-seed cake, fish- and bone-meals, offal, salt and other minerals. Most of the inputs could be procured locally, but the condition of the agricultural sector and of upstream industries is such that the branch must live with a high degree of import dependence. In all three countries under review, the branch imports all its essential vitamin requirements.

The stockfeed manufacturing branch in ***Liberia*** has been acutely dependent on imports for its major raw materials (maize, soya-meal, fish-meal and concentrates). Between 1981 and 1984, 20 per cent of Liberian demand for stock feed was met by domestic millers, who imported 80 per cent of their inputs. However, the last Liberian mill was closed down in 1984, and the country has since relied almost totally on imports.

Bright Feed Mill, a poultry operation in Kakata mentioned in Chapter 2, is in the process of installing a feed mill, which was due to start production at the end of 1989. Although the mill plans to use imported maize initially, it hopes to work with supplies purchased from local contract growers in the long-term under arrangements that have not been specified. There is no data on maize production.

Cassava chips, pellets or flour could substitute for imported cereals and other local filler materials for up to 25 per cent of the total feed for layers and 10 per cent for broilers. Rice bran is also a potential input. Rice production amounted to 288,000 tonnes in 1988, and imports to 85,000 tonnes in 1985. Much of the rice is milled in villages, and the bran fed to farm animals. However, the bran that is the residue of commercial rice milling should be collected for further processing. Other potential inputs that are domestically available are pulses, slaughterhouse by-products and fish-meal.

In ***Tanzania*** the branch relies mainly on local supplies for maize, oil-seed cake, wheat bran, fish- and bone-meal, limestone and salt, supplemented by imports on vitamins, amino acids and trace minerals.

Fish-meal has been in short supply since the plant at Mbeya halted operations on a regular basis in 1986. The branch now depends on irregular supplies of small dried fish from the lakes purchased from fishermen and from middlemen at wildly fluctuating prices. Meat and bone-meal has been unobtainable since the abattoir was closed in 1984. Access to oil-seed cake is also limited because several oil-seed processors have broken down. At the same time, supplies of oil-seeds are scarce, mainly as a result of transport constraints.

Imports of essential vitamins, amino acids and trace minerals were severely limited until the recent beginning of Canadian supplies under an aid programme. Branch performance is generally weakened by the low productivity of the agricultural sector and of upstream processing operations, and a shortage of transport facilities.

As with the two other countries under review, the animal feed branch in ***Zambia*** depends on imports of the same essential ingredients, mainly minerals and vitamins. Domestic processing of by-products from slaughterhouses, such as offal, blood and bones, and, to some extent, condemned meat and carcasses, could provide the branch with considerable volumes of inputs. This possibility has apparently not received much attention, and existing rendering plants are not operating efficiently. Cereal inputs are normally produced domestically, but the quality of maize, for example, is generally poor as the prices paid to farmers are set irrespective of quality. Lucerne-meal and fish-meal are not currently used by the branch, but could serve as raw materials.

4.1.2 Output and markets

Domestic output of animal feed in ***Liberia*** is presently minimal. Only the National Milling Company, mainly a producer of wheat flour for human consumption, is manufacturing some bran and compound feeds for stock-breeding: its raw material, wheat, is entirely imported. Its animal feed production level is not known. The new Bright Feed Mill will have a theoretical capacity of 3 tonnes/hour. The Liberian market for stockfeed is estimated at 12,000 tonnes per year, one-third of which is imported, highlighting the opportunities for new domestic units.

The branch in ***Tanzania*** is dominated by the Tanzania Animal Feeds Company Ltd. (TAFCO), a parastatal with total installed capacity of 170,000 tonnes per year. Its largest plant is in Dar-es-Salaam, and has a capacity of 10 tonnes/hour. The smaller privately-owned companies in the branch have an estimated combined capacity of 80,000 tonnes per year. In 1988, the output of TAFCO amounted to a little more than 15,000 tonnes, of which the Dar-es-Salaam unit accounted for 8,000 tonnes. The private sector contributed an estimated 50,000 tonnes towards domestic demand of about 220,000 tonnes.

About 95 per cent of output consists of poultry feeds, the balance being for pigs and cattle, and for special experimental feeds. Sales take place predominantly at the factory gate. There are no imports to cover the large gap between supply and demand. Consequently many farmers mix their own feed, using imported minerals and vitamins. Given the unfulfilled demand in the domestic market for animal feed and also the fact that TAFCO prices exceed those on the international market, prospects for exports by the branch are remote.

Production of stockfeed in ***Zambia*** has fallen from 192,000 tonnes in 1980 to 140,000 tonnes in 1987. Aggregate nominal capacity is put at 244,000 tonnes. The most important producers are indicated below, with their nominal output/24 hours shown in tonnes.

Table 4.1: Zambia - important producers of stockfeed in 1988

	Tonnes
E.C. Milling Ltd.	*120*
National Milling Ltd.	*110*
ZATCO	*90*
INDECO Milling Ltd.	*60*
Chimanga	*30*
Kabwe Milling	*30*

Source: Report of the UNIDO field mission to Zambia in May-June 1988. The regeneration of Zambian manufacturing industry with emphasis on agro-based industries, PPD/R.19, 1988, p.90.

Total demand is estimated at 3,000,000 tonnes/year, but fluctuates with product quality and prices, which are fixed by the Government. There is some interest in Zambian stockfeeds in Tanzania and Botswana, and the branch is exploring regional export possibilities. However, domestic shortages, combined with the current export clearance and licensing system, are expected to constrain export development.

4.1.3 Spatial distribution

No feed manufacturers are presently operational in ***Liberia***, although the Bright Feed Mill was scheduled to start production in late 1989. The latter is privately owned, as were those units at Monrovia and Gbarnga that have closed down.

There are 24 feed plants on the mainland of ***Tanzania***, 14 in Dar-es-Salaam, two in Moshi, two in Arusha and one each in Lindi, Mbeya, Mtwara, Mwanza, Kigoma and Shinyanga. In additional there is one unit in Zanzibar. The four largest plants are located in Dar-es-Salaam, Moshi, Mbeya and Mwanza, and owned by TAFCO, a subsidiary of the parastatal National Milling Corporation. A study of the industrial licenses issued shows that there are at least 16 privately owned units, many of which are newly established but small.

Most of the stockfeed plants in ***Zambia*** are found along the 'line-of-rail', with the exception of some small units that are owned by the Co-operative Unions. 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 provinces. Parastatals account for 95 per cent of output.

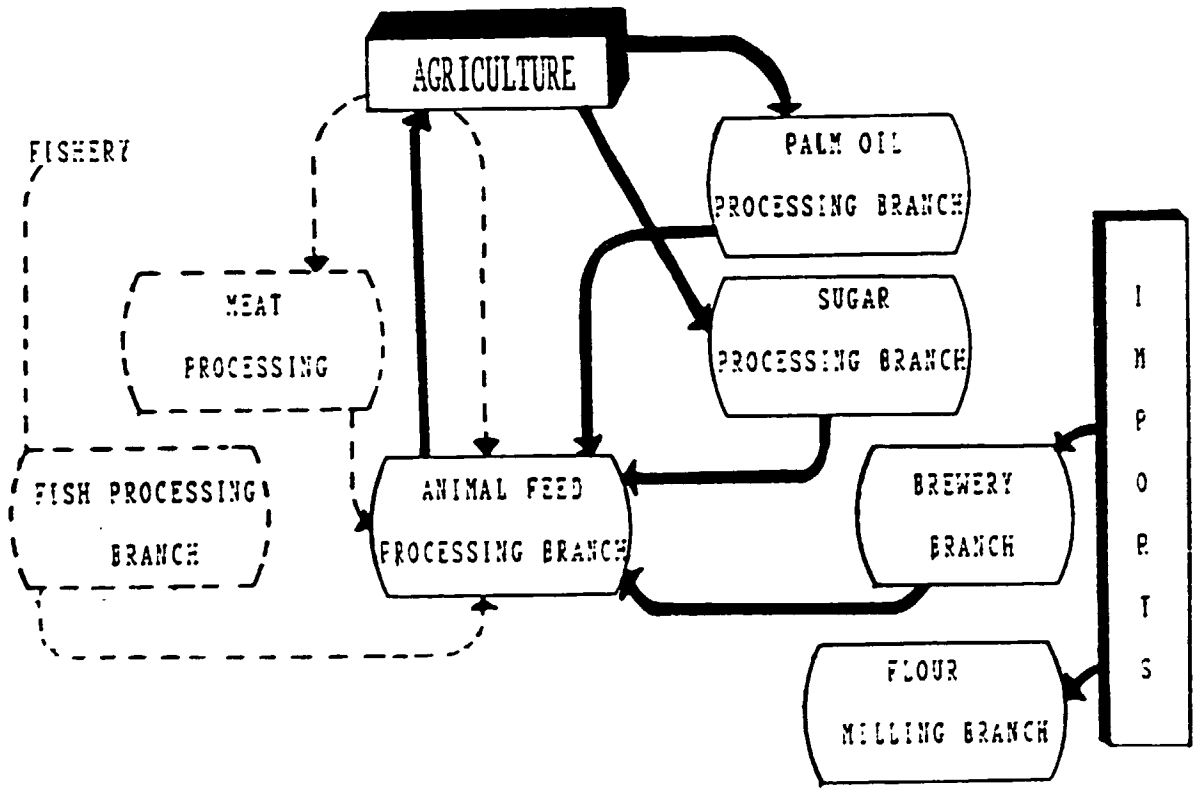
4.1.4 Linkages

A well developed feed industry normally involves a network of backward linkages. The branch may use inputs from the agricultural sector and food processing industries.

In the case of ***Liberia***, where the branch is still in its infancy, the backward linkages are less pronounced. This is indicated in Figure 4.1. It should be remembered that the branch is important for boosting the earnings of many food processing industries by providing a ready market for their by-products and wastes. The "present" linkages refer to the plants that are currently operational.

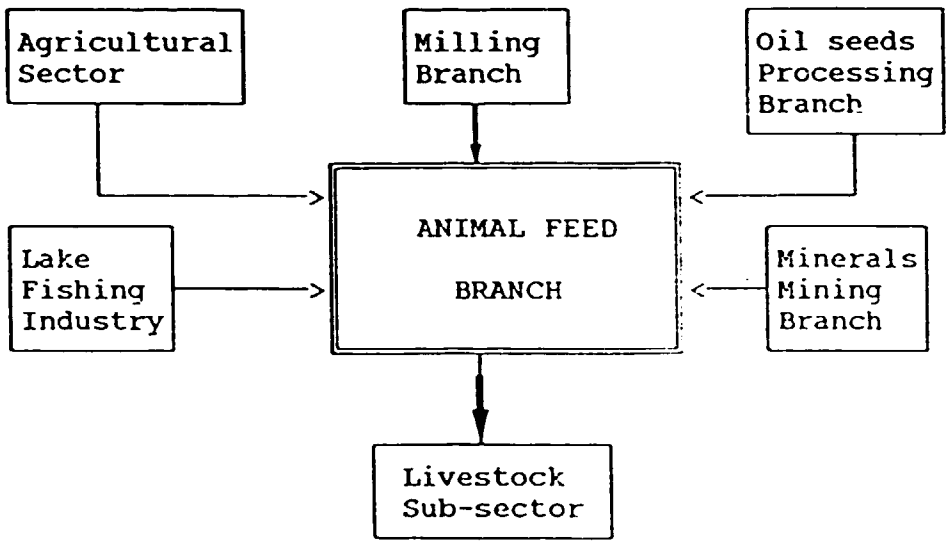
The animal feed branch in ***Tanzania*** has backward linkages to the agricultural sector for grains, the milling branch for brans, the oil-seeds processing branch for seed cake and the fishing industry for dried fish. The forward linkage is to the livestock subsector, as indicated in Figure 4.2

Figure 4.1: Liberia - linkages in animal feed manufacturing



Source: Report of the UNIDO field mission to Liberia in January-February 1989, Regeneration of the Liberian manufacturing industry with emphasis on agro-based industries, PPD/R.23, 1989, p.64.

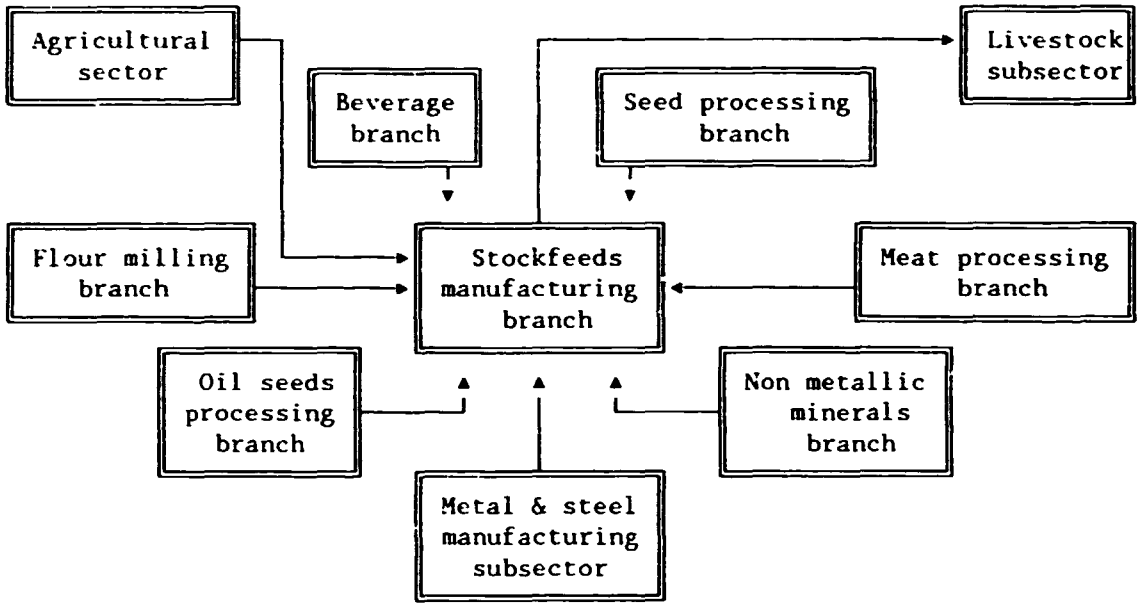
Figure 4.2: Tanzania - linkages in animal feed manufacturing



Source: Report of the UNIDO field mission to Tanzania in February-March 1989, The regeneration of Tanzanian manufacturing industry with emphasis on agro-based industries, PPD/R.26, p.54.

The branch in ***Zambia*** has backward linkages to the agricultural sector and other manufacturing subsectors, notably flour milling, oil-seed processing and meat processing, as illustrated in Figure 4.2.

Figure 4.3: Zambia - linkages in animal feed manufacturing



Source: Report of the UNIDO field mission to Zambia in October 1988, The regeneration of Zambian manufacturing industry with emphasis on Agro-based industries, PPD/R.19, 1988, p.27.

4.2 Major problems and constraints

The branch in ***Liberia*** has four principal constraints. There is a shortage of domestic inputs, since farmers have few incentives to grow and market the necessary products. The branch must also live with a shortage of spare parts and equipment as a result of limited access to foreign exchange. In addition, it suffers from the present weakness of commercial meat production, which results in low demand for animal food. Fourthly, capable managers, technicians and skilled workers are in short supply. The constraints are all inevitable consequences of the low level of ecconomic development. The branch will have to be entirely rebuilt, which itself requires the return of stable economic conditions.

Some of the constraints on the branch in ***Tanzania*** have already been highlighted in the section on inputs. The shortage of key inputs, notably the animal protein supplements, means that branch output often breaches the

specifications of the Tanzanian Bureau of Standards. The absence of regular preventive maintenance and the shortage of foreign exchange to purchase spare parts have led to increasingly regular plant breakdowns and complete stoppages. Inadequate roads and the lack of 7-10 tonne lorries are also substantial constraints.

In ***Zambia*** there are the same foreign exchange constraints on imports of inputs. With offal, there is the additional problem that the structure of relatively small slaughterhouses militates against producers making economies of scale. The branch has the same problems of spare parts shortages and irregular plant maintenance that have been noted in the case of Tanzania.

Laboratory facilities do not exist in most Zambian plants. Given the uneven quality of feed ingredients, this is a major obstacle to quality control. In the absence of adequate monitoring, the finished product is not uniform, and an excessively high fibre content is found in poultry and pig feeds. Protein deficiencies also create lower quality stockfeeds, which results in adverse effects on the quality of the animals that consume them. The Zambian Standards Institute (ZSI) has established national standards for the different types of stockfeed, but these are not enforced by regulations, apparently because there is no body to administer a control system. There are no established national standards for inputs, with the exception of maize.

The pricing of ingredients is set irrespective of the level of impurities, or of protein and fibre content. Consequently, quality suffers as producers have the incentive to keep their costs down. Prospects for the branch would be enhanced if national standards for inputs were established, and stockfeed prices related to quality. These changes assume the creation of an appropriately qualified, independent laboratory to serve the national stockfeed branch. This need is clear in view of the weaknesses of the few existing laboratories: test results are not always quickly assessed and passed to appropriate parties, while there is a low level of co-ordination between quality control centres and individual plants. These quality related constraints in the branch hold back livestock development and weaken efforts to develop export markets once domestic demand is met.

Chapter 5
Wood processing

5.1 Characteristics of the branch

5.1.1 Inputs

This branch was covered in ***Liberia***, and not in Angola, Morocco, Tanzania and Zambia which have limited forestry resources. Almost half of Liberia's territory is covered with forest. Timber harvesting within National Forest Areas and other productive forest land is regulated on the basis of a Forest Management Plan and other government policies. These regulations restrict cutting to cases when the trees felled are replaced by replanting and/or natural regeneration. In reality mining, road construction, urbanization and shifting cultivation patterns have continued to erode the forestry resources. Depletion of reserves have been more severe elsewhere in West Africa, such as Côte d'Ivoire where an estimated two-thirds of the forest has been cut down since 1966, but it is nonetheless obvious that measures must be taken in Liberia to reverse the trend.

An increased volume of wood processing would help to preserve forests for the simple reason that less trees need to be felled to attain the same level of earnings from unprocessed timber. This would encourage better forest conservation practices per se. A similar policy could also be applied to those other African countries that still retain significant forest cover, such as Gabon, Congo and Zaire. A new regulation on exports of wood came into effect in Liberia in March 1988. It imposed an obligation on logging companies to process 10 per cent of extracted logs locally. If implemented, this could boost operational sawmilling capacity by an estimated 25-50 per cent. The example of Zaire has indicated the difficulties in enforcing such a regulation, since authorized logging companies generally operate in remote areas where they cannot be easily supervised.

Current sawmilling operations in Liberia are inefficient. Slabs and off-cuts are used as fuelwood, and large quantities of wood residues and waste are left to rot. Productivity is low and installed machinery is normally underutilized, mainly because roads and logging trucks are poorly maintained. In these circumstances sawmills cannot be properly supplied. This in turn constrains the performance of the secondary wood processing industry, which uses the primary products for further manufacturing and assembly into standardized products (such as scaffolding, partial frames, beams and formwork), non-standard products (building components such as doors, windows and mouldings), furniture, packaging (crates, boxes and pallets), and other products (such as hatches and boats).

Similar problems are reported from the branch in other timber producing countries in Africa. The Government in Equatorial Guinea set itself a target that 60 per cent of its timber would be exported in processed form by 1990, but has fallen far behind its schedule, partly because of deficiencies in the sawmilling industry and partly because of changes in the world market which are explained in the next section. In Congo a plantation company has shown flexibility: its eucalyptus interests near Pointe-Noire (and thus ideally located for exports) were intended for a paper and pulp industry that has not materialized, but the company is now

establishing a joint venture to market a system of cloning that produced hybrid eucalyptus trees which grow as much as 4 cm per day.

5.1.2 Output and markets

Output data on the branch in ***Liberia*** is limited to sawn wood, with monthly production of about 14,000m³. The export component of this total is not known. The domestic market for wood products is modest, given the weakness of the economy which contracted each year from 1983 to 1988. Secondary wood products usually cannot compete with imports, which are less expensive and of better quality. In this context an encouraging example has been set by Ghana, which has developed a furniture industry and started to penetrate overseas market with products of proven quality. The small-scale of the Liberian market is another obstacle to increased processing, although it is not a constraint for other African producers, such as Nigeria and Côte d'Ivoire which are of a scale to make a modest secondary processing industry viable for domestic consumption.

Changes in the developed country market for tropical timber should have benefitted the African producers which export their timber principally in log form. This is because the South-east Asian producers have introduced, and largely enforced bans on exports of unprocessed African logs. However, freight charges to Europe, the principal market for African countries, make African exports uncompetitive in relation to those from South-east Asia. Furthermore, the European market has changing needs: in 1980 it imported 62 per cent of its tropical timber in unprocessed form, but by 1987 the proportion had fallen to 39 per cent. This trend makes still more urgent the development of the wood processing branch in Liberia.

5.1.3 Spatial distribution

Most logging and wood processing operations are located in the major forest reserves in the North-west and South-east of ***Liberia***. The plants are situated at the points of access to main roads or ports, as the branch is heavily dependent on the export market. In terms of the number of companies and employees, primary processing dominates the branch, with exports largely in raw log form. In 1986-87 there were 17 operational sawmills producing sawn timber, veneer and plywood, located in the regions indicated below.

Table 5.1: Liberia - distribution of wood processing units

Forest region	*Country of forestry headquarters*	*Number of sawmills*	*Number of plywood/ veneer plants*
1	*Nimba*	*7*	*---*
2	*Grand Gedeh*	*8*	*2*
3	*Lofa*	*7*	*---*
4	*Sinoe*	*2*	*1*
	Total	*24*	*3*

Source: Forestry Development Authority, Annual Report 1986/87.

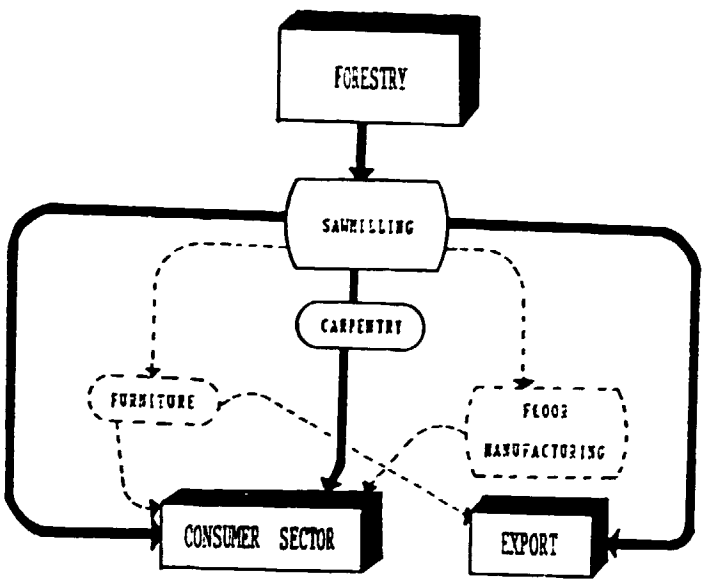
Seven of these sawmills were not operational in 1987. The branch also contains secondary processing units, all owned by Liberians: 16/ were registered with the Liberian Wood and Carpentry Industry Association (LWCIA) in the Greater Monrovia area in 1987. Such units are found in other major towns, but their exact numbers are not known. Private ownership is predominant, with only one sawmill fully Government-owned. The location of units mirrors that in Nigeria, Côte d'Ivoire and Cameroon, and is more logical than in key Central African producers such as Congo and Zaire: sawmills are generally found at points of good access in forest areas, with secondary activities located in or near urban centres.

5.1.4 Linkages

Forward linkages are not well developed in ***Liberia***. Doors, panels, crates and pallets are examples of manufacturing, but the volume of production is modest.

As illustrated in Figure 5.1, sawn timber is also sold to carpenters working for the domestic market. Potential forward linkages are shown in the figure, including export-oriented knock-down furniture industries, and the manufacturing of floor boards and parquet floors for direct installation. Market surveys would have to be made to identify products that can be manufactured at competitive prices and of export quality, but the overall potential for forward linkages is considered good.

Figure 5.1: Liberia - linkages in wood processing



▬▬▬ = *Present linkage*
---------- = *Potential linkage*

Source: *Report of the UNIDO field mission to Liberia in January-February 1989. The regeneration of Liberian manufacturing industry with emphasis on agro-based industries, PPD/R.23, 1989, p.53.*

In other West African countries, a common forward linkage is to the fibreboard, plywood and veneer industry. The furniture industry is dominated by artisanal production, with the exceptions of Ghana and, to a lesser extent, Nigeria and Côte d'Ivoire. As already noted in the section on output and markets, linkages to export markets are weak. Competition from South-east Asia and Europe in secondary wood processing leaves a formidable challenge for African producers such as Liberia. The potential of regional markets, other than Ghana, should be explored.

5.2 Major problems and constraints

The branch in ***Liberia*** faces substantial constraints in all areas. Supplies of wood inputs at competitive prices are inadequate because of the inefficient extraction and transport of logs. Productivity in the sawmills is very low, and secondary processed wood is both non-standardized and of low quality. Operators have great difficulty in reaching break-even point because of high production costs and the low prices in the domestic market.

Lesser-known and relatively inexpensive species of wood are poorly promoted on the local market. The branch suffers from a lack of experienced and trained management, and skilled personnel. Operators have not often recognized the need for short- and long-term planning, and have a poor grasp of pricing considerations and record-keeping procedures. The units tend to be undercapitalized and have restricted access to foreign exchange, so that plants are poorly maintained due to a shortage of spare parts. Institutional credit facilities are scarce, especially for Liberian-owned operations, and loan applications are processed slowly.

These constraints are covered in other studies of wood processing in West Africa,[5] but their gravity differs in the various countries. They are often more serious for secondary than for primary processing, two examples being transport (because the products require more care, and packaging), and trained manpower (because of technical and marketing needs).

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[5] See for example, the country reports submitted to the Regional Meeting for Africa in Preparation of the First Consultation on the Wood and Wood Products Industry, organized by UNIDO in Vienna, 1982.

Chapter 6
Vegetable oil milling

6.1 Characteristics of the branch

6.1.1 Inputs

This branch was surveyed in Angola, Liberia and Zambia, and not in Morocco and Tanzania. Vegetable oil mills can use a variety of inputs: palm-oil fruit, and kernels, cotton seed, sunflower seed, soya beans, olives, groundnuts and coconuts. With this wide range of options for inputs, the branch can operate in most climatological zones in Africa, although the type of technology used will depend on the nature of the input. At the village level, small quantities of the local oleaginous crop are sufficient to permit artisanal processing. Larger scale operations require access to greater volumes of inputs of relatively uniform quality. Supplying the larger plants on this scale often presents difficulties.

In ***Angola*** the branch used to have access to locally produced raw materials, such as sunflower seed, palm-oil seed and cotton seed, for all its needs. Before the civil war it could not use all the inputs and palm-oil seeds were exported (11,500 tonnes in 1970). The massive dislocation and the near abandonment of many rural areas in the war have severely curtailed this supply (Ministry of Planning data show that only 1,190 tonnes of palm-oil were marketed in 1985), making the branch dependent on imports. The single unit operating in the branch cannot function at a profit due to the fixed price structure imposed by the Government, and may well decide to abandon the grinding, pressing and chemical extraction of the seeds. In this case, it would refine crude oil into edible oil and soap. The oil-seeds processing branch would then cease to exist.

In ***Liberia***, palm cultivation and palm-oil processing is divided between modern plantations and mills, and artisanal practices. No area estimates are available for wild palm groves, but a World Bank report claimed that almost 45 per cent of agricultural households make palm-oil traditionally from wild fruits. There is no refinery for crude palm-oil. Imports of refined oil for local consumption averaged L$ 3.85 million per year in 1983-87.

In the late 1960s and 1970s the Government encouraged the modern cultivation of oil-palms and became directly involved. Its target was to satisfy domestic need and then produce for export. In this objective it has been only partly successful. Exports are negligible, and the private sector dominates the branch.

Estimates of the Ministry of Planning and Economic Affairs suggest that the area planted with oil-palms currently amounts to 19,600 hectares, of which 5,600 hectares are run by small-holders under the Government operated oil-palm scheme (the mills on small-holder farms are owned and operated by the Government). The remaining hectares consist of plantations, which are largely Government-owned. The condition of state managed branch operations gives cause for alarm. Most plantations are approaching the end of their natural life of 15-16 years and are poorly maintained, which is characterized by the absence of fertilizer, the low rate of replanting, and irregular and inadequate upkeep. One reason for this decline is that the mills, both small and large, operate at a fraction of their capacity and

have done so for several years, thereby eroding the incentive to replant oil-palm. The yields on smallholders' farms compare unfavourably with those on wild palm groves, primarily due to poor site selection and management, although the planting material (of the Fenera variety) usually gives good results.

The investment plan of ***Zambia***'s Ministry of Agriculture and Water Development (MAWD) Task Force projected the production of oil bearing seeds at 106,000 tonnes by 1988. However, MAWD's final crop estimate put the total crop yield of sunflower, soyabeans and cotton seed at 82,000 tonnes in 1988. Output of groundnuts from oil extraction appears to be about 1,000 tonnes per year. Sunflower production fell dramatically in the first half of the 1980s from 40,000 tonnes per year to 10,000 tonnes, but is now recovering under the stimulus of higher producer prices.

For the 1988-89 growing year there were sizeable increases in producer prices for oil-seeds. These amounted to 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. This, and subsequent increases are expected to lift production levels allowing higher capacity utilization in the industry. Currently large volumes of comparatively inexpensive crude vegetable oil are imported, but on an insufficient scale to meet the needs of the branch.

6.1.2 Output and markets

The sole operational oil-mill in ***Angola*** has a capacity of 5,000 tonnes of refined edible oil per year, with crushing capacity of 30 tonnes per day. Its output in 1987 was 2,461 tonnes of refined oil and 65 tonnes of palm kernel oil. Such data as are available suggest a sharp fall in output since the early 1980s. Mills not currently operational are thought to have total capacity of 5,000 tonnes per year.

The Angolan market for edible oils is estimated at 30,000 tonnes per year, and is largely met by imports, to the extent that foreign exchange availability permits. Domestic sales are normally made at the factory gate. Vegetable oil is considered an essential commodity, and, because of the extreme shortage, a license is required for exports. The manufacturer does not presently envisage exports.

Zambia's oil-seed processing capacity was estimated at about 214,000 tonnes by a USAID study in 1987.[6/] The two largest operators, Refined Oil Products (ROP) and Premium Oils, accounted for about 73 per cent of the total, or 157,000 tonnes per year. Medium size firms processed about 50,000 tonnes of oil-seeds per year, representing 24 per cent of the then total. The balance of 3 per cent (about 7,000 tonnes per year) was processed by roughly 40 small-scale artisanal operators, some of them hand-operated with capacities varying from 12.5 to 180 kg per hour. The Government's Interim National Development Plan, unveiled in August 1987 and since reversed in some key policy aspects, urged encouragement for enterprises producing essential consumer goods, such as cooking oil. It

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[6/] USAID, Study of the oil-seeds in Zambia, Ministry of Commerce and Industry.

envisaged additional supplies of oil cakes for farmers and the stockfeed industry, which currently meets about one-third of demand.

The installed modern oil-milling capacity in ***Liberia*** is highlighted in Table 6.2. Output is low, since some units have been closed down and others operate intermittently. In 1987, modern mills produced about 5,000 tonnes of vegetable oil. The greater part of domestic demand, estimated at 25,000 tonnes per year, is met by traditional village processing. There is no palm-oil refinery in Liberia, so refined palm-oil must be imported. Sales of vegetable oil are effected at the factory gate, and exports are a distant prospect, given the production constraints.

6.1.3 Spatial distribution

The only oil-seeds processing company in ***Angola*** is INDUVE, located about 10 km north of Luanda. It has been operating at a loss for many years. Prior to independence a number of other crushing plants were in operation, five of which are listed below:

- A.A.A., a state-owned company in Catumbela, Benguela;
- UPOHKA, a state-owned company located in Malanje;
- INDUMIL, situated in Huambo, a mill only for maize seeds;
- E.G.C., located in Lobito, utilizing sunflower seeds and groundnuts; and
- CONGERAL, a subsidiary of state-owned Olmag, situated in Luanda.

None of these five plants is operational. The Benguela unit has very old equipment which could not be restarted if sunflower seed supplies were to become available again. The branch also includes the following factories producing soap with vegetable oil.

Table 6.1: Angola - distribution of firms producing soap and vegetable oil, 1988

	Company	Location	Ownership	Nominal capacity (tonnes/year)
1.	INDUVE	Luanda	Private	6,500
2.	OLMAG	Luanda	State	12,690
3.	BARATA & BARATA	Benguela	State	3,480
4.	SODETE	Huambo	State	4,693

Source: Ministry of Industry.

The five factories listed above are all said to be operational

The state-owned companies account for 36 per cent of branch employment, and the private sector 64 per cent. The three largest producers of edible oils and/or soaps used to be the privately owned INIDUVE, and the state-owned OLMAG and RGC.

The palm-oil processing branch in Liberia consists of a few modern crushing mills, the location of which is shown in Table 6.2, as well as many small village units that crush by hand for local consumption. The kernel crushing mill is situated in the Monrovia Free Zone. As already noted, the larger units are either closed or running at very low capacities.

Table 6.2: Liberia - distribution of the palm-oil sector

Company	Plantation size (acres)	Installed milling capacity (tonnes/hour)	Country location
WACC	4,000	10	Grand Cape Mount
Butaw	5,800	10	Sinoe
Decoris	14,000	4	Maryland
Foya	2,500	6	Foya
Dube	1,100	1	Grand Gedeh
Zlea Town (village processing)	1,000	0	Grand Gedeh
Kpatawee (village processing)	1,000	0	Bong
Totota	900	1.5	Bong
Madco	700	1	Fendell
Libinc	6,500	10	Grand Bassa

Source: SOCFINCO, Study on palm.-oil processing sector, 1985.

The Government operates oil-mills on smallholder farms (which cover 73.7 per cent of the existing planted area) and on concessions, and owns, or is the majority shareholder in, 73.8 per cent of the total milling capacity in the country. Libinc, a private company located in Buchanan, supplies industrial oil to Rainbow Industries for soap manufacture, and appears to be the most successful operation.

In **Zambia** about 89 per cent of the oil extraction capacity is accounted for by a small number of units situated in the Lusaka and Copperbelt regions. One plant, located at Kalite in Eastern province, has about 6 per cent of crushing capacity, while another at Choma in Eastern province has about 2 per cent. Small-scale operations in the Copperbelt, Central province and Lusaka claim the balance of 3 per cent. Table 6.3 shows the percentage distribution of processing units by province.

Table 6.3: Zambia - distribution of oil-seed mills

Province	Per cent
Lusaka	27
Central	15
Copperbelt	9
Southern	31
Western	1
North Western	5
Northern	12
Total	100

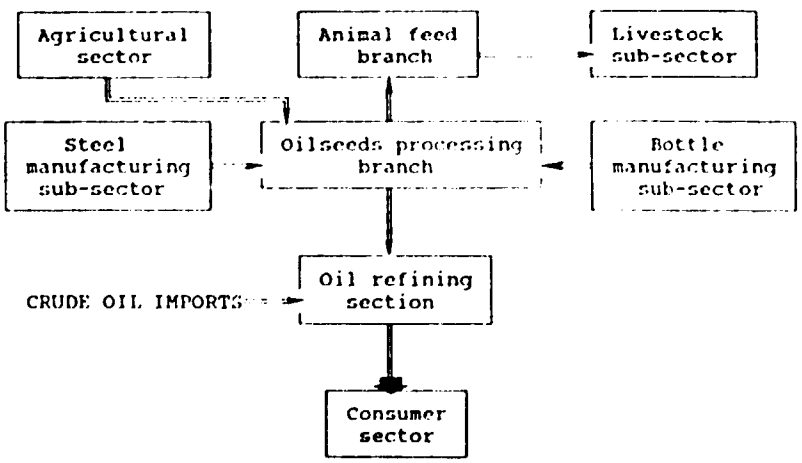
Source: Report of the UNIDO field mission to Zambia in October 1988. The regeneration of Zambian manufacturing industry with emphasis on agro-based industries. PPD/R.19. 1988. p.25.

Oil-seed processing in Zambia is dominated by the parastatal INDECO which accounts for 75 per cent of the branch. The balance of 25 per cent is privately owned.

6.1.4 Linkages

In **Angola** the oil-seeds branch has a potentially strong backward linkage with the agricultural sector for its raw materials. As indicated in Figure 6.1, there is an existing backward linkage to the bottle manufacturing industry for its container needs and to the steel manufacturing subsector for its spare parts. The branch has a direct forward linkage to consumers and the animal feed industry and hence, because oil-seed cake is a by-product of milling, to the livestock subsector. It also has an indirect forward linkage to consumers through soap manufacturing.

Figure 6.1: Angola - linkages to oil-seed processing



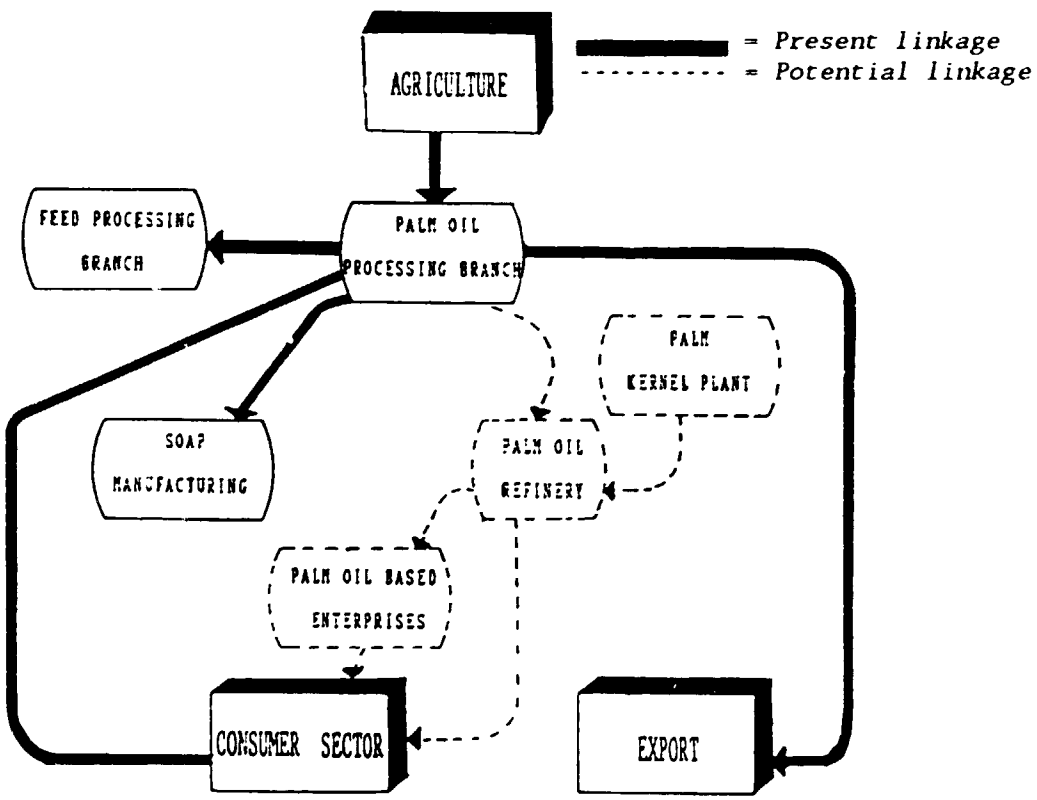
Source: Report of the UNIDO field mission to Angola in September 1988. The regeneration of Angolan manufacturing industry with emphasis on agro-based industries. PPD/R.21. 1988. p.53.

The backward linkage is currently to the foreign agricultural sector, whereas previously inputs were available on the domestic market. The forward linkages to consumers and the animal feed/livestock industry have been greatly weakened, and now depend on one processor, INDUVE. This linkage will disappear, if INDUVE decides to abandon grinding, pressing and chemical extraction of seeds, and start to import oil for refining. In the short term, manufacturing capacity in this branch could be strengthened by a technical assistance programme for rehabilitation at INDUVE.

In ***Liberia***, the branch has a backward linkage to agriculture, and two forward linkages to soap manufacturing and stockfeed processing. Some crude palm-oil is sold directly to consumers, while the small balance is exported. Present and potential linkages are shown in Figure 6.2. To strengthen linkages, MVA and employment, rehabilitation of the existing palm kernel processing plant should be considered. This would give the palm-oil extraction units a market for the kernels, which are presently used as fuel or discarded.

A palm-oil refinery has been considered by the Government on the basis of a UNIDO feasibility study in 1978. The survey concluded that demand in the domestic market and in the Mano River Union would justify the plant. Refined oil availability would enable the branch to exploit further forward linkages.

Figure 6.2: Liberia - linkage in palm-oil processing

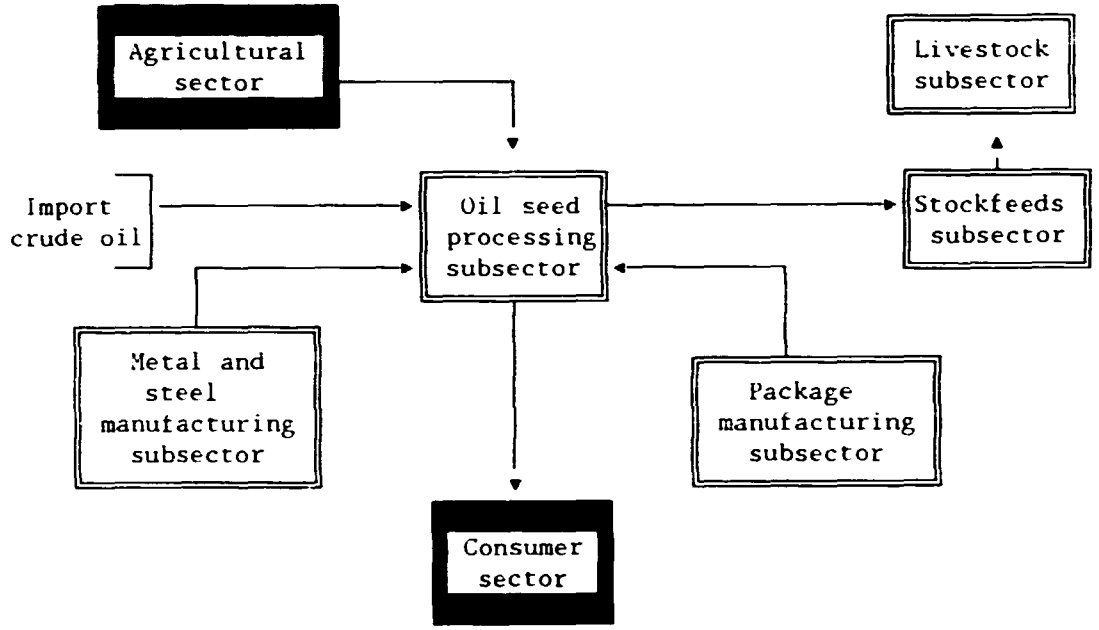


Source: Report of the UNIDO field mission to Liberia in January-February 1989, The regeneration of Liberian manufacturing industry with emphasis on agro-based industries, PPD/R.23, 1989, p.58.

The major linkages is the oil-seeds processing branch in ***Zambia*** are highlighted in Figure 6.3. The pattern is straightforward, and similar to

that in Angola and Liberia, although the backward linkage to agriculture is better developed in Zambia than the other countries. The linkage with the stockfeed industry is also strong: in several cases, the latter operated adjacent to oil-seeds processing in the same plant.

Figure 6.3: Zambia - linkages in oil-seeds processing



Source: Report of the UNIDO field mission to Zambia in October 1988, The re generation of Zambian manufacturing industry with emphasis on agro-based industries, PPD/R.19, 1988, p.24.

6.2 Major problems and constraints

The major problem facing the branch in ***Angola*** is the pricing of its main product, edible oil, which is termed a strategic commodity. The controlled prices are so low as to discourage any new investment in the branch, even assuming the removal of other constraints, since there are no prospects of making a profit from the business. At the same time, investors would have to achieve an unrealistically high level of capacity utilization to compensate for the low prices, but this is not possible because the seeds have to be imported and foreign exchange availability does not currently extend to regular access for the branch.

Without locally produced raw materials, and adequate foreign exchange for both spare parts and experienced expatriate engineers (to train local personnel), the branch allowed its plant to deteriorate and may start to import crude oil for refining. Moves towards internal stability would initially free foreign exchange resources presently allocated to military expenditure and then, over a longer period, create an environment in which Angolan agriculture can again become a supplier of inputs. A renaissance of rural communities would also require major public investment in roads and power supplies. While the civil war lingers, the Government has various policy options that are widely believed to offer encouragement for industry: one such is the removal of price subsidies, as that on edible oil, and tentative steps towards economic reforms have been hinted at.

The principal constraint on the branch in ***Liberia*** is the absence of coherent development policies and targets. This is a crippling weakness of the whole economy, with the possible exception of some raw materials extraction industries, such as iron ore. Therefore, the branch is also

various policy options that are widely believed to offer encouragement for industry: one such is the removal of price subsidies, as that on edible oil, and tentative steps towards economic reforms have been hinted at.

The principal constraint on the branch in ***Liberia*** is the absence of coherent development policies and targets. This is a crippling weakness of the whole economy, with the possible exception of some raw materials extraction industries, such as iron ore. Therefore, the branch is also constrained by flaws in present and potential linkages. Most plantations are poorly managed, while oil-palm reserves have been partly destroyed by inadequate upkeep and harvesting techniques. Uncollected crops have been left on trees on occasions because of the insufficient capacity of the mills. A potentially strong raw material base has become neglected and underutilized.

Deficiencies of management and working capital mean that all plants operate intermittently, at very low output levels, resulting in high production costs and operating losses. Furthermore, a prevailing low level of skills and, more importantly, a lack of motivation among employees due to low salaries and non-payment of wages also reduce productivity. Plant breakdowns and closures are common because of foreign exchange shortages and poor planning or spare parts imports.

Major constraints to full capacity utilization in ***Zambia*** are inferior equipment, including non-existent or poor cleaning facilities, a lack of spare parts, a poor working environment and irregular raw materials supplies.

The oil-mills tend to be technically unsophisticated and ill-suited to the type of input, and the equipment is generally old. The result is that the efficiency of oil extraction suffers. The inadequate cleaning facilities mean that impurities enter the machinery along with the seeds. The constraint of spare parts shortages is accentuated by the advanced age of most machinery in the branch. There is no spare parts manufacturing industry in Zambia, which leaves the branch vulnerable to the familiar problem of securing foreign exchange for imports.

Domestically produced oil-seeds cannot compete effectively with low priced imports of crude oil, illustrating the need for some incentives to stimulate growers. In any event the quality of the local inputs is adequate, seen in the already noted presence of impurities which damage all moving parts, especially the expeller screws. This invariably leads to poor equipment performance, increased maintenance needs and breakdowns.

Many mills have the additional problem of price controls. There is usually a time-lag between an increase in the price of inputs and a rise in the price of edible oils. The resulting losses in earnings have led to some production stoppages. Companies combining the production of oil-seeds and stockfeed have been able to absorb the losses by raising their stockfeed prices.

Chapter 7
Packaging materials

7.1 Characteristics of the branch

7.1.1 Inputs

This branch was surveyed in Angola, Tanzania and Zambia, but not in Liberia and Morocco. The branch offers a wide range of products and uses inputs from a variety of sources, including agriculture, paper mills, and glass and chemical industries. This discussion concentrates on materials with a potential linkage to agriculture and forestry. Sheet polyethylene bags are important as lining for fertilizer bags, but much less utilized for agricultural and agro-industrial purposes.

Bag manufacturing in ***Angola*** is mainly based on synthetic materials. Bags for cereals and coffee used to be made of jute, but in 1975 the only production line was closed. The raw materials for natural fibre bags used also to be produced locally, but the disruptions of the civil war have brought total dependence on imported synthetic substitutes, mainly from the Federal Republic of Germany.

In ***Tanzania*** paper bags and cardboard boxes are produced by the paper and pulp branch. The principal input, pulp, is manufactured within the branch. The main supplier is Southern Paper Mills (SPM) at Mufindi, and has installed capacity of 90,000 tonnes per year of newsprint, kraft, machine-finished paper and pulp.

Most other converters rely on SPM to a great or lesser extent for paper (kraft and machine-finished) and/or pulp. The paper and pulp mill division of Kibo Match Corporation at Moshi is independent of SPM, but has difficulty in securing reliable and reasonably priced waste paper supplies from Dar-es-Salaam. It manufactures board for conversion to plain cartons.

Kibo Paper Industries in Dar-es-Salaam relies on SPM for unbleached pulp for manufacture of its corrugated carton board, as well as kraft paper for conversion to cement and grain sacks. It procures the thicker white-lined boards from Kibo Match Corporation.

Twiga Paper, also located in Dar-es-Salaam, is almost entirely dependent on SPM for supplies of kraft liner and text liner for corrugated board manufacture, and kraft paper for conversion into grocery and other bags. It also uses some yellow-machined paper from SPM for tea-bags. The quality of the paper is inadequate for exports, and the company uses imported machine-glazed paper in its place.

The bag manufacturing industry in ***Zambia*** is almost exclusively dependent on imported raw materials, making it very vulnerable in view of the foreign exchange constraints. The UNIDO survey found in mid-1988 that the foreign exchange cost of these imports was estimated at ZK 45 million per year (although subsequent currency devaluations have boosted these costs). Polypropylene and polyethylene granules are imported from Europe. There has been a steady increase in the price of polypropylene from US $950/tonne in 1983 to US $1,550/tonne in 1988. The price of polyethylene increased in the same period from US $650 to US $1,600/tonne. The mission also found that jute prices were US$ 483/tonne for BWC quality and US $452/tonne for BWD quality.

Alternative sources of natural fibre have been investigated in an effort to save foreign currency costs. Kenaf has been identified as the most suitable alternative for jute. Its fibre is of similar colour, length and smoothness, and it is stronger and more resistant to decomposition. It can be easily grown in Zambian agro-climatic conditions, and processed with the same type of equipment as jute. A kenaf development programme has been launched. It is the Government's view that Zambia should become self-sufficient in natural fibres for manufacturing bags for grain, coffee, hessian cloth and twine. The survey concluded that the Government should consider possibly cheaper alternatives to jute, such as sisal, before funding programmes to produce kenaf.

The production target for kenaf during Phase I of the plan (1987-88) was 360 tonnes, estimated to require cultivation on 450 hectares. In phase II (1989-93) 1,500 tonnes would be produced on about 1,900 hectares. Rolled kenaf was priced at ZK 3.50/kg for grade A fibre and ZK 2.50/kg for grade B fibre in the 1986-87 growing season. In 1987-88 farmers were paid ZK 3.60/kg regardless of quality, as the Government sought to encourage interest in growing kenaf. In 1988-89 the producer price of kenaf fibre was raised to ZK 6/kg, which was then equivalent to US $0.67. This price was set considerably higher than the cost of imported jute, reflecting the Government's wish to boost rural incomes and save foreign exchange.

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

The results of Phase I suggest that the targets set for Phase II may also fall short of expectations without additional efforts. Further producer price increases are necessary to persuade the small-scale farming community to extend their cultivation of kenaf. The branch must improve the co-ordination between the increase in kenaf cultivation and the planned rehabilitation of the KIFCO jute line. Failure to do so is expected to prove costly.

7.1.2 Output and markets

The nominal production capacity and the output of bags in ***Angola*** are highlighted in Table 7.1. It is clear that even the two companies in operation are producing well below their capacity.

Table 7.1: Angola - production capacity and output of bags

Company	Location	Nominal capacity (tonnes)	Output plastic (1987, tonnes)	Output raffia (1987, tonnes)	Output raffia (1)
SIGA	Luanda	7,200	600	1,500	1,500
FIBREX	Luanda	1,800	79	...	780
INSUL	Lobito	1,590	0	N.A.	0
PECLENE	Huambo	720	0	N.A.	0
SOPLAS	Huila	400	0	N.A.	0

(1) After rehabilitation.

Source: Report of the UNIDO field mission to Angola in September 1988. The regeneration of Angolan manufacturing industry with emphasis on agro-based industries. PPD/R.21. 1988. p.59.

In 1987 output of raffia bags amounted to 679 tonnes, equivalent to about 4.2 million bags (of 50 kg). If the two operational manufacturers were rehabilitated and able to function without any major constraints, their output would rise to 2,280 tonnes per year, corresponding to about 40 million bags. The domestic market has been estimated at 6.5 million bags per year. The return of internal stability would lead to a strong expansion of economic activities, including an increase in the demand for bags.

At present, bags are principally sold to Government agencies in Luanda, usually at the factory gate. The unmet level of domestic demand and the erratic quality of the product have deterred any serious consideration of exports.

Total output of paper packaging materials in **Tanzania** cannot be accurately estimated, because data on the smaller enterprises are not available. The four largest products have a combined capacity of 112,000 tonnes/year. The branch has two very different elements: a highly competitive, limited market for cardboard boxes and an undersupplied, less competitive market for paper bags. Purchasing interest is dominated by Dar-es-Salaam, although the proposed rehabilitation of the national transport network should broaden the market for branch products. The quality of materials is presently too low for export markets.

In **Zambia** total demand for woven bags is estimated at 70 million, of which about 60 million are synthetic and 10 million made from natural fibres, mostly jute. Domestic output of polypropylene and jute bags runs at about 225 to 30 million, and 0.25 million respectively.

Although imports fill the gap, there is a good market for synthetic bags in Zaire and Burundi during the three to four months when demand in Zambia is low. The market for jute bags in neighboring countries is conceded especially encouraging. However, inefficient raw materials purchasing and other production constraints currently prevent exploitation of these markets.

7.1.3 Spatial distribution

The five bag manufacturing enterprises in ***Angola***, largely privately owned, are located in Luanda, Lobito, Huila and Huambo. The four cities were formerly important manufacturing centres. The only two firms making raffia bags that are currently operational are situated in Luanda. The location of the plants at Luanda and Lobito (not operational) should facilitate their necessary imports of raw materials (plastics), since both cities are also ports, but their supplies have regularly been interrupted by transport and payment delays.

Most units in the branch in ***Tanzania*** are small to medium size, and concentrated in Dar-es-Salaam because it constitutes a very large market. Eight units are located in Dar-es-Salaam, and one each in Tanga, Arusha, Moshi, Zanzibar, Iringa and Mosi.

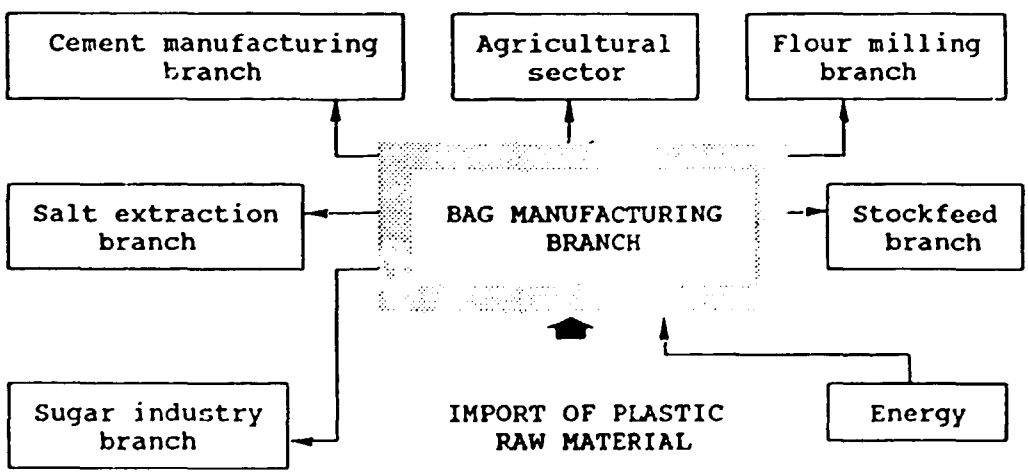
The four largest processors are Southern Paper Mills (SPM) in Mufindi, 720 km from Dar-es-Salaam by road via Iringa and Makambako, or 600 km by rail; Kibo Match Corporation, situated on the outskirts of Moshi, about 560 km from Dar-es-Salaam by road or rail; and Kibo Paper Industries and Twiga Paper Products, both in Dar-es-Salaam. Of the largest enterprises, only Kibo Paper Industries and SPM are publicly owned.

Information on the spatial distribution of the branch in ***Zambia*** is limited. One bag manufacturer is located in Kabwe, and another along the 'line-of-rail' connecting the Copperbelt with Lusaka and its environs. Privately owned firms provide 86 per cent of branch output.

7.1.4 Linkages

The branch in ***Angola*** has strong forward linkages to the agriculture sector, and the food industry and other subsectors, as illustrated in Figure 7.1. Backward linkages are weak since the branch is largely dependent on imports of plastic raw materials.

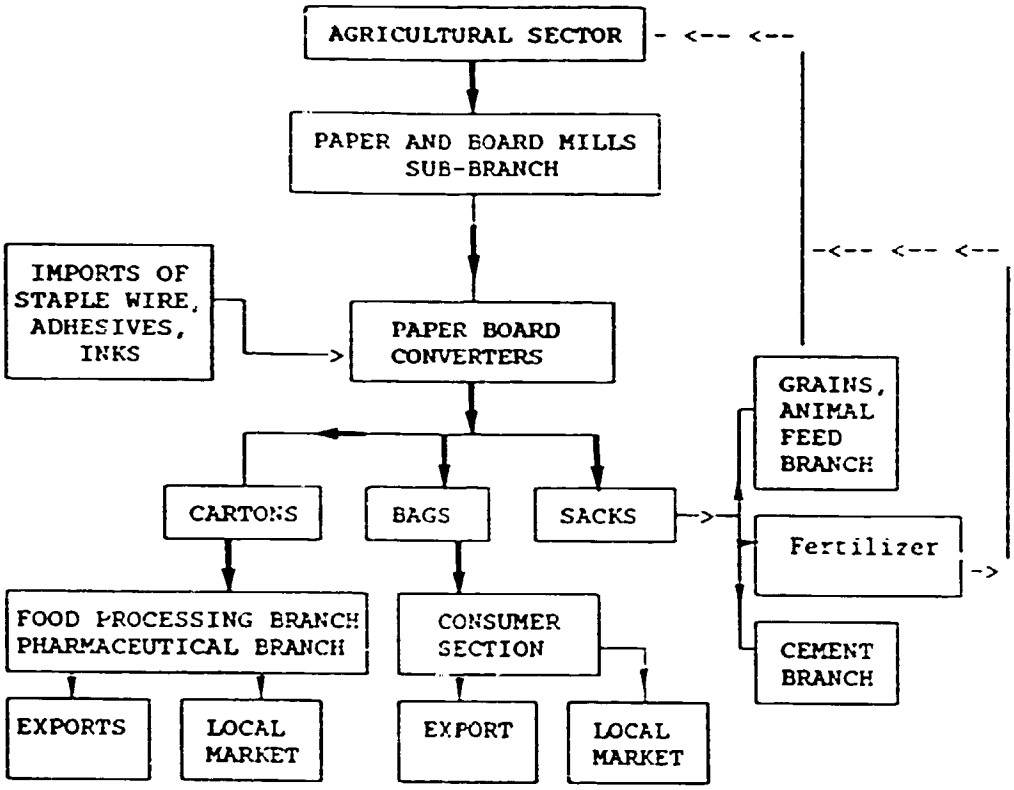
Figure 7.1: Angola - linkages in bag manufacturing



Source: *Report of the UNIDO field mission to Angola in September 1988, The regeneration of Angolan manufacturing industry with emphasis on agro-based industries, PPD/R.21, 1988, p.61.*

Linkages in the paper processing branch in ***Tanzania*** are shown in Figure 7.2. As well as the backward linkages to the paper and board mills sub-branch, and indirectly to the agriculture and forestry sector, there are numerous forward linkages to the food processing, pharmaceutical, fertilizer and cement branches, all of which serve domestic and export markets. It should be recalled that one input is waste paper, which cannot be classified as a "product" of any branch.

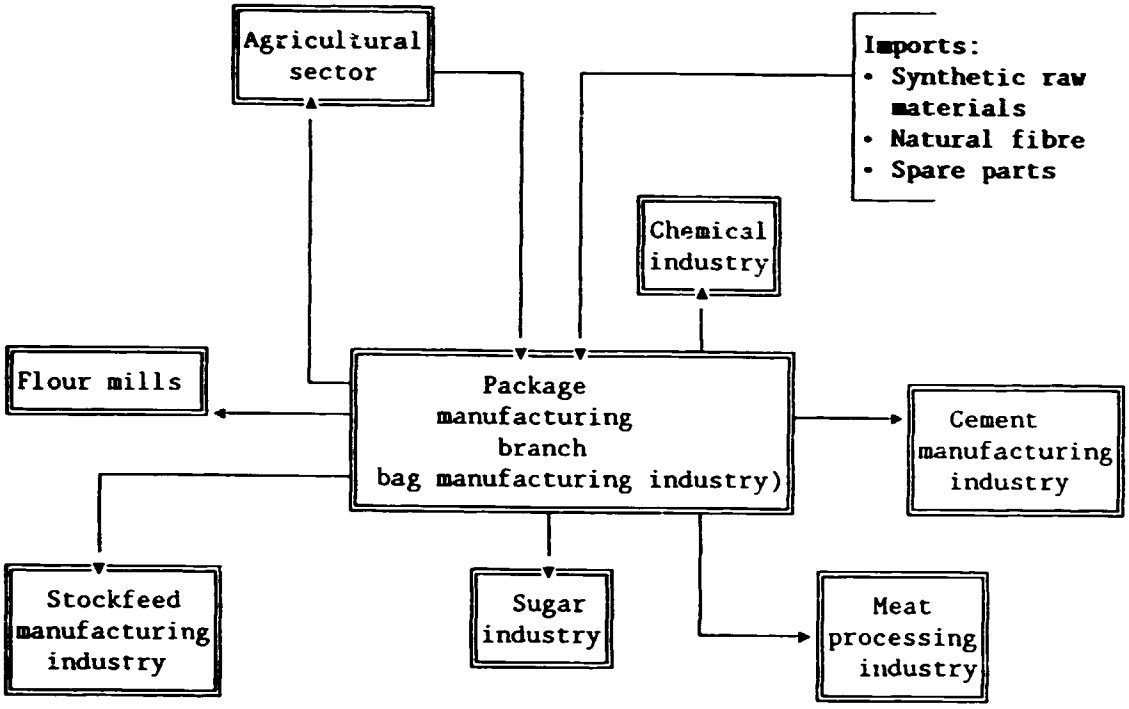
Figure 7.2: Tanzania - linkages in paper processing



Source: *Report of the UNIDO field mission to Tanzania in February-March 1989. The regeneration of Tanzanian manufacturing industry with emphasis on agro-based industries. PPD/R.26, p.52.*

Bag manufacturing in ***Zambia*** has a large number of forward linkages, although its backward linkages are extremely weak. Figure 7.3 highlights the present situation, and points to the importance of the branch to a comparatively large number of manufacturing subsectors.

Figure 7.3: Zambia - linkages in package manufacturing



Source: Report of the UNIDO field mission to Zambia in May-June 1988. The regeneration of Zambian manufacturing industry with emphasis on agro-based industries. PPD/R.19. 1988. p.29.

7.2 Major problems and constraints

Plastic raw materials for the branch in ***Angola*** have become increasingly difficult to obtain. In 1988 the industry expected that the foreign exchange centrally allocated for its imports would not be fully utilized. This did not necessarily reflect a shortage in supplies on the world market. The regulations for these imports stipulate that ANGOLNAVE, a state-owned company, must handle the sea transport. The arrival of its vessels in the port of shipment is often delayed, and poorly co-ordinated with the delivery of the cargo to the dockside by the supplier. Payment, which is due when the cargo is loaded on board the vessel, is regularly delayed, and it is likely that the supplier gives priority to other customers with better records of payment.

In common with other manufacturing branches, the production of raffia bags in confronted with mechanical deficiencies in equipment. Spare parts have proved difficult or impossible to locate on the domestic market, while foreign exchange constraints have prevented the acquisition of adequate imports and a shortage of sufficiently trained personnel at many levels has accentuated maintenance problems.

Nonetheless, the two raffia bag manufacturers have achieved about 50 per cent capacity utilization, which is a high rate in the circumstances. However, there is a tendency among synthetic bag manufacturers to

New agricultural output directives call for increased volumes of marketed crops, such as cereals, coffee, ground-nuts and sunflower seeds. If implemented, and hopes should not be set too high in view of the unresolved civil war, this would boost demand for bags. If agricultural raw supplies were again normalized, mechanical breakdowns would become more frequent and prolonged as the deficient equipment would be in greater use. The Government has not projected the demand for bags in coming years, but it is obvious that rehabilitation of the branch, notably the raffia bag manufacturing, is essential to meet higher demand.

The branch in ***Tanzania*** has two major constraints, the high cost and unreliability of road and rail transport, and the high prices charged by SPM for its products. This high tariff stems from heavy production costs, which are further increased by the need to subsidize exchange. All operators face stiff competition from better quality and lower priced imports.

A further constraint common to all the countries under review in this branch is the acute shortage of foreign exchange to procure essential spare parts. The branch is bedevilled by shortages: two others are heavy road and rail transport for ferrying raw materials and finished goods, and storage space to accommodate the fluctuating deliveries of inputs and dispatch of finished goods.

The bag manufacturing branch in ***Zambia*** suffers from a number of problems familiar to Angola and Tanzania, although the transport and input constraints are less marked than those in Angola. Raw material supplies are in a problem, not least because 98 per cent of the branch's input needs are imported. Prices of synthetics and jute for the branch increased strongly in 1983-88, leaving it short of its import requirements at a time when general economic difficulties in any event reduced foreign exchange availability.

The branch also relies on imports of spare parts for almost all equipment. This will remain the case, except for some simple parts that could be locally manufactured. This dependence has created further problems. When spares have been unavailable, some pieces of equipment have gradually been dismantled. In consequence, capacity has fallen and import needs risen.

Chapter 8
Conclusion

Although this report only covers the findings of missions to five countries and examines six processing branches, some broad conclusions can be drawn. The four countries of Sub-Saharan Africa (SSA) are bedevilled by shortages that result from their poor economic performance for most of the 1980s. Domestic inputs are often in short supply, sometimes the result of poor harvests and sometimes of poor Government policy in pricing and the allocation of public resources. This raw materials gap cannot generally be met by imports because of foreign exchange shortages which have been caused by a combination of weak prices for Africa's commodity exports, debt service requirements and the allocation of resources to unproductive projects.

Spare parts are also in short supply. The scale of needs is not such as to justify the establishment of a large individual country spare parts industries in individual countries. On the other hand, the establishment of a significant spare parts industry on a regional basis may be justified. At the national level, there is the possibility of setting up small units to manufacture the simpler spares. This shortage is also explained by foreign exchange constraints. While these constraints will remain in the foreseeable future, there are ways of alleviating their impact. For example, Zambia and Tanzania are members of the Preferential Trade Area for East and Southern Africa (PTA), which operates a mechanism to handle trade between members without drawing on foreign currency. This mechanism is in growing use, and undoubtedly the scope exists for its further expansion.

Another common weakness in the branches lies in management. This is often because the managers have abandoned the units, as in Angola and Liberia. This constraint can be seen in poor marketing, weak planning, inadequate quality control and insufficient records on the basis of which to make management decisions. Selective technical assistance programmes would remedy the situation in individual units.

The constraints mentioned above are felt most strongly in the SSA countries under survey. Angola presents an extreme case, since the civil war has destroyed many rural communities, dispersed hundreds of thousands of people, reduced agricultural production to a fraction of its former levels and obliged the Government to devote massive resources to military expenditure.

Morocco is the most developed of the five economies under review, seen in the development of fruit and vegetable processing which has an established European market for its products. This report is not pessimistic in its conclusions. Horticulture is a growth industry in some SSA countries, and its products can be seen increasingly in developed countries. Kenya and Nigeria are two good examples in this respect, and are extending their exports to include some processed products. In this case export markets have been established, and regular orders have become the norm. Some further points are made below about the branches under study.

The meat processing branch in Angola has access to some inputs although the herds have become isolated by transport breakdowns. A return to stability would free these inputs for utilization by the branch. Farmers are reluctant to sell their stocks as the currency has become virtually worthless. The much-aired massive devaluation will not ease this problem unless the farmers can buy consumer goods with their revenue from selling animals. In Zambia, the survey found the Integrated Pig Management Scheme was providing support for farmers in producing better bred pigs, and further assistance could be supplied to the scheme.

The Moroccan survey suggested that the fruit and vegetable processing branch receive assistance with management training, export market surveys, spare parts manufacture and advice on hygiene.

The animal feed manufacturing branch in Zambia currently imports key ingredients such as vitamins and minerals. The survey pointed to the possibility of processing slaughterhouse by-products for the vitamin and protein needs of the branch. Finished products are often poor and of non-standardized quality, pointing to the need for an independent central laboratory.

Also in Zambia the survey found that producer price increases had boosted output of raw materials for the vegetable oil milling branch, and lifted capacity utilization.

In Liberia, weaknesses were found in all aspects of the wood processing branch, highlighting a dire state of affairs that cannot be improved by changes at the branch level.

In Tanzania, the survey came across a formidable pricing constraint in the packaging materials branch. The latter depends heavily on one company for its inputs. This company charges high prices because it is directed by the Government to subsidize its export prices for the sake of competitivity, at the expense of domestic consumers.

Finally, despite what has been achieved in this report, it is clear that much more detailed branch level analyses of African manufacturing industry needs to be carried out. This report would provide the basis for such in-depth research.