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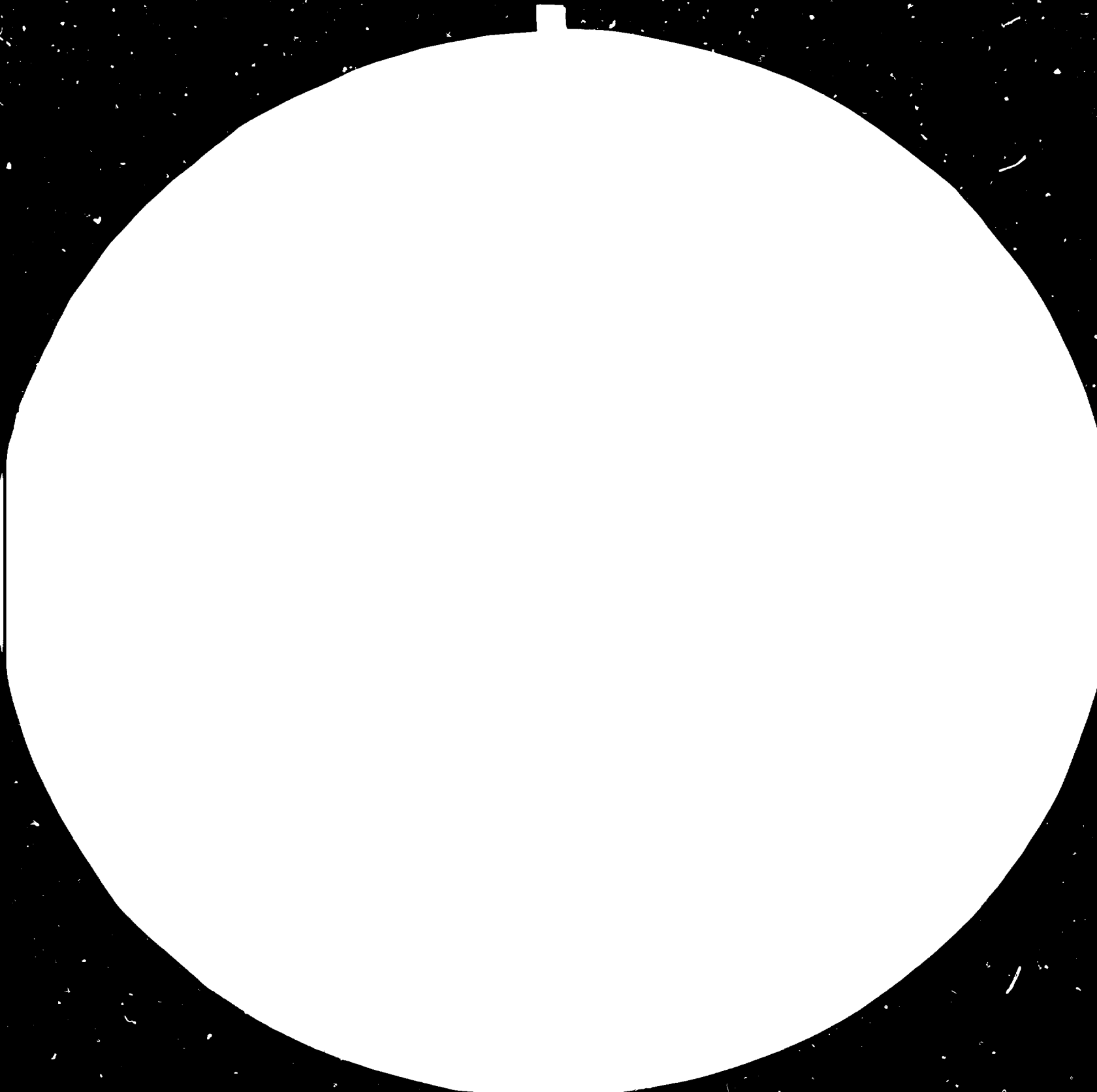

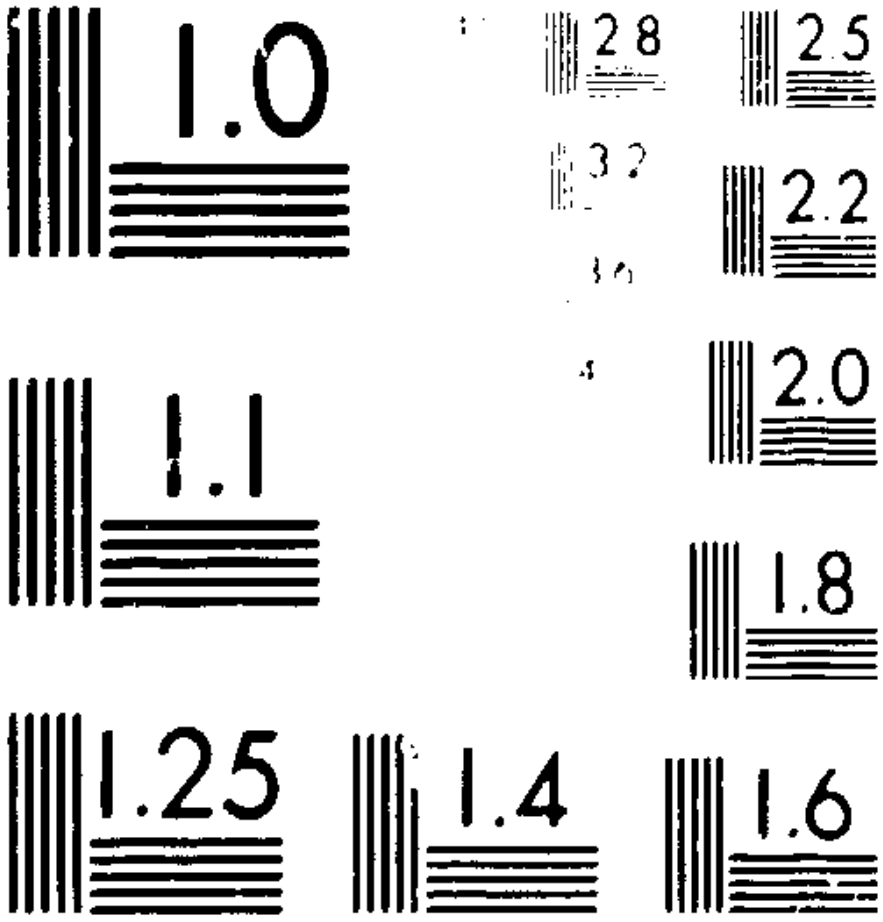

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INTEGRATED FOOD-PROCESSING INDUSTRY DEVELOPMENT IN AFRICA: CONSTRAINTS AND PROMOTIONAL MEASURES *

by

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1026

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CONTENTS

LIST OF TABLES

Note: The numbers in parenthesis in the text refer to the corresponding numbers in the reference list at the end of the paper.

INTEGRATED FOOD PROCESSING INDUSTRY DEVELOPMENT IN AFRICA: CONSTRAINTS AND PROMOTIONAL MEASURES

SUMMARY

The food processing industry in Africa is characterised by a food production rate which lags behind population growth, hence frequent food shortages. Food Processing is dominated by traditional food technologies. Processing establishments, have not integrated well and have grown slowly with emphasis on major staples (cereals), livestock, oil seeds, fruit and vegetables, coffee, cocoa, soft drinks, breweries and bakery products.

Raw material supply has shown a fluctuating trend with sizeable post harvest losses and inadequate collaboration between processing and marketing systems which are largely deficient, though national priorities emphasize self-sufficiency.

Major constraints include, internal political indifference, poor linkage between agricultural production, processing and marketing; inadequate infrastructure, manpower and administration.

Measures to promote integrated food processing involve firm political commitment, integrated national development, better co-operation between relevant institutions, integrated agriculture, processing and marketing also involving horizontal integration. Sub-regional, regional and international co-operation by minimizing barriers to encourage co-operation between LDCs and DCs. Acquiring appropriate technology, increasing domestically produced equipment and spare parts and widening domestic markets through co-operatives.

Improvement of skilled manpower development and training, dynamic Research and Development and mobilizing needed investment.

Possible forms include the formation of agro-industrial complexes, co-operatives with mutual contracts with processing establishments, food processing centres, unions of private enterpreneurs and joint ventures at all possible levels.

INTRODUCTION

Agro-industrial development forms the backbone of most economies in developing countries and covers unit operations from production to consumption. The importance attached to this has been highlighted in activities undertaken by national governments, United Agencies and other bilateral and multilateral agencies. The role of UNIDO to spearhead a fare share for all countries and integration was highlighted in the Lima Declaration (1) and the need for global approach was strongly reiterated during the First Consultation Global Meeting which recommended regional consultation meetings (2). Previous attempts elsewhere at food processing involved vertical integration with little horizontal development.

This communication addresses three main issues namely: current status of the food processing industry in Africa; vegetable oils and fats; constraints and barriers to the development of the food processing industry (integration between production processing and marketing), measures to be undertaken and possible forms of integrated food industry development in Africa.

In order to bring out the integrated requirements of the industry and the necessary linkages the systems approach to the food processing industry has been followed. This covers production of raw material, storage, processing, handling and marketing. The production subsystem is dealt with in this paper as a raw material source and the purely agricultural aspects such as husbandry, agronomy, and methods of obtaining the raw materials are just mentioned. Similarly the storage subsystem for raw materials is given limited treatment. Main emphasis is put on the post harvest aspects concentrating on processing handling and marketing. This type of treatment was adopted so as to stress the essential elements of integration in the food processing industries, a field which has been little studied in the past, but which should be high on governments priority and has a fundamental role to play in the development of countries in order to meet national and international needs.

PART A

ANALYSIS OF THE FOOD PROCESSING INDUSTRY

This section briefly covers traditional food processing in developing African countries, observations linked to integration, main branches of the food processing industry, current establishments and employment, indicators of development and contribution to national income. Also included are current trends in some branches of the food industry; availability of raw materials required for the food processing industry and identification of the most favourable conditions for the development of particular branches of the industry.

(a) GENERAL OBSERVATIONS

Presently the population in Africa stands at over 500 million growing at about 2.6% per annum with about 50% under the age of 15 years, providing high demand for fresh and processed food products. Over the past two decades there has been some changes of food habits with a shift towards processed cereal and animal based processed products.

The African countries apart from South Africa are generally classified as Developing Countries (DCs) or Least Developed (LDC) and are characterized by low income and ailing economies as indicated by the growth of the Gross Domestic Product as shown in Table 1.

Table 1: Growth of Gross Domestic Product, 1960-82 in Low Income African Countries

1960 - 73	1973 - 80	1980	1981
3.8	1.3	0.4	2.7

*Average annual percentage charge.

Source - World Development Report 1982. The World Bank, Washington D.C.

The GDP dropped from 3.8% in 1960-73 to a low 0.4% in 1980 and rose up to only 2% in 1981.

Table 2: Growth of Gross Domestic Product in Low Income Sub-saharan Africa, 1960-90. (Average annual percentage change).

G.D.P.				GNP per capita	
		High	Low	High	Low
1960 - 70	1970 - 80	1980 - 90	1980 - 90	1980 - 90	1980 - 90
40	2.4	3.0	1.9	0.1	-1.0

Source - World Developement Report 1982.

World Bank, Washington. Table 4.4. Page 37

Table 2 shows that the G.D.P. has dropped since 1960-70 from 4.0% in low income sub-saharan African countries. Projected change for 1980-90 is only 1.9% for the low G.D.P. group, indicating very poor prospects. The gross national product (GNP) per capita is a negative 0.1 change for the Low G.N.P. group of countries; implying a worsening situation by 1990.

Table 3: Growth of Agricultural and Food Output in African Developing Countries (Percentage)

Agricultural Output				Food Output			
Total		Per Capita		Total		Per Capita	
1960–70	1970–80	1960–70	1970–80	1960–70	1970–80	1960–70	1970–80
2.1	1.3	0.2	1.4	2.6	1.6	0.1	-1.1

Source: World Development Report (1982)
Washington D.C. Table 5.1 Page 41

The change pattern for total agricultural output showed a decline from 2.7% to 1.3% from 1960-70 to 1970-80 respectively, lagging behind population growth. Similarly output per capita had a negative change of 1.4% in 1970-80. Food output (total) fell by about 1% over the period under consideration, while food output per capita in 1970-80 had a negative change of 1.1% implying dependence on imports.

(b) TRADITIONAL FOOD PROCESSING

Africa has many traditional food processing activities which are integrated in their local environments. Typical examples include cereal pounding with the mortar and pestle where the flour is used for human food, the waste (bran) for making local brews or feeding livestock; while the stover from the field is used for building or fuel. Other unit operations, include extraction of oil from oil seeds such as groundnuts, oilpalm seed, sunflower or sesame. Fermentation for beer making is wide spread, while sun and smoke drying of fruits, vegetables and animal products including fish, are common. These are but few examples but need further development to exploit local resources and act as a base for introducing new technologies, so as to produce products which meet local taste and integrate well into local industrial activities.

(c) MAIN BRANCHES IN THE FOOD-PROCESSING INDUSTRY

The main products produced by the major branches in the food processing industry in Developing and Least Developed countries, combined by 1980 are summarised in Table 4.

Table 4: Total Production of Basic Food Products and Beverages by African Developing Countries (1980) According to ISIC classification

		Thousand metric tons
Animal Products	Beef/veel fresh (1)	2,403
	Mutton/lamb fresh (1)	1,1[illegible]3
	Pork fresh (1)	270
	Poultry dressed fresh (1)	962
	Other meat fresh(1)	831
	Meat tinned	12.8
	Butter (1)	137.8
	Cheese (1)	332.5
Fruit and Vegetables	Fruits tinned or bottled	140.2
	Vegetables tinned or bottled	62.7
Fish	Fish frozen	178.6
	Fish salted/smoked	283.8
	Fish tinned	180.2
Cereal Products	Flour wheat	9,347
	Flour/cereal other than wheat	721
	Macaroni/noodle products uncooked	543
	Bread/chips biscuits/other ordinary baker's wares	496
	Biscuits	134
Sugar Products	Raw sugar	4,288
	Refined sugar	1,793
	Sugar confectionery	184.7
Others	Cocca powder	38.8
	Cocoa butter	39.9
	Chocolate and chocolate products	16.2
	Coffee extracts plus instant coffee	85.0
Liquid beverage		Thousand Hectolitres
	Distilled alcohol beverage minus Ethylacohol	423*
	Ethyl alcohol-all purposes	701
	Wine	4,518
	Beer	36,070
	Mineral water	2,870
	Soft drinks	15,902
Feeds	Prepared Animal Feeds	739

* Provisional or estimated figure
(1) Including non-industrial production.

Source: Derived from Yearbook of Industrial Statistics. United Nations 1980 Edition. Volume II.

Note: Some of the estimated figures are derived from data dating back to the seventies. It is therefore just indicative for 1980 and should be treated as such.

Table 4 shows that, the main branches of the food industry including cereal processing and related products were the most important, producing an estimated 11.2 million tons in 1980. Sugar and sugar products ranked second with 6.3 million tons while animal products were 3rd, with 6.1 million tons. Fish and fish products followed with 612.6 thousand tons, followed by fruit and vegetables and coffee extracts including instant coffee with 202.9 and 85.0 thousand tons respectively.

Among the liquid beverages, beer production ranked first with 36.1 million hectolitres in 1980, while soft drinks production was 2nd at 15.9 million hectolitres and wine was 3rd with 4.5 million hectolitres.

The data overall indicates that food processing was centred on the processing of staple cereals, animal products and convenience products such as bakery products, sugar, coffee and liquid beverages.

Table 5: Total Average Growth Rates of Real Manufacturing Value Added Originating in Food Processing and Beverages and in the Total Manufacturing Sector in Developing African Countries[a/]. 1965-1970 - 1970-1975.
(Percentage on the basis of values in 1975 US$ constant prices).

1965 - 1970			1970 - 1975		
Food Processing	Beverages	Total Manuf.	Food Processing	Beverages	Total Manuf.
5.9	6.7	7.5*	0.2	10.8	5.1*

a/ Food Processing industry data is not available for the following countries: Cape Verde, Comoros, Djibouti, Equatorial Guinea, Guinea-Bissau, Sao Tome and Principe and Sychelles.

* This figure was calculated as average growth rate for only those developing African countries for which data was available.

Source: UNIDO data base, information supplied by the UN Statistical Office, with estimates by UNIDO Secretariat.

Table 5 shows that the total average growth for the developing countries dropped from 5.9% to 0.2 in the food processing industry for 1965-75. Although data for 1981 are not available for most developing countries, indication points to a further drop.

However, the beverage industry increased from 6.7% growth rate in 1965-70 to 10.8% in 1970-75, implying wrong emphasis over beverage rather than "solid" food. Overall the total manufacturing industry in the developing countries registered a declining growth rate of 0.4% over the period.

(d) VALUE ADDED IN THE FOOD PROCESSING AND BEVERAGES INDUSTRIES AND TOTAL MANUFACTURING IN AFRICAN DEVELOPING AND LEAST DEVELOPED COUNTRIES IN 1970, 1975 and 1980.

The relevant statistics are contained in Table 6.

Selected observations from Table 6, indicate that Kenya had the highest value added of million US$ 340.4 which 11.5% of total manufacture in 1980, at current prices then. The Ivory Coast had US$ 288.8 million which was 30.4% of total manufacture in 1979. Ghana had US$ 260.6 million which was 10.3% of total manufacture in 1977 while Egypt had US$ 250.9 million which was 14.4% of total manufacture in 1976. Morocco had US$ 239.8 million which was 26% of total manufacture in 1976 while Tunisia had US$ 121.4 million which was 14.9% of total manufacture. Nigeria had US$ 238.5 million which was 19.9% of total manufacture while Zimbabwe had US$ 196.0 which was 22.1% of total manufacture in 1978.

In general between 1976 and 1980, the countries considered above indicated value added amounts varying from US$ 121.4 million in Tunisia (1979) to 340.4 million in Kenya in 1980. The percentage for the food processing and beverages industries over total manufacture varied from 10.3% in Ghana to 30.4$ in the Ivory Coast, implying that there is scope for more growth compared to developed countries.

(e) STRUCTURAL CHANGES

Structural changes which occurred in the Developing and Least Developed African Countries are indicated percentage wise in the food processing and beverages sectors shares on the basis of values in 1975 US$ constant prices as presented in Table 7.

From Table 7, the structural changes varies much from one country to another and indifferent commodities. Overall, in most countries the food processing sector was substantially higher than the beverages sector as percentage of total manufacture. Countries which registered small to moderate increments in the food processing and beverages sectors after 1970 include, Algeria, Kenya, Morocco, Mozambique, Senegal, Malawi and Sudan. However all other countries (Developing and Least Developed) registered a decline.

It is worth noting that among individual countries, Mauritius had 90.9% in the food and beverages sector as percentage of total manufacture in 1970. In the same sectors, Algeria, had about 24% between 1970 and 1977, Egypt has 21.6% in 1970 and declined to 17.3% in 1978, Kenya increased from 29.4% in 1970 to 33% in 1981 while Morocco also increased from 25.6% in 1970 to 28.8% by 1979. Senegal remained between 43.1% in 1970 and 43.7% in 1979.

Table 6

VALUE ADDED IN THE FOOD PROCESSING AND BEVERAGES INDUSTRIES AND TOTAL MANUFACTURING IN AFRICAN DEVELOPING AND LEAST DEVELOPED COUNTRIES* IN 1970, 1975, 1980

Countries	Value Added (in thousand US$/current prices)								
	1970			1975			1980		
	311 ISIC Food Proc.	313 ISIC Beverages	300 ISIC Total Manuf.	311 ISIC Food Proc.	313 ISIC Beverages	300 ISIC Total Manuf.	311 ISIC Food Proc.	313 ISIC Beverages	300 ISIC Total Manuf.
African Developing Countries (not LDCs)									
Congo	10,756	8,257	29,085	8,436	12,211	43,585	9,903(76)	16,200(76)	51,141(76)
Egypt	72,299	10,690	694,873	183,120	25,320	1,499,488	217,903(76)	32,992(76)	1,742,711(76)
Ghana	23,961	22,519	217,451	91,400	52,826	510,348	138,522(77)	122,087(77)	1,191,391(77)
Ivory Coast	38,621	7,400	171,091	96,680	20,134	436,248	219,025(79)	69,790(79)	951,463(79)
Kenya	25,630	12,857	134,734	85,984	43,880	331,311	250,968	89,435	779,946
Libya	6,134	2,689	43,501	23,513	9,966	166,588	31,351(76)	11,520(76)	197,669(76)
Madagascar	19,301	2,233	66,881	28,771	10,820	134,764	22,100(76)	14,016(76)	123,072(76)
Mauritania	-	-	-	-	139	21,126	-	173(78)	31,226(78)
Mauritius	15,242	1,362	25,054	50,808	5,666	91,551	52,809	10,796	147,372
Morocco	-	-	-	-	-	-	192,891(76)	46,864(76)	918,044(76)
Mozambique	57,144	12,799	158,528	-	-	-	-	-	-
Nigeria	67,003	84,258	552,185	162,683	87,837	1,007,805	145,470(76)	93,014(76)	1,200,255(76)
Senegal	-	-	-	98,593	-	234,971	135,035(77)	-	282,136(77)
Swaziland	4,993	-	13,518	34,987(76)	-	65,611(76)	39,431(79)	-	81,415(79)
Tunisia	23,581	9,848	126,533	154,428	19,776	340,995	80,640(79)	40,763(79)	817,438(79)
Zambia	24,216	71,358	175,196	-	-	-	-	-	-
Zimbabwe	44,062	22,311	362,325	86,720	58,880	845,440	123,338(78)	72,673(78)	889,365(78)
African Least Developed Countries									
Central African Republic	-	-	-	10,834	-	22,775	10,138(76)	-	19,259(76)
Ethiopia	27,620	16,268	104,112	45,560	31,343	210,396	114,164(79)	58,971(79)	353,198(79)
Gambia	-	-	-	1,209	244	1,659	2,175(78)	1,143(78)	3,894(78)
Lesotho	-	-	-	257	-	3,494	-	-	-
Malawi	5,348	4,120	24,007	12,234	4,515	43,330	-	-	-
Rwanda	7,610	-	8,510	-	-	-	97,251(79)	-	104,263(79)
Somalia	12,507	294	14,014	6,594	1,655	18,786	10,932(77)	6,602(77)	38,607(77)
Sudan	26,810	17,213	126,063	-	-	275,000	52,799(76)	-	236,655(76)
United Rep. of Tansania	16,395	7,383	78,440	-	-	-	-	-	-
Togo	-	-	-	1,316	5,468	18,029	849(76)	5,895(76)	20,665(76)

* Data for African developing or least developed countries which not included in table are either not available or incomplete, or are below 1970.

Source: UNIDO data base, information supplied by the UN Statistical Office, with estimates by UNIDO Secretariat.

Table 7

STRUCTURAL CHANGES OF FOOD PROCESSING AND BEVERAGES INDUSTRIES VALUE ADDED IN TOTAL MANUFACTURING IN AFRICAN COUNTRIES*/ FOR 1970, 1975 AND 1979

FOOD PROCESSING AND BEVERAGES SECTORS SHARES (PERCENTAGES) ON THE BASIS OF VALUES IN 1975 US$ CONSTANT PRICES

Countries	1970			1975			1979		
	311 ISIC Food Proc. %	313 ISIC Beverages %	300 ISIC Total Manuf. %	311 ISIC Food Proc. %	313 ISIC Beverages %	300 ISIC Total Manuf. %	311 ISIC Food Proc. %	313 ISIC Beverages %	300 ISIC Total Manuf. %
Developing African Countries (not LDC's)									
Algeria	16.7	7.3	100	19.8	4.1	100	19.1(77)	5.2(77)	100
Angola				18.5	7.2	100			
Congo				22.9	9.0	100			
Egypt	20.8	0.8	100	15.5	1.0	100	16.4(78)	0.9(78)	100
Gabon				8.6	4.5	100			
Ghana	20.8	6.3	100	18.6	8.0	100			
Ivory Coast	22.8	3.6	100	18.0	3.5	100			
Kenya	22.8	6.6	100	23.9	9.3	100	23.3(81)	9.9(81)	100
Liberia				8.8	10.2	100			
Libyan Arab Jamahiriya	6.1	1.7	100	5.8	2.5	100			
Madagascar				21.2	4.6	100			
Mauritius	88.1	2.8	100	62.3	6.4	100			
Morocco	19.2	6.4	100	21.0	5.1	100	21.9	6.9	100
Mozambique	27.6	6.7	100	31.3	10.0	100			
Namibia				64.6	5.6	100			
Nigeria	18.6	4.8	100	16.8	9.1	100			
Senegal	40.7	2.4	100	38.0	3.9	100	39.1	4.6	100
Tunisia	14.8	5.0	100	16.1	5.8	100			
United Rep. of Cameroon	16.2	14.8	100	15.1	16.3	100			
Zaire	10.3	17.1	100	12.4	21.3	100			
Zambia	11.4	5.9	100	9.4	4.9	100			
Zimbabwe	9.6	5.0	100	9.2	5.9	100			
African Least Developed Countries									
Benin				49.0	13.3	100			
Central African Republic				2.3	19.9	100	3.1(77)	27.0(77)	100
Ethiopia				14.4	7.1	100			
Malawi	24.8	5.0	100	31.0	8.9	100			
Sierra Leone				21.2	8.3	100			
Sudan	23.9	8.8	100	26.6	11.5	100			
Uganda	72.5	2.9	100	35.6	11.1	100			
United Rep. of Tanzania	23.1	4.6	100	19.7	5.1	100			

*Data for African developing or least developed countries which not included in the table either not available, incomplete or below 1970.

Source: UNIDO data base, information supplied by the UN Statistical Office, with estimates by the UNIDO Secretariat.

Among the Least Developed Countries, Ethiopia had 21.5% in the food processing and beverages industries as percentage of total manufacture in 1975. In the same period, Malawi had 39.9%, Sierra Leone had 29.5% and Tanzania had 24.8% in 1975 having decreased from 27.7% in 1970.

(f) GROSS OUTPUT IN THE FOOD PROCESSING AND BEVERAGES INDUSTRIES AND TOTAL MANUFACTURING IN AFRICAN DEVELOPING AND LEAST DEVELOPED COUNTRIES IN 1970, 1975 and 1980

The relevant data is presented in Table 8.

Table 8

GROSS OUTPUT IN THE FOOD-PROCESSING AND BEVERAGES INDUSTRIES AND TOTAL MANUFACTURING IN AFRICAN DEVELOPING AND LEAST DEVELOPED COUNTRIES*
IN 1970, 1975 AND 1980

Countries	Gross output (in thousand US$/current prices)								
	1970			1975			1980		
	311 ISIC Food Proc.	313 ISIC Beverages	300 ISIC Total Manuf.	311 ISIC Food Proc.	313 ISIC Beverages	300 ISIC Total Manuf.	311 ISIC Food Proc.	313 ISIC Beverages	300 ISIC Total Manuf.
African Developing Countries (not LDCs)									
Congo	17,137	12,827	54,314	31,537	24,063	-	30,284(76)	19,543(76)	-
Egypt	570,575	31,724	2,547,586	1,203,580	69,309	5,636,829	1,304,859(76)	87,468(76)	6,367,775(76)
Ghana	72,255	32,216	432,451	190,087	77,278	1,101,565	269,739(77)	163,043(77)	1,990,869(77)
Ivory Coast	115,722	12,200	406,881	395,981	43,515	1,418,195	969,727(79)	132,639(79)	3,126,745(79)
Kenya	156,527	28,627	476,190	459,290	102,186	1,463,388	1,285,753	278,226	4,059,946
Liberia	-	-	-	7,376	8,832	-	9,300(77)	11,980(77)	-
Libya	23,137	6,078	93,977	88,074	18,885	373,581	109,932(76)	22,770(76)	429,358(76)
Madagascar	55,160	4,944	154,760	91,346	20,600	352,157	63,442(76)	23,723(76)	327,193(76)
Mauritania	-	-	-	-	556	-	-	1,300(78)	-
Mauritius	65,974	5,678	94,870	288,419	22,529	401,400	296,696	45,135	605,229
Morocco	-	-	-	-	-	-	1,002,943(76)	125,424(76)	3,347,974(76)
Mozambique	138,460	16,138	347,037	-	-	-	-	-	-
Nigeria	199,636	110,028	1,187,451	375,447	172,683	2,332,032	397,927(76)	175,279(76)	2,861,403(76)
Senegal	-	-	-	418,317	-	819,430	627,626(77)	-	1,067,786(77)
Swaziland	26,360	-	47,008	80,526(76)	-	145,633(76)	132,121(79)	-	243,392(79)
Tunisia	132,352	24,419	508,381	311,716	61,716	1,399,751	521,182	103,448	2,910,098(79)
United Rep.of Cameroon	78,812	31,631	263,612	-	-	-	-	-	-
Zambia	105,042	95,238	435,574	-	-	-	-	-	-
Zimbabwe	204,020	38,557	901,120	416,000	102,720	2,108,320	518,907(78)	122,156(78)	2,171,492(78)
African Least Developed Countries									
Burundi	1,440	4,743	-	-	-	-	-	-	-
Central African Rep.	-	-	-	21,632	-	60,989	19,259(76)	-	48,258(76)
Ethiopia	53,252	24,176	218,140	85,560	43,062	435,860	207,101(79)	80,918(79)	786,763(79)
Gambia	-	-	-	19,854	508	20,734	19,675(78)	3,151(78)	23,138(78)
Lesotho	-	-	-	2,578	-	11,169	-	-	-
Malawi	25,750	5,987	82,446	63,164	20,712	215,574	-	-	-
Rwanda	18,100	-	22,370	-	-	-	152,269(79)	-	172,002(79)
Somalia	19,191	777	23,298	25,005	3,542	59,299	32,003(77)	9,689(77)	83,199(77)
Sudan	115,632	43,132	361,695	-	-	827,586	282,419(76)	-	796,526(76)
Tanzania	77,978	12,460	243,735	-	-	-	-	-	-
Togo	-	-		6,714	16,905	64,116	6,510(76)	16,912(76)	61,881(76)

* Data for African developing countries or least countries which not included in table are either not available or incomplete, or are below 1970.

Source: UNIDO data base, information supplied by the UN Statistical Office, with estimates by UNIDO Secretariat.

The monetary aspects have been dealt with previously (see Table 6), so here only percentage changes of gross output of the food processing and beverage industries as percentage of total manufacture, as extracted from Table 8.

In general the percentage of the food processing and beverages industries over total manufacture varied from 85.7% in Somalia in 1970 to 23.7 over the period in Egypt. Later the range was 50% in Somalia (1977) and 20% in Nigeria in 1976. In the 1970 period, Tunisia registered 21.5% in 1979 in North Africa. In West Africa, Ghana had 24.2% which dropped to 21.7% in 1977, while Nigeria declined from 26.1% in 1970 to 20.0% in 1976. The Ivory Coast however rose from 31.4% in 1970 to 35.3% in 1979.

In East Africa, Kenya slightly dropped from 38.9% in 1970 to 38.5% in 1980; Ethiopia increased slighly from 35.5% in 1970 to 36.6% in 1979. Further South, Zimbabwe increased from 26.9% in 1970 to 29.5% in 1978, while Madagascar decreased from 38.9% in 1970 to 26.6% in 1976. Overall most countries had only small increases a declined in the percentage of gross output from the food and beverages industries expressed as a percentage of total manufacture.

(g) NUMBER OF ESTABLISHMENTS IN THE FOOD PROCESSING AND BEVERAGES INDUSTRIES IN AFRICAN DEVELOPED AND LEAST DEVELOPED COUNTRIES

The data available is incomplete and only gives a scanty picture, since between 1970 and 1980, some establishments may have closed down and statistical returns from some of the countries are inadequate. Table 9 presents available data, so the comments given here should be treated cautiously.

Table 9

NUMBER OF ESTABLISHMENTS IN THE FOOD-PROCESSING AND BEVERAGES INDUSTRIES
IN AFRICAN DEVELOPING AND LEAST DEVELOPED COUNTRIES */ IN 1970, 1975 AND 1980

Countries	Number of Establishments								
	1970			1975			1980		
	311 ISIC Food Proc.	313 ISIC Beverages	300 ISIC Total Manuf.	311 ISIC Food Proc.	313 ISIC Beverages	300 ISIC Total Manuf.	311 ISIC Food Proc.	313 ISIC Beverages	300 ISIC Total Manuf.
African Developing Countries (not LDCs)									
Angola	648	39	1,327	-	-	-	-	-	-
Cameroon	-	-	277	-	-	-	-	-	-
Congo	6	4	42	8	3	48	6(76)	3(76)	49(76)
Egypt	1,862	40	5,138	1,910	44	4,788	1,996(76)	44(76)	4,838(76)
Ghana	44	11	347	45	14	391	51(77)	17(77)	482(77)
Ivory Coast	-	-	-	136	8	438	245	9	701
Kenya	45	7	281	91	8	417	94	8	450
Liberia	-	-	-	11	6	-	11(78)	6(78)	-
Libya	61	13	202	92	10	272	91(76)	10(76)	271(76)
Madagascar	129	18	352	130	19	365	136(76)	25(76)	428(76)
Mauritania	-	-	-	1	-	-	1(78)	1(78)	-
Mauritius	174	18	3,553	141	14	389	164	15	528
Morocco	-	-	-	-	-	-	656(76)	67(76)	2,963(76)
Mozambique	854	16	1,571	-	-	-	-	-	-
Nigeria	154	13	704	277	16	1,246	296(76)	18(76)	1,269(76)
Senegal	-	-	-	-	-	-	-	-	-
Seychelles	-	-	-	11(76)	-	30(76)	12(79)	-	33(79)
Swaziland	12	-	29	14(76)	-	47(76)	13(79)	-	57(79)
Tunisia	175	35	798	419	38	1,308	290(79)	41(79)	1,401(79)
Zaire	159	19	494	-	-	-	-	-	-
Zambia	82	23	446	-	-	-	-	-	-
Zimbabwe	150	37	1,161	-	-	-	-	-	-
African Least Developed Countries									
Botswana	-	-	-	-	-	153	-	-	264
Burundi	6	1	-	-	-	-	-	-	-
Cape Verde	-	-	-	13	2	-	10(78)	2(77)	-
Central African R.	-	-	-	10	-	36	9(76)	-	33(76)
Ethiopia	141	38	479	166	32	435	130(79)	30(79)	417(79)
Gambia	-	-	-	9	11	25	9(78)	10(78)	29(78)
Lesotho	-	-	-	6	-	38	-	-	-
Malawi	42	6	127	33	4	115	26(79)	4(79)	105(79)
Mali	-	-	36	-	-	-	-	-	-
Niger	12	3	54	-	-	-	-	-	-
Rwanda	18	-	58	-	-	-	17	-	47
Somalia	39	5	183	1	4	287	63(77)	5(77)	257(77)
Tanzania	129	11	452	-	-	-	-	-	-
Togo	6	3	24	7	3	47	7(76)	3(76)	56(76)
Upper Volta	-	2	10	-	2	10	-	2(78)	11(78)

*/ Data for African developing or least developed countries which not included in table not available or incomplete or below 1970.

Source: UNIDO data base, information supplied by the UN Statistical Office, with estimates by UNIDO secretariat.

Just general observations are given here. The total number of establishments in the DCs (excluding IDCs) in the food processing industry was 4,555 and beverages had 293 in 1970. The LDC countries had 413 units in 1970 while beverage units numbered 67. These figures are small compared to the potential that exist in these countries.

It is worth noting that the food processing sector very much outnumbered the beverages industries. Egypt had the highest number of establishments in the food processing and beverages industries at 1902 to 1970, which increased to 2040 in 1976. Second was Mozambique with 870 units in 1970. Angola had 687 units in 1970. Burundi on the other hand had only 7 establishments in 1970 and 10 in 1976 while Congo had 10 units in 1970 and only 9 in 1976.

The above data indicates the small magnitude of establishments in the food processing and beverages industries. There is much room for expansion to make wider use of locally available raw materials to meet local demand and satisfy multinational needs of the population.

(h) EMPLOYMENT IN THE FOOD PROCESSING AND BEVERAGES INDUSTRIES IN AFRICAN DEVELOPING AND LEAST DEVELOPED COUNTRIES

Comments given on data inadequacy already given, apply here also as evident in Table 10.

General observations from Table 10 show that, the number of employees in the food processing and beverages industries is small compared to what would be desirable. The total number of employees in the food processing industry of African developing countries listed in Table 10 was about 285 thousand in 1970, while the beverages industries employed 46 thousand people. The corresponding figures listed in Table 10 for least developed countries were 36 thousand people in food processing and 6 thousand people in beverages.

It is therefore implicit that the food processing and beverages industries, if well developed and integrated, could employ more people and raise the standard of living in the countries under consideration.

Table 10

EMPLOYMENT IN THE FOOD-PROCESSING AND BEVERAGES INDUSTRIES
IN AFRICAN DEVELOPING AND LEAST DEVELOPED COUNTRIES */ IN 1970, 1975 AND 1980

Countries	Employment (in thousand)								
	1970			1975			1980		
	311 ISIC Food Proc.	313 ISIC Beverages	300 ISIC Total Manuf.	311 ISIC Food Proc.	313 ISIC Beverages	300 ISIC Total Manuf.	311 ISIC Food Proc.	313 ISIC Beverages	300 ISIC Total Manuf.
African Developing Countries (not LDCs)									
Angola	18.4	2.6	73.2	-	-	-	-	-	-
Cameroon	2.5	1.9	25.7	-	-	-	-	-	-
Congo	10.5	0.7	15.8	-	-	-	-	-	-
Egypt	97.0	9.9	595.9	107.3	10.5	731.4	110.4(76)	12.7(76)	754.3(76)
Ghana	5.2	2.8	57.7	7.7	4.8	76.8	10.5(77)	5.1(77)	89.9(77)
Ivory Coast	7.7	1.2	33.3	12.6	2.1	49.4	21.5	3.5	67.2
Kenya	11.9	2.5	65.4	22.3	5.3	97.8	32.1	4.9	129.3
Liberia	0.4	0.6	-	0.4	0.6	-	0.6(78)	0.7(78)	-
Libya	1.5	0.6	7.1	2.6	1.3	12.3	2.6(76)	1.3(76)	13.8(76)
Madagascar	13.4	1.1	36.1	14.6	2.6	42.2	12.8(76)	3.0(76)	42.9(76)
Mauritania	-	-	-	-	0.02	-	-	0.04(78)	-
Mauritius	6.9	1.1	21.8	-	-	-	13.1(79)	2.0(79)	45.6(79)
Morocco	-	-	-	-	-	-	29.7(76)	3.5(76)	157.9(76)
Mozambique	36.5	2.1	85.1	-	-	-	-	-	-
Nigeria	18.4	4.3	128.5	46.5	9.6	244.4	48.6(76)	11.9(79)	214.3(79)
Senegal	-	-	-	47.5	-	92.1	11.3(76)	-	24.8(76)
Seychelles	-	-	-	0.3	-	0.6	0.4(79)	-	0.9(79)
Swaziland	2.2	-	5.4	4.1(76)	-	7.8(76)	6.1(79)	-	12.6(79)
Tunisia	9.8	1.8	54.3	11.9	2.4	77.3	14.5(79)	3.5(79)	120.4(79)
Zaire	17.9	6.2	85.8	-	-	-	-	-	-
Zambia	8.9	3.5	40.6	-	-	-	-	-	-
Zimbabwe	15.9	3.5	114.4	20.9	6.8	151.7	22.6(78)	6.9(78)	138.7(78)
African Least Developed Countries									
Botswana	-	-	-	-	-	3.8	-	-	5.7
Burundi	0.1	0.3	-	-	-	-	-	-	-
Cape Verde	-	-	-	0.3	-	-	0.2(78)	0.01(77)	-
Central African R.	-	-	-	1.0	-	6.7	1.0(76)	-	4.6(76)
Ethiopia	8.3	3.0	49.4	13.5	3.1	60.1	15.9(79)	5.1(79)	76.8(79)
Gambia	-	-	-	2.8	0.1	3.0	2.9(78)	0.2(78)	3.5(78)
Lesotho	-	-	-	0.3	-	2.0	0.1(77)	-	2.0(77)
Malawi	5.7	0.6	17.4	8.6	1.2	28.0	6.8(79)	1.6(79)	29.2(79)
Mali	-	-	10.4	-	-	-	-	-	-
Niger	0.4	0.1	3.3	-	-	-	-	-	-
Rwanda	2.7	-	5.2	-	-	-	2.8(79)	-	4.6(79)
Somalia	3.0	0.2	5.3	4.2	0.8	9.5	3.8(77)	0.8(77)	10.5(77)
Tanzania	15.1	0.7	48.3	-	-	-	-	-	-
Togo	0.4	0.6	2.5	0.6	0.4	3.6	0.5(76)	0.4(76)	6.3(76)
Upper Volta	-	0.1	1.3	-	0.3	3.6	-	0.6(78)	4.9(79)

*/ Data for African developing or least developed countries which not included in table not available or incomplete or below 1970.

Source: UNIDO data base, information supplied by the UN Statistical Office, with estimates by UNIDO secretariat.

(i) PRODUCTION OF RAW MATERIALS (CROPS AND LIVESTOCK) IN DEVELOPING MARKET ECONOMY AFRICAN COUNTRIES

The major crops used as staple foods and for industrial processing are summarized in Table 11.

Table 11: Production of Major Food Crops in Developing Market Economy African Countries

(Million metric tons)

	1969-71	1979	1980	1981
Cereals (Total)	42.9	44.4	46.3	47.2
Wheat	4.9	4.6	5.2	4.3
Rice Paddy	4.8	5.8	6.0	6.1
Maize	12.6	12.9	13.1	15.5
Sorghum	7.2	7.3	7.5	7.8
Pulses (Total)	4.2	4.6	4.6	4.6
Roots and Tubers (Total)	66.9	78.3	81.0	82.6
Vegetables and melon (Total)	9.6	13.0	13.5	13.8
Sugar cane	24.6	32.2	33.0	36.5
Fruit excluding melons	21.9	25.5	26.2	26.8
Coffee, green	1.3	1.2	1.2	1.3
Cocoa beans	1.1	1.0	1.0	1.0
Tea	0.1	0.2	0.2	0.2

Source: FAO Production Year Book. Volume 35 - 1982.

From Table 11 it is evident that production of the major cereals registered only small increments from 1969-71 and amounted to 47.2 million tons in 1981, while wheat decreased to 4.3 million tons. Roots and tubers were the biggest source of food and increased to 82.6 million tons in 1981 while pulses which form the major source of protein for most rural African populations, amounted to only 4.6 million tons.

Table 12: Summary of Livestock Numbers (million head effectives)

Source: FAO Production Year Book. Volume 35 - 1981 Tables 80, 81 and 82

		CATTLE	PIGS	SHEEP	GOATS	CHICKENS
Africa (Developing Market Economies)						
	1969-71	124.6	5.7	112.9	118.2	346.7
	1979	134.6	7.8	121.2	123.8	462.7
	1980	136.6	8.2	126.0	125.7	483.3
	1981	137.8	8.5	126.7	127.8	505.0

As seen from Table 12 the cattle population increased from 124.6 million head in 1969-71 to 137.8 million in 1981. Sheep increased from 112.9 million head in 1969-71 to 126.7 million 1981. A similar pattern of increase occurred in pigs, goats and chicken numbers over the period. Livestock provides ready raw materials as meat, milk and dairy products as well as skins for the leather industry.

It is worth noting that the increases noticed in the livestock population was mainly due to the introduction of exotic breeds, improved animal health and disease control. If the hardy indigenous breeds are upgraded and catered for through an adequate animal feeds industry, the continent has a big potential for livestock products.

(j) GENERAL OBSERVATIONS AND TRENDS

Agricultural production as a raw material source for industry is largely peasent and small scale in nature, using inadequate means and limited inputs in Developing African Countries. The yields are low due to poor inputs such as low yielding varieties or breeds, poor crop and animal husbandry, poor management and natural calamities such as drought and floods. There has been a drift of labour from rural to urban centres thus depleting the rural labour force. The raw material supply is inadequate and of variable quantity and quality and cannot easily be geared to post harvest handling, processing and marketing.

Over the last two decades there has been an increase in food demand with determination in self-sufficiency as much as possible. This seems to have determined trends and priorities in national development plans in Africa.

The food processing industry in general, is characterized with low income while rapid urbanization is creating a big demand in processed food products. In this context the industry is relatively well developed in grain milling, vegetable oil processing, sugar refining and slaughtering and primary processing of meat.

Comparing production and processing of food, the dissociation between the two seems to have widened instead of closing and bad integration has been mainly due to poor co-ordination between the various sectors of the industry.

Storage methods and facilities at all levels remain largely traditional and inadequate coupled with poor management. The same applies to pre-processing raw material inputs, and processed products ready for marketing.

Processing establishments equipment and tools are often small units with few large establishments which are often owned by public institutions or private enterprise. Some of the technologies used and the equipment are absolute.

Marketing and distribution is largely inadequate and is often linked with brand names of multinational corporations. In some countries self-reliance and nationalized industries have successfully established local and international marketing channels under local or joint management.

(k) PRIORITY TRENDS

Observations from national development plans show the following priorities.

(i) Directly productive Sectors

The relative sectors are endevouring to be self-sufficient in food requirements as far as possible mainly through proper and efficient use of indigenous local resources. This is being achieved through stressing the following:

Processing of primary commodities including food and agricultural products into final or semifinished products for local consumption and export. Development and restructuring of the industrial system to emphasize basic industries and self-sufficiency by using more local resources as in the production of tools and machinery.

(ii) Infrastructure

The priority areas here include developing scientific and technical education, satisfaction of industrial needs of water and electricity, improvement of transport, communications and storage, all being essential in horizontal integration in food processing.

(iii) Strengthening of Work Organization Discipline and Related Industries

This is essential to improve production through effective control over all implementing agencies and people involved by using innovation and modern methodology.

The long-term plans have basically the same priorities with emphasis on agriculture related industries especially food processing. The iron and steel industry, iron smelting and smithery and related metal and engineering aspects, important for supporting the basic needs activities mentioned earlier have also been developing.

(iv) Processing

Cereal Milling and Related Products

Cereal milling, by far the dominant activity in the food processing sector is almost monopolized by the National Milling Corporations in Tanzania and Ethiopia or big private firms with government backing elesewhere.

(v) Packaging

Indigenous manfuacture of containers and packaging materials include metal cans using mainly metal sheets. Plastic containers (sheets, jars, pails, drums, bottles and tubes) are made in some industrialized African countries. Paper containers in the form of bags, multiwalled and polythene lined paper bags and cartons, and also local bags made of sisal and kenaf are being used more and more for packaging of food products in local food processing industries. Glass containers are also made indicating that continued use of big local sand deposits has a big potential for this industry.

PART B - SECTION I

CONSTRAINTS AND BARRIERS TO THE DEVELOPMENT OF THE FOOD PROCESSING INDUSTRY

Constraints in the food and agricultural products industry are generally common in most of the industrial sectors. Only the major constraints are dealt with here. The systems approach has been used in making the analysis, concentration on the major system of production, of mainly raw materials; storage; processing; marketing and distribution. Supporting subsystems such as manpower, communication, finance and political aspects are also dealt with. This appraoch has been followed since the sub units are closely interrelated and mutually affect one another in integrated food processing industry.

(a) INTERNAL BARRIERS OF POLITICAL NATURE

In this analysis experience is drawn on available information from Ethiopia, Kenya, Ghana, Nigeria, Senegal, Sierra Leone, Zimbabwe, Angola, Tanzania and Uganda. These countries could be regarded as representative since most DCs have fairly common problems differing mainly in the degree of severity.

(i) General Constraints

General observations in African developing countries reveal several problems facing integrated food processing industry development. Some of the recently independent states are in a transitional state plagued with instability, frequent coups, incapability and inadequate ability to sort out priorities in national development plans, often due to circumstances beyond their control.

(ii) Support for Independent States and Internal Strife

Among these countries the Front Line States, apart from guarding their own independence, they have to divert their efforts and resources to help those who are not independent. This has caused disruption in the food system from production to processing and marketing and supporting horizontal integrative infrastructure especially transport and power as is the case in Mozambique, Zimbabwe, Angola, Zambia and Tanzania. Internal strife in countries like Ethiopia, Uganda, Chad and Liberia to mention but a few have created similar problems including exodus of skilled manpower and abandonment or wrecking of food processing establishment and equipment. The situation has not been helped by effects of pre-independence struggle and different political ideologies with some countries changing from capitalist to socialist systems involving nationalization of means of food production, processing and marketing.

(iii) Lack of Food and Nutrition Policies

Most countries under consideration have no Food and Nutrition Policies with development plans and policies geared to nutritional goals in food and agricultural programmes, aimed at satisfying the needs of the population, and high standards of processed food to guard the health of consumers.

Pre-independence food and agricultural production has a structure which was based on the supply of raw materials to Developed Countries. For example coffee and tea in East Africa, cocoa and groundnuts in West Africa, to mention but a few. The pattern has not altered much and this directly inhibits rapid development of integrated industries.

(iv) Inadequate Information Systems

Limited facilities for information retrieval and dissemination at the national level tends to hinder rapid development and vertical as well as horizontal integration in the food processing industry since it is a fast growing industry with new processed and products being invented often in the modern technological development especially in Developed Countries.

(v) Collapse of Regional Groups

Breakdown of established regional common markets such as the defunct East African community, led to closure of interdependent sectors of the food processing industry especially in the supply of processing inputs and markets.

(vi) Inadequate Policies

Lack of policies adhering to integrated food processing industries and misallocation of meagre resources emphasising administrative and defence costs has left the food processing sector in a state that leaves much to be desired.

(vii) Lack of Strong Political Will

On the other hand, the absence of strong political will and firm decisions committed to integrated food industry development may have lead to reluctance among appropriate authorities to accord the necessary priority to food and agriculture.

(viii) Poor Development Strategy

Inadequate development strategy, geared to full utilization of locally available resources and maximum returns. Programmes and projects are often not integrated into the overall National Development Plan, causing compartimental development with subsequent poor results and uncalled for problems as reflected in some National Development Plans.

(b) FOOD AND AGRICULTURE CONSTRAINTS

Agricultural and industrial policy laid down by Governments, is generally inadequate for integrated food industry as noted in some National Development Plans studied. Lack of proper production targets and programmes for food and agricultural industrial products have enhanced the problems. Lack of more pragmatic plans with priorities from the village, right up to the national level with realistic targets is a common constraint.

(i) Inappropriate Priorities

Emphasis was previously put on cash crops rather than food crops, and a balance has not been struck. The cash crops are mainly plantation crops such as coffee, tea and food such as maize crops for plantation workers. The situation developed from pre-independence days where production was oriented towards overseas markets for cosmopolitan industries. Local farmers have kept this up as a means of earning badly needed local income and foreign exchange. Most of these crops are tree crops which take long to phase out or change and restructure the crop system.

Agricultural growth is low and does not cope with the population growth of 2.6%. Indeed there is a recent drastic decline in some crops. This has been caused by mainly unpredictable weather. Dependence on rains and limited undertaking of irrigation works cause under utilization of valuable land. Generally low yields per hectare are attributed to poor inputs such as seed, fertilizer, pesticides and husbandry; all of which have increased in prices. The peasant based agriculture uses semi-modern methods with little mechanization, thus realizing low hecterages.

Inefficient use of inputs causes more constraints, for example fertilizer use based on dubious hasty package recommendations is mis-used and farm machinery such as tractors realize only a fraction of their capacity.

(ii) Poor Pricing Policies

Inadequate pricing policy worsens the situation. Although prices of major crops and animals have increased annually the real producer prices have marginally increased giving only minimal returns to persuade the producer to produce more since the increases are eroded by the high cost of inputs, transport and interests on credit. The collection and marketing of produce has been hampered by similar problems and changes in marketing institutions.

(iii) Poor Storage

Storage of inputs and harvested products is a vital step and this is a problem from the village to the national level where storage collection and transport facilities are inadequate, causing large post harvest losses. This has developed through lack of storage plans as part of the agro-industrial system.

(c) PROCESSING INDUSTRY PROBLEMS

The raw material supply is problematic. The supply is often insufficient, unreliable and variable in quality as mentioned earlier thus causing processing problems. Plants operate at a fraction of their capacity due to low raw material supply. For example fruit canning is seasonal (rain dependent) and achieves only a low percentage of utilization. In general the situation has developed mainly due to inadequate project planning and feasibility studies.

The problems mentioned under agriculture and mismanagement also apply here. Proper project implementation and evaluation, guaranteed supply of raw materials through binding contracts with farmers especially villages and parastatals are largely lacking.

(i) Limited Technology Capability

The agro-industry is largely dependent on imported technology, equipment, machinery, chemical and relevant inputs as mentioned earlier in this study. Absence of indigenous advanced technology and manufacturing under licence or patented overseas processed aggrevate the problem since the technology is foreign and is transferred if not transplanted wholly into a strange environment without much adaptation to suit the local conditions and taste. Use of such technology leads to considerable inefficiency, due to handling by semi-skilled personnel and poor inplant operation. There are glaring examples in sugar manufacture, vegetable oil processing and fruit canning where operating capacities are below average because of these problems.

The general world inflation has increased the cost of new machinery, equipment, spares and imported raw materials and as a result most plants are obsolute and inefficient. Maintenance and running costs are high. Shortage of water in some areas, frequent power failures especially in thermo electricity areas, cause sever constraints. In addition, decline in labour productivity, weak marketing institutions and limited industrial disputes nave increased production costs and slowed down industrial production and growth.

(ii) Inadequate Policies and Guidelines

The food industry faces critical problems due to lack of defined guidelines with several inadequate manufacturing premises, lack of local standards for most manufactured products and minimal or non-existent quality control facilities, thus leading to low quality products. The indiscriminate use of processing aids, such as colour and flavouring agents, coupled with adulteration in some products such as spices and processed fruits; along with inadequate packaging and labelling, puts the consumer at a big disadvantage. Some products such as canned meat is mainly exported but due to stiff overseas competition, the industry is triffled. The grip on the local market in some products by powerful multinationals tends to discourage local manufacture of items such as baby foods. The situation is a

hangover from pre-independence days when a colongy was treated as a market for developed countries and of late, there is a danger of becoming a dumping ground for developed countries products, which fail to meet increasingly stiff environmental regulations in the countries of origin of strings imposed on loans or aid.

iii) Poor Backup Services

Updating local processes to regional or even international standards, has not been done. Equipment and machinery are not locally fabricated and no adequate training, proper maintenance and local manufacture of spares is undertaken. Enforcement of existing agro-industry related legislation is often not carried out. New and modified products with potential for new markets have not been considered seriously.

(iv) Poor Research and Development

Haphazard selection and assessment of technology using existing institutions along with serious Research and Development efforts have not helped in technology transfer and adaptation to make full use of the big agro-industrial potential that exist.

Associated and closely allied industries such as food manufacture, textile and leather have not pooled resources and common services, to establish service units such as quality control, spare parts manufacture, standardization and research and development.

(v) Inadequate Marketing

Poorly organized local markets to meet demand, frustrates ready outlets since inadequate protective legislation and infrastructure exist. At the regional level, a poor export drive does not open up markets with African countries, other developing countries and even in developed countries for products such as quality tropical fruit and vegetables. There is no strong national capability to store, transport and distribute finished products in most DCs in Africa.

(d) MANPOWER MANAGEMENT AND ADMINISTRATION CONSTRAINTS

Self-sufficiency in manpower in the food processing industry falls for short of requirements. Demand gossly outstrips supply due to insufficient relevant training institutions. Degree and diploma level personnel especially in agriculture, industry and marketing currently are in short supply. This has been caused by limited technical schools and enrolment pattern whereby the sciences are shunned in favour of arts subjects at secondary school level. Again this is a pre-independence legacy where training was geared towards administrative and clerical personnel.

(i) Limited Apprenticeship

Lack of serious and systematic on the job training in agro-industries in those operations which are apprenticeable and new industrial mannual operations are generally disparaged, thus inhibiting the building of experience without advanced formal post school training.

This has led to over dependence on imported skilled qualified technical staff, to keep essential production going in parastatal and private agro-industries; but how long will this continue especially in food processing?

The system of using counter part expatriate staff is a stop gap measure, but experience has show that some of the staff have no obligation to teach the local staff for they are employed to work and not to teach. After all, their overseas conditions of service are much superior to their local colleagues or even their equivalents back home, so there is a tendency to stay on.

(ii) Misallocation of Trained Manpower

Misallocation of the limited number of trained technical personnel drains the food industry of much needed skill. This has been caused by pertinent government institutional changes such as appointment of administrative personnel. Overall, the number of skilled manpower at the professional, supervisory, technician and labourer levels in the food industry is inadequate. A review of the manpower situation in the agro-industrial sector and development of a systematic long-term programme to train a scientific and technical cadre to man the food industry has not been done in most Developing African Countries.

(iii) Management and Administrative Problems

Management and administrative problems in the agro-industry exists like in any other sector. Deficient organization, administrative, and implementational capacity are problems already outlined, yet performance in the agro-industry is worth commendation. However, the high incidence of young managers and supervisors that have been put in very challenging positions through internal promotion, training or sheer determination, leaves much to be desired.

This has been mainly due to deliberate official policy to localize management that is sympathetic to their political philosophy, and understands local situations or even sheer nepotism may have worsened the situation in the food processing industry.

(e) FINANCE AND INVESTMENTS PROBLEMS

It is apparent that financial constraints are serious. Governments are the largest investors in the food and industry processing sector which has been growing fast according to the national Development Plans. However, although the sector contributes to the national income a high percentage of the investment is usually spent on recurrent expenditure. Vital agro-industrial projects fair badly because of failure to provide the needed infrastructural works. There is much dependence on foreign finance from the World Bank and other bilateral sources and this has lead to excessive external influence on project implementation, delay in instituting desirable reforms and a feeling of complacency. This has belittle the need to increase domestic savings needed for local investment and attainment of some degree of self-sufficiency.

(i) Insufficient Funds and Related Aspects

Inefficient and mis-use of investments is rather common. As mentioned earlier, most plants are running at below capacity due to possibly avoidable reasons. Some establishments are not producing sufficient surplus to finance new investment.

Local credit and borrowing facilities are not without problems. Recovery of loans from major borrowers is disappointing. This has been attributed to an inefficient loan recovery system, uneconomic returns of inputs such as fertilizer due to hasty dubious agricultural recommendations in agricultural projects, lack of good breed cattle and low milk yields in livestock projects; bad husbandry, unqualified manpower, and inadequate involvement of creditors. Poor maintenance of processing machines and transport vehicles in some projects and unavoidable out-break of diseases such as the recent cholera out-break in some African countries have worsened the situation.

Overhead costs, training of financial management personnel and proper project feasibility and implementation have not been considered seriously. The supporting subsystems such as marketing, transport and communication have problems. The success of the agro-industry is heavily dependent on national political idiology and policies which are sound and require proper and committed implementation of programmes.

Problems have arisen from non-realization of self-reliance, mainly due to failure to understand and apply own activities related to the concept of self-reliance, thinking big that schemes and orthodox methods will solve local problems with dependence on foreign aid instead of local efforts.

The temptation to succumb to positions of importers as open markets and retail outposts for overseas manufacturers has not drastically changed to cater for local preferences, taste and quality so as to consume more locally manufactured goods and promote local industry.

The food processing industry is worsened by low income and poor purchasing power with a wide gap between urban and rural population. The low level of effective demand for a high volume of processed food products stems largely from low productivity and level of education in some countries with subsequent small domestic markets.

Limited government and private investment in the food processing industry infrastructure and supporting systems does not stimulate higher volume production and marketing. Some national pricing policies or the total absence of these, are characterized by low prices of primary crops and inefficient payment and collection by relevant institutions. This has caused black marketing especially for staple foods and high return cash crops such as coffee. Meanwhile the low prices provide no incentive to farmers who tend to switch to other more lucrative activities.

PART B - SECTION II

EXTERNAL BARRIERS

External constraints to the development of integrated food industries in Africa are many and varied and some of the causes mentioned under internal problems also apply here so just major ones are dealt with below.

Political differences often result in unwillingness to use experience and institutions available in the different regions. Language and cultural barriers are factors which hinder and complicate easy exchange of experience.

(a) TARIFFS

Limited access to markets outside DCs due to high tariffs and terms and conditions set by DCs to protect their markets are big constraints in integrated food processing development as indicated in Table 13.

Table 13 illustrates the argument and the predicament faced by DCs. Meat, tropical fish, fruit, vegetables sugar, coffee and cocoa are major foreign exchange earners for DCs. The value levels for 1976 are highest for coffee i.e. US$ 2.879 to the EEC, fresh fish is high for Japan while the USA's highest is also coffee at 2,672 million dollars. The projected changes are low and mostly negative after the Tokyo Round Tariffs, which implies that DCs might face a very tough future with dwindling foreign earnings.

Other attempts at giving DCs a fair share of the world trade has hardly borne fruit. The North - South dialogue and the call for a new Economic Order in the world have not been successful thus creating more constraints for DCs.

Table 14 also indicates that most of the food imports by DCs are raw materials or semi processed products which negates integrated food industrialization in DCs.

The World Market Price Policies and trends are often dictated by DCs as evidenced in various community negotiations, and the fall in prices of sugar, coffee and cocoa favours consumers in DCs at the expense of the DCs producers.

Surpluses from DCs such as grain and dairy products have also been given often as food aid which has negative effects on the African producer who tends to become complacent, loses the moto for self-reliance and has production incentives blocked by the aid especially in the oil and dairy industry.

Table 13: Trade Effects of the Tokyo Round Tariff Cuts for Agricultural Products (Value in $ U.S. million)

Product Group	European Economic Community (EEC)		Japan		United States	
	Imports from developing countries		Imports from developing countries		Imports from developing countries	
	1976	Projected Change	1976	Projected Change	1976	Projected Change
Meat - Fresh	179.8	1.0 to 1.0	174.3	2.6	181.8	3.1
Prepared	181.8	0.0	4.5	-	184.2	2.7 - 2.9
Fish - Fresh	143.6	-2.4 to -3.8	1,208.7	20.7	676.6	0.0
Prepared	129.2	0.0	85.0	0.2	112.8	0.4 to 0.5
Fruit - Fresh	957.1	-0.4 to -0.8	205.1	-	507.7	1.3
Preserved	201.0	-3.1 to -5.8	31.6	0.8	144.0	3.6
Vegetables - Fresh	744.5	-1.8 to -2.8	130.0	0.1	151.3	0.7
Preserved	174.6	0.1	54.3	-0.1	98.8	0.8 to 0.9
Sugar - Raw	439.6	0.0	435.5	0.0	1,023.7	0.0
Coffee - Green or Roasted	2,879.0	35.4	337.9	0.0	2,671.8	0.0
Cocoa - Beans	720.3	0.0	61.1	0.0	358.1	0.0

Source: First Global Study on the Food-Processing Industry - UNIDO
The Hague, Netherlands, 1981

(b) ROLE OF TRANSNATIONAL CORPORATIONS

It is worth nothing that transnational corporations have own interests which literally stiffle integrated food industry development in DCs. These corporations even control germplasm for agricultural products, promote Green Revolution attempts such as the recent new wheat and rice varieties which demand high inputs of fertilizer, pesticides and irrigation which are beyond the means of the rural poor who in the end wind up worse off.

Transnationals tend to control key branches of the food industry in DCs and as seen in Table 14 the future points to more multinational strangling of DCs unless remedial measures are taken or workable arrangements are made for mutual benefit.

Involvement of TNCs in staple foods as indicated in Table 14 tends to limit the degree of integration since most of these corporations are geared to maximum returns at least cost, without striking a balance vertically and horizontally.

Branded foods for domestic markets involving TNCs include processed livestock products such as meat and dairy products, confectionery, bakery good, refined vegetable oils, beverages (wine spirits, soft drinks and beer) refined sugar, processed coffee, cocoa and tea. All these are handled in medium and large scale plants whose projected growth is high to medium.

(c) CONSTRAINTS IN MARKETING, TECHNOLOGY EXCHANGE AND FINANCING

Inadequate level of efficient marketing arrangements, manipulation and management is a major constraint in the African market and distribution systems linked with the overseas outlets.

High pressure salesmanship, strong promotion and advertising tend to enhance imported products and belittle local products whereby the consumer is imbued with the idea that "imported" is "best". This tendency is a major constraint in integrated food processing in most African countries.

Limited access to advanced technology is a real problem since DCs tend to protect their indigenous technologies through patents and copy rights, making DCs manufacture items under licence and pay heavy royalties.

Free exchange of information and co-operation in Research and Development are lacking so there is little effective communication since there are not many data banks or institutional memory arrangements.

The shortage of manpower in some countries, makes it difficult to release badly needed specialist while the danger of brain-drain lurks in the background.

There seems to be a general lack of funds for the promotion and implementation of sizeable international co-operation programmes.

Financing and International Credits are essential in an integrated food industry development since large capital inputs are required. DC programmes financed by agencies such as the World Bank, the International Monetary Fund and others, are often hampered by tough conditions especially high interest rates and terms which are not sympathetic to the needs of DCs.

Table 14: Selected Principal Types of Plants and Transnational Corporation (TNC) Activities in Developing Country Food Processing Industries

Industry Group / Market Oriented	Type of Plant: Small, Medium and Large	TNC involvement, Mid 1970
Domestic staple foods		
Corn milling	Large	High
Rice milling	Small	Low
Wheat milling	Small and Large	Medium
Pulses and roots	Small	Low
Sugar milling	Small	Low
Vegetable oils	Small and Large	Medium
Bakery	Small and Large	High
Meat (fresh)	Small	Minor
Poultry	Small and Large	High
Dairy and products	Small and Large	Minor
Fish	Small	Minor
Fruit and vegetables	Small	Minor
Animal feeds	Small	Little

Source: UN Centre on Transnational Corporations (1981) "Transnational Corporations in Food and beverage Processing". New York.

PART C

COMPONENTS OF INTEGRATED FOOD-PROCESSING INDUSTRY DEVELOPMENT

After identifying the major constraints, in integrated food processing industry development, measures to be taken must forge clear links between production of raw materials (mainly agriculture), processing and marketing so that the system functions in unison along side supporting related infrastructure. Some of the constraints were dealt with in a limited way in part B, but as solutions, there is more emphasis where appropriate in this chapter.

It is appropriate to have the righ priorities in measures to be taken and among others are the following:

(a) CRITERIA FOR DETERMINING PRIORITIES

The following are just guidelines and the order will have to depend on existing local conditions. Action taken should:

Satisfy hunger and achieve a big degree of self-sufficiency in food for the population.

Provide enough of major nutrients such as energy, proteins, vitamins and minerals. Creat job opportunities in rural areas and urban centres in a balanced sort of way, to minimize migration from the country side.

Raise national income from local and external sources.

Improve the overall quality of life.

Increase exports especially of processed foods which fetch higher returns than pure raw materials.

Have a positive effect on political change and sociological infrastructive. It is vital to build on what already exists by improving or expanding them.

(b) POLITICAL ASPECTS

The development of integrated food industry development must have a strong political conviction and understanding among all concerned. It's place in formulation of national development plans must be central, emphasising the main food system with supporting systems of economic and sociological nature.

(c) NATIONAL DEVELOPMENT PLANS, PROGRAMMES AND STRATEGIES

Integrated food industry development requires National Development Plans with short and long term clear objectives, strategies for implementation, programmes and projects down to activities which are integrated and linked with directly relevant other sectors of the food industry. Proper phasing, regular evaluation against set targets and review of implementation should be carried out.

(i) Implementation Strategy

A three pronged implementation strategy could be adopted namely: national, district and village industries.

National Industries. These could include medium and large industries producing goods for the domestic and foreign markets. National industries would be initiated and implemented by a national body by their very nature, national industries cannot be established in every region. Their location would be governed by availability of raw materials and markets. Industries intended to satisfy the domestic market would best be located in different industrial growth zones, in an effort to minimize transport and disperse industries.

Research or district industries. This group could consist of medium and small industries. Most of the basic consumer goods could be produced by these industries. Most of the basic consumer goods could be produced by these industries. They involve simple technology, rendering them flexible and easier to locate near the consumer. They will be complementary to the national industries to which they provide and from which they receive inputs.

To stimulate development districts, governments could establish District Development Corporation (DDCs). The responsibility of initiating and establishing local industries could fall under the DDCs co-operative groups and private individuals. Government could encourage the development of these industries by undertaking feasibility studies, arranging their financing and seeking markets for their products. Capable villages would be able to initiate and establish industries as part of their economic activities. These food industries will supply some basic requirements of the villagers themselves as well as the neighbouring villages and districts.

(ii) Industrial Estates for Small Scale Industries. These could be established at regional or provincial level by giving priority to the least industrially developed areas. In these estates, production would be mainly for the regional market and provide the necessary local industrial infrastructure.

(iii) Village Industries and Industrial Co-operatives. The goal would be to assist groups and village governments in initiating and establishing industries in villages. A national body would assist in feasibility studies, construct industrial buildings, facilitate loans for machinery and equipment and technical training.

(iv) Incentives and Protection of the Food Industry. The agro-industry which accounts for a big proportion of all industrial activity in African LDCs requires sizeable incentives and protection as governments policy and development objectives. The production of agricultural raw materials could be encouraged through a food pricing policy. The prices could be announced during the previous season, and be set to allow producers enough return so that they produce more, minimize price fluctuations and meet costs of production.

Appropriate national price control bodies could control the prices of essential commodities such as maize flour, wheat flour, rice, beans, sugar, milk, salt, tea, coffee, bread, cooking oil, beer and soft drinks. The pricing system should provide for a comfortable profit margin to allow for manufacturing development and expansion, efficiency of firms amd maximum utilization of available capacity through price fixing which is dependent on operating overhead costs. Distributors at all levels should be awarded reasonable gross profit meargins to encourage efficient distribution which is a direct outlet for manufactures.

Since most local food industries are single firm industries and they tend to be monopolistic ; the industries could be protected by government through import restrictions on products similar to those manufactured locally and the imposition of tariffs on such imports where appropriate. This may sound contradictory when lifting barriers is dealt with later, but somewhere, a balance must be reached by mutual agreement among nations. Quantitive restrictions on the allocation of foreign exchange for the importation of finished consumer goods which compete with local ones, could provide a very effective protective mechanism for local industries. Other incentives include the provision of easy to get soft loans and credit facilities for equipment and building, through banks and related institutions.

State control mainly through parastatal organizations as the major instrument of development could be explored. At the national level, national development corporations could be in fore front in the development of agro based industries including food processing.

Medium and small scale industries run on co-operative basis at regional industrial estates could be encouraged. Private enterprise should be encouraged to fill in gaps left by the state and co-operative groups and could play a fairly important role especially in small scale food processing. Industrial Licensing Acts should lay down specific policy on licensing including manufacture and trade. In conjunction with several factory ordinances, the ministries of industry and trade could ensure legislation to stimulate, control and monitor industry and trade in general with emphasis on the food and agricultural product industry as well as protection of the consumer.

National Bureau of Standards have a direct bearing on food industries. They are charged with the responsibility to undertake measures for quality control of commodities of all descriptions and to promote standardization in industry and commerce. It should grant licenses for standards and test local and imported products so that they conform with national and international requirements as well as consumer interests.

Food (Control of Quality) Acts should control the manufacture of food through granting licenses and registration. It should ensure, through authorized inspectors that food manufacturing premises are hygienic, products is optimal and proper labelling is undertaken so that adulteration is curbed thus protecting both the manufacturer and consumer.

Marketing and distribution of products including processed food products could be dealt with by Boards of Internal Trade, while external trade could be under Boards of External Trade which are mainly responsible for the promotion of external trade, licensing for export as well as marketing.

(d) INTEGRATION OF AGRICULTURE AND PROCESSING

There is an obvious interdependence between agriculture and industry whereby agriculture supplies food and other raw materials, earns local income and foreign exchange, supplies finance and labour and acts as a market for industrial products. This provides for vertical and horizontal integration in food processing, hence the need to have a link between production and the industry that uses agricultural output.

In view of the above mentioned, agriculture should be planned to satisfy demand for food for consumption especially staples which form the bulk of the food processing industry in Africa. There should be enough surplus for strategic reserves and a bigger surplus for sale to the food processing industry for local consumption and overseas markets. Apart from cereal staple food products, other crops which could involve integrated food industries include oil seeds such as groundnuts, sunflower and soybeans. Cash crops such as sugar, coffee, cocoa and tea are other examples. Perishable products from livestock (meat and milk products) and fish integrate well with feeds manufacture. Fruit and vegetables also fall into this category. The above mentioned could be well integrated by farmers producing the right varieties for processing possibly through contracts or co-operatives and delivering their produce to adequately sited processing establishments.

(e) PROVISION OF PHYSICAL AND INSTITUTIONAL INFRASTRUCTURE

An essential first step would be to identify existing establishments and strengthen or expand them where necessary.

(i) Storage

This includes improvement in the storage of raw materials and other inputs such as chemicals and other processing aids; packaging material and the holding of finished processed products ready for marketing.

(ii) Transport

The major means used are roads, railways, waterways, airways and animal drawn carriages. All these need to be improved, established and well maintained to facilitate the movement of raw materials and processed goods as well as other inputs so as to achieve proper integration.

(f) Communication

The existing facilities of mail, telephone, telegram (cables) and telex services could be upgraded and widespread to facilitate free information flow between the producer and processor especially where perishable goods are involved in integrated food processing industry. The formation of industrial associations to bring together the private and public sectors could be encouraged.

(g) MORE INTENSIVE USE OF TECHNOLOGY IN THE FOOD-PROCESSING INDUSTRY

(i) Use of Technology for Development

Technology assessment, selection, modification and transfer which is a means for rapid development, is inadequate in the DCs in Africa. Governments could create or stimulate bodies charged with the advancement and utilization of Science and Technology. National Scientific Research Councils should be a priority. Currently some of the mentioned activities are actively being persued and the ground work is being laid down through national and international workshops, seminars, symposia and documentation efforts. The present patent system used is still tied up to DCs and it is out dated since current objectives are radically different from preindpendence ones.

(ii) Technical Assistance and Servicing

Technical assistance information openly available for technology development is limited, most is tied up with confidential government negotiations with aid agencies. The situation could change, to open up and allow more integration. Technical assistance in most DCs should be in the form of equipment. Since the national economies are suffering from inflation, dependence on technical assistance is likely to continue into the future. In the field of food and agricultural products industry, emphasis should be on raw material production, storage especially of grain, transport, processing, marketing and distribution, planning and management in agriculture, fisheries, engineering and food science and technology.

(h) ENCOURAGEMENT OF DOMESTICALLY PRODUCED EQUIPMENT TOOLS AND SPARE PARTS

In order to promote integrated food industry development the above mentioned items are essential just as they are in other industries. More use could be of traditional and local craftsmen and talented individuals. Wider use of machine tools such as the machines could promote local fabrication of equipment and spare parts. Some of the required machinery could be made under licence. Overseas plants installed and commissioned could include contracts with provisions to supply spare parts and maintenance of sophisticated components where local facilities are not available.

(i) ACTIVATING SMALL AND MEDIUM SCALE ENTREPRENEURS AND THE ESTABLISHING OF FOOD PROCESSING CENTRES

Since the food processing industry in Africa, especially in DCs, is so young, there is room for all. Small and medium scale entrepreneurs are an apt choice to stimulate the establishment of the processing of local surplus food produce whose production centres are located far away from big establishments or the amounts of raw materials produced do not warrant putting up a big factor. Food Processing Centres (FPCs) not requiring very big capital investment could easily integrate into local infrastructure and provide employment in rural areas and satisfy local demand especially of staple foods and perishable products. Farmers could bring in their raw materials, have them processed at a

fee and take away their final products and by-products for other uses as might be the case for cereals where the bran could be used for feeding livestock, making oil or local brews.

(j) RESEARCH AND DEVELOPMENT

This is the core for advancement in any industry and it should receive serious consideration. National Scientific Research Councils should be supreme bodies, their executive functions related to the council's co-ordination of all type of scientific research work carried out, including own research programmes. Other functions include establishing priorities, allocation of research funds, documentation and dissemination of research findings. Major relevant projects undertaken, should include survey and review of previous work. The DCs can no longer wholly depend much on industrial research findings from overseas and previous relevant local research conducted by different industries is negligible if not non-existent. The councils have therefore the task of encouraging integrated food processing industry development. Research and Development (R and D) in food and agricultural products should be geared towards local and overseas needs.

(k) WIDENING LOCAL MARKETS

There is a need in DCs involved in food processing industries, to develop dynamic and viable marketing plans and strategies in order to survive at the national and international level.

Demand for processed food products should be stimulated mainly by raising income levels possible through wage increases and prices paid to rural farming communities. Parallel to this the processed food commodities should be abundant and readily reached.

More outlets with an efficient wide network of distribution should be improved or established especially in the form of retail shops and supermarkets.

The quality of local food products should be high and consistent in quality and substitute imports or compete equally. Selected items could be promoted through aggressive advertising to break into international markets. Joint ventures could be undertaken with Transnational Corporations to widen outlets and where possible use established brandnames of highly successful establishments.

(l) SUBREGIONAL AND INTERNATIONAL CO-OPERATION IN PROCESSING TECHNOLOGY AND TRADE

Developing countries have fairly similar problems, but their degrees of advancement differ, so there is room to share experiences and learn form one another. Primary constraints already identified include manpower development and management, research and development, technology transfer and financial resources. Other developing countries could help much.

In manpower development much could be achieved through a more agressive followship programme in technical and professional training in food processing. Improvement of the national training infrastructures or establishment of regional centres would make more efficient use of available human resources; apprenticeships, on the job training, exchange visits and consultancies would help solve some of the problems.

Research and Development and the acquisition of relevant technology from other developing countries are important and the methods already mentioned are applicable. National institutions could acquire more manufacturing rights of equipment and processes from other developing countries through licenses and lifting of patents. Free exchange of scientific findings of applied nature relevant or capable of being adopted locally would be beneficial. Equipment, machinery and processes when acquired need proper commissioning, training of operators and other relevant back up services.

Financially, some of the more developed countries such as the OPEC group could provide more sizeable financial resources in the form of grants and soft loans without too many strings, to help implement the above mentioned solutions.

UN agencies could play a vital role to solicit co-operation and act as a clearing house for identifying problems, solutions and potential co-operating agencies including banks, consulting groups and other donors of aid.

The suggestions made for mutual help between developing countries also apply to developed countries with slight modifications according to the nature of the problem. In manpower development and management, more sophisticated training could be undertaken especially in fields not available in the developing countries.

The type of Research and Development and technology available in developed countries require careful assessment and selection, since it is usually more expensive, sophisticated and not-labour intensive. This may jeopardise local employment chances. Financial resources could be made available more freely without elaborate conditions as at present. Successful implementation of these suggestions may require the developed countries to sympathize and respect local political philosopy and aspirations.

All parties concerned could strike a balance but the decisions must be made at the national level according to prevailing conditions. Financially the developed countries have a higher capacity but dependence on external resources by developing countries is dangerous, so national effort must be made to be self-reliant and achieve self-sufficiency in possible field. The lifting of tariffs or at least limiting them to a level which does jeopardise integrated food industries in DCs would go a long way towards solving the problem. A more serious treatment of the North/South dialogue might provide a bigger share of the world trade to DCs thus giving the DCs more access to the free world market.

Stabilization of world commodity prices, especially those from DCs is another obvious solution especially if it is coupled with higher export quarters to processed, semi-processed and raw materials from DCs.

Where possible money as a medium of exchange could be waged and use the barter system as presently agreed between Zambia, Msumbiji and Tanzania whereby the countries exchange good without the involvement of foreign exchange.

(m) MOBILIZING INFRASTRUCTURE FOR FINANCING FOOD-PROCESSING INDUSTRIES

(i) Local Investment and Credit

In most DCs in Africa, governments and private institutions own most sizeable food processing industries. These are financed through financial allocation to corporations, banks and own capital and these should be expanded in a form that promotes integrated development as already outlined elsewhere in this paper.

Loans and credit facilities from other local institutions could be made more readily available with limited restrictions and reasonable interest rates so as to encourage and promote the food processing industry with the provision that integration should be the rule rather than the exception.

(ii) Multilateral and Bilateral sources

Information on external resources that have been granted and available in the near future is scanty and hard to come by. According to UNDP country programmes, United Nations agencies could provide substantial funds with governments giving contributions. FAO could contribute mainly for agricultural improvement, strengthening marketing and livestock development. Resources made available to industry are smaller principally from UNIDO for Research and Development, industrial promotion and assistance to selected relevant industries; these could be increased. In most DCs in Africa, government development budgets could further be boosted by the IBRD and the EEC. The pattern of aid could be biased towards rural development in agriculture and food processing industries. Loans from the World Bank, though not readily available, could be solicited for integrated food industry development which is likely to yield returns more effectively.

Assistance available in the future for DCs from bilateral sources could be increased substantially as most of these countries are in difficult economic situations which have been worsened by inflation.

(n) MANPOWER TRAINING AND DEVELOPMENT

Primary school education programmes should be geared to prepare potential producers of raw materials and semi-skilled labour in agro-industries. Secondary school programmes could have technical, agricultural and home economies oriented streams apart from general schools. These would be geared towards producing personnel who are biased towards aspects which are directly related to food and agricultural industries.

Post secondary school training, offering certificate and diploma courses related to agriculture and food science and technology and related special products could be encouraged. Management and marketing training could be provided mainly at Institutes of Development Management, Colleges of Business Education and Management Institutes. Even at this level of training for providing semi-professional and foremen or supervisory manpower for industry; there are not many specific specializations in key industries. This means that graduates often have to do on the job training and specialize into competent workers in particular food processing industries later on their careers.

Universities in DCs with faculties of Engineering, Agricultural Science affiliated institutes such as the Institute of Development Studies (IDS), Economic Research Bureau (IRB), could undertake research related to national development with food and agricultural processing integration as their priority.

Industrial research institutes should be established where they do not exist. Their major tasks should include carrying out research and development in industry with emphasis on the food processing industry. Other functions could include documentation and dissemination of relevant information, consultancy services and the undertaking of relevant feasibility studies.

University level education carried out at various universities in DCs could emphasize agriculture, food science and technology and process engineering. Efforts should be made to utilize existing facilities more fully and fellowships abroad especially in food and agricultural processing studies could be solicited as a short term, stop gap measure where local facilities are unavailable.

Apparently the little high level manpower available is mostly allocated to education, agriculture and administration with only a small number joining research and development institutions related to food processing. This trend could be reversed to enhance integration.

(o) POSSIBLE FORMS OF INTEGRATED FOOD-PROCESSING INDUSTRY

Having analysed the present status, constraints and measures to be taken to promote integrated food processing industries, it is worth examining possibilities. The following are feasible undertakings: Meat and meat products, milk and milk products, cereal milling, oil seed processing and fruit and vegetable processing. These are likely to be successful under existing environmental conditions in DCs in Africa. Integrated food processing industry could be organized in different forms but, here, only co-operatives, food processing centres, combinates and groups of entrepreneurs are dealt with. These are best illustrated with brief successful case studies.

(i) Co-operatives

Co-operatives offer a unique chance for integrated food processing industry development and classical success stories have been reported in India, Mexico, Europe and Africa. The best example in Africa was the Kilimanjaro Co-operative Union which has since changed name to Uremi Corporation alongside the Coffee Authority of Tanzania.

Integration involves production of coffee where the society provides improved ready to transplant seedlings from a central nursery, thus maintaining uniformity and quality of raw materials. Production is linked with intensive research and development to ensure good varieties, crop husbandry and pest control. Inputs such as fertilizer (mainly cowdug from the peasant farmers who grow the coffee), pesticides and packaging material are sold through the co-operative outlets. There is a dynamic back up extension services offering advice on the spot on production, processing and marketing.

Processing of coffee beans is done using mostly locally fabricated pulpers and after treatment, the beans are dried mostly on mats again made by the farmers themselves.

Marketing is done through the co-operative chain of outlets which are many and within easy reach of farmers.

The dry coffee beans are then transported to a regional coffee curing factory which produces clean or roasted beans for export.

Some is also processed into instant coffee. These products are then marketed overseas through an organized central marketing system.

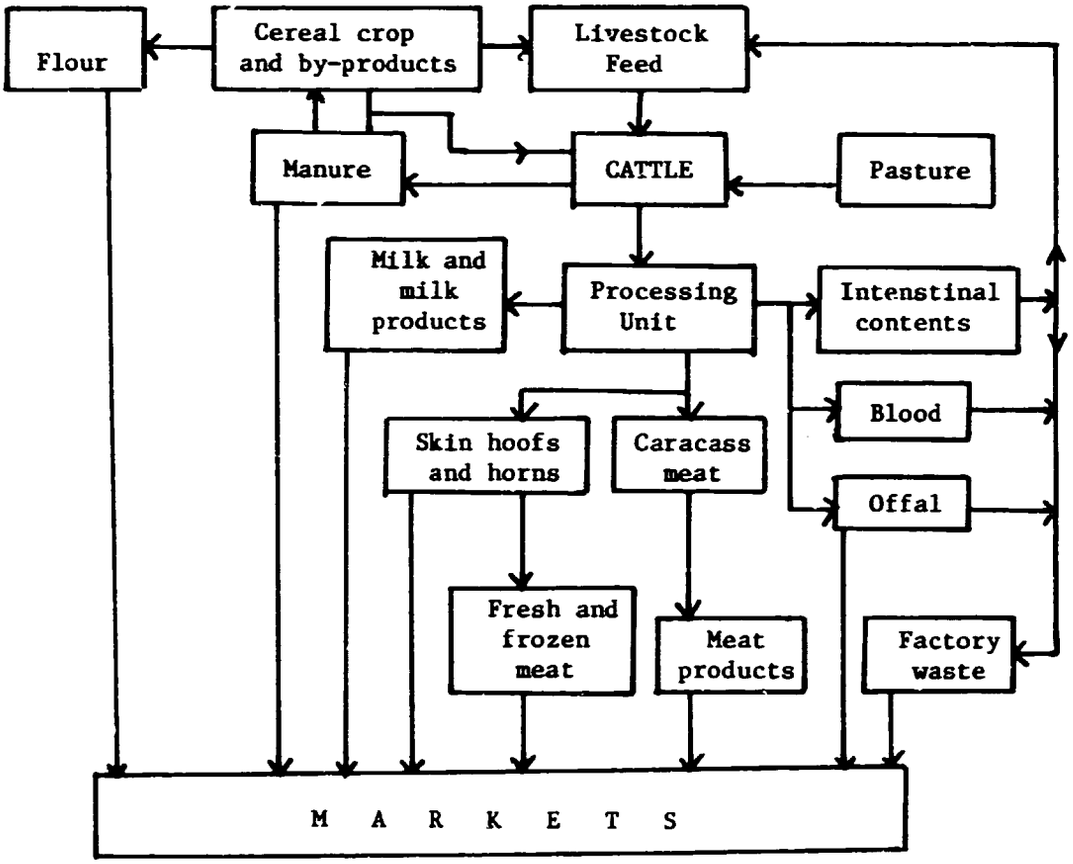
The pulp from the village pulping machines, is used as manure in the coffee plantations while the coffee husks from the curing factory are used as fuel for steam generation.

Horizontal integration involved good health case as coffee growing is labour intensive. Water is amply supplied, ever for irrigation under adverse weather conditions. Feeder raods are built and well maintained to ensure smooth movement of all inputs and products.

There is good interaction between the farmer, the buyer and the processor who sets the standard of quality needed for good coffee.

Quantities produced and delivered usually meet the requirements of the factory and often there is a good link to minimize losses and capacity underutilization.

(ii) FIGURE I: THE ESTABLISHMENT OF FOOD PROCESSING CENTRES: THE CASE OF MEAT



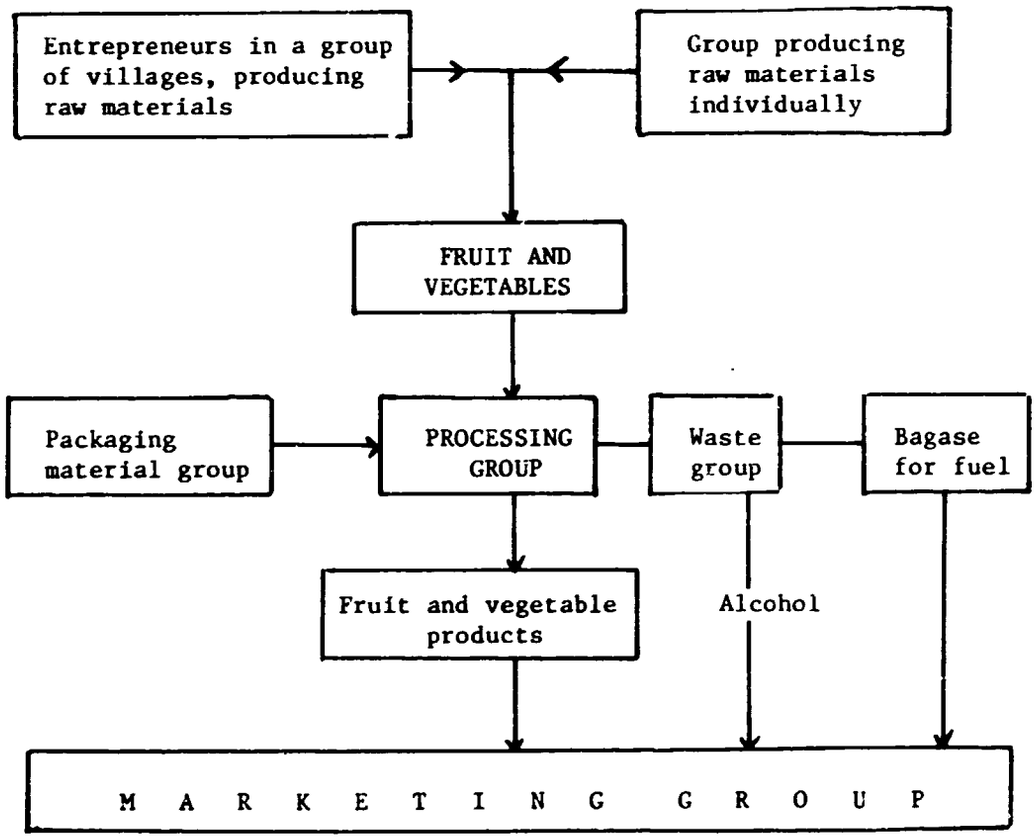
Adapted from: UNIDO Global Preparatory Meeting for the Consultation on the Food-Processing Industry, Vienna, 1979

The above flow diagram on an integrated meat processing industry is clear and self explanatory thus needing no further comment than it illustrates the potential for integration.

(iii) United Group of entrepreneurs

This form of integration involved groups specializing in some branch of food processing and when they operate together, the whole system ends up integrated. It may however require very rigorous management and communication. Fruit and vegetable processing is taken as a suitable illustration.

Figure II: GROUP OF ENTREPRENEURS



(iv) Agro-industrial Complexes

Agro-industrial complexes offer a good chance for integrated food processing industry. A typical complex is characterized by a rich agricultural area with surplus agricultural production and labour, large investment potential, collaboration with related enterprises and government support.

Raw materials could be produced under contract by individual farmers or farm co-operatives for processing into a variety of products to meet local and export demand, backed up by dynamic research and development; planning and public relations. Production contracts could involve some form of advance payment in the form of cash or inputs to encourage a high degree of self-reliance.

Proper selection of food product lines would make use of all the raw materials, by products and subsequent subindustrial establishments such as pharmaceuticals and baby foods from animal sources.

Adequate marketing distribution network should be based on market research to satisfy consumer needs. This requires reliable transport even own fleets of vehicles.

Financing is a vital component which could involve a good credit system: individuals or co-operatives investing in the complex or sharing profits and management; the complex investing in interlinked paying projects and having reliable banking facilities.

Personnel of high calibre with intensive development and training at all levels, in all the units of the complex, would ensure proper integration and mutual understanding.

(v) Joint Ventures

Joint ventures in food processing could encourage integration. Most of the aforementioned aspects in the other possible forms, apply here also.

Joint ventures could involve local, regional or even overseas establishments. It would be composed of partners who keep their own identities. Raw material production could be provided by farm co-operatives. These would be linked to industrial processing partners with capable managerial, technological know-how and commercial organization. The relationship between the partners could be regulated by contract establishing the allocation of costs, profits and risks. Financing could also involve having shares, thus enhancing mutual trust between the partners in joint ventures.

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