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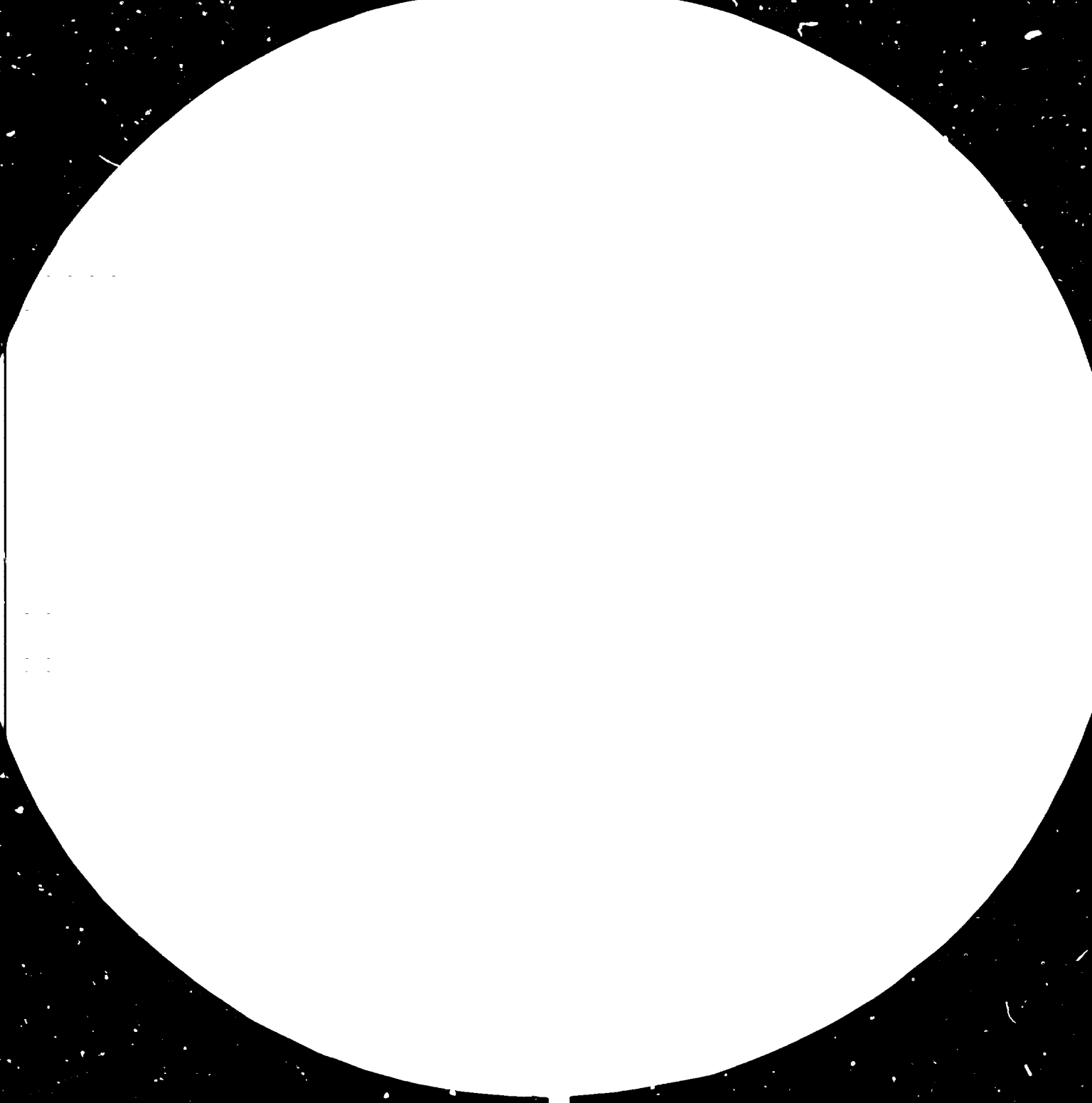
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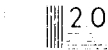
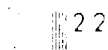
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Resolution Test Chart (continued)

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DIAGNOSTIC STUDY OF THE PRESENT SITUATION AND
TRENDS IN THE PRODUCTION AND UTILIZATION OF
AGRICULTURAL MACHINERY IN AFRICAN COUNTRIES*

produced by

The Sectoral Studies Branch
Division for Industrial Studies

002037

* This document has been translated from an unedited original.

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INTRODUCTION

This document sets out and analyses the present situation in regard to the production of agricultural tools, machinery and equipment in the countries of the African continent at the beginning of the 1981-1990 decade. The diagnostic study deals not only with all existing forms of production, both industrial and small-scale, but also concentrates on the nature of the demand for agricultural machines and the institutional and political context of the sector. It is based on an analysis of sixteen case studies carried out for UNIDO in representative African countries, by national experts having responsibility in their own countries in this field, based on a uniform plan of analysis put forward by UNIDO*. It represents an important step towards understanding African realities, made by Africans themselves and based on considerable and high-quality (though capable of improvement) documentation; the analysis and synthesis of this has been undertaken by the UNIDO Secretariat. This data has been extended, wherever other information was available, to other countries which do not belong to this sample, so as to reflect as closely as possible the realities of the entire continent. We should emphasize that many of the facts and points of view expressed in these national reports present a coherent and unequivocal picture of the situation of the sector in Africa, largely agreeing with the opinions expressed at the time of the first Consultation meeting at Stresa in October 1979 and with the major themes of the First World-wide Study on the Agricultural Machinery Industry (UNIDO/ICIS.199, 29 June 1979).

This observation of realities should contribute towards improving the intelligence of the existing situation and the major development trends in this sector in Africa: this is an essential first step towards the identification of alternative solutions and strategies by countries or groups of similar countries.

After describing the sample of the 16 countries which were the object of specific studies there follows an analysis of the present situation in Africa for the production of agricultural machinery and tools, and from these the main lessons are extracted.

* The UNIDO Secretariat expresses its grateful thanks to these authors who are listed in Annex 1, page 85.

I. DESCRIPTION OF THE SAMPLE OF AFRICAN COUNTRIES WHICH WERE THE SUBJECT OF SPECIFIC CASE STUDIES.

The size and nature of the sample represents a compromise between a need for "technical representativeness" of the countries chosen and the constraint of keeping the mass of information collected and the actual organization of the survey within reasonable limits.

The countries studied accurately represent typical national configurations on the African continent, in particular existing development levels and agro-ecological conditions. They are grouped into four major geographical sub-regions (see following map):

<u>North Africa:</u>	Algeria, Egypt, Sudan
<u>West Africa:</u>	Senegal, Mali, Ivory Coast, Togo, Nigeria
<u>Central Africa:</u>	Cameroon, Zaire, Burundi
<u>East (and South) Africa</u>	Ethiopia, Kenya, Tanzania, Zambia, Madagascar.

The principal macro-economic characteristics of these countries (divided into sub-regions) are set out in Tables 1 and 2 below; Table 3 provides some data on the countries themselves.

- The 16 countries account for 52% of the total area of Africa, for more than 64% of its population (293 million out of 456 million inhabitants) and for nearly 50% of the GDP* of the continent. Of the four sub-regions the least representative is East Africa, since the countries studied represent only a third of the population and GDP of this sub-region.

- It should also be noted that the mean per capita income in the sample is lower than the mean for the continent (\$115 instead of \$627 in 1979), in particular because of the absence of countries with a high revenue (Libya, South Africa). Five of the least developed countries (LDC) are part of this sample (Sudan, Mali, Burundi, Ethiopia and Tanzania), representing a total population of 78 million inhabitants out of a total of 135 million for all the 20 African LDC as officially recognized by the United Nations (see Table 4).

* GDP = Gross Domestic Product.

AFRICAN COUNTRIES ON WHICH SPECIFIC CASE STUDIES WERE CONDUCTED AND OTHER COUNTRIES ON WHICH PRECISE INFORMATION WAS AVAILABLE

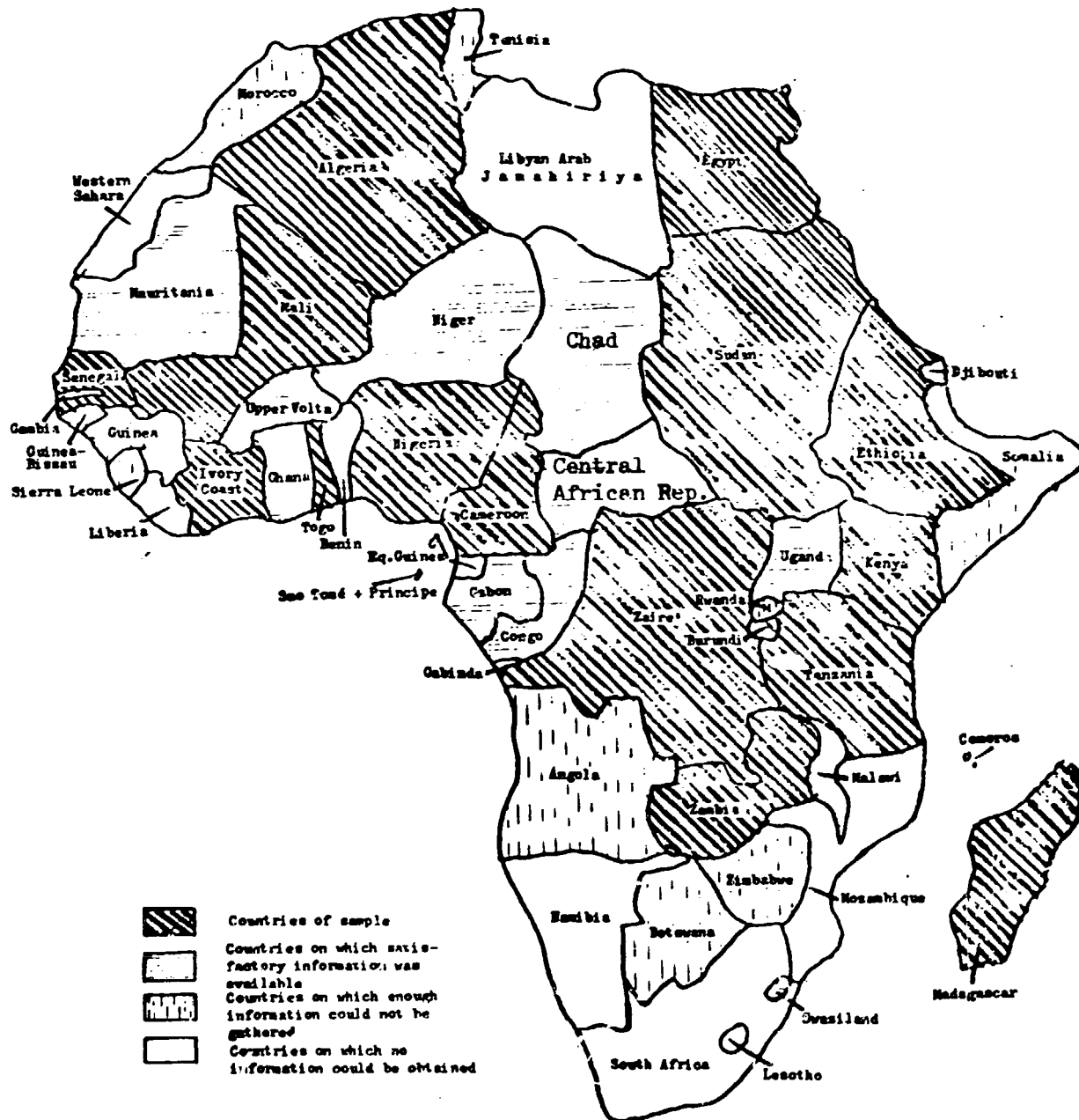


Table 1. Main characteristics for African regions and the selected country groups, 1979

Region	Area		Population		GDP at current fact. cost		GDP per capita whole region, country group	Population per square kilometre whole region, country group
	Km ²	a/ b/ (Percentage)	Thousands	a/ b/ (Percentage)	thousand US dollars at 1979 exchange rates	a/ b/ (Percentage)		
North Africa (6) ^{c/}	8 259 794	100.0 27.5	105 454	100.0 23.1	90 905 122	100.0 31.9	862	12.7
of which: Algeria, Egypt, Sudan	5 899 554	71.3 19.6	76 730	72.8 16.8	42 447 629	46.7 14.9	553	13.0
West Africa (16) ^{d/}	6 142 141	100.0 20.4	136 844	100.0 30.0	84 777 101	100.0 29.8	620	22.3
of which: Senegal, Mali, Ivory Coast, Togo, Nigeria	2 738 663	44.6 9.1	96 918	70.9 21.3	65 570 909	77.2 23.0	677	35.4
Central Africa (11) ^{e/}	6 667 389	100.0 22.2	60 767	100.0 13.3	18 150 813	100.0 6.4	299	9.1
of which: Cameroon, Zaire, Burundi	2 848 685	42.7 9.5	40 150	66.1 8.8	9 254 994	50.0 3.2	231	14.1
East Africa (20) ^{f/}	8 983 116	100.0 29.9	152 672	100.0 33.5	90 959 388	100.0 31.9	596	17.0
of which: Zambia, Madagascar, Tanzania, Kenya, Ethiopia	4 089 286	45.5 13.6	78 911	51.7 17.3	19 408 326	21.3 6.8	246	19.3
African total (53)	30 052 440	100.0	455 557	100.0	284 792 424	100.0	627	15.2
of which: Algeria, Egypt, Sudan, Senegal, Mali, Ivory Coast, Togo, Nigeria, Cameroon, Zaire, Burundi, Zambia, Madagascar, Tanzania, Kenya, Ethiopia (16)	15 565 188	51.8	292 729	64.3	136 681 858	48.0	471	18.8

a/ Shares of country groups in total of regions.

b/ Shares of regions and country groups in African total

c/ Morocco, Algeria, Tunisia, Libya, Egypt, Sudan.

d/ Mauritania, Senegal, Mali, Ivory Coast, Upper Volta, Benin, Niger, Cape Verde, Gambia, Guinea-Bissau, Guinea, Sierra Leone, Liberia, Ghana.

e/ Cameroon, Chad, Central African Republic, Gabon, Congo, Guinea (Equatorial), Sao Tome-Principe, Zaire, Rwanda, Burundi, Angola.

f/ Eritrea, Lesotho, Swaziland, Zambia, Zimbabwe, Malawi, Mozambique, Madagascar, Comoros, Réunion, Mauritius, Seychelles, Tanzania, Uganda, Kenya, Somalia, Djibouti, Ethiopia, South Africa, Namibia.

Source: ECA, The World Almanac and Book of Facts, World Population, "Trends and Prospects by Country 1951-2000"; UN, SP/Doc/DESA/P/33; own calculations.

Table 2. African regions and selected country groups, 1979: other data

Region	Agriculture and forestry, fishing, hunting as % of GDP	Manufacturing as % of GDP	Arable hectares per capita	Labour force in agriculture as percentage of total labour force
North Africa (6) ^{a/}	16.8	11.4	0.45	52
North Africa without Lybia	19.6	13.2	0.36	58
Algeria, Egypt, Sudan (3)	31.1	12.6	0.28	56
West Africa (16) ^{b/}	35.9	7.7	0.77	80 (15)
Senegal, Mali, Ivory Coast, Togo, Nigeria (5)	29.0	11.5	0.85	75
Central Africa (11) ^{c/}	39.7	7.5	0.61	81 (10)
Cameroon, Zaire, Burundi (3)	40.0	10.0	0.45	84
East Africa (20) ^{d/}	31.0	11.4	0.45 (16)	72 (17)
Zambia, Madagascar, Tanzania, Kenya, Ethiopia (5)	39.0	12.8	0.41	85
Africa (53)	32.7	9.5	0.63 (49)	74 (48)
Sample (16)	34.6	11.8	0.53	78

a/ Morocco, Algeria, Tunisia, Lybia, Egypt, Sudan.

b/ Mauritania, Senegal, Mali, Ivory Coast, Upper Volta, Benin, Niger, Cape Verde, Gambia, Guinea-Bissau, Guinea, Sierra Leone, Liberia, Ghana, Togo, Nigeria.

c/ Cameroon, Chad, Central African Republic, Gabon, Congo, Guinea (Equatorial), Sao Tomé and Principe, Zaire, Rwanda, Burundi, Angola.

d/ Botswana, Lesotho, Swaziland, Zambia, Zimbabwe, Malawi, Mozambique, Madagascar, Comoros, Réunion, Mauritius, Seychelles, Tanzania, Uganda, Kenya, Somalia, Djibouti, Ethiopia, South Africa, Namibia.

(...) number of countries.

Source: ECA, The World Almanac and Book of Facts, World Population, "Trends and Prospects by Country 1951-2000"; UN, ST/ECA/SER.R/33; own calculations.

Table 3. Main characteristics for the 16 selected countries - 1979.

	Area Km ²	%	Population 1000	%	GDP at current factor costs ^{a/}	%	GDP per capita	Population /Km ²	Arable land per capita	% of the labour force in agricul- ture
North Africa:										
Algeria	2 381 741	7.9	17 959	3.9	23 015 996	8.1	1 282	7.5	0.9	60
Egypt	1 002 000	3.3	40 926	9.0	13 669 429	4.8	334	40.8	0.2	50
<u>Sudan</u>	2 505 813	8.3	17 865	3.9	5 762 204	2.0	323	7.1	1.1	86
West Africa:										
Senegal	196 722	0.7	5 518	1.2	2 337 497	0.8	424	29.5	1.1	70
Mali	1 239 710	4.1	6 465	1.4	920 119	0.3	142	5.2	3.8	80
<u>Ivory Coast</u>	322 463	1.1	7 722	1.7	7 646 563	2.7	990	24.0	2.6	75
Togo	56 000	0.2	2 618	0.6	797 826	0.3	305	46.7	2.5	78
Nigeria	923 768	3.1	74 595	16.4	53 868 904	18.8	722	80.8	0.8	70
Central Africa:										
Cameroon	475 442	1.6	8 248	1.8	5 221 377	1.8	633	17.4	2.1	82
Zaire	2 345 409	7.8	27 519	6.0	3 394 290	1.2	123	11.4	0.5	78
<u>Burundi</u>	27 834	0.1	4 383	1.0	639 327	0.2	146	156.5	0.6	92
East Africa:										
Zambia	752 614	2.5	5 465	1.2	2 702 133	0.9	494	7.3	2.3	85
Madagascar	587 041	2.0	8 511	1.9	2 628 484	0.9	309	14.5	0.7	90
<u>Tanzania</u>	945 087	3.1	17 382	3.8	4 068 676	1.4	234	18.4	0.6	90
Kenya	582 644	1.9	15 780	3.5	5 187 294	1.8	329	27.1	0.3	76
<u>Ethiopia</u>	1 221 900	4.1	31 773	7.0	4 821 739	1.7	156	26.0	1.1	86
Total Africa (53 countries)	30 052 440	100	455 447	100	284 792 424	100	621	15.2		

^{a/} 1000-US\$ at 1979 exchange rates.

Underlined: least developed countries.

Table 4. The twenty African least developed countries, 1979.

	Population 1000	GDP	GDP per capita
Benin	3 424	927 896	271
Botswana	798	512 611	642
* Burundi	4 383	639 327	146
Cape Verde	319	77 371	243
Central African Republic	2 169	591 260	273
Chad	4 417	901 037	204
Comoros	328	82 495	252
* Ethiopia	31 773	4 821 739	156
Gambia	587	174 237	297
Guinea	4 887	1 367 989	280
Lesotho	1 309	166 338	127
Malawi	5 963	1 209 237	203
* Mali	6 465	920 119	142
Niger	5 150	1 974 642	364
Rwanda	4 649	1 020 552	220
Somalia	3 542	759 333	214
* Sudan	17 865	5 762 204	323
Uganda	12 796	4 847 165	379
* Tanzania	17 382	4 068 676	234
Upper Volta	6 728	895 045	133
* countries (sample)	77 868	16 212 065	208
African least developed countries	134 934	31 691 273	234
Total Africa (53 countries)	455 557	284 792 424	627
% of *countries in African least developed countries	57.7	51.3	
% of African least developed countries in total Africa	29.6	11.1	
% of *countries in total Africa	17.1	5.7	

Source: ECA, "World Population Trends and Prospects by country 1951-2000", UN, ST/ESA/SER.12/33.

- The mean population density of the sample is 19 inhabitants per km², with considerable divergencies between regions (13 in North Africa, 35 in West Africa because of Nigeria) and between the countries (see Table 3).

- The agricultural sector (including forestry and fishing) represents on average 35% of the GDP for the African countries in the sample. It is highest in the Central and East zones, falling to 31% in North Africa (see Table 2). This degree of concentration on agriculture is also seen when the percentage of the active population employed in agriculture is examined. This average is 78% for the whole of the continent and 74% for the sample. It exceeds 80% for all the sub-regions of the sample with the exception of North Africa (56%). The considerable divergency which can be seen in every sub-region and country between the contribution of the agricultural sector to the GDP and its contribution towards employment shows very clearly the low productivity of the agricultural sector (taken as a whole), related in particular to under-equipment in machines and equipment. However the second essential point to be kept in mind concerning these ratios is that the agricultural sector in Africa plays a very considerable role in employment in the country. The phenomenon of a widespread rural depopulation reflects quite clearly the inability of agriculture to establish jobs, whereas the other activities⁽¹⁾ are unable to compensate for the population growth in the towns⁽²⁾. This change is the main cause of a major existing and future problem in the African countries, namely under-employment. The development of agricultural equipping in terms of tools and plant, and the local manufacture of these products, constitute a necessary route for facing up to this problem, at the same time that it makes it possible to meet another essential concern, that of the production of food products.

(1) The contribution of the manufacturing sector is less than 10% in Africa, less than 12% in the countries of the sample.

(2) The rate of growth of the population in the towns reached 6% per year during this last decade.

Source: World Bank Study: "Accelerated Development in Sub-Saharan Africa - An Agenda for action". Washington, 1981.

- It should be noted that divergencies between countries in the same region can also be very pronounced. Countries such as Sudan and Egypt have a GDP which is four times smaller than that of Algeria whilst that of Mali is six times smaller than that for the Ivory Coast. Nevertheless the sub-regions do represent relatively homogeneous agro-ecological groupings.

- The arable land/population ratio demonstrates the importance of the constraint of limited cultivatable land in the face of the population growth of the African countries. The average per capita figure is 0.55 hectare for the sample. It falls to 0.28 ha for the countries of North Africa with a large population and rises to 0.85 ha for West Africa. The most extreme values are found in Egypt (0.2 ha) and Mali (3.8 ha).

II. THE PRODUCTION OF AGRICULTURAL MACHINERY IN THE AFRICAN COUNTRIES

The content of these case studies carried out in 16 countries has made it possible to draw up, for each of these countries, data sheets which show the essential characteristics of the production in the country. This covers industrial production, small-scale production (structured or otherwise), relationships with existing engineering activities in the country, maintenance activities, relationships with importing and finally those projects announced within the sector. These 16 data sheets are given as an Annex to this document, beginning on page 87. As an example we reprint here the data sheet on Mali (Table 5)⁽³⁾. The national data have been grouped by sub-regions to facilitate the comparative and synthetic analysis described in this section, dealing successively with industrial production and small-scale or artisan production.

A. Industrial production

1. The production apparatus

a) Overall approach

Table 6 (a, b, c, d) at the end of this section, pages 27 to 30, sets out the major characteristics of the (semi-)industrial production of agricultural machinery in the 16 African countries in the sample and also gives some information concerning other countries⁽⁴⁾. Despite some inaccuracy with regard to the number and size of the companies and of the range of their activities⁽⁵⁾ it is possible to make some overall estimates:

- There are about 90 companies of the industrial or semi-industrial type in the countries considered which, as a rough estimate, account for 15,500 persons employed on the production of equipment evaluated at \$ 150 million with a value added of \$ 50 million. These companies are mostly of small size, with the notable exception of SONACOME, in Algeria, which employs 6,000 persons (or 40% of the potential industrial production force in the sector for all the countries.

(3) This data sheet could serve as the basis for a file held, and periodically updated, by the UNIDO Secretariat.

(4) The industrial production of South Africa has not been taken into account.

(5) Taking these inaccuracies into account it is most desirable that each participant should supply any supplementary information which he possesses.

Table 5. National Data Sheet on Mali

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN	<u>M A L I</u>
<u>Industrial production</u>	1 enterprise
Name(s) (date set up)	SMECMA (1974)
Legal status	State owned (83%)
Number of employees (cadres/skilled workers/unskilled labourers)	5 + 8 + 150 = 163 + seasonal workers
Turnover (local currency)	2.9 billion Malian francs in 1976; 1.2 in 1979
Added value	8.7% in 1976; 28.4% in 1979
Proportion of capacity used	Estimated at 65%
Type of products manufactured and production	Animal drawn equipment: 23,000 units in 1979
Technical nature of operations	Assembly/cutting and welding/simplification
Study and research capacity	Responsibility of the Agricultural Mechanization Division (DMA) of the Ministry of Agriculture
Nature and extent of relations abroad	17% of capital is foreign. Highly dependent for supplies of raw materials and high grade items (France)
Nature of any operational assistance	Tax exemption for the first five years only
Marketing networks	Through a state company, Agricultural Credit and Rural Equipment Company (SCAER), closed down in 1980. Direct sales to development operations.
Other characteristics	This unit which specializes in agricultural equipment was financed by the Fund of Aid and Co-operation (FAC) in 1969 (with an initial investment of 110 million Malian francs). Provides village blacksmiths with subcontracting work.
<u>Handicraft production</u>	
Structured handicrafts	A total of 310 blacksmiths trained under contract as part of agricultural development schemes (Malian Company for the Development of Textile Fibres (CMDT) and the Groundnut Marketing Food Crops (OACV)). Repairs of animal-drawn equipment. Modern equipment with a welding unit. Retail price of products 25% less than industrial prices.
Non-structured handicrafts	About 3,000 farmers/blacksmiths, manufacture of hand tools.
<u>Linkage with the metallurgical and engineering sector</u>	
Characteristics of the sector	10 enterprises. Principal activities: structures/carpentry/foundry/cycle/vehicle body construction/metal construction; 30 to 50% of capacity used
Links with agricultural machinery	Very weak
Potential for developing links with the agricultural machinery sector	Opportunity for links with foundries and metal construction
<u>Maintenance operations</u>	
	Spare parts supplied by SMECMA. Craftsmen are important for repairs. Centralized and local workshops for tractors.
<u>Imports/exports</u>	
Necessary imports for local production of agricultural machinery	Imports represent 70% of SMECMA's turnover (steels, moving parts, bolts, etc.)
Use of local production in relation to imports	All tractors and motorized equipments are imported.
Exports	Non-existent except for exports to Upper Volta initiated in 1980
<u>Project announced and prospects</u>	
	One unit for the assembly of threshing machines and other fixed equipment, with the objective of a sustained increase in SMECMA's exports.

About fifteen companies have more than 200 employees (BEHERA COMPANY, Egypt; SISCOMA /SISMAR, Senegal; TROPIC, Cameroon; UFI, Tanzania, etc.). If Algeria and Egypt are excluded the average size of a company⁽⁶⁾ in this sector in Africa is less than 200 employees, according to the data collected in our survey, but with some considerable divergencies between countries.

- Each country possesses, in general, at least one industrial or semi-industrial production unit, with the exception of about ten countries⁽⁷⁾.
- African countries which are regarded as of medium or small size⁽⁸⁾ have a production unit at semi-industrial level, very often designed and developed from a national viewpoint and framework, according to the circumstances and modalities typical of the specific context of the country. The "national" character of these companies is particularly shown by the almost total absence of exports of finished products or components of agricultural machinery between African countries. Amongst the countries studied there are only two significant exceptions to this: SISCOMA/SISMAR in Senegal and TROPIC in Cameroon⁽⁹⁾.
- By far the largest number of the companies in the sector were established during the period 1950 - 1972, or even earlier. These are therefore units with a considerable history and experience, and in many cases owning old equipment. Changes during recent years have showed few new units being established, whilst on the other hand there are some disappearances or conversions in older companies⁽¹⁰⁾.

(6) The concepts of "company" and "production unit" are almost always the same, with the notable exception of the SONACOME company in Algeria which includes three production units.

(7) Countries identified on the basis of the available information as being without any industrial production are Sudan, Mauritania, Cap Verde, Guinea Bissau, Burundi, Central African Republic, Gabon, Congo, Rwanda and Somalia. However it should be noted that in Sudan there is a project for an assembly unit for tractors and motorized farming equipment and in Burundi there is a unit for manufacturing hand tools which is not in operation. However the indistinct frontier between industry and non-industry makes some of the information rather unreliable.

(8) Algeria, Egypt, Nigeria, Zaire and Kenya excluded.

(9) TROPIC exports to other members of UDEAC: Gabon, Congo and the Central African Republic.

(10) Many companies, during their development, have either integrated or abandoned the production of agricultural equipment in their manufacturing programmes. A more detailed analysis within each company and a follow-up would make it possible to examine these degrees of change.

- The legal status of these companies varies and is considerably dependent on the political and economic system of the country concerned. However the direct role of the State in the establishment and operation of companies is seen to be preponderant almost everywhere.
- One special feature characterises the activities of these companies: of all those identified, less than half produce exclusively agricultural equipment. The others can be divided into two groups: Those whose dominant activity is effectively agricultural machinery, but which have diversified their production, very often to counteract the narrowness of a single market, by occupying one or more additional target areas of higher profitability. The types of equipment can be very diverse: fixed equipment for the agricultural or other sectors, wheel trains and transport equipment, metal furniture, etc. These products may account for a considerable part of the turnover.

Companies "outside the sector": these are, in particular, industrial groups in the first converting of metals sector (foundries such as CHANIMETAL in Zaire), in engineering construction (SONACOME in Algeria), in metal construction (ACMEFON in Zaire, SIDEMA in Madagascar), in the construction of transport vehicles (NASCO in Egypt), or importing companies (FIAT-Zaire). In addition to these groups of considerable size and influence, linked to State interests and playing an important role in the national industrial dynamic or private interests (multinational companies), are private companies which have diversified their activities towards the production of certain agricultural equipment, the demand for which was developing, ensuring the replacement of imports.

Whether these companies have a dominant activity in agricultural machinery or not the range of equipment produced is generally very varied. This reflects the multi-purpose character of the production apparatus, linked to the diversity of market needs.

- The role of multinational companies in production appears to be concentrated on the production of tractors and heavy equipment for land improvement. It can be seen in various forms such as the granting of licences with or without direct technical assistance (DEUTZ in Algeria, MASSEY FERGUSON and IMR YUGOSLAVIA in Egypt) or forming subsidiaries in the country (FIAT-Zaire, FIAT in Nigeria, etc.). In the past these multinational companies played a very considerable role in the organization and development of imports of tractors and other heavy motorized equipment. Local production appeared to be a poor alternative for the multinational companies, adopted only when the size of the market appeared to be attractive and, in practice, limited to final assembly using sub-assemblies or preassembled units which had been imported. Maintenance and supplying spare parts, linked with the import trade of finished products (tractors, combine harvesters, heavy equipment for land clearing, etc.), is far more important than assembly units which are only found in the larger African countries. (The almost total industrial integration which has been achieved in Algeria is the exception to the rule in Africa).

b) Regional specialization

Analysis of the various types of products manufactured shows some degree of regional specialization:

- In North Africa the production of tractors and motorized equipment (for soil cultivation and harvesting) has been the major choice in Algeria and in Egypt with, in addition, the supply of engines and fixed equipment for irrigation and harvesting. In Sudan there is a total absence of industrial units, despite the size of the agricultural potentialities, the existence of four foundries and a highly developed network of small engineering companies. A project for a MASUDAN tractor assembly unit, which had been discussed since 1974, was finally blocked for reasons which were principally financial. It should be noted that companies in Algeria and Egypt account for about 8,000 employees in all, or 60% of the total employed in this sector for all the 16 countries studied.

- On the other hand 9 companies out of 15 listed in 9 West African countries ⁽¹¹⁾ are oriented towards the production of equipment for animal-

(11) The Western African countries considered are: Senegal, Mali, Upper Volta, Niger, Ivory Coast, Ghana, Togo, Benin, Nigeria.

draught cultivating. Industrial production of hand tools is limited, in particular since the disappearance of IVOIR OUTILS in the Ivory Coast⁽¹²⁾. The leading company in the region is SISCOMA/SISMAR in Senegal which was created in 1954 and which has achieved a high level of industrial integration and very rapidly developed its exports to neighbouring countries. The recent cessation of its activity⁽¹³⁾ is evidence of the difficulties which are generally encountered by companies in this sector (analysed at the end of this section).

One original feature of this sub-region is the existence of two patterns of development in the production of agricultural equipment:

That of industrial production centred on appropriate equipment
(of the type of SISCOMA/SISMAR in Senegal, SMECMA in Mali)

The development of such units has been closely linked to the impulse given by the Ministry of Agriculture (increasing the production of groundnuts and cereals by promoting light animal-draught cultivating in Senegal) with the assistance of research organizations for defining farming techniques, agricultural development schemes for the wide use of the equipment and financial institutions for implementing a suitable system of credit. In particular this involves the large-scale production of equipment adapted to the local conditions⁽¹⁴⁾.

Direct support from French private partners was important for financing, the development of engineering techniques and the supply of high-quality semi-finished products.

The model of decentralized production supported by a cooperative of small blacksmiths, started in Benin and found today in this country through COBEMAG, developed in Upper Volta with the implementation of an ARCOMA-COREMMA network, and extended into Niger and Togo with the recent expansion of UPROMA. These experiences, directly linking training and maintenance to production, naturally results in a link between agriculture and industry and the manufacture of appropriate equipment. This new route has been supported in Upper Volta from the beginning by the Ministry of Rural Industry and Vocational Training with the Assistance of FAO.

(12) ABI, having taken over the assets of the IVOIR OUTILS company, continues to produce machetes.

(13) Production re-started in early 1982 under the name SISMAR.

(14) The simple chassis of the "SINE multi-cultivator" for animal-draught farming and the adaptation of present-day soil working equipment have been developed by M.J. Nolle in the SINE SALLOUM region of Senegal. Other equipment (groundnut screen, millet thresher, pump, etc.) has been designed by the Senegal Institute for Agronomic Research.

Based on this model UFROMA has developed in Togo within the framework of a UNIDO/CNPPME (National Centre for Productivity of Small and Medium-sized Engineering Companies) project, supported in various ways by FAO, FED and USAID. This company, created in 1980, is a rare example of an agricultural machinery company in Africa, launched within the framework of inter-State cooperation and of concerted support from various international organizations.

Finally it can be seen that Nigeria has a very weak productive apparatus at industrial level. One large company manufactures motorized cultivation equipment (JOHN HOLT AGRICULTURE ENGINEERING Ltd.), using imported components. Since the beginning of 1981 FIAT has assembled agricultural tractors in a vehicle assembly unit. In this immense country there are very few companies, often of very modest size, and this shows the high level of dependence of the country on imports. We should however note the research efforts of the IITA (International Institute for Tropical Agriculture) of Ibadan, which has resulted in the development of simple equipment and tools for small firms. The production of these on a reduced scale is carried out by local firms (planters, crop-processing equipment, seed drills, small threshers, etc.)

- In the three companies of Central Africa which were studied⁽¹⁵⁾
industrial production is essentially concentrated around the production of hand tools. The most important companies are TROPIC in Cameroon and CHANIMETAL and UMAZ in Zaire, with capacities close to a million units per year or higher. In Cameroon TROPIC also manufactures animal-draught cultivating equipment, simple machines (back-pack sprayer) and agricultural trailers for tractorization. In Zaire three companies, subsidiaries of multinationals, carry out the assembly of tractors on a reduced scale and without integration (about 75 units assembled in total in 1980). The other companies, CHANIMETAL and ACMEFON, are not solely producers of agricultural equipment. These are industrial groups engaged in the first converting of metals and engineering work which have diversified their production to include hand tools. The case in Burundi should be noted, where the hand tools production unit installed in 1974 by the Democratic People's Republic of Korea has never started production⁽¹⁶⁾.

(15) Central African countries studied: Cameroon, Zaire, Burundi.

(16) Similarly in Chad the SCMAT unit for the production of animal-draught cultivating equipment, installed in 1978, has still not come into production.

- The five countries in the East Africa (and South Africa) group⁽¹⁷⁾ are not very representative of this region which includes a total of 20 countries and represents a third of the total population and production. The five countries forming part of the sample account for 21 agricultural machinery production units. However, this figure is reached by including 12 small and medium sized companies in Kenya in regard to which the case study carried out in this country does not give any information. The companies are in general of small or medium size, often producing both hand tools and animal-draught equipment (SIDEMA in Madagascar, UFI in Tanzania, etc.), and at times equipment for tractors (LENCO in Zambia, TOLY in Madagascar) and fixed equipment (Kenya, Zambia, etc.). One can see, in these five countries, the absence of units for assembling tractors and the semi-industrial dimension of the artisan cooperatives manufacturing animal-draught cultivation equipment (Ethiopia).

We should note that, in this region, some countries of South Africa which do not form part of the sample have a significant production of agricultural machinery which has led to interesting experiences. These are large- and medium-sized countries (South Africa, Zimbabwe), or very small countries (the manufacture of TINKABI tractors in Swaziland).

c) Technical operations carried out and the degree of industrial integration

As a general rule units carry out assembly and cutting-welding operations, and possibly machining, but rarely heat treatment. The cost of imported products and materials represents a very high percentage of the cost price of the products manufactured (often within the range 60 to 80%), and the local value added contribution is, for this reason, limited.

Integration at the national level is often difficult to achieve because of the absence of local suppliers of raw materials, of metal first

(17) Countries of East (and South) Africa studied: Ethiopia, Kenya, Tanzania, Zambia, Madagascar.

converting companies (forges, foundries) and companies in the engineering sector. And even when such basic industrial installations exist supplier/client relationships with agricultural machinery companies are almost non-existent, or very limited (Mali, Ethiopia, Zambia, Nigeria). Links, however, have been started up and developed in certain cases: Egypt (strong), Senegal (SISCOMA-SISMAR and the Thiès aluminium foundry), Zaire, Tanzania (TAMTU and NECO supply the sector with steel and forged steel), and Madagascar (with the TOLY Company).

This obstacle which the level of local industrial and national integration encounters, and which results in the maintenance of a very high level of dependence on foreign suppliers, could be removed in the case of national horizontal integration with the coordinated development of the fabric of metallurgical and engineering companies (this has not occurred in the countries south of the Sahara which have been considered), or by vertical integration within the company. It is in this way that SISCOMA-SISMAR in Senegal has raised the value added level from about 30% to more than 45% by integrating a forging and boilerwork unit, so making it possible to manufacture many cultivating parts. Such an increase can only be achieved in a discontinuous manner, with a high level of capital investment, and primarily on the condition that the outlets of the company make it possible to make such a basic installation profitable. These two characteristics constitute a barrier to entry for a number of small companies, particularly in a period of recession.

Technical activity within companies rarely depends on its own internal research and development activities: out of more than fifty production companies of industrial or semi-industrial size, only two medium sized units had a design office for designing and producing new machinery:

- SISCOMA-SISMAR (Senegal) has developed a group of small machines, both for the needs of the local market and also for export to neighbouring countries, by close relationships with research institutes and agricultural development schemes.
- TAMTU (Tanzania) has developed and manufactured, in small production runs, animal-draught cultivating equipment and fixed harvesting machinery, and is collaborating with the UFI company in the production of longer runs.

Research and development activities exist in most of the countries, as is shown by the presence of institutions of a governmental character (Centres for Design and Experimental Work - Research Institutes). However their impact remains very limited as far as the orientation of the production of industrial units is concerned.

2. Difficulties encountered by companies producing agricultural equipment

Without making any distinction between regions and countries, the companies producing agricultural equipment in Africa operate with a level of utilization which is below the actual or potential production capacity. This level varies on average between 30% and 60%. Changes in the real value of their turnover also often reflects a fall in the volume of activities. Such indicators lead to a primary finding: this agricultural machinery sector in Africa is today in a state of crisis.

What are the causes of this difficult situation? It is possible to distinguish two kinds of difficulties:

- those of a structural type,
- those linked with the economic situation.

a) Structural difficulties

Every industrial production unit established in an economically underdeveloped country, lacking industrial and transport infrastructures, must face up to many obstacles if it is to carry out its activities successfully. Amongst the most significant obstacles listed are the following:

- it is almost impossible to obtain local supplies of necessary raw materials and semi-products (steels, forged components, engineering components, etc.);
- it is necessary to import production machinery and equipment;
- there is a shortage of skilled labour on the local market (workers, technicians, etc.);
- it is difficult to implement a network for the maintenance and supply of spare parts for a very widely dispersed market which is far from the centre of production, in particular because of a shortage of transport and communications infrastructures;

- the national engineering capabilities are weak when it comes to adapting or designing models of agricultural equipment which are suited both to the conditions of the demand and the technologies and equipment available in the company;
- the existing systems are inadequate to aid, promote and give technical assistance to small- and medium-sized companies.

A major cause of the difficulties of operation of companies in the sector arises from delivery delays and the conditions for bringing in raw materials and semi-finished products imported from abroad, for lack of being able to purchase these locally. For example a period of 6 to 12 months elapses between issuing an order for products to foreign manufacturers and the manufacture of the equipment by the unit, and this makes it almost impossible for the company to meet orders rapidly, and so favours sales of competitive but imported equipment.

These various factors, linked with the absence of an adequate national industrial environment and fabric, lead to a double blockage:

- the limitation of the local or national added value to a consistently low level forms a difficult barrier for small or medium sized companies to overcome, and
- the maintenance of dependence on foreign suppliers (design of models, prices of imported materials and components, delays in obtaining supplies).

As counterpart to the difficulty of upstream companies and their physical, scientific and institutional environment, downstream problems, at the level of demand and the market, constitute an essential factor blocking the activity of companies in the sector. This factor does not arise specifically from a strictly industrial problem, but from a grouping of data involving politics and the agricultural system, the social and economic policies of the government and the national institutional framework, in particular by the role entrusted to public or para-public companies which are responsible for agricultural development.

The majority of companies producing agricultural machinery in Africa have to face up to a disorganized market the principal characteristics of which are as follows:

- the intrinsic limitation of outlets as a result of the small size of national markets and the absence of sub-regional trading;
- the insolvency of the peasant population, linked with the generally unfavourable evolution of the agricultural sector and with static farmers' income. This structural characteristic is rarely effectively counterbalanced by the policies and resources of the national authorities (inadequate agricultural credit, low price of agricultural products, restricted subsidies for equipping, etc.);
- the absence of control over selling and the market by the producers. Selling is often entrusted to intermediary organizations (development companies or public organizations) which express the needs of the market, order the equipment, settle with the supplier and distribute the equipment to the farmers. These intermediaries form a screen which is a source of difficulties: failure to understand the real needs of the farmers, erratic programming of orders, delay in payments;
- the random and insecurity-forming character of outlets linked with decisions exogenous to the sector (changes of orientation in agricultural policy, purchase of imported equipment within the framework of bilateral government agreements, systems of customs protection or relief from taxes, reform of para-state companies).

This absence of a rational market explains to a considerable extent the general disengagement of private investors and, as a result, the necessity for direct support from the State, called on to remedy a de facto situation which it has sometimes created itself.

Many small and medium-sized companies in the sector cannot in this way control either their upstream or downstream relationships. The changes over the last five years have reinforced this fragile situation and made it more obvious.

b) Difficulties arising from the economic situation

The effects of the world economic crisis since 1974, and of the deterioration of many African economies, have contributed towards an aggravation of the situation of the companies. The latter have had to confront:

- a considerable increase in the cost of raw materials and imported products: a doubling of the price of steel between 1974 and 1978 (an increase

ex works, amplified by the rise in freight cost which can represent up to 30% of the total price of the product delivered in Africa), a rise in the price of production equipment and a considerable increase in the price of energy. The rising price of the various inputs and intermediate consumables, which represent up to 70% of the total cost of the product, has effectively reduced the total local added value (in proportion) and has led to a considerable increase in production costs. Faced with this increase producers have either passed on the increase, in this way exceeding the limits of solvency of their clients, or they have seen their selling prices frozen, so resulting in a considerable dwindling of their margins and of their investment capabilities;

- a stagnation or fall in the income of farmers and of development operations, linked to the crisis in the agricultural sector, to possible results of drought, to governmental policy measures (stagnation in agricultural product prices), which have all resulted in a considerable reduction in the volume of the market;
- the reduction or cancellation of State measures giving aid to industrial companies (the State being in turn confronted with high indebtedness) or the reduction of credits linked with bilateral aid;
- a reinforcement of competition from companies in the developed countries, in particular multinationals confronted with a recession on their own markets.

To these various difficulties, which can be imputed to factors which cannot be controlled by the company, are added the inadequacies specific to the companies, in particular their low technical content, the inadequacy of their productivity and errors in management. The economic crisis often exacerbates these internal inadequacies in respect of employment and wage levels, leading to management on a short-term basis or the search for unsafe solutions. Thus it can be seen that very many companies analysed in the survey are seeking a solution by developing exports, and this is almost certainly illusory.

There are now many African companies producing agricultural equipment which are in a serious financial and structural situation, with risks of possible disappearance. Development of this sector in each African country calls, as a priority, for immediate measures to maintain and reinforce the existing production apparatus.

3. Prospects for development based on declared industrial projects

On the basis of the indications given in the case studies, and as an illustration, the principal industrial projects which are today envisaged for the agricultural machinery sector in the 16 countries of the sample are set out below.

Countries with no new declared projects for creating new capacities

Egypt, Zaire, Ethiopia, Kenya, Sudan⁽¹⁸⁾, Madagascar.

To this group can be added Senegal and Burundi, respectively envisaging the immediate return to production of SISCOMA/SISMAR (the production of which stopped in September 1980) and the effective launching of the hand tools plant at Bujumbura which has never operated since it was built in 1972. In other African countries, units exist but are not in production⁽¹⁹⁾.

Countries with major investment projects relating to existing production units

- Algeria - 1981 extension of the Constantine complex to a capacity of 1,000 tractors and 4,000 motors.
- 1983 extension of the Sidi Bel Abbes complex (+ 500 combine harvesters/year)
- Togo - Development of the UPROMA company, created in 1980.
- Cameroon - Addition of a foundry for the TROPIC Company.
- Zambia - Possible expansion of the Northland Engineering Company to include the production of animal-draught equipment, hand tools and tractor equipment (a pre-project has been put forward for a tractor assembly unit).

Countries with projects for creating new production capacities

- Mali - Possible launching of a small unit for assembling threshers and other fixed equipment
- Nigeria - Tractor assembly within the units for assembling various vehicles.

(18) The MASUDAN project for a tractor assembly unit launched in 1974 (4,000 units/year) is facing severe financial difficulties. Sudan could however be classed in the third category.

(19) In Uganda two modern hand tool units have ceased their activities because of the war situation. For similar reasons the SOMAT unit in Chad has still not operated.

- Tanzania Unit for hand tools, equipment for animal-draught cultivation and tractor equipment at Mbeya, with financing from Holland and Indian technology.
Capacity: 4,000 t/year.
- Another "mixed" project at Mwanza, with Bulgaria.
Capacity: 6,700 t/year.
 - Tractor assembly unit with the VALMET company (Finland)
Capacity: 1,500 units/year.
 - Also an expansion of the UFI company (1.000 t/year).

This information is too fragmentary to be able to judge the capacities and volumes of the capital investments and, above all, the probability that the projects mentioned in the case studies will actually take place.

One can however make the following comments:

- Eight countries out of sixteen have no declared project for agricultural machinery. Of the existing companies in the African countries less than ten have capital investment projects of any size, for extension and/or diversification. They are most frequently projects of small or medium size (with the exception of SONACOME in Algeria) for either the production of animal-draught cultivating equipment or motorized equipment, in some cases hand tools, or tractor assembly or the supply of materials making it possible to meet the internal needs of the company and to supply the domestic market (foundries - forges).

- The creation of new and extensive units seems to be limited to Nigeria and Tanzania. This latter country, though one of the least developed countries, appears to be a special case amidst a restricted group of most developed countries in Africa (Algeria, Nigeria, and also Cameroon) which envisage real future investment in the agricultural machinery sector. The assembly of tractors, associated with that of other heavy motorized machinery (vehicles, trucks, military vehicles) constitutes the principal target area, together with the "mixed" production of equipment for animal-draught cultivation, with drawn and fixed equipment to a lesser extent. It will be noted in fact that the projects for expansion or creation all have the character of multi-purpose production and are also of medium size. Furthermore no project relates to the exclusive industrial manufacture of hand tools, apart from the project relating to the TROPIC Company in Cameroon and the re-entry into production of the existing unit in Burundi (In Sudan a project, drawn up in collaboration with China, has been abandoned).

The picture given by these national projects has to be seen in the context of the difficult situation in which the majority of companies in the sector find themselves. The level of abandonment of projects has been extremely high in the recent period, and today there are even more companies whose sole objective is to face up to coming deadlines and to ensure their own survival than companies envisaging investments, not to mention those existing units which are inactive. The industrial fabric of agricultural machinery in Africa was created and developed during the decades 1950-1970 and up to 1974. The last years have marked a break in the rhythm and nature of development in this sector.

Table 6a. Comparative table of industrial production of agricultural machinery by countries and sub-regions - 1981

COUNTRIES	Number and name of industrial enterprises (starting date)	Legal Status	Employees	PRODUCTION				Rate of utilization of capacities	Particular characteristics
				Agric. equipment only	Main activity	Types of agric. equipment manufactured	Number of units produced/year		
North Africa									
Algeria	4 SONADOMEX (units in Constantine, Sidi Bel Abbès and Uma)	public	5,960	no	Mechanical and metal constructions	Tractors, motors, harvesters and tractor equipments	3280 u.; 8000 u. 238 u.; 1400 u.(1979)		34,000 employees (total)
	SACRA	private	unknown	no	Agricultural machinery	Tractor equipment	{ 6500 u. } (programme 1981) { 5800 u. } { 5700 u. (max. year 1977)		Main activity: import of agricultural machinery Tractors import
	DAHOUN	private	100	no	Agricultural machinery				
	ONAMA	public	unknown	yes					
Egypt	5 KEMERA COMPANY	public	500	no	Foundry + mech. constr.	Tractor equipment	4500 u. (1980)	100 %	11,000 employees (total)
	TANFA MOTOR COMPANY	private	200	no	Agricultural machinery	idem+motor mount. on fixed equipment	2500 u. (1980)	unknown	
	WASCO	public	unknown	no	Assembling of vehicles and motors	Tractor assembling, trailers		unknown	
	EL SALLAM WORKS	private	unknown	no	Agricultural machinery	Tractor equipments		unknown	
Sudan	no industrial production								
Morocco									
	6 ATMAR	unknown	= 60	yes	Mechanical construct.	Tractor equipment	= 8000 units	= 30 %	Import and assembling of M.P. tractors and equipment Import and tractor assembling Import of 20-30 ploughs/year Tractor assembling FIA"
	COMAGI	unknown	unknown	yes	Assembling of tractors and equipment	disc harrows trailers	200 units 30 units	unknown	
	INTERNATIONAL HARVESTER	unknown	= 60	yes	Tractor assembling and manufacturing of equip	disc harrows	50 - 100 units	unknown	
	PRENDO	unknown	13	yes	Mech. construction.	disc harrows sprayers	400 units 30-40 units unknown	not fully realized	
	STOKVIS	unknown	45	yes	Assembling				
	BONDI-MAROC	unknown	60	no	Mining equipment	trailer bars, frames of disc harrows	60 units	60 %	
Tunisia									
	4 SOTUNO	public	90	no	Motor assembling	Diesel engines for irrigation pumps	4400 units	60 %	Project: mechanical complex for 2200 tractors, 700 agric.mach., 6250 diesel engines General remarks: several small scale industries and mechanical workshops; = 300 employees
	AMS	public	unknown	no	Manufacturing of par. metal parts	handtools	unknown	unknown	
	STIA	unknown	unknown	no	Car and vehicle assembling			70 %	
	SICAME	private	200	no	Assembling of transport equipment		unknown	unknown	
Libya	no information available								
Total North Africa									
= 19 enterprises employing approximately 9,000 persons (estimate)									

Source: Case studies concerning Algeria - Egypt - Sudan
Other information from UNIDO

Table 6h. Comparative table of industrial production of agricultural machinery by countries and sub-regions - 1981

COUNTRIES	Number and name of industrial enterprises (starting date)	Legal Status	Employees	PRODUCTION				Rate of utilization of capacities	Particular characteristics
				Agric. equipment only	Main activity	Types of agric. equipment manufactured	Number of units produced/year		
West Africa									
Senegal	1 SISCOMA (1964)	mixed ^{a/}	350 + seasonals		Agricultural machinery	animal drawn equip. and various machines	123,000 units (1979)		30% of production was exported; closed operations in Sept. 1980
Mali	1 SIMECA (1974)	public	160 + seasonals	yes	Agricultural machinery	animal drawn equip.	23,000 units (1980)	65 %	
Ivory Coast	2 ARI (1960) FRACASSI	private	50	no	Foundry and rail road equipment	pumps, machetes, axes, animal drawn equip. agricultural trailers	unknown 250 units		Was taken over IVOIROUTILS with a total of 400 employees (appr.)
Togo	1 UPROMA (1980)	co-operat.	15 + seasonals	yes	Agricultural machinery	animal drawn equip.	700 units (1980)	60 %	Started operations in 1980
Nigeria ^{b/}	5 JOHN HOLT, AGRICULTURE ENGINEERING LTD.; MICHELA ENGIN.WORKS; SARMA PRODUCTS EX SERG.ARB'S CARPENTRY WORKSHOP; JAURO MAKERS PLOUGH WFD.	private	unknown	unknown	unknown	hand tools, fixed equip., ploughs, ploughshares and fixed equipments			Two units engaged at present in tractors assembly
Mauritania	no industrial production								
Upper Volta	2 SOVICA (1966) ARCOMA/CORENMA	private handicraft no-operat.	30 50	yes yes	Agricultural machinery Agricultural machinery	animal drawn equip. animal drawn equip.	= 4000 units (1976) - 2500 units	unknown unknown	3 central ARCOMA workshops are connected to 11 CORENMA branch workshops and village workshops Major activity: food processing equipment
Ghana	2 AGRICULTURAL ENGINEERS LTD. CROCODILE MATCHET LTD.	private private	200 unknown	yes yes	Agricultural machinery Agricultural machinery	ploughs, harrows, tools, axes, outlass, harrows, spades, shovels	unknown - 1300 units	unknown 75 %	
Benin	1 COMSAD (1972)	handicraft co-op.	650	no	Agricultural machinery	animal drawn equip.	unknown		Central workshop and 7 district branches
Niger	5 DARNA ACREMA UCOMA SEPAMAO (1978) SOMI FAME (1965)	handicraft co-op. private private	12 unknown unknown 20 300	yes yes yes yes no	Agricultural machinery Agricultural machinery Agricultural machinery Agricultural machinery Agricultural machinery	animal drawn equipment and hand tools	unknown unknown unknown unknown	unknown unknown unknown unknown	Each central workshop is connected with 3 secondary workshops and village workshops Former blacksmiths co-oper.
Cap Verde	no industrial production								
Gambia	1 CHAN SECKA LTD.	unknown	unknown	no	General metal work	hand tools	unknown		
Sierra Leone	1 TABC 2 small enterprises: AGRICULTURE DIVISION WORKSHOP WEST AFRICAN MACH. LTD.	unknown unknown unknown	unknown unknown unknown	yes yes yes	Agricultural machinery Agricultural machinery Agricultural machinery	rice thresher, riddles, covers, oil-presses hand tools	750 units unknown		
Guinea	1 (unspecified)								
Guinea-Bissau	no industrial enterprise								
Liberia	no information								

Total for West Africa = 23 enterprises employing approx. 2000 persons (estimate)

a/ mixed with private management b/ based on the document of M.Kitra, 5 September 1980.

Source: Case studies concerning Senegal - Mali - Togo - Nigeria

-UNIDO informations

Table 6c. Comparative table of industrial production of agricultural machinery by countries and sub-regions - 1981

COUNTRIES	Number and name of industrial enterprises (starting date)	Legal Status	Employees	P R O D U C T I O N				Rate of utilization of capacity	Particular characteristics
				Agric. equipment only	Main activity	Types of agric. equipment manufactured	Number of units produced/year		
Central Africa									
Cameroon	1 TROPIC (1966)	private	254	no	Agricultural machinery	hand tools, animal drawn equipment	1650 tons (1980)	90 %	Exports (80 %) to the member countries of UEMOA
Zaire	6 CHARI METAL UMAZ ACHEFON FIAT-ZAIRE YZZAL MAGI KUS HEUTE ZAIRE	Subsidiary public private Subsidiary Subsidiary Subsidiary	unknown 243 66 unknown unknown unknown	no yes no no unknown unknown	Foundry Agricultural machinery Metal construction Vehicle assembling unknown unknown	Hand tools tractors	744,000 units (1980) 1,440,000 units (1980) unknown 26 units 7 units (1979) ^{b/} 26 units	unknown unknown unknown unknown unknown	2240 employees (total)
Burundi	(1) Bujumbura Unit	(public)	(25)	(yes)	Agricultural machinery	(Hand tools)	(80,000)		Has never been in operation.
Chad	1 SONAT	private	unknown	yes	Agricultural machinery	Animal drawn equipment	unknown		Production interrupted by Civil War.
Centr. Afr. Rep.	no industrial production								
Gabon	no industrial production								
Congo	no information								
Equat. Guinea	no information								
Sao Tomé	no industrial production								
Rwanda	no industrial production								
Angola	2 (unspecified)					Animal drawn equip-	unknown	unknown	
Total Central Africa	-10 enterprises employing approx. 1000 persons (estimate)								
East and South Africa									
Ethiopia	1 ETHIOPIAN HAND TOOLS FACTORY	public	120	no	Agricultural machinery	Hand tools	600 tons (1979)	100 %	Belongs to the group of National Metal Works Corp
Kenya	12 ^{a/} Small and medium enterprises	private	unknown	unknown	unknown	Hand tools; animal drawn equipment; tractor equipment; fixed equipment (mills, dryers)	unknown	unknown	Examples: Kay Engineering Services Ltd.; Hammers Engineering; Greob Engineering, etc.
Tanzania	2 UFI TANTU (2 small enterprises unspecified)	public public unknown	700 150 unknown	yes yes unknown	Agricultural machinery Agricultural machinery unknown	Hand tools; animal drawn equipment Animal drawn equip. Tractor equipment	1.1 million (1980) 10,000 u. and 3,500 units unknown	50 %	Close co-operation between UFI and TANTU

a/ Subsidiary of a multinational company

b/ Very irregular production - assembly of 400 units in 1977

c/ According to the document of Mr. Mitra, 5 September 1981. Only half of these enterprises are of significant size.

Source: Case studies concerning Cameroon - Zaire - Burundi - Ethiopia - Kenya - Tanzania.
-OIEAO information-

(continued)

Table 64. Comparative table of industrial production of agricultural machinery by countries and sub-regions - 1981

COUNTRIES	Number and name of industrial enterprises (starting date)	Legal Status	Employees	PRODUCTION				Rate of utilization of capacities	Particular characteristics
				Agric. equipment only	Main activity	Types of agric. equipment manufactured	Number of units produced/year		
East and South Africa									
Zambia	3 NORTHLAND ENGINEERING	private	80	no	unknown	Animal drawn equipment, hand tools, mills	70,000 units and 40,000 units	unknown	Examples: Ruon Industries, Scaw Ltd., Demer
	SHONGA STEEL	private	unknown	no	unknown	Animal drawn equipment, hand tools	3,000 units and 300,000 units	unknown	
	LENGO	public	unknown	no	unknown	carts and agricult. trailers	1,000 units and 1,000 units	50 %	
	(12 small and medium enterprises, unspaced filed)	private	unknown	no	unknown	Animal drawn equipment, hand tools, fixed equipment	unknown		
Madagascar	3 SIDEMA	public	250	no	Metal construction	Animal drawn equipment, hand tools	12,800 units and 144,000 units (1980)	unknown	
	TOLY	public	150	no	Foundry	Tractor equipment	1,500 units (1978)	unknown	
	BARDAY	private	100	no	unknown	Animal drawn equipment	4,000 units	unknown	
Botswana	1 unspecified	unknown	unknown		Agricultural machinery	Hand tools	unknown	unknown	capacity: 100 units (1977)
Lesotho	no information								
Swaziland	1 NATIONAL INDUST. DEV. ORG.	unknown	unknown	yes	Agricultural machinery	Tractors (TINKARI)	unknown	unknown	
Zimbabwe	4 UNITED SPRING AND FORGING MULANAYO STEEL PRODUCTS ZINFLOW LTD TINTU INDUSTRIES	unknown unknown unknown unknown	unknown unknown unknown unknown	yes	Agricultural machinery	Hoes, hand tools, heavy forged parts Animal drawn equip. Motorized equip.	unknown unknown 80,000 units	unknown unknown unknown	
Malawi	1 AGRICAL	unknown	170	yes	Agricultural machinery	hoses, ploughs, cultivators	800,000 units 2,000 units	unknown	Assembly of tractors MP
Djibouti Mauritania Comoros Réunion Seychelles	no information								
Ascension	2 BELL Ltd. TAYLOR SMITH LTD.	private private	unknown unknown	yes no	unknown Steel products	Motorized machines for sugar Sugar machinery, spare parts for transport equipment	45 units	unknown	
Uganda	3 UGMA TESO-Soroti KCES Limited	public public unknown	unknown unknown unknown	no unknown unknown	Foundry unknown unknown	Hand tools Animal drawn equipment, hand tools	unknown unknown unknown	10 %	
Swazilia	no industrial production								
East and South Africa - 35 enterprises employing approx. 3500 persons (estimate)									
SOUTH AFRICA (rough estimate) 87 enterprises employing 15,500 persons									

Without Rep. of South Africa and Namibia
 Sources: - Case studies concerning Zambia and Madagascar.
 - UNIDO information*

B. Small-scale or artisan production

Table 7 summarizes the main facts relating to the small scale or artisan production of agricultural equipment and tools in the various countries of the sample⁽²⁰⁾.

The available data is generally not very precise both in regard to the estimated quantity of production (overall or by type of products manufactured) and also in respect of a knowledge of the production apparatus (number of blacksmiths and artisans, nature of the equipment and the operations carried out).

This lack of precision seen in the national reports arises from the very wide dispersion of artisans throughout the country and, above all, reflects, with very rare exceptions, the way in which this network of producers is rarely taken into consideration in the agricultural machinery sector.

1. Small-scale production units and their activities

Two principal types of small-scale units can be distinguished:

- traditional blacksmiths,
- mechanical artisans.

a) Traditional blacksmiths

Village blacksmiths who, for thousands of years, were the exclusive manufacturers of tools and equipment for peasant farmers, exist in all countries; as in the past these blacksmiths continue to provide the individual and dispersed peasants with various products necessary for everyday life in the rural areas. It is possible to define the traditional blacksmith by a number of criteria which are common to all countries:

- a low level of equipment, (the tools used are generally manufactured by the blacksmith himself);
- traditional training, received from a relative;
- dispersed within the agricultural area, but often grouped into colonies or villages;
- exercising another activity, most frequently agricultural, which is necessary for self-subsistence in food products.

(20) This table gives data from three additional countries in West Africa (Upper Volta - Niger - Benin) which have developed their artisan production, so that it now has in certain respects a semi-industrial character. For this reason these cooperative type enterprises have also been included in Table 6 relating to industry.

Table 7. HANDICRAFT PRODUCTION IN AFRICAN COUNTRIES

Country	Structured handicraft production			Traditional handicraft production		Type of products	Quantity produced/year (or estimated)	Remarks
	Co-ordinating institutions	Number of craftsmen encountered	Main activity	Number of handicrafts counted (or estimated)	Main activity			
SEMI-INDUSTRIAL								
Algeria	Unknown	Unknown	Unknown	Unknown	Traditional forge, repair work	Hand tools, animal drum equipment	Unknown	Supplies from private traditional agricultural sector, not touched by the Agrarian Revolution. Average quality. Substantial production.
Egypt	Unknown	Unknown	Unknown	Unknown	Traditional forge	Hand tools	Unknown	
Sudan	Unknown	Unknown	Unknown	Unknown	Traditional forge	Hand tools	Unknown	
INDUSTRIAL								
Senegal	National Service for Rural Professional Training (SONAPR)	Unknown	Progressive technology modern tools bought on credit	Unknown	Traditional forge	Hand tools, animal drum equipment	Unknown	- 500 craftsmen trained in the Centre of Expertise from 1965 to 1979; - hand tools requirements are covered; - retail price of animal drum equipment 30% less than industrial price
Mali	Comp. Nat. Développement Pêche Terrestre Op. Archa. et Oulmes Villages (DARC)	160 190	Repair work with modern tools Repair work with modern tools	- - (3,000)	- - Traditional forge, low technology Traditional forge	Spare parts, animal drum equipment Spare parts, hand tools Hand tools, animal drum equipment Hand tools, animal drum parts	600 millions FR Unknown (5% of ind. production of a.d.e.) Unknown	- Installation of mills to make electric welding equipment profitable - Production of all spare parts necessary for the animal drum equipment of furniture in hand tools - - -
Ivory Coast	Office National de la Promotion Rurale (ONPR) Opération Nord Paga	Unknown	Progressive technology Assembly of animal drum equipment	Unknown	- - Traditional forge Traditional forge	Animal drum equipment Animal drum equipment	Unknown Unknown	Training of craftsmen (6-week duration) Assembly of ANCOHA kits manufactured in Upper Volta (foreseen at IPROSA)
Togo	Opération ABAC/OPRY	Unknown	Assembly of animal drum equipment	Unknown	- - Traditional forge Traditional forge	Hand tools Hand tools, animal drum equipment	Unknown Unknown	Decline due to competition from imported products
Sierra Leone	Unknown	Unknown	Unknown	Unknown	- - Traditional forge Traditional forge	Hand tools Hand tools, animal drum equipment	Unknown Unknown	
Upper Volta	Centre National de Promotion de l'artisanat Rural Services Améliorés Cereals et Soins	16 (23) 5 (21)	Cutting, drilling, cutting, welding, assembly, painting, repair work Sub-contracting and repair work	- -	- - Traditional forge Traditional forge	Animal drum equipment (delivered in kits) Animal drum equipment	Covers most of the mal. production	- 3 ANCOHA central workshops (semi-ind. production) - 1 COOPER subsidiary workshop (assembly shop and storage of spare parts) Village workshops (sub-contracting for ANCOHA)
Niger	Centre de la Riv. de l'artisanat Rural et de Mécanisme Agricole de Basse Atelier de Centre et Région de l'agriculture de l'artisanat	12	Cutting, drilling, welding, assembling Mechanism, welding, assembling	- -	- - Traditional forge Traditional forge	Animal drum equipment (delivered in kits) Animal drum equipment (delivered in kits), grille Animal drum parts	Covers most of the mal. production	ANCOHA central workshop (semi-industrial production); 3 subsidiary (SP) carrying out assembly; 3 village workshop for maintenance operations and sub-contracting. ANCOHA central workshop (semi-industrial production); 3 subsidiary and village workshops.
Benin	Direc. Coopération de Mécanisme Agricole de l'artisanat Comp. Beninoise de Nat. Agriculture (COMBENAG)	Unknown 650	Cutting, welding, assembling Cutting, forge, welding, planing, carpentry	- -	- - Traditional forge Traditional forge	Animal drum parts Animal drum equipment	Unknown Unknown	Central workshop with master craftsmen and training craftsmen; 3 subsidiaries (assembling), 3 village workshops. - Central workshop (industrial production) and sub-contracting works; village workshops (carrying out maintenance of animal drum equipment)

(continued)

a) a.d.e. = animal drum equipment

Table I. HANDICRAFT PRODUCTION IN AFRICAN COUNTRIES

Country	Structured handicraft production			Traditional handicraft production		Type of products	Quantity produced/year (or estimated)	Remarks
	Co-ordinating institutions	Number of craftsmen encountered	Main activity	Number of blacksmiths counted (or estimated)	Main activity			
CENTRAL AFRICA								
Cameroon	-	-	-	Unknown	Traditional forge	Hand tools and animal drawn equipment	(3 to 4 % of ind. prod.)	Some important agricultural workshops (1 of them serves the whole Northwest of the country).
Eaire	Centre de Développement Commercial (CEDECO)	20	Forge, forge welding	Unknown	Traditional forge	Hand tools	(5 % of the ind. prod.)	Important role played by religious masters.
Surinam	Ministère Jeunesse, Sport et Culture	213	-	8,000	Traditional forge (using scrap and ore)	Hand tools	(760,000 units)	Strong competition from imports, covering 30 % of demand.
EAST and SOUTH AFRICA								
Ethiopia	Coopérative d'Addis Ababa	86	Unknown	-	-	Hand tools, animal drawn equipment	1,440 t (1979)	
	Projet Arussi, Develop. Unit (ARDU)	Unknown	Unknown	-	-	Animal drawn equipment, hand thresher		
	Project in Bako	Unknown	Unknown	-	-	Animal drawn equipment		
	Institute of Agricultural Research	Unknown	Unknown	(1,000)	Traditional forge	Irrigation pump, sheller, hand tools	Most of nat. production	
Kenya	Rural Industrial Development Centre	Unknown	-	Unknown	Traditional forge	Hand tools for small farms	-	Production of average quality; competitive from imported products.
Tanzania	Small Ind. Dev. Organisation (SIDO)	70 x 25	Unknown	14,000	Traditional forge	Hand tools and simple machinery	(5.5 millions US\$)	70 groups of craftsmen scattered over the territory meet 1% to 20 % of total demand.
Zambia	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	
Zimbabwe	Unknown	Unknown	Unknown	Unknown	Traditional forge, maintenance operations	Tools, animal drawn equipment	(5 to 10 % of the market)	Former blacksmiths regrouped in villages; refuse sub-contracting; retail price: 1/2 of industrial price.

Source: Case studies
UNIDO information

Their raw materials, formerly entirely of local origin (timber, charcoal, iron ore) are increasingly being replaced by scrap material from the so-called modern world (car bodies, scrap iron from factories, wooden packing crates, etc.).

The equipment produced consists:

- essentially of products necessary for agriculture -
 - . hand tools (hoe, machete, knife)
 - . simple machines (swing-plough, harrow)
 - . miscellaneous equipment (yokes, carts).
- but also a wide variety of products of miscellaneous uses -
 - . kitchen equipment (ovens, pans)
 - . ironmongery and similar (doors, locks, chains).

The maintenance activity also relates to the production of spare parts for simple machines, particularly of the animal-draught type, and the repair of other equipment (cycles, motor cycles, cars).

All these activities reflect a multi-production characteristic linked to the traditional forging technology and the use of scrap metal materials.

No case study analysed specified the existing number of blacksmiths, nor the volume of production, nor changes in this industrial category. However the estimates given by certain countries made it possible to give an order of magnitude. For example in Mali, 3,000 traditional blacksmiths provide practically all the hand tools and 5% of the animal-draught equipment. In Tanzania 14,000 blacksmiths and 70 groups of small artisans account for 25% of the national production of hand tools and simple machines.

b) "Mechanical" artisans

Unlike the traditional village blacksmiths whose dominant activity is linked to the use of the forge and tools and made by himself, these mechanic artisans may be defined by the following criteria;

- production tools which is simple, often consisting of purchased tools (spanners, files, dies, pliers and sometimes a welding torch or an electric welding unit),
- trained by a "tutor" and, more rarely, have a certificate;

- are integrated into the semi-urban environment (large villages) or are installed on the outskirts of a town,
- exercise their calling as a mechanic for the maintenance and repair of various vehicles, including agricultural machinery;
- produce furniture, doors, metal grilles and manual tools and animal-draught cultivating equipment.

In no national document has the production of this industrial category been the subject of an estimate, but every case study emphasized the increasing role of these "small mechanic-artisans",

- firstly for the maintenance of complex machinery, including motorized equipment, and.
- secondly for the possibility of small-scale production of simple machines adapted to the needs of the small farmers.

For example in Cameroon, this type of artisan plays an important role in supplying and equipping enclosed areas or areas far from the urban centres. In Senegal the Kafrine Centre has trained 500 artisans in ten years, and these generally settle on the outskirts of the towns.

Whilst the activity of such artisans is of an individual nature there are also forms of collective production. A significant example is that of the Addis Ababa cooperative of artisans which has 86 members and produces 1,500 tons of equipment per year (hand tools and animal-draught equipment).

2. Historical developments and blockages to the development of small-size production units.

Activity in the artisan sector has been, and seems still to be, very much ignored by the national authorities. At the present time very few countries have institutions for promoting rural handicrafts. Where such do exist the assistance goes as a matter of priority to artisan workers in the town or those living on the outskirts of built-up areas (SONEPI in Senegal, CAPME in Cameroon). As far as rural blacksmiths are concerned the productive unit taken into consideration would be a group of artisans (artisan cooperatives in Upper Volta, Niger, Benin, groups of artisans in Tanzania). Almost without exception the traditional village blacksmith is not assisted, but does this not represent the largest body of workers in the field of agricultural machinery? For example in Mali the figure of 3,000 traditional blacksmiths is very much higher than the total personnel in the SMECMA industrial unit which only employs 160 permanent workers.

Far from being assisted the small artisan has on the contrary to face competition arising from the distribution of industrial equipment produced locally or imported. In particular the improvement of transport infrastructures and national distribution circuits, together with increasing trading with industrialized countries, have increased this competition over the last two decades. The technology of traditional forging and the nature of the equipment which can be produced from scrap metal do not make it possible to improve the quality of the equipment produced, whilst the price is well below that of industrial products (25 to 30% in Senegal and Mali, 50% in Madagascar for animal-draught cultivating equipment).

A national policy of agricultural development, oriented towards easier acquisition of equipment by farmers (subsidies, credit) from industrial units or importing organizations, contributes even more towards speeding up this phenomenon, and this explains the total destruction of the network of small artisans in relatively industrialized countries such as Algeria. In the absence of assistance or reconversion these men will simply swell the flood of migrants towards urban centres. However their dual activity (agriculture or commerce) in order to ensure self-sufficiency in food products or to improve the level of life, and the persistence of a traditional peasant environment, have made it possible for traditional artisan-blacksmiths to survive in their original environment.

Since the beginning of the seventies many attempts at structuring and integrating the artisan fabric have been made, in particular in the development of animal-draught cultivating. The following should be mentioned:

- the cooperative grouping of artisans with a view to semi-industrial production and maintenance of simple machines and equipment for animal-draught cultivating: COBEMAG in Benin, ARCOMA/COREMMA in Upper Volta, DARMA/APR in Niger (these attempts have been taken into consideration in the previous industrial part).

- employment and assistance to artisan-blacksmiths within the framework of agricultural development schemes (CDMT in Mali, the Nord Togo operation and the ARDU and BAKO projects in Ethiopia).

3. Promising experiments for the future

Experiments in the semi-industrial manufacture of animal-draught cultivating equipment by a cooperative of blacksmiths, associating the aspects of training and maintenance and launched in Benin in 1970-1972 with the creation of COBEMAG, have served as a model for the other countries (Upper Volta - Niger - Togo). The establishment of a genuine network based on central workshops and extending out through the village workplaces makes it possible to cover most of the farmers' needs.

At a scale which is often very localized it is necessary to emphasize the development of small artisan units for the production of simple and appropriate equipment in general manual (pumps, huskers, pulp extractors, seed drills) with the maximum utilization of local resources. For example CEDECO, the Zaire Centre for Community Development, has produced in small numbers simple machines which incorporate 80% of local components. In this respect it is also necessary to emphasize the important role and the support which can be given by often benevolent organizations (religious missions) in the wider use of appropriate technologies for small farmers.

Still in the field of the production of animal-draught cultivation equipment experiments in the integration of artisans into industrial manufacture have been carried out successively in Senegal and then in Mali. At the present time sub-contracting operations have been established with blacksmiths for the production of simple parts and for the assembly of machines. In particular carts are being assembled by blacksmiths who obtain axles from the industrial units.

Even if this integration is only partial, and relates only to some types of machines, the widespread distribution of blacksmiths within the rural world facilitates the work of maintaining the agricultural equipment. In particular, and as a result of an appropriate training system and an improvement of their working equipment, blacksmiths can carry out all the maintenance of the animal-draught equipment in two agricultural development schemes in Mali⁽²¹⁾. The introduction of an electric welding unit makes it possible to carry out many other repair jobs (vehicles), and also serves to bring into operation a flour mill; this milling activity has been found to be highly remunerative for the 41 blacksmiths at present equipped in Mali.

(21) The two development operations covering the greater part of the South of Mali are:

- CMDT (Mali Company for the Development of Textile Fibres) and
- OARCV (Groundnut and Food Crop Operations)

Summarizing, therefore, the importance of the role of traditional blacksmiths in rural social structures must be emphasized, since they live in a close relationship with the farmers to whom they supply a wide range of services. In most of the African countries the persistence of this artisan sector arises from the fact that the majority of the agricultural population (sometimes 90%) consists of widely distributed peasant farmers. The increase in imports and the organization of distribution circuits makes a major contribution to the destruction of the traditional artisan environment and the disappearance of this sector can already be seen, for example, in zones with a high intensity of heavy motorization of imported origin (Algeria, Nigeria). To a lesser extent national industrial production comes into competition with artisan production; how many artisan jobs are destroyed to create one job in the industrial agricultural machinery section? However the possibilities of integration of this small-scale artisan section into industrial production (sub-contracting work and assembly) and into agricultural production (maintenance work on simple manual machines or animal-draught equipment), together with the possibility of supplying the various services necessary for normal rural life, provide evidence of the multiplicity of the potentialities of traditional blacksmiths.

III. THE DEMAND FOR AGRICULTURAL EQUIPMENT AND MACHINERY IN THE AFRICAN COUNTRIES

The diagnosis set out above on the production of agricultural equipment, and in particular the analysis of the difficulties of companies, has shown the determinant role played by the market and the demand.

Once this need for analysis of the demand is recognized it is then necessary to consider the multiform and wide-ranging character of this field and to avoid simplifying approaches which, for example, confuse markets and needs, or users and actual deciders on purchase of the equipment, which neglect the traditional tools and machines because they are not included in the normal statistics, and in particular ignore certain traditional techniques... This is why this study of the demand should be approached in total clarity, and a first step in this direction could be taken by asking some simple questions by way of an introduction: demand for what, for whom, to do what, and where ?

- The first question deals with the very nature of the demand, the products or services required by the agricultural sector. This agricultural demand is concerned with acquiring not only finished equipment and machines, such as hand tools, ploughs and tractors, but also spare parts to maintain and repair this equipment, services to carry out maintenance of the equipment or to utilize it (operations for land development, ground clearing, construction of irrigation schemes), or again to lease equipment to the farmers to carry out certain operations. In particular the local production of agricultural machines involves a major demand for raw materials and semi-products which results in waves of imports.

- The second question (for whom) is related to the criterion "nature of the users". Essential differences separate, for example, the demand of the small traditional farmer from that which comes from modern farms directed towards cash crops. This criterion of analysis will be considered as a priority in this section.

- The question "to do what" reflects the need to ask questions on the diversity of the actual functions of agricultural equipment. To equip or mechanise agriculture with the aim of improving the performance and development of this sector must not be limited to considering the operations

of soil preparation, cultivation and harvesting. It is also necessary to develop land (clearing operations, prevention of erosion), to ensure the availability and control of water resources (irrigation and drainage works), to store agricultural products and to carry out the processing which is necessary at farm and village level. It is also, and above all, necessary to transport all the equipment and inputs necessary for production and the agricultural products themselves so as to effect their distribution. All these interdependent operations are indispensable and require a very wide range of tools, and equipment, and it is necessary to analyse the need for these with sufficient precision and not to ignore them on the basis of an absence of statistics or a strictly sectoral approach.

- The last question deals with the sources of supplies of the equipment acquired by agriculture. There are two major different sources:

- . national product, either industrial, artisan or "mixed";
- . imports which, faced with a national production which is not highly developed, play a fundamental role in particular for motorized equipment.

This section will attempt to diagnose these various aspects of the demand, starting principally with the case studies. The characteristics of the imports and of the importing circuits will be examined first, making it possible to understand quantitatively the consumption of agricultural equipment (incorporating local production). The demand can then be appreciated through the purchase of products (markets), which is in fact located at the interface of demand and supply. It is the intrinsic dimension of the demand which we will attempt to evaluate by analysing the various categories of users (or more precisely the social and agricultural sub-systems which require agricultural machines) and the needs and purchases in these categories, together with the origin and the supply circuits. Finally a brief synthesis will set out the identification of the principal trends and blockages which affect the demand for agricultural machinery in the African countries.

A. Importing and the consumption of agricultural machinery

1. Data on imports

At the risk of repetition the structural inadequacies of statistics relating to trading by the African countries must be pointed out, and also the unsuitability of the classifications used for identifying all the products intended for the equipping and mechanization of agriculture in Africa⁽²²⁾. However a certain number of tables have been extracted from these sources of international information, and these are analysed here with such reservations as are necessary.

Tables 8 and 9 cover exports of agricultural machinery coming from the 35 major world exporting countries⁽²³⁾, and intended for Africa, and exports from Africa.

The contribution of purchases of agricultural equipment (SITC code 721), for the whole of the African continent, represented only 3.3% of all world imports in 1979 and 4.4% for tractors (the sums concerned were \$215 million and \$262 million. These ratios have been falling since 1975 (respectively 3.9% and 8.2%), with a marked fall in 1979 for tractors. This reduction in the contribution of Africa to the world demand is paralleled by the considerable fall in the volume of imports. In fact whilst world trading was stagnating in value from 1975 to 1977, and rose slightly in 1978-1979, the specific imports of Africa fell in actual value, reflecting a net fall in volume. In particular imports of tractors fell from \$390 million in 1978 to \$262 million in 1979 (or by 33%)⁽²⁴⁾. Even when possible statistical errors are taken into account the following facts are quite clear:

- the smallness of the African market, taken overall, as compared with the world market (and at the same time immense unsatisfied needs);
- the regular fall since 1975, and the sudden fall in 1979;
- the deterioration of the even more serious situation in Africa as compared with the other regions of the world.

One can also distinguish the relative importance of the various groups of products: in 1972 imports of tractors into Africa represented about 68%

(22) For example it is impossible to identify agricultural hand tools or irrigation pumps.

(23) Responsible for more than 99% of world exports.

(24) This fall in imports can naturally not be explained by the increase in local production, since this itself is in a recession state.

Table 8. Regional import of agricultural machinery in Africa - total export of agricultural machinery by 35 developed and developing countries to Africa and the world

(US\$ million FOB)

SITC Rev.2 No.		World export	Export to Africa *	Share of exports to Africa (%)	World export	Export to Africa *	Share of exports to Africa (%)	World export	Export to Africa *	Share of exports to Africa (%)	World export	Export to Africa *	Share of exports to Africa (%)
		1972			1973			1974			1975		
695	Handtools **	1,417.6	89.7	6.3	1,893.1	106.0	5.6	2,450.9	148.0	6.0	2,734.8	212.7	7.8
721	Agricultural machinery	1,902.9	51.8	2.7	2,775.0	69.2	2.5	3,667.5	104.2	2.8	4,437.2	175.7	3.9
721.1 721.2	Equipment for cultivating soil + harvesting	1,298.1	41.6	3.2	1,813.6	54.8	3.0	2,496.5	79.0	3.2	3,352.3	140.8	4.2
722	Tractors	1,697.0	111.0	6.5	2,191.2	145.4	6.6	2,854.1	209.2	7.3	4,371.7	357.9	8.2
695 + 721+722	TOTAL	5,017.5	252.5	5.0	6,860.1	320.6	4.7	8,972.5	461.4	5.1	11,543.7	746.3	6.5
		1976			1977			1978			1979		
695	Handtools **	3,020.6	207.6	6.9	3,786.2	281.7	7.4	4,627.4	297.7	6.4	n.a.	n.a.	n.a.
721	Agricultural machinery	4,365.3	114.4	2.6	4,104.2	153.5	3.7	4,898.1	179.7	3.7	6,493.1	215.2	3.3
721.1 721.2	Equipment for cultivating soil + harvesting	3,240.2	879.0	2.7	3,167.8	106.3	3.4	3,744.2	124.0	3.3	4,419.5	148.2	3.4
722	Tractors	4,581.3	323.5	7.1	5,156.3	382.8	7.4	5,548.1	389.8	7.0	5,949.8	262.4	4.4
695 + 721+722	TOTAL	11,967.2	645.5	5.4	13,046.7	818.0	6.3	15,073.6	867.2	5.8	unknown	unknown	unknown

Source for data: 1. ECE Bulletin of Statistics on World Trade in Engineering Products 1972-1979
2. UN Yearbook of International Trade Statistics, Vol.II, 1976-1979, United Nations, New York

*) Africa excluding South Africa and Zimbabwe

**) Data are for market economy countries only, world export figures refer to import figures.

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Table 9. Developing Africa. Exports of SITC 695, 721, 721.1,2 and 722 *

(US\$ million)

SITC Rev.2 No.		World exports	Exports from Africa	Share of exports from Africa (%)	World exports	Exports from Africa	Share of exports from Africa (%)	World exports	Exports from Africa	Share of exports from Africa (%)	World exports	Exports from Africa	Share of exports from Africa (%)	
		1972			1973			1974			1975			
695	Handtools	1,406.4	2.2	0.2	1,880.8	3.8	0.2	2,500.6	4.6	0.2	2,807.3	5.0	0.2	
721	Agricultural machinery	1,325.9	unknown	unknown	1,878.4	4.4	0.2	2,761.5	3.3	0.1	3,266.8	4.0	0.1	
721.1	Equipment for - cultivating	n.a.	n.a.	n.a.	380.2	0.8	1.0	553.6	1.4	0.3	725.2	2.1	0.3	
721.2	- harvesting	798.5	0.5	0.1	1,152.6	n.a.	n.a.	1,639.8	0.5	0.0	1,892.5	1.4	0.1	
722	Tractors	1,472.6	n.a.	n.a.	1,974.1	1.1	0.1	2,667.8	1.9	0.1	4,052.0	6.7	0.2	
695 + 721+722	TOTAL	4,204.9	5.1	0.1	5,733.3	9.3	0.2	7,929.9	9.8	0.1	10,126.1	15.7	0.2	
		1976			1977			1978						
695	Handtools	3,005.3	4.4	0.2	3,677.4	4.2	0.1	4,449.6	3.6	0.1				
721	Agricultural machinery	3,213.1	3.8	0.1	3,439.6	3.3	0.1	3,920.2	2.9	0.1				
721.1	Equipment for - cultivating	742.8	3.2	0.4	775.2	2.8	0.4	872.7	2.1	0.2				
721.2	- harvesting	1,885.8	0.5	0.0	1,970.6	n.a.	n.a.	2,283.9	n.a.	n.a.				
722	Tractors	4,141.1	2.0	0.0	4,419.0	5.0	0.1	4,825.6	3.2	0.1				
695 + 721+722	TOTAL	10,359.5	10.2	0.1	11,536.0	12.5	0.1	13,195.4	9.7	0.1				

Source: UN Yearbook of International Trade Statistics, Vol. II, 1976-1979, United Nations, New York

*) World export figures refer to market economy countries only.

of the purchases of agricultural equipment (Code 721) (excluding hand tools). For the whole of the world the relative contribution of tractors is on average lower (55% in 1978).

Table 9 shows the export of agricultural machinery from Africa between 1972 and 1978 as compared with world exports. The contribution of Africa during the whole of this period is 0.1% of the world total⁽²⁵⁾ for agricultural machinery including tractors and 0.2% for hand tools. By comparing the values of the exports and imports of the same group the exports/imports ratio in Africa in 1978, and according to the data in Tables 8 and 9, was equal to 1%. This eloquent figure shows very brutally the non-existence of an African agricultural machinery sector at a world-wide level, and also the absence of inter-state trading.

Table 10 (a and b) sets out the totals for imports in 1975 (the most complete year for data) and 1978 (the most recent year) for various products, in particular for agricultural machines, for each of the countries of the sample studied. On the basis of ratios established at country levels between different products, or of inter-country comparisons, certain comments can be made:

- Imports of agricultural machines (including tractors) represents on average 4% of all the imports of engineering, electrical and transport equipment products (group 7) of the African countries considered. This ratio varies considerably according to the country (18% in Mali, 4% in Nigeria, 2% in Zaire and 8% in Sudan).

- The ratios between imports of agricultural equipment and fertilizers differs considerably according to the countries considered, obviously as a function of national production for these two types of agricultural inputs. It is for this reason that imports of fertilizers represent twice the cost of purchases of agricultural equipment in Algeria; this ratio is similar to that in countries such as Senegal, Zaire and Burundi, whereas for Ivory Coast it is 0.4. The mean value is 1.34.

- It is also interesting to compare the total for the import of food products (consumer goods) and that for agricultural machines (capital goods allowing the production of the former). In 1975 these ratios were 11.5 in Algeria, 70.1 in Egypt, 6.8 in Sudan, 16.5 in Senegal, 4.8 in

(25) This ratio is calculated from data on the market economy countries.

Table 10_a. Imports of relevant commodities by the selected African countries - 1975
(1000 US\$)

Countries	Code SITC Commodities	Food and live animals	04 Cereals and preparations	561 Fertilizers	599.2 Pesticides, disinfectants	695 Handtools	7 Machines, transport equipment	721 Agricultural machinery	721.1 Cultivating machinery	721.2 Harvesting machinery	722 Tractors non-road	719.21 Pumps for liquids	733.3 Other vehicles (unspecified), trailers	All commodities
North Africa														
Algeria		1101792	415018	184070	-	52975	2386094	54842	18333	26202	41254	53766	65251	5974103
Egypt		1003761	732783	91099	25168	-	804969	3155	-	-	11158	9334	15385	3933730
Sudan		166455	24473	21052	33794	3406	306502	14525	4710	9477	9999	4026	9761	956957
West Africa														
Senegal		127239	55150	5971	4052	449	150961	2964	2324	-	4751	2829	2572	581446
Mali		37086	25301	6840	2195	552	41828	4203	3727	-	3523	530	1144	190072
Ivory Coast		135535	20869	11315	6058	7951	346863	3529	-	-	23010	3961	3832	1126522
Togo		13921	2954	1329	1280	1062	48166	226	-	-	1778	678	-	173900
Nigeria		483543	138713	19910	34287	32556	2535582	22272	-	-	73428	23533	23720	6041232
Central Africa														
Cameroon		51247	27797	14894	8077	3060	189999	1095	-	-	6544	2291	2171	598256
Zaire		144785	57005	5650	2606	8856	305243	1485	-	-	4606	3657	-	932821
Burundi		8688	5558	294	1143	1067	17410	185	-	-	196	-	-	62708
East Africa														
Zambia		55534	28576	35505	3357	11521	328662	4255	-	-	10347	9545	1700	928716
Madagascar		37315	28226	3943	3665	2244	89824	2017	1347	-	4383	1541	808	366930
Tanzania		128550	115350	13226	7460	7487	235939	5048	3026	-	5302	5602	1553	718161
Kenya		30166	14001	30087	8460	5442	276337	5754	2492	-	11175	2577	2217	910824
Ethiopia		9457	2813	11446	6921	891	83823	1070	-	-	2794	989	862	293977
Total 16 countries		3535074	1695387	156631	208523	139519	8148212	126625	35959	35679	214218	124659	130976	23790355

Source: UN Yearbook of International Trade Statistics, 1978-1979

Mali, 5.1 in the Ivory Coast, 6.3 in Togo, 5.0 in Nigeria, 6.7 in Cameroon, 23.8 in Zaire, 22.8 in Burundi, 3.8 in Zambia, 5.8 in Madagascar, 12.4 in Tanzania, 1.8 in Kenya and 2.5 in Ethiopia. In a more realistic manner, and by eliminating the contribution of imports of luxury food products or those typical of the consumer modes of the developed countries, so as to retain only imports of cereals (SITC 04 code) it can be seen that in 1975 import of cereals represented on average five times the total imports of agricultural machinery. This ratio was accentuated between 1975 and 1980, in particular for the more deprived countries.

These figures explain the vicious circle of under-equipment of African farmers⁽²⁶⁾ who are, year by year, increasingly mobilising their resources (which taken overall are diminishing) in order to overcome in the short term the inadequacy of their food products, without being able to make the lasting and essential efforts needed to equip and modernise the agricultural sector (through imports or the development of national production). The political dimension of this problem is fundamental. Concerning the imports of agricultural equipment between countries the importance of two countries (Algeria and Nigeria) should be noted, each representing more than 25% of the total purchases of the 16 countries studied. Four countries (Algeria, Nigeria, Sudan and Ivory Coast) monopolise 70% of this same total. It should be recalled that in 1975 the total imports of agricultural machinery into Africa cost \$534 million (see Table 8); the contribution of the countries in the sample to this total was therefore 64%. In 1978 Algeria and Nigeria each represented about 18% of this regional market, whilst seven countries taken together (Algeria, Nigeria, Sudan, Ivory Coast, Kenya, Egypt and Zambia) accounted for 54%.

Table 11 has been drawn up with the aim of not limiting the analysis to agricultural equipment as recorded by the official statistics (Group 721), but of including other equipment essential to agriculture which is too often "forgotten". In this way it is possible to identify the imports, for the whole of Africa, of internal combustion engines, pumps and centrifuges, equipment for building, packaging and weighing machines; ratios have been calculated in order to express the contribution of the various items of equipment intended for agriculture⁽²⁷⁾.

(26) See first World-wide Study on the Agricultural Machinery Industry (UNIDO/ICIS 119, Chapter I, paragraph D-2, p. 54 and following in the French version)

(27) According to M. Mitra, Joint UNIDO/CEA division for industry, CEA, Addis Ababa, Ethiopia, on the basis of surveys carried out in Africa.

Table 11. Imports to Africa of different types of machines and equipment for agriculture

	SITC Code Rev.2 No.	1978			1979		
		World Exports	Exports to Africa *	Share of exports to Africa*	World Exports	Exports to Africa*	Share of exports to Africa*
		US\$ million		(%)	US\$ million		(%)
Hand tools	695	4,627.4	297.7	6.4			
Agricultural machinery	721	4,898.1	179.7	3.7	6,493.1	215.2	3.3
Tractors	722	5,548.1	389.8	7.0	5,949.8	262.4	4.4
Other equipment:							
Internal combustion engines (20 %)	713	11,297.1	569.6 113.9	5.0	12,941.1	575.4 115.1	4.4
Pumps and centrifuges (40 %)	742+743	10,330.0	815.7 326.3	7.9	11,536.9	885.9 342.4	7.4
Construction machinery (40 %)	723	10,174.1	1,057.8 317.3	10.4	11,916.1	1,037.1 344.7	9.6
Packaging machinery (30 %) 1/	719.62	2,369.1	131.9 39.6	5.6	n.a.	n.a.	n.a.
Weighing machinery (30 %) 1/	719.63	403.2	33.9 10.2	8.4	n.a.	n.a.	n.a.
Food processing machinery	727	1,789.0	252.3	14.1	2,318.9	226.9	9.8
TOTAL ENGINEERING PRODUCTS	7	368,198.0	24,366.4	6.6	409,475.0	23,100.6	5.6
Total non-electrical machinery	7.1 - 7.5	142,694.7	8,725.5	6.1	174,301.5	9,263.6	5.3
Total electrical machinery	7.6 + 7.7	75,127.3	4,503.7	6.0	78,415.2	3,896.5	5.0
Total transport equipment	7.8 + 7.9	136,518.1	10,460.7	7.7	151,453.3	9,531.6	6.3

*) without South Africa

1/ SITC Code Rev.

Source: Bulletin of Statistics on World Trade in Engineering Products 1978, 1979

It can be seen immediately that in 1978 world exports of each of the first three types of equipment (engines, pumps and steel building equipment) were at a level equivalent to agricultural machines and tractors taken together.

If only the contribution of equipment intended for agriculture is considered the following figures are obtained for 1978:

Imports into Africa	US\$ million	Percentage
Hand tools	298	18
Tractors	390	23
Agricultural machines	180	11
Engines	114	7
Pumps	326	19
Building equipment	317	19
Packaging and weighing	50	3
Total	1,675	100

The total cost of imports of just these four kinds of equipment largely exceeds that for agricultural machines and tractors.

Like agricultural machines and tractors, imports of engines and building machinery are increasing slightly. The contribution of imports of these products into the whole of the African continent is now nearly 10%, whereas it was only 3 to 4% for agricultural tractors and machines in 1979. Another comment concerns imports of equipment for the agro-food sector, since the contribution of Africa was very high in 1978, accounting for 14% of the world total, but fell considerably in 1979 until it was only 9.8%. Taken overall the crisis in the agricultural sector is reflected in many indicators: a falling trend for imports of tractors and agricultural machinery, pumps, and equipment for the agro-food industries, much more clearly shown than in the case of other imported manufactured products such, for example, as transport equipment, and for the other regions of the world.

Finally Table 12 relates to imports and exports of agricultural tractors for all the African countries.

Table 12. Import and export of tractors by African countries according to the FAO Trade Yearbook

Tractors

TABLE TABLEAU CUADRO	123											
	IMPORTS			IMPORTACIONES			EXPORTS			EXPORTACIONES		
	QUANTITY QUANTITE CANTIDAD	NUMBER	VALUE VALOR VALOR	1976	1977	1978	QUANTITY QUANTITE CANTIDAD	NUMBER	VALUE VALOR VALOR	1976	1977	1978
WORLD	76344	33754	82454	4161904	6674862	5221799	852856	897527	803759	460954	5102509	5409805
AFRICA	51062	40051	55088	431649	514492	508765	1455	1622	1159	9316	12779	8298
ALGERIA	450F	2545	2700F	5015	22344	20020F						
ANGOLA	830F	840F	850F	7500F	8000F	9500F						
BEHIN	60F	15F	60F	750F	750F	730F						
BURUNDI	15F	8F	16F	87	50F	70F						
CAMEROON	1320F	1800F	2000F	13332	19218	22418	12F	20F	45F	189	327	1052
CAPV VERDE	2F	1F	6F	20F	10	84						
CENT AFR REP	6F	12F	17F	66	128	150F						
CHAD	45F	47F	47F	500F	550F	540F						
CONGO	65F	110F	85F	920	1577	1300F						
EGYPT	1849	3498	4000F	12184	31245	54486						
ETHIOPIA	380F	534	210	3881	5519	1372						
GABON	500F	520F	535F	7481	7830F	8200						
GAMBIA	24	45	46F	152	332	350F						
GHANA	890F	700F	740F	12483	10037F	11300F						
GUIN BISSAU	30F	15F	15F	293	122	150F						
IVORY COAST	720F	1483	2500F	34804	54657	50300F	41	129		841	3939	
KENYA	1341	201	2830	12012	28931	35077	33	41	21	346	643	716
LESOTHO	100F	130F	142F	1057	1300F	1500F						
LIBERIA	90	169	140	2628	3237	2024			2			33
LIBYA	2291	2737	5530F	16713	21533	46438						
MADAGASCAR	184	135F	329	2359	1641	3294	4			43		
MAJAWI	432	254	250F	3341	1529	2300F	3F	13	8F	15F	107	70F
MAJAWI	20F	195F	220F	193	1964	2200F						
MALITANIA	133F	343	240F	498	1811	1500F						
MALITANIA	145	132	165F	2464	1548	2000F		2			59	
MOROCCO	2317	2800F	2543	19046	22725	20583			1			46
POIAPPIQUE	111	150F	215F	702	1000F	1500F						
WICER	1500F	780F	800F	4384	3530F	4033F						
NIGERIA	4397	4600F	4670F	78032	82735	56300F						
REUNION	150F	145F	140F	1506	1462	1465			2F			23
RUANDA	19F	19F	20F	190F	200F	223						
SAC TORE ETC	6F	6F	6F	30F	32F	35F						
SENEGAL	290F	300F	310F	3500F	4000F	4300F	50F	57F	40F	200F	220F	250F
SEYCHELLES		10F	10F		38	36						
SIPRA LEONE	219	50F	85F	352	226	409F						
SOPALIA	155F	590F	290F	1530	5932	3053						
SOUTH AFRICA	15585	13547	13966	119503	109899	125478	1500F	1350F	1000F	7581	7374	5914
SUCAN	2813	2570F	2420F	16164	15000F	15530F						
SWAZILANE	70F	103F	140F	731	1007F	1422						
TANZANIA	491	500F	540	4520	5000F	910F	12	70F		101	100F	
TUGO	480F	510F	527F	5127	30F	5830F						
TUNISIA	2453	1895	1781	15976	14192	14903						
UGANDA	435	450F	442F	4092	4300F	4500F						
UPPER VCLTA	133F	143	150F	2000F	3574	3300F						
ZAIRE	548	330F	7455	4854	6330F							
ZAMBIA	811	692	840	4025	4411	5850						
DEV. PER N E	557235	681140	599827	2466645	2834757	3174186	722494	748097	841800	4111513	4333444	4725076
N AMERICA	129362	153247	145953	776188	803452	1227079	202217	179391	99676	1495758	1752301	1445443
N EUROPE	375720	408252	389083	1329017	1632245	1734349	410644	427356	381690	2185735	2506548	2546790
OCEANIA	26772	28248	19670	191220	217439	168613	478	752	1406	4820	2578	2373
OTH DEV. PER	25381	21413	24321	199420	141591	244143	108559	141098	159030	425253	481997	730254
DEV. PING N E*	149095	170840	173434	1407346	1541279	1700846	3985	8045	10905	33301	94300	118240
AFRICA	28524	27349	27772	267085	336818	346563	155	272	159	1735	5405	2184
LAT AMERICA	41443	45030	52253	493914	534227	672748	2909	6946	9929	26240	82652	104213
NEAR EAST	61455	59363	54546	428240	409137	405406	197	80	198	1641	541	2119
PAC EAST	36765	37810	37802	207016	248583	264221	724	495	819	3685	5082	5727
OTH DEV. PING	1508	1288	1241	11091	10514	11708		32		400		
CENTA PLAND	36284	51734	51083	287915	320806	346749	126375	141385	151254	544727	674834	744489
ASIAN CPE	2940	7277	8448	11250	26550	73550						
E EUROUSSA	33344	44457	42435	278715	294256	273419	126375	141385	151254	544727	674834	744489
DEV. PER ALL	940579	655637	642262	2743365	3119013	3447623	848871	889482	793054	4456248	5098250	5490545
DEV. PING ALL	172835	178117	182282	1418246	1567829	1774196	3985	8945	10905	33301	94300	118240

* Developing market economy countries

F/ Estimated figures

Source: FAO Trade Yearbook, Vol. 32, 1978, Table 123

It can be seen quite simply that:

- there are apparently eight African countries exporting tractors, including South Africa which exported 6,000 units out of a total of 8,100 in 1979⁽²⁸⁾.

- The whole of the African continent imported about 55,000 tractors in 1978, only 27,800 of these being for the African developing countries (the figure for South Africa is 14,000 tractors). The principal importing countries in 1979 were South Africa, Egypt, Libya, Nigeria, Kenya, Ivory Coast, Morocco, Algeria and Cameroon.

- The total volume of imports in units for all the African developing countries fell during the period 1976-1978, whereas this volume increased slightly in Latin-America and, to a lesser extent, in the Far East. In 1978 it represented 3% of the total number of tractors imported in the world. This reduction in volume was, however, accompanied by a rise in the value of these imports from \$323 million in 1976 to \$390 million in 1978 (+ 20%), reflecting a considerable increase in the unit price of the equipment purchased.

2. Import circuits and mechanisms

Analysis of the case studies has led to the compilation of Table 13 which makes it possible to indicate, in a simplified manner, and for each of the countries in the sample, the flows and circuits involved in agricultural equipment imports.

As far as the quantities imported are concerned the indications emerging from the case studies come, in principle, from the same sources as studied above⁽²⁹⁾ except, however, in regard to purchases of hand tools and animal-draught cultivation equipment. It can be seen that for imports of tractors and if the four principal purchasing countries (Algeria, Egypt, Kenya, Nigeria) are excluded the twelve other countries imported about 3,600 tractors, or an average of 300 units per country; this does however hide considerable national divergencies (575 units in Sudan in 1980, 150 in Senegal, 48 in Mali and 11 in Burundi). These levels of imports express at the same time the dimension of the national markets of these countries which do not have any domestic production. They lead to the following comment: none of these levels of domestic demand would justify the installation of a local production unit (or even an assembly unit) with an acceptable limit of economic efficiency, involving identical products and manufacturing technologies.

(28) Some caution is called for regarding exports from Kenya, Cameroon and Senegal, for example, which do not have a local plant, whereas no exports are indicated for Algeria or Egypt which are the main producers.

(29) The slight differences from the data obtained from the case studies should be noted, particularly when estimates are involved.

Table 13. Agricultural machinery imports and channels in the countries of sample

Country	Import body	Legal status	Type of agricultural machinery imported	Quantity imported	Country of origin	Distribution network	Maintenance network	Imports/domestic consumption	Remarks
North Africa									
ALGERIA	SONATRACH	State corporation	- hand tools - animal-drawn equipment - tractors	unknown unknown 1300 u. (1979)	Pol. Rep. Germ.	SONATRACH	ONARA	45 %	Irregular imports
EGYPT	- manufacturers of equipment - commercial companies	private or public private or public	- hand tools - animal-drawn equipment - tractors	unknown unknown 6060 u. (1977)	USSR (Czech. Rep. Rep. USSR, USSR, Yugoslavia, India, Japan)	Public or private contractor	Public or private company.	70 %	Import of tractors increasing since 1973
LIBYA	Commercialization of large firms. 20 firms, 4 of which are very large (80% of the market)	Private agents of international firms	- hand tools - animal-drawn equipment - tractors	272 u. (1977) unknown 475 u. (1980)	USSR, CHINA USSR, USA, USSR		15 private machine shops authorized by the State and the main commercializer	unknown 100 %	Tractor imports decreasing since 1976 (2% by year)
West Africa									
GHANA	- Commercial companies - SENECA/SEBEN - SENECA/SEBEN	Private Joint company Development corp.	- hand tools - tractors	unknown 140 u. (1979)	- Western Europe (esp. France)	Import companies Development corporations	Planners and development corporations	unknown 100 %	Small stock (400 tractors) but very diversified
IGBO	- merchants - OBT	Private Agric. development schemes	- hand tools - animal-drawn equipment - tractors	- No imports - Very few imports 48 u. (1979)	Western Europe	Importers	Importing firms	0 % 0 % 100 %	Tractor imports declining till 1978; distinct increase in 1979.
TOGO	State		- hand tools - animal-drawn equipment - tractors	unknown unknown 40 units by year Imports of 400 u. in 1977 with equipment	Upper Volta Spain	SOYERNA administrators the supply	SOYERNA shops provide maintenance and repair in each region	unknown unknown 100%	Large purchases in 1977, followed by interruption in imports
SIERRA LEONE	Commercial companies	Private and semi-public	- hand tools - animal-drawn equipment - tractors	unknown unknown 1800 u. (1978)	UK, Pol. Rep. Germ., Spain, USA, Canada, India	'87 Arts-Service Centres (non-functional)	Workshops of commercial companies	unknown unknown 100 %	Tractors imported very irregularly
Central Africa									
CHAD	- Commercial company - SODIFON	Private Public	- tractors	65 u. (1980)	USA, Brazil, Spain, Switzerland, France	Import companies	Workshops of importing companies and agro-industrial units	100 %	Tractor imports decline since 1978
ETHIOPIA	- Dealers - Commercial companies	Private Private	- hand tools - tractors	200,000 items (1979) 81 units (156 million CFA) (1979)	Europe, China, USA, Brazil, Europe, USA, South Africa	Import companies	Import companies	17 % 47 %	Tractor imports and production declining since 1975
GUINEA	- Dealer - State		- hand tools - tractors	265,000 items (1979) 11 units (1979)	Europe and China		Workshops of Public Works Ministry Civil engineering (ANAR) and metal construction (FATADINA) workshops	70 % 100 %	Hand tool imports very irregular since 1974; tractor imports on small scale and irregular
EAST and SOUTH AFRICA									
ETHIOPIA	Monopoly of the Agricultural Equipment and Supply Corporation (since 1974)	Public	- hand tools - tractors	unknown 500 units (1974)	Europe, Japan, Israel, USSR		Agricultural Equipment and Supply Corporation for the State farms		Irregular imports of tractors
KENYA			- hand tools - tractors	550,000 items (1978) 2600 units (1978)	China, India, Europe, USA			unknown unknown 100 %	
TANZANIA	Companies	Public Private	- hand tools - animal-drawn equipment - tractors	4 million items (1979) 200 u. (1979) 450 units (1978)			Large parts supplied by TTT and SUT (Public) - Repair shops (REV A, REV B) - Workshop in agro-industrial complexes and private enterprises	75 % 4 % 100 %	Drop in tractor imports since 1970
MALAWI	4 large-scale importers	Private	- hand tools - animal-drawn equipment - tractors	225,000 items per year unknown 600 units (1980)	Europe, USA, USSR		After-sale services provided by importers	45 % unknown 100 %	
ZAMBIA			- hand tools - animal-drawn equipment - tractors	25,000 items (1979) unknown 740 units (1979)				10 % unknown 100 %	Drop in hand-tool imports since 1971. Increase in tractor imports since 1974

Source: Case studies

It should also be noted that these purchases of tractors involve purchases of drawn equipment (ploughs, seed drills), representing almost an equivalent sum of money which is not reflected in the statistics.

Imports of hand tools are indicated for many countries. The volumes involved are considerable, especially in Tanzania (5 million items imported in 1979), in Sudan (2,700 tons in 1979), Zaire (200,000 items in 1979) and Burundi.

Import circuits

Generally speaking trading with the industrialized countries which serve as suppliers takes place through many private or public commercial import companies, concentrated in the main goods transit centres (ports, capitals). Amongst these companies it is possible to distinguish:

- national traders selling all kinds of products, including raw materials.
- private or public import companies specializing in agricultural equipment (including producers themselves: SISCOA-SISMAR in Senegal, SONACOME in Algeria).
- private (or sometimes semi-public) commercial companies which are subsidiaries or direct offshoots of multinationals, importing and distributing the whole range of equipment produced by the parent company (tractors, utility vehicles, public works or handling equipment, machine-tools, etc.).

These various import companies are often established in an autonomous manner. The result is that on the same market there are a multitude of different products, trademarks or models, in particular for tractors. This is the case in Sudan where there are no less than twenty companies importing tractors for a market which was limited to 575 units in 1980. In the same way in Zambia 17 companies import fewer than 800 tractors a year from 15 different countries. In practically all the countries this situation is the cause of many almost insoluble problems concerning maintenance and supplies of spare parts.

The State plays a major role, including those countries with a liberal regime, either by itself controlling the flow of imports (Togo) or by controlling it through public or para-State companies (SONACOME in Algeria, Agricultural

Equipment and Supply Corporation which has had the monopoly of imports since 1974 in Ethiopia), or agricultural development companies (SODEFITEX in Senegal, CMDT in Mali, SODECOTON in Cameroon). The role of the State is also determinant when it concludes bilateral governmental agreements or decides on import licences or the customs duties to be paid on imported products and materials, in this way directly fixing the conditions of competition between local production and imports. Whilst the importing activities of commercial companies are related principally to the real or anticipated situation on the domestic market the imports of the State and para-State companies are conditioned directly by budgetary choices and capacities of the overseeing organizations dealing with agricultural development. The aggravation of the external debt and the deterioration of trading, in particular since 1975, are a direct cause of the erratic development and fall in orders for agricultural equipment from many African countries.

- The situation regarding the "distribution of equipment" shows the same variety of situations as that of imports. This can be carried out by the importing companies themselves (SONACOME in Algeria, Egypt, Senegal and Ethiopia) or by specific and often para-public companies (Agro-Services Centres in Nigeria). The role of the small traditional trader is important in the case of hand tools, whilst companies emanating from the multi-nationals are responsible for the sale of their own equipment and its maintenance from central or regional workshops.

- The question of "maintenance" forms a very sensitive and problematic link in the import chain. This function can be carried out by the importing suppliers themselves (see above), by private or State-aided engineering workshops (35 private engineering workshops in Sudan, Workshop of the Ministry of the Public Works in Burundi, supplies of spare parts by the public companies MMT and NECO and the RCV and AMC workshops in Tanzania) or by development companies and the agro-food complexes which are users of the equipment (Senegal - Cameroon).

In a more or less generalised manner, and independently of the types of systems and actors concerned, the maintenance and spares function for imported equipment (particularly heavy motorization) is insufficiently provided for, leading to massive under-utilization and chaos where the existing stocks of motorized equipment are concerned.

3. The close relationships between imports of agricultural equipment, the demand and domestic production

The factors of imports, market and production are closely interlinked, the key and dominant factor being imports in the case of the African countries. From a simple quantitative point of view the consumption of agricultural equipment in a country (which indicates the market or real demand) is the sum of local production and imports, exports being practically non-existent. These relations can be set out below:

a) Imports and the demand for agricultural equipment

- Apparent consumption of agricultural machinery

It is very difficult to make a quantitative determination of the real consumption of agricultural equipment in Africa because:

- . little is known concerning production, in particular the production of hand tools and simple equipment by craftsmen and small manufacturing units;
- . import statistics are notoriously inadequate;
- . a considerable amount of the equipment used in agriculture is not identifiable (fixed equipment).

Table 14 shows these difficulties by assembling in graphic form for each country in the sample the available data from the case studies on production, imports and consumption in three major categories of equipment: hand tools, animal-draught equipment and tractors.

A rapid glance at these graphs confirms:

- . the total inadequacy of the data for each country concerning its own production, imports and forecasts concerning future markets;
- . the low level of production in each country with, at the same time, a reduction in activity (Mali, Senegal, Zaire, Madagascar);
- . the erratic nature of changes in imports, in particular of tractors, with a central trend marked by a reduction of import levels (Sudan, Mali, Nigeria, Togo, Burundi, Zaire, Ethiopia, Tanzania and Zambia) reflecting the phenomenon of disorganization and disruption of this market already apparent from the analysis previously carried out on the difficulties of the production companies;

Table 14. PRODUCTION AND MARKET TRENDS FOR DIFFERENT TYPES OF AGRICULTURAL EQUIPMENT, BY COUNTRIES AND SUB-REGIONS

Subregion: North Africa

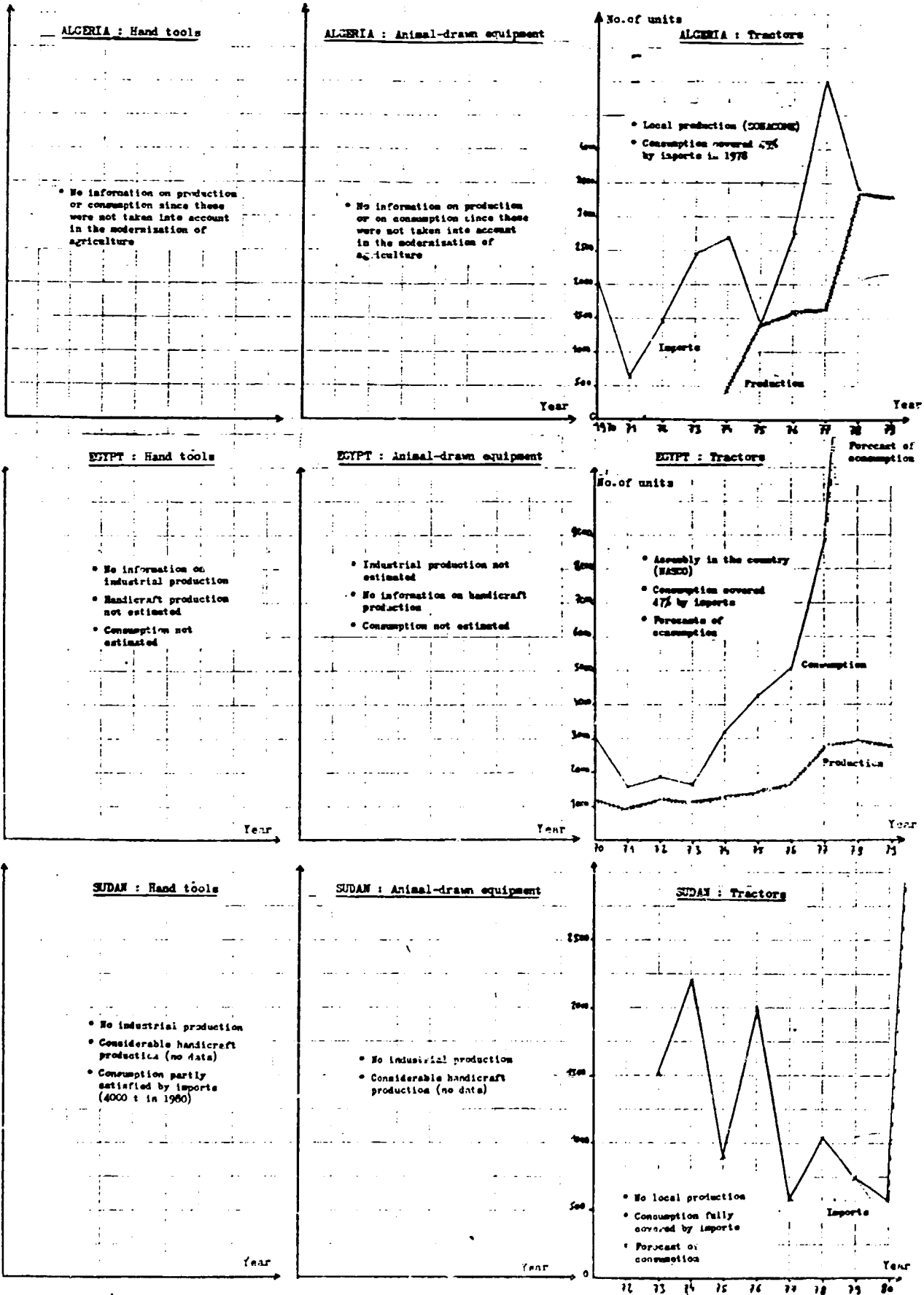


Table 14. (continued)

Subregion: West Africa

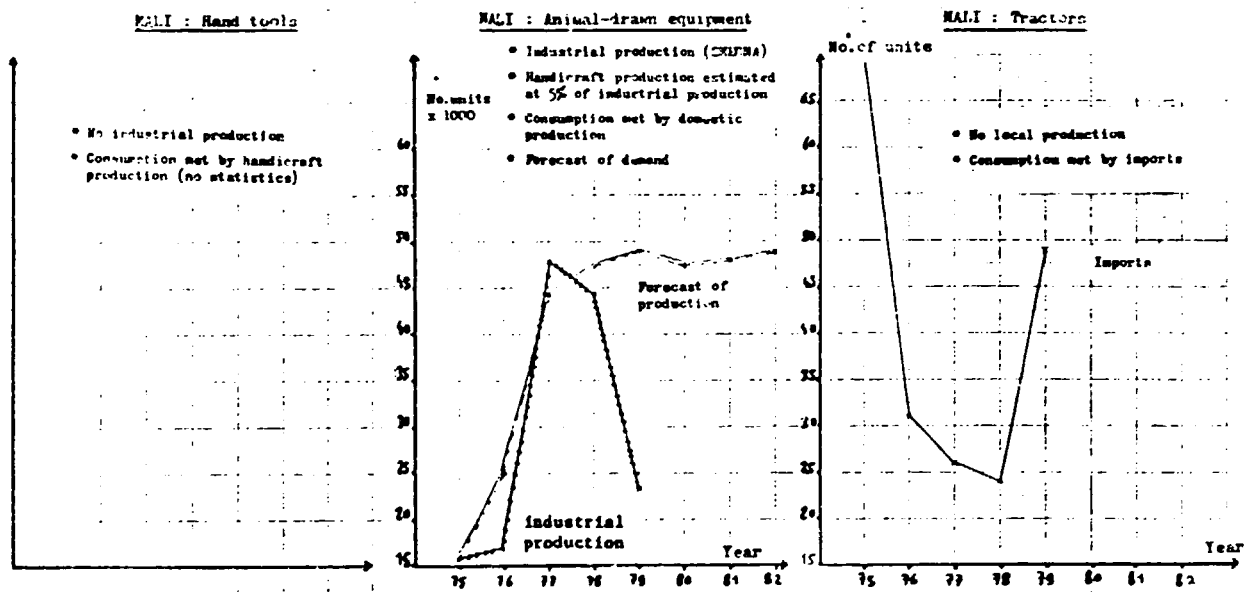
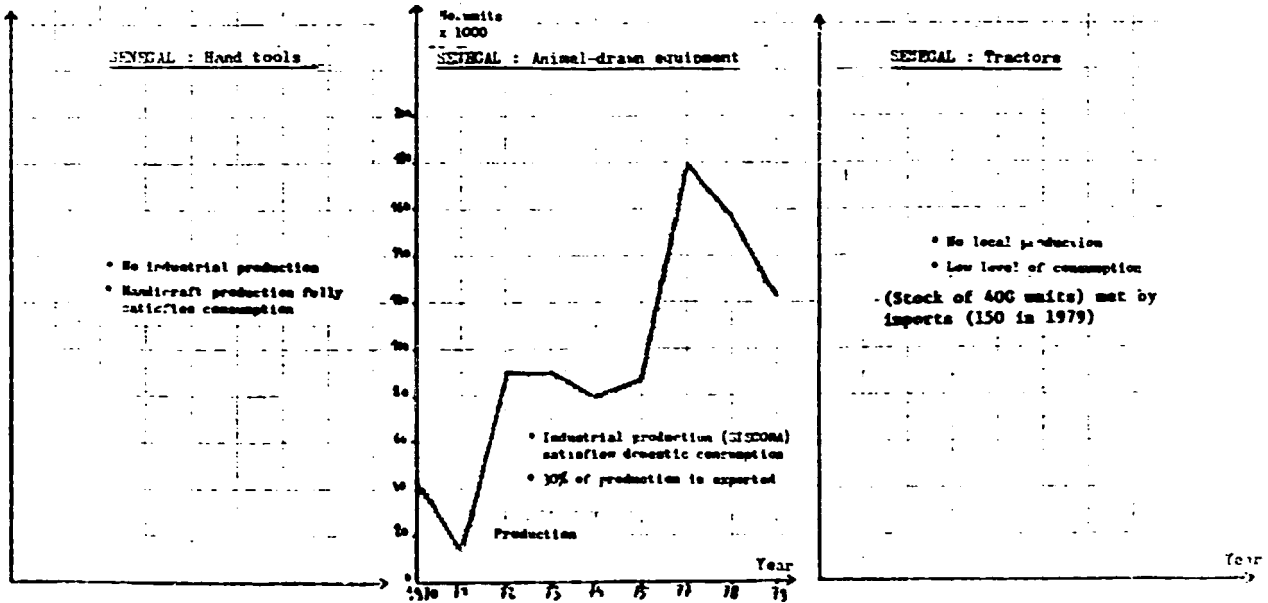
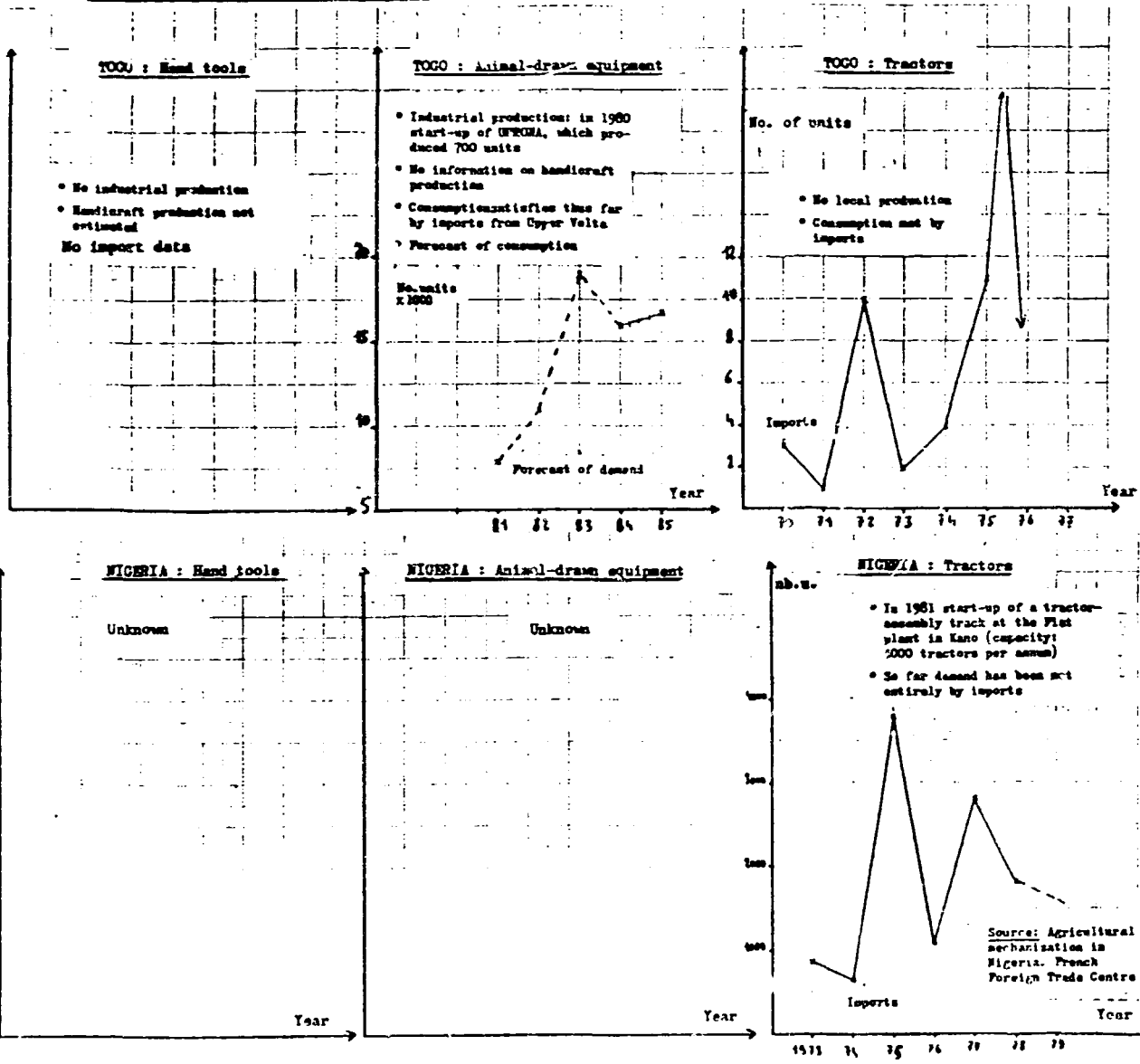
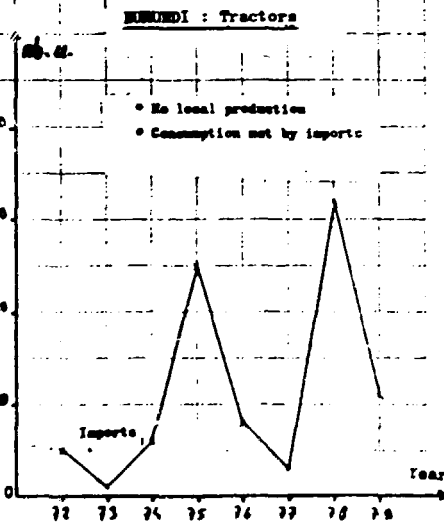
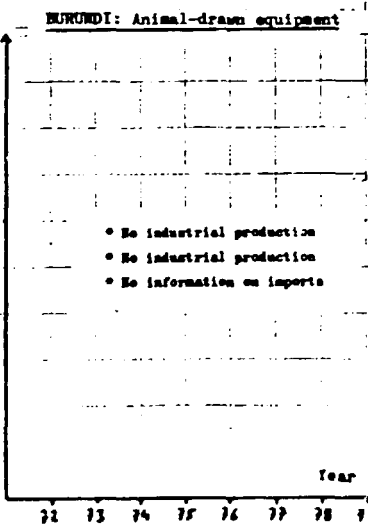
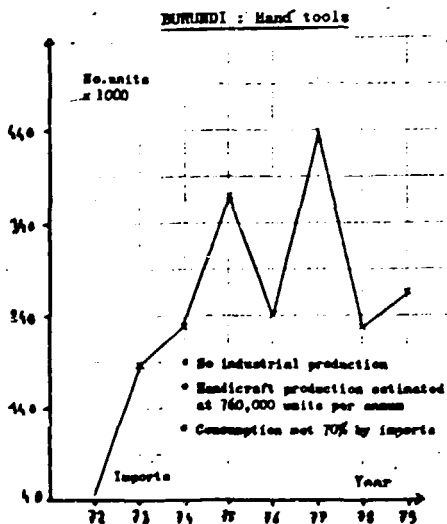
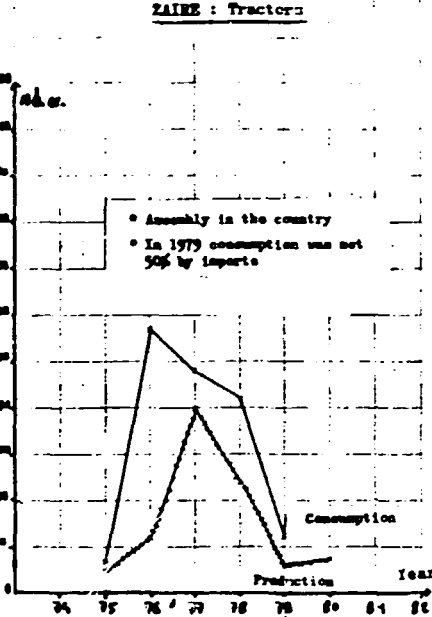
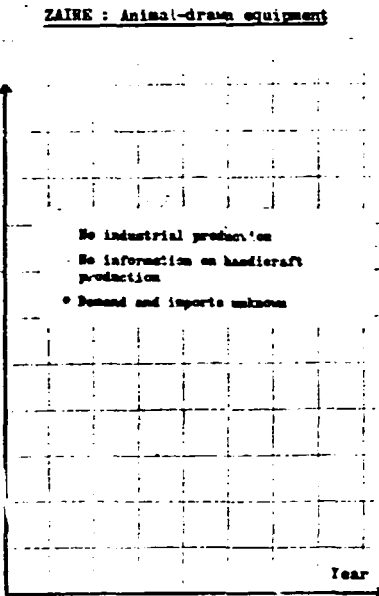
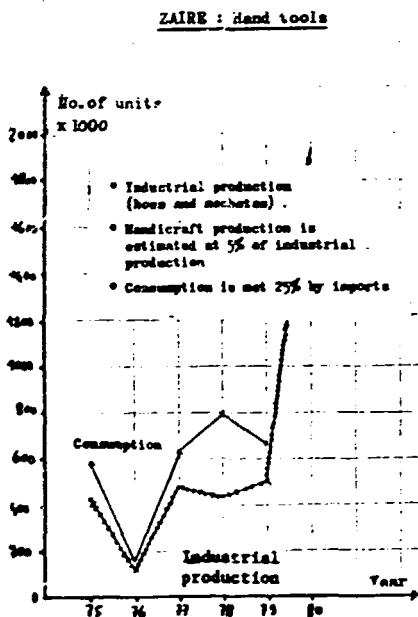
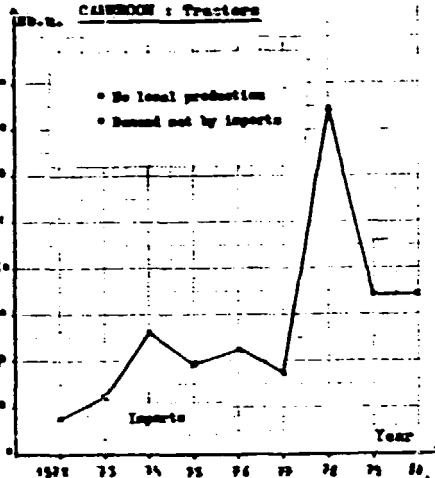
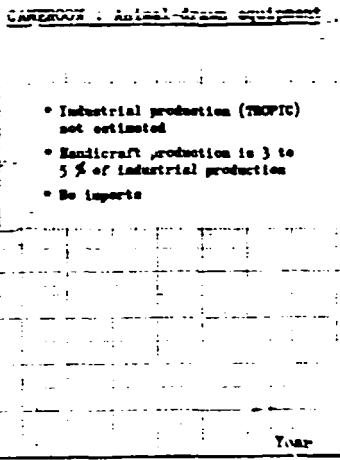
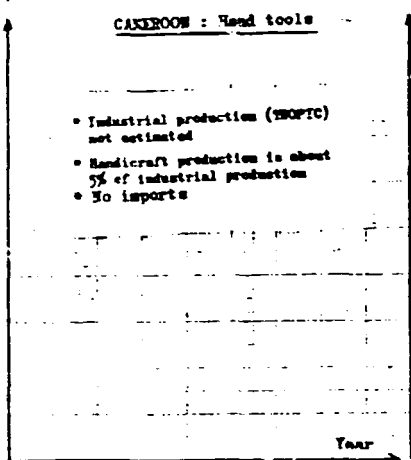


Table 14. (continued)

Subregion: West Africa cont.

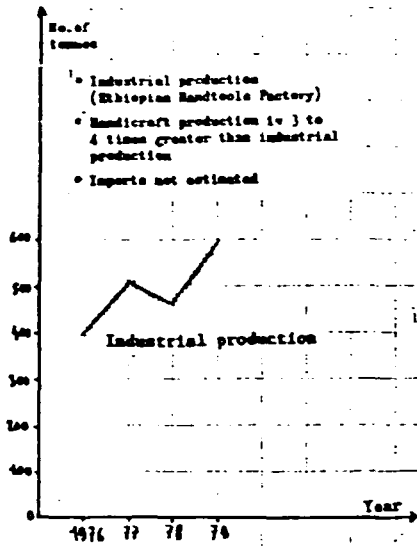


Subregion: Central Africa

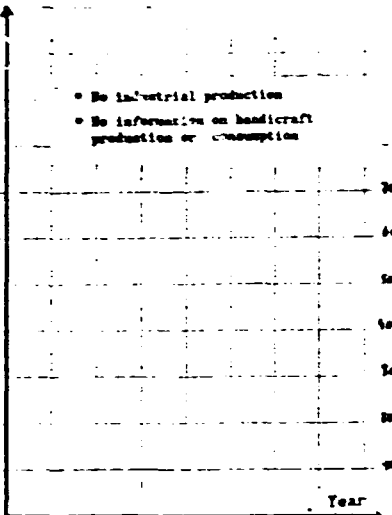


Subregion: East and South Africa

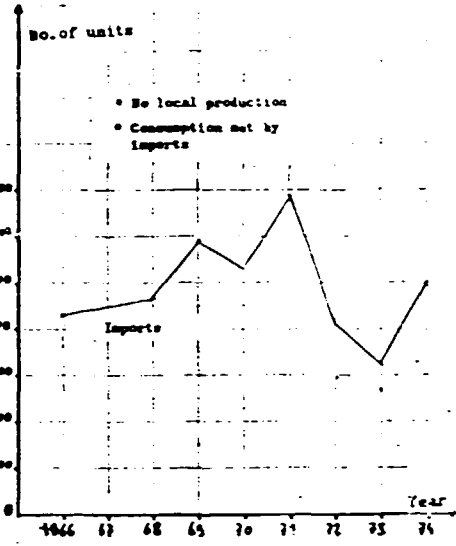
ETHIOPIA : Hand tools



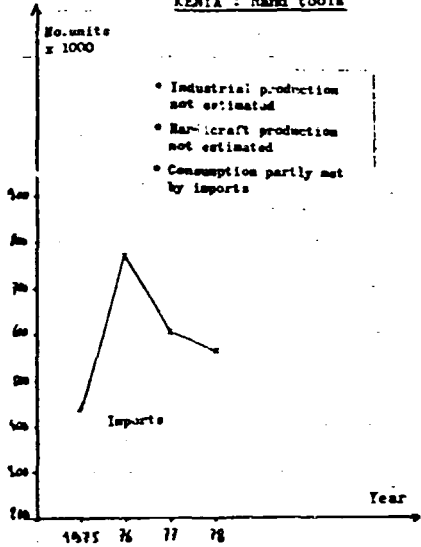
ETHIOPIA : Animal-drawn equipment



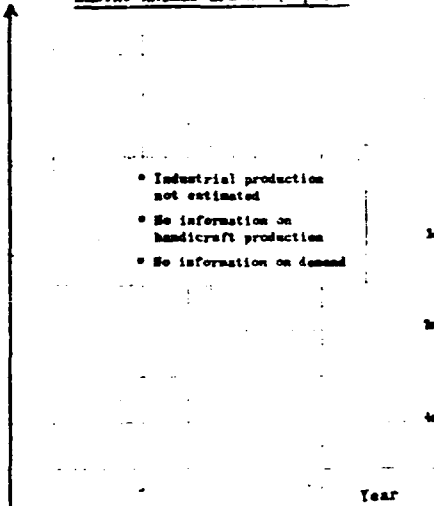
ETHIOPIA : Tractors



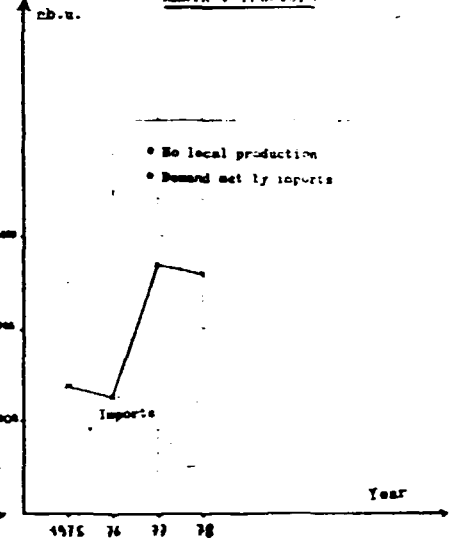
KENYA : Hand tools



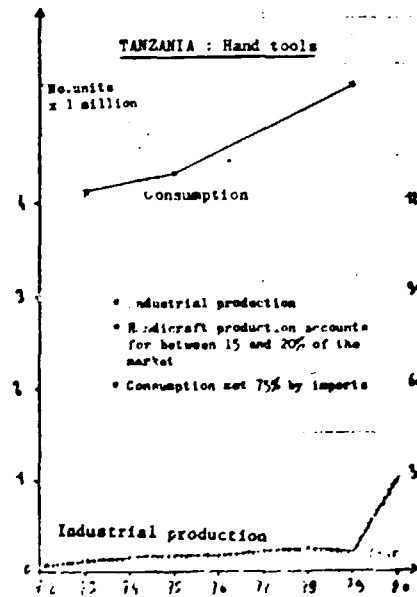
KENYA : Animal-drawn equipment



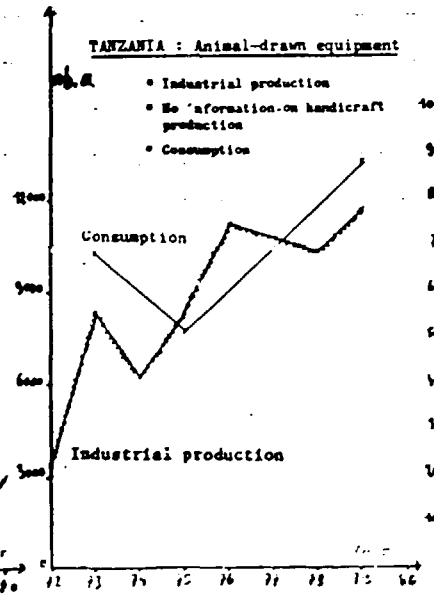
KENYA : Tractors



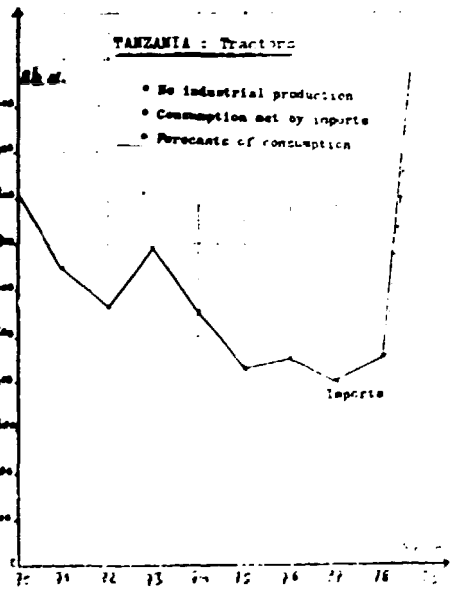
TANZANIA : Hand tools



TANZANIA : Animal-drawn equipment

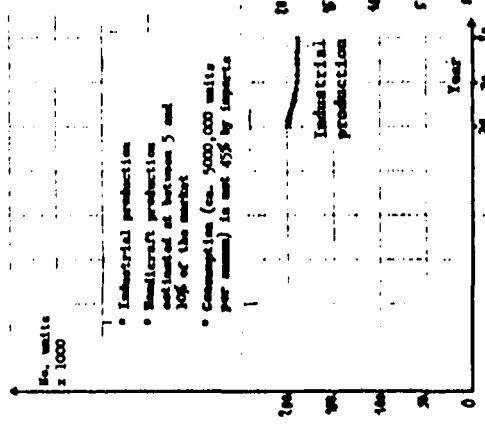


TANZANIA : Tractors

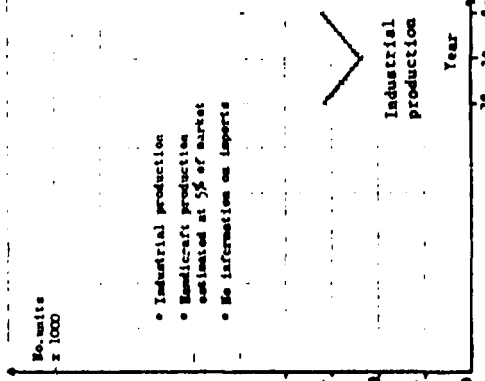


Subregion: East and South Africa cont.

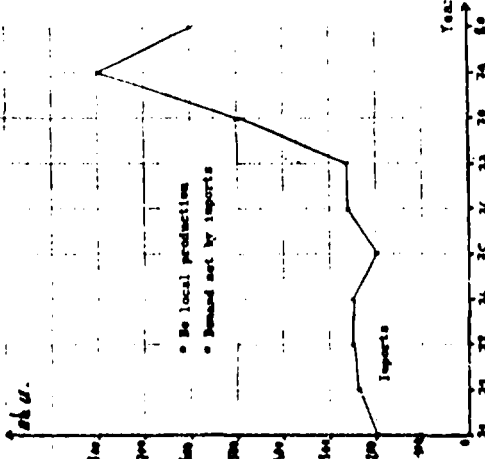
MADAGASCAR : Hand tools



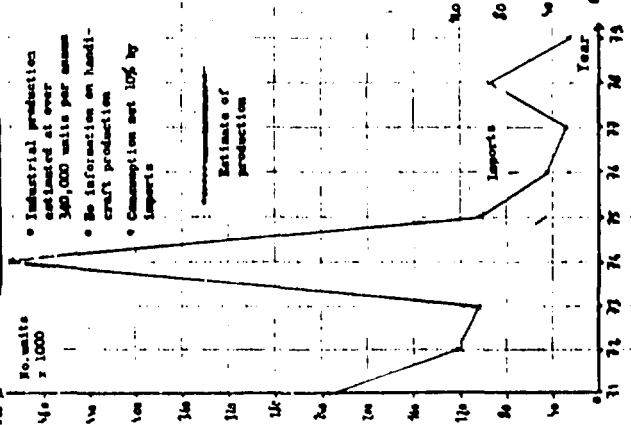
MADAGASCAR : Animal-drawn equipment



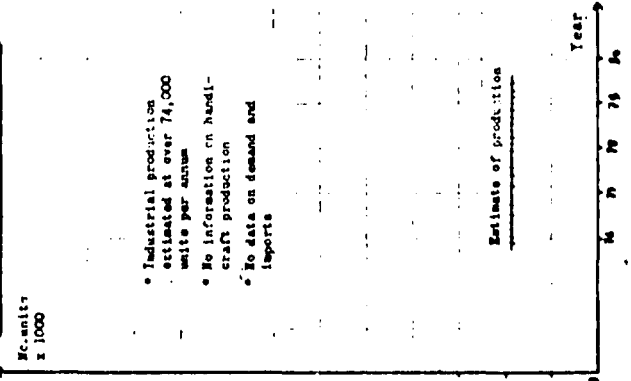
MADAGASCAR : Tractors



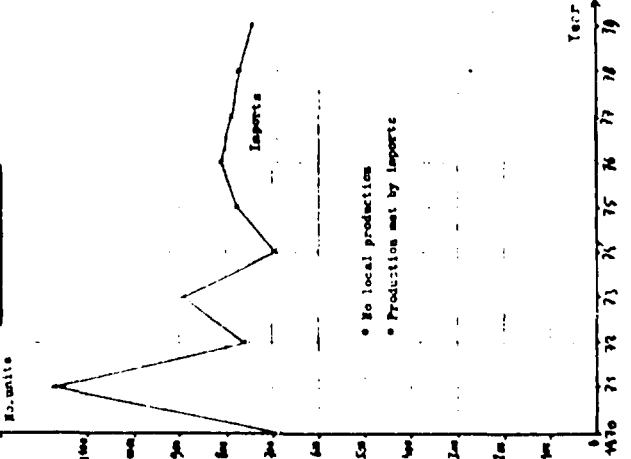
ZAMBIA : Hand tools



ZAMBIA : Animal-drawn equipment



ZAMBIA : Tractors



. the absolute dominance of motorized equipment (tractors and their equipment, possibly also combine-harvesters) in the volume of imports of each country.

. Analysis of the demand by countries and groups of countries

Tables 15 (a, b, c, d) summarize the principal factors in the demand and its evolution by countries and sub-regions, obtained from the case studies. The following comments illustrate the contents of this table:

- . The demand for agricultural equipment formulated by the North African Group relates essentially to motorized cultivation, and represents a market of 15,000 tractors in Algeria, 8,500 in Egypt and 575 in the Sudan, representing more than 50% of the total demand from the 16 countries studied. Compared with the population the ratio works out at an annual demand for one tractor for 3,000 inhabitants in Algeria, 1 for 5,000 in Egypt and 1 for 30,000 in Sudan. This equipment is partially manufactured locally, except for the Sudan where it is entirely imported. Apart from the fact that these countries inherited a history of motorized cultivation the choice of model is encouraged by the public authorities (subsidies, credits) when equipping cooperatives or state farms, but also in the case of private farms, so creating a complete infatuation as in Algeria where the purchase price for such equipment has been unchanged since 1974. For all the other items of equipment (hand tools, simple machines, animal-draught equipment) the farmers obtain these directly from blacksmiths and small local artisans who meet their needs, with the exception of the Sudan where each year an increasing quantity of hand tools are imported (2,721 tons in 1979).
- . In the case of the West African countries the demand relates essentially to animal-draught equipment and, to a lesser extent, to motorized equipment, with the exception of Nigeria where the annual market represents about 2,000 tractors (partly assembled locally). However when related to the national population this market represents an average of 1 tractor for 40,000 persons (identical to Senegal and the Ivory Coast), this ratio being lower in Mali (one for 100,000 inhabitants) and even smaller in Togo which has ceased importing motorized equipment after a massive purchase of 400 tractors in 1977.

Table 13a. ANALYSIS OF THE DEMAND IN THE COUNTRIES OF THE CARIBBEAN OF BARGE APRIAS

Country	Type of agricultural equipment	Annual volume of demand (with specification of year)	Origin of equipment		Purchasers and users	Trend of demand in last years	Main obstacles to growth in the use of barge aprias by type of equipment	Problems and prospects
			Local production	Imports (country of origin)				
ALGERIA	- Hand tools	Subsides	Local production	-	Direct purchase by individual small farmers from local craftsmen, especially in unfavourable (mountain) areas	Good data not available; apparent stagnation of demand.	- The needs of the traditional small private farmers have been basic, with emphasis in the agricultural revolution.	- Commercialization program through the introduction of power tillage
	- Animal draw equipment	Subsides	Local production	70% (Ind. Rep. Germ.)	Imports by co-operative farmers and private farmers	Increase in demand, partly linked to purchase of 1794 (1000 units), to purchase near and year old to the purchase of new, especially in the plains.	- Poor maintenance of equipment in the well-managed and temperate coastal areas (20 to 25% of units immobilized due to lack of spare parts)	- Increased demand in private sector (especially of credit unions)
	- Simple non-motorized machines	500 u. (78)	Local production	100%	Imports by co-operative farmers and private farmers	Tractors: 1000 units (11000 units)	- 200,000 pumps (SUCIAL) are in demand	- Demand for equipment hire
	- Tractor draw implements	4000 u. (78)	Local production	100% (Ind. Rep. Germ., France)	Imports by co-operative farmers and private farmers	Tractor draw implements: 7000 units (11000 units)	- 100,000 pumps (SUCIAL) are in demand	- Demand for equipment hire especially for transport
EGYPT	- Hand tools	Subsides	Local production	70% (Ind. Rep. Germ., Spain, Ind. Rep.)	Direct purchase by small private farmers who represent 80% of all farm units	Increase in demand during the preceding years.	- 95% of the farmers work on areas of less than 5 feddans (1.5 ha)	- Installation of small farmers
	- Animal draw equipment	Subsides	Local production	Local production	Imports by large private units from commercial importing companies and the FAO/UNEP/ICR	Large-scale imports in 1980 to offset the deficit in import and production during the preceding years.	- Inefficient decentralized credit	- Management of local private sector (struggling with existing subsidies)
	- Simple non-motorized machines	Subsides	Local production	Local production	Imports by large private units from commercial importing companies and the FAO/UNEP/ICR	Tractor draw implements: 7000 units (11000 units)	- 100,000 pumps (SUCIAL) are in demand	- Growing demand for motorized pumps, threshing and winnowing machines for fish-position work, etc.
	- Tractor draw implements	300 u. (78)	Local production	Local production	Imports by large private units from commercial importing companies and the FAO/UNEP/ICR	Tractor draw implements: 7000 units (11000 units)	- 100,000 pumps (SUCIAL) are in demand	- Use of motor and winnowing machines (struggling with existing subsidies)
GHANA	- Hand tools	Subsides	Local production	100% (Japan)	Direct purchase by private farmers	Increase in demand with policy of free import purchases in the last 10 years	- 95% of the farmers work on areas of less than 5 feddans (1.5 ha)	- Demand for equipment hire for ploughing operations
	- Animal draw equipment	Subsides	Local production	100% (Japan)	Direct purchase by private farmers	Tractors: 1000 units (11000 units)	- Inefficient decentralized credit	- Management of local private sector (struggling with existing subsidies)
	- Simple non-motorized machines	Subsides	Local production	100% (Japan)	Direct purchase by private farmers	Tractor draw implements: 7000 units (11000 units)	- 100,000 pumps (SUCIAL) are in demand	- Growing demand for motorized pumps, threshing and winnowing machines for fish-position work, etc.
	- Tractor draw implements	4000 u. (78)	Local production	100% (Japan)	Direct purchase by private farmers	Tractor draw implements: 7000 units (11000 units)	- 100,000 pumps (SUCIAL) are in demand	- Use of motor and winnowing machines (struggling with existing subsidies)

Table 15d. ANALYSIS OF THE DEMAND FOR THE COUNTRIES OF THE SAMPLE FOR EAST AND SOUTH AFRICA

Country	Type of agricultural equipment	Annual volume of demand (with specification of year)	Origin of equipment		Purchasers and users	Trend of demand in last years	Main obstacles at present to an increase in the volume of demand, by type of equipment	Trends and prospects
			Local production	Imports (country of origin)				
ETHIOPIA	hand tools	unknown	artisanal unit 170 tons/year	unknown (Europe - Japan Israel - USSR)	Purchases made directly by farmers			
	animal drawn equipment	unknown	artisanal coop. blacksmiths Amole (AGAU) BAO		Purchases made directly by farmers	Increase of demand by providing simple, strong and inexpensive machines	Limited number of draught - Low income of farmers - Low development of appropriate technical and economical technologies	- Priority to development of animal drawn cultivation - Development of appropriate technical and economical activities for farmers - Use of fixed machines and low powered agricultural units
	simple non-motorized machines	unknown	artisanal coop.					
	simple motorized machines	unknown						
	tractors	500 u. (75)			Imports by a public organization "for S.C. enterprises controlled by the State since 1974 (cooperatives, State farms)	- Existing stock estimated at 7,000 tractors - Imports from 1966 to 1974 : 3,950 tractors	- Difficulties encountered because of irregular terrain - 60% of equipment capacity in use for lack of qualification of workers, absence of spare parts, of repair shops, of frequent breakdown of equipment	- Partial mechanization of farms - Increase of mechanized operations by State farms (50% in 85) - Help for newly installed farms (mechanization of cooperatives)
tractor drawn implements	unknown							
KENYA	hand tools	unknown	blacksmiths and small artisans	550,000 u. (78)	Small private farmers	Important demand for cash crops by small holdings Little mechanization for food crops Increase of demand for small equipment through the development of a hiring system for motorized equipment used in agriculture	No place for small holdings in areas of rich soil - Decrease of farmers' income - Failure of hiring system to small farmers partly because of low income and of technical difficulties encountered in use of equipment	Demand estimated at 1.5 million hand tools per year - Development in dry areas especially for small holdings (estimated demand 100 000 units animal drawn equip. - Increase of demand by developing appropriate technologies
	animal drawn equipment	unknown	small private enterprises and rural development schemes					
	simple motorized or non-motorized machines	unknown						
	tractors	2,600 u. (78)		100 \$ (Europe - USA - China India)	Purchases by big farms and cooperatives Hiring service to farmers: - This set up in 1966 for newly installed farmers - private undertakings for small farmers	Existing stock estimated at 10,000 tractors		Absolutely necessary mechanization of large farms (estimated demand, 6000 tractors and implements per year) Need for low powered tractors for small and medium sized farms (1000 units/year)
	tractor drawn implements	unknown						
TANZANIA	hand tools	5 to 6 million u.	blacksmiths and UP (1 million tools)	75 \$ (China - India)	Purchases made directly by farmers			
	animal drawn equipment	14,000 u.	UP and TANTU (10,000 ploughs)		Purchases made directly by farmers	Increasing demand since 1970 (700,000 used for animal drawn cultivation) Increasing demand partly due to adaptation of appropriate equipment by section B/B of TANTU		Demand depends on low income and type of traditional cultivation Priority to devel. animal drawn cultivation for small holdings
	simple motorized or non-motorized machines	unknown						
	tractors	450 u. (78)		100 \$	Purchases by State farms or by private enterprises	Increase in demand since 1970 3000 tractors imported from 72 to 80	- Difficulties in maintenance (85% of stock is unusable) - Low income of farmers - Decreased imports due to external deficit, increased mechanization expenses and difficulty to reach maintenance centers	Development of irrigation equipment (made estimated at 500 large pumps and 2000 small pumps) Development of tractorization limited to State farms, large holdings and irrigated culture (limit: 1000 tractors/year)
	tractor drawn implements	unknown	small units in Iringa and Arush	unknown	Hiring service to farmers			
SAMBIA	hand tools	2,500,000 u.	blacksmiths	105, or 25,000 units	Direct purchase by farmers			
	animal drawn equipment	unknown	industrial unit (300,000 u.)	12,500 u./year		Low development of animal drawn cultivation Purchase of 220 motorized units in last 2 years	Little spreading of animal drawn equipment	
	simple machines motorized or not	unknown						
	tractors	750 u. (79)		100 \$ (Europe - Asi. - 15 different countries)	Purchases made by large holdings Hiring service to farmers (TSM) set up in 1975	Market solicited at 120 tractors/year during 1970-79 Present stock evaluated at 3800 tractors used for cash crops 450 tractors are used for hiring (TSM)	Difficulties in maintenance due to the diversity of marks and origin of equipment Lack of spare parts	Need for small tractors evaluated at 100/year
	tractor drawn implements	unknown						
MADAGASCAR	hand tools	500,000 u. (80)	750,000 u. (SIDEMA and blacksmiths)	45 \$	Direct purchase by farmers			
	animal drawn equipment	17,000 u. (80)	17,000 u. (SIDEMA) 4,000 u. (BARDAT)		Direct purchase by farmers	Development of semi-mechanized holdings (soil cultivation and transport) Subsidies for the purchase of plows Purchase of 91,000 plows from 73 to 80 (plow action)	Subsidies for the purchase of animal drawn plows enlarged the demand but penalized maintenance	Increasing demand for - animal drawn equipment - simple harvesting and processing machinery - motor-pumps (6000 units for 1981)
	simple machines motorized or not	unknown						
	power tillers	unknown		100 \$ (Japan)	Imports of power tiller by SIDEMA	Decreasing demand in the last few years	- Relief and small size of the holdings - Increasing costs for use and maintenance - Increasing imports of motorized equipment due to external deficit - Difficulties of maintenance	Stabilizing demand due to difficulties in imports and maintenance
	tractors	400 u. (80)		100 \$ (Europe USA - USSR)	Purchases by agro-industrial State companies			
tractor drawn implements	unknown		300 u. (locally assembled by TOLT)	Imports of Russian tractors with a hiring system to farmers	In the last 3 years, 1200 tractors imported			

Motorized equipment is purchased by:

private individuals (rich businessmen or officials in Mali, large farms in Nigeria, etc.),

or by agro-industrial production units (SAED in Senegal, the Niger Office in Mali, large semi-public or private units in Nigeria),

or by State organizations, to carry out contract work for farmers incorporated into cooperatives.

A very small quantity of tractor drawn implements is manufactured locally (mainly trailers), the remainder being imported. At the present time, and taking into account all the difficulties linked with the acquisition of equipment (high price, expensive credit) and with its use, (lack of spares, low level of competence of technicians) and of management (relatively low prices of agricultural products), the market is in regression.

In the case of animal-draught cultivation the demand for equipment is linked with the development of draught animals, a necessary but not a sufficient condition. In fact the increase in the price of equipment and the restriction of credit, together with the reduction in income of the farmer, has led to an extremely rapid falling-off of the demand in Mali and Senegal.

In the absence of information on agricultural policy

in these countries, particularly in regard to agricultural prices, no forecasts in regard to the demand for the coming years are possible. In Togo, on the other hand, the promotion of animal-draught cultivation by a policy of subsidies and credits for the acquisition of draught animals and equipment has resulted in a rapid increase in the demand (100 units in 1978, 700 units in 1980). As far as Nigeria is concerned no precise statistical data are available which would make it possible to quantify the volume of the demand for the Northern zone of the country.

In the case of hand tools the farmers obtain part of these from local artisans, part from tradesmen. Despite the absence of statistics there is every reason to believe that the demand per farmer is high, particularly when account is taken of both the regression in animal-draught cultivation and the absence of motorized cultivation.

. For the central African countries the importance of hand tools is very considerable. Animal-draught cultivation is relatively absent (with the exception of North Cameroon). Motorized cultivation is limited (140 tractors in Zaire, 80 in Cameroon and 11 in Burundi), representing an annual market of one tractor for 100,000 inhabitants in Cameroon, one for 150,000 inhabitants in Zaire, and one for 400,000 inhabitants in Burundi. Despite the presence of three tractor assembly units in Zaire the demand seems to be generally falling off.

Industrial production of hand tools is carried out by three major units (TROPIC in Cameroon, CHANIMETAL and UMAZ in Zaire), making it possible to satisfy not only the demands of the large plantations but also the needs of the smaller farmers who prefer quality tools to the traditional tools produced by craftsmen. To this is added the increasing importing of products, coming in particular from the Asiatic countries, which compete with locally produced products.

. In the case of the East and South African countries the demand covers both hand tools for small traditional farms with a very low income, animal-draught equipment for medium-sized farms which can integrate cattle-raising, and motorized cultivation equipment for the largest private or State farms.

In particular note should be taken of the use of animal-draught cultivation in agricultural development projects (Ethiopia, Tanzania). In Kenya the integration of cash crops into the systems of traditional production increases the demand for small items of equipment.

- The dependence of the market on imports

No African country which has been considered is reasonably self-sufficient in regard to modern agricultural equipment. Each country imports variable quantities of equipment from the industrialized countries, principally motorized cultivation equipment but increasingly hand tools, together with numerous items of miscellaneous equipment.

Local production of tractors does not break these dependency links, since the majority of the units only carry out the final assembly operations or cannot fully meet the demand (Algeria). Whilst the level of self-sufficiency is considerable in the case of animal-draught cultivation equipment the local production units purchase on average more than 60% of the cost of the equipment (raw materials, semi-products) from outside. Outside purchases of hand tools (from Western Europe, but mainly from Eastern Europe and Asia) manufactured in very large production runs, come into increasing competition with products manufactured locally at craftsmen level and even at industrial level (where imported materials often represent more than 70% of the cost of the product).

The role of imports in the demand and the market exceeds the purely quantitative aspect of the rate of coverage of needs. The very nature of the imported products (in particular the model of tractorization, which represents about 70% to 80% of the imports) has consequences on the national infrastructure, the agricultural world and the cornering of financial resources devoted to imports, plus the power held by those who organize these imports, which shape and transform the demand and the market, so inducing a reproduction of their own demand (for example for replacing existing stock) and hence preventing the development of other types of mechanization. The supply of imported products shapes and dominates the objective national demand, giving rise to factors for blocking the system as has been seen since 1975.

b) Imports and domestic production

The agricultural machinery sector appears to a large extent to be an industry of import replacement, with the exception of animal-draught cultivation equipment⁽³⁰⁾. This replacement has not cut the dependency links, particularly in the sector of tractor manufacture/assembly (very low added value, purchase of "collections", patents and licences, etc.) nor, generally speaking, for the supply of raw materials and special products.

(30) The reduction of use of animal-draught cultivation in the industrialized countries over the last 20 years has resulted in the almost complete disappearance of the market for such equipment, with the reconversion of industrial units for supplying motorized equipment.

Competition from the industrialized countries remains considerable and weighs heavily on the competitiveness of local factories confronted with the limited size of the domestic market and with multiple difficulties (tractors, hand tools). This factor of competition has a not unimportant weight on the growth or death of projects for building local units, inasfar as the economic calculations often find that importing is the most profitable solution in the short term when satisfying the needs of the market.

It should nevertheless be emphasized that these assembly units or workshops, built to ensure the maintenance of imported equipment, have been and are a core of activities contributing to the training of local labour and to the emergence of small enterprises which can develop production of certain agricultural equipment.

Analysis of the dominant role played by imports on the market and production of a country leads to formulating the following comment: any national policy designed to develop the demand and production of agricultural equipment must necessarily ensure that the system of importing is adequately controlled.

B. Identification of the categories of demand and of users of agricultural equipment in Africa

Previous sections have dealt with flows of imports and the consumption of agricultural equipment in Africa, centred on the product. This approach has been supplemented not only by a description of the importing mechanisms but also of the origins of the equipment and of trends in the markets. The actual nature of the final users, of the social and agricultural systems within which the equipment is utilized, and the real needs which they express, have not yet been touched on. This is the objective of this section, to direct attention to this hidden but essential part of the demand, placing the categories of users at the very centre of the analysis. Two principal types will be distinguished, the traditional peasant farmer and modern agricultural units, and the essential features of these will be specified in regard to the nature, historical evolution and present situation in regard to those key points which condition their needs and the equipping methods.

1. Traditional peasant farmers

At the present time they form the majority of the rural masses, sometimes representing more than 95% of the agricultural population in certain countries, (Sudan, Ethiopia and Nigeria).

a) Principal characteristics

Traditional peasant farmers can be defined by a set of obvious features, as follows:

- . a farming unit of family type and small dimensions (less than 5 ha, that is to say $\frac{1}{2}$ to 1 ha per agricultural worker) with small and scattered plots,
- . an agricultural system centred on food crops produced using non-intensive traditional methods, using manual cultivation but possibly having recourse to animal-draught cultivation for carrying out difficult tasks, but very rarely motorized cultivation,
- . a limited production apparatus, most frequently restricted to manual tools or simple machines, and making it almost impossible to increase production.

All this is the result of an agricultural system directed, as its priority, to meeting food needs, and strongly dependent on the physical and socio-cultural constraints of the environment. For example the choice of crops is guided by food habits, themselves conditioned by agro-climatic constraints (cereals in dry savanna, roots and tubers in the wet zone). The methods of production, extensive long-fallow methods with cultivation on burnt areas, gives place to intensive short-fallow systems as the population pressure increases. Cropping techniques are strongly dependent on agro-climatic constraints. In particular the technique of cultivation on ridges makes it possible to carry out the breaking-up of the soil with at the same time protection against weeds and the fight against erosion or excess moisture. In the same way associating different crops on the same plot allows permanent coverage of the soil which facilitates maintenance. This system is furthermore controlled by a set of traditions and customs which strongly impregnate the traditional environment.

b) Historical development

The operations of development and modernization of the rural sector which have been undertaken in the last twenty years have been directed principally towards integrating the peasant into the modern economy by encouraging the production of cash food crops so as to increase his level of income. This has generally resulted in a disruption of techniques and modes of production (flat cultivation instead of on ridges, single crop cultivation as opposed to multi-crop cultivation, competition between food and cash crops) and the introduction of new equipment (plough - sprayers - seed drills) which give rise to new categories of peasants according to the methods of training in the rural world:

- . The small "individual" planters integrate a cash crop into their production system (coffee - cocoa - cotton - rice - groundnut) but continue to produce food crops for their own consumption, using the traditional methods. The guarantee of market prices, the distribution of inputs necessary for this cultivation and, in particular, a system of subsidies, facilitates the acquisition of

equipment in order to increase the production of these cash crops, the sale of which determines the level of solvency for the acquisition of specific equipment (back-pack sprayer, for example, in Cameroon).

- . In the case of peasants included in a development structure (in general a State organization) the latter popularizes more productive techniques, facilitates the modes of acquiring equipment goods (subsidies and credits) and favours certain cultivating operations, possibly by a leasing system (motorized deep ploughing). The development organization plays the role of a genuine tutor for the peasant, deciding on the choice of his equipment together with its mode of acquisition.
- . Cooperative production groups are in general a reflection of a desire for organization in the rural world. Many countries favour the cooperative organization of producers by means of a series of encouraging measures (easier credits, subsidies for the purchase of equipment and grants for improvement work). In particular the regrouping of farms facilitates the acquisition of expensive equipment, opening up the way to motorized cultivation, itself encouraged by State assistance (Egypt - Ethiopia).

However these changes have often remained superficial, and have concerned only a minority of the peasants. In particular the latter remain mistrustful of new techniques and systems which remain outside their own control. They continue to give priority to the traditional crops necessary for their own consumption, using the techniques which they know well and which are adapted to the environment, at the expense of cash crops which are not indispensable and which are almost always abandoned as soon as the first difficulties arise (fall in prices - delays in supplies of inputs or in the marketing of products - irregularity of production, etc.) or which are cultivated in a very extensive manner.

Therefore the majority of the small peasants, and this applies to all the African countries, continue to live on a practically self-subsistence basis. A small part of the production is marketed at local markets in order to acquire essential goods and services. The very low income allows only the purchase of simple and cheap tools manufactured

by local blacksmiths. In particular this low-productivity equipment does not make it possible to improve the level of production in a traditional agricultural system, so constituting a vicious circle which, in particular, increases the vulnerability of the mass of the population to climatic hazards.

c) The existing situation is characterized by blockages and clearly-defined trends:

- The failure to integrate tractorization into the traditional peasant system

Generally speaking it can be seen that there has been in all countries, a failure in the system of hiring tractors, linked mainly to the difficulties of managing a dispersed stock of equipment and the technical impossibility of being able to carry out the work at the right time (difficulty of maintenance - poor utilization of the equipment - failure to improve the land, etc.). For example in Kenya a report from the Ministry for Agriculture on the Tractor Hire Service shows the level of utilization of tractors or productive activities as 7% (see Table 16). Similarly in Senegal a study by SAED indicates a breakdown every four hours of use of the tractor. However it should be pointed out that encouraging results are obtained by private entrepreneurs when carrying out specific cultivation operations, in general at peak periods of work (ploughing, sowing, threshing).

- Difficulties in the integration of agriculture and husbandry for the development of animal-draught cultivation

Animal-draught cultivation develops in most zones where there is a tradition of cattle-raising. The moderate cost of acquisition of the equipment⁽³¹⁾, its ease of use and maintenance, the mastery of farming techniques and, in particular, the possibilities of increasing production by simply increasing the areas cultivated, are factors which favour its use on small farms. To this has to be added certain

(31) The cost is estimated at US\$ 325 (1975 prices) over a period of 10 years. To this is added the cost of acquisition and training the animals, evaluated at US\$ 400 per animal. Source: Agricultural Mechanization and the Demand for Agricultural Machinery and Equipment in Africa for the year 2000 - An analysis of results and implications of the FAO study at 2000 (FAO June 1981).

Table 16. Tractor hour analysis ^{*/}: 1/2 year 1978/79
percentage hours spent on various activities

Activity	Percentage hours
Productive hours	6.8
Non-productive hours	3.5
Workshop	44.5
Field breakdown	15.8
Ploughing problems	1.9
No work	11.9
No diesel	0.6
Rain	1.2
Holiday	0.5
No reason	13.6
Total	100.0

^{*/} The percentage of productive hours in 1979/80 increased to 10 %
(2nd half year Report January-June 1980)

Source: Republic of Kenya: Tractor Hire Service, half year report,
1978/79, Report 1, Ministry of Agriculture, Nairobi, 1979.
(Country paper for Kenya by Gichuki Muchiri done for UNIDO,
May 1981, page 75).

promotional measures, both for animal vaccination campaigns), for equipment (subsidies - credit - supplies of spare parts, for crops (supply of selected seeds and fertilizers) and for the workers (information campaigns - training). Despite the encouraging results and the overall increase in the volume of demand in all the countries there has been a stagnation or a falling-off in certain zones (Senegal, Mali) or a rejection by the rural masses as in Burundi, a country with a cattle-raising tradition where the cow is regarded as a noble animal, or again in Nigeria where young farmers aspire to modernization through motorization.

To this should be added the physical limits related to the use of animals (weakness of the animals at the beginning of the season, difficult work in zones which are rough or infested by parasites, reduction of the herd), to types of crops which are non-mechanizable (roots, harvesting work in general with the exception of lifting groundnuts), and to competitiveness in the use of the land for stock-raising or crop-raising in zones of high population density.

The development and perpetuation of the use of animal-draught farming passes through a true Agriculture/Stock raising integration in farms, rarely realised and highly localized in some countries (Mali - Ethiopia - Kenya - Madagascar).

- The existence of many unsatisfied needs

Hand tools (hoes, machetes) of poor quality manufactured by local craftsmen and blacksmiths still remain the only types of equipment used by the small peasant farmer. It is impossible for him to obtain other equipment which would allow him to meet his priority objective of "food survival" (harvesting equipment, storage), to overcome the difficulty of the work and daily constraints (transport of agricultural products and materials, the initial processing of products, preparation of foods; all tasks where the role of the woman is the leading one) and of limiting the effects of climatic uncertainties and constraints (irrigation). The transport function here is of primary importance, since it is a permanent one and could be used for several hours every day.

- The reduction in the purchasing power of the peasant farmers, linked with the deterioration of the whole of the agricultural and rural environment, the fall or stagnation in the price of food products, with inadequacies in the circuits for collecting the products and with problems with those credit systems which have been introduced. For example in Senegal halting the distribution of credit, as a result of too great an indebtedness of the cooperatives, has resulted in an almost total halting of the demand. Conversely in Togo the introduction of credit to purchase draught cattle has strongly contributed towards an increase in the demand for animal-draught equipment in the last two years.

- The far-reaching transformation of the peasant farmers social environment, which benefits by, or undergoes at the same time, the penetration of modernity by the spread of mass information media, the development of literacy and of education and the relative attractiveness of towns as compared with life in the country. All these "disturbances" result in a far-reaching transformation of the traditional peasant system, modifying the attitudes of the peasant farmers, particularly the younger generation, in regard to agriculture and the use of agricultural equipment. In particular these young persons reject archaism and hard manual labour (hand tools) but are sensitive to and understand motors (driving vehicles, small repairs). Such factors are determinant in the failure or success of modes of mechanization.

2. Modern agricultural units

These are distinguished from traditional farming units by the systematic use of motorized cultivation and the employment of modern production techniques (the use of crop rotation, selected seeds and fertilizers)

a) General characteristics

The dominant characteristics are:

- . the large size of farms, with frequently improvements to plots and access routes;
- . a system of production directed towards single crops, the products being entirely marketed (sugar cane, palm oil, pineapples, etc.);
- . modern and generally imported equipment (buildings, rolling stock, etc.);

b) Historical development

Large-sized agricultural units, the production of which was formerly intended entirely for export, have always had a high level of influence on the national economy and for this reason have benefited from priorities: research work, improvements in production, organization of the marketing circuits for the products, etc.

In particular these units have served as models, justified sometimes by the shortage of labour in certain newly-equipped areas.

At the present time production is orientated towards supplying the towns, the agricultural industries and exports. The mode of mechanization is based on that of the industrialized countries. It is possible to distinguish between five major categories of modern agricultural units:

- . State farms, particularly developed in countries with a socialist tendency (Ethiopia, Sudan, Tanzania, Madagascar). In general only the difficult work (soil preparation, harvesting) is carried out mechanically, the other work remaining manual. Purchase of equipment is directly linked to State investment credits or external financing.
- . Large production cooperatives. Equipment is purchased collectively for individual use. This form is particularly encouraged in socialist countries (Algeria, Egypt, Ethiopia).
- . Agro-industrial units. These are highly developed in countries with a liberal tendency, possibly with State participation, but with mainly foreign financial shareholdings which guide the choice and origin of the equipment. The search for profitability generally results in the integral mechanization of all work.
- . Large private farms. These large farms are a heritage of colonialism, but also the result of measures of encouragement by the public authorities (access to credit - ease of marketing), and are mainly developed in the countries of East and South Africa.

Two fundamental characteristics define their production: single cropping, in general directed towards exports, and high productivity of the work linked with a high level of mechanization.

To a lesser extent medium-sized farms aspire to the same development, having recourse to a system of hiring equipment for carrying out certain difficult work.

- . The new modern farmers. These new "peasants" are generally from the large towns where they exercise another profession (official, businessman), so facilitating access to credit for purchasing expensive motorized equipment. Although this category is still not numerous it is relatively encouraged and constitutes a new privileged clientele for the importing sales companies (Nigeria, Cameroon, Mali, Senegal, etc.).

c) The present situation

The heavy mechanization model concerns only a minority of farmers (if Algeria is excluded). For example in Kenya, a country which represents the largest market for tractors, only 0.2% of the rural community benefit from heavy mechanization.

Furthermore purchases of motorized equipment represents more than 80% by value of the imports of agricultural equipment in all countries.

The use of tractors presents many problems of organization and training of personnel, involving the handling, driving and maintenance of the equipment. The diversity of the supplies (linked partly to the method of purchasing equipment by calls for tenders) results in a very wide variety of makes, models and origins, presenting serious downstream problem of supplies of spares. To this is added the increasing costs of operation (fuel, spares). All this reflects an increase in the cost of mechanization which is rarely compensated for by increases in production because of difficulties in using the equipment, nor does it result in improvements in the prices of agricultural products.

The result is a stagnation in the equipping of agriculture and difficulties in the renewal of motorized equipment, resulting in a reduction in the demand; this is then reflected in a fall in imports (cf. previous section concerning imports).

The widespread use of the tractor at the present time is largely linked to its use as equipment for transporting agricultural products and miscellaneous materials, and also for driving fixed harvesting machines (rice threshers in Egypt, millet threshers in Senegal). A new opening concerns intermediate motorization (tractors of 20 to 30 hp for equipping small farms), but this meets similar problems (high cost of the equipment - imported products - maintenance difficulties).

These numerous difficulties encountered by the mechanization model subsist within a context of their own which is difficult for all the modern units.

This analysis of the major categories of agricultural units shows firstly the diversity of the segments of the demand and their needs, and secondly the acuteness of the problems encountered which are linked to a lack of structural adaptation of the modes of mechanization and the equipment which is offered.

IV. MAIN LESSONS

The diagnosis set out in this document is based on the content and interpretation of 16 case studies carried out by African experts on the agricultural mechanization situation in their countries. It forms an essential starting point, since it is on this analysis of the present situation, and the problems encountered, that the proposals for action intended to result in concrete improvements in this sector in the African countries has to be based.

What, summarizing, are the principal lessons to be drawn from this diagnosis ?

- Agricultural mechanization does not constitute an isolated activity but lies at the heart of a complex system of activities, actors and problems which are intimately linked. In particular the equipping of the rural world does not involve solely supplies of current agricultural equipment (hand tools, animal-draught equipment, motorized cultivation equipment) but includes all the fixed and mobile equipment necessary for all agricultural processes, for developing land and the environment and the associated rural activities (transport, storage, processing of the products), together with an organization to ensure the utilization and operation of this equipment.
- A notable characteristic is the situation of fundamental under-equipment of agriculture in Africa. This situation can only become aggravated as a result of a decrease of the market. Furthermore it is necessary to take into account the very great disparities between the minority "modern" agricultural sector (less than 5% of the population has access to motorized cultivation and concentrates about 80% of the purchase of equipment) and a traditional "insolvent" farmers sector representing the majority of the rural population.
- 90% of the market is met by imports, particularly motorized cultivation equipment and, increasingly, hand tools. Local production involves mainly hand tools and almost all the animal-draught cultivation equipment (with, exceptionally, some equipment for motorized cultivation). This low level of cover of the demand

by local production (10%) reflects the very great dependence of African farmers on equipment or supplies from abroad, a dependence reinforced at the maintenance level by supplies of spare parts other essential products for motorized equipment.

- Local industrial production is limited in each country to one or a few companies of medium or small size (rarely more than 200 employees) with multiple and general activities and carrying out simple technical operations (essentially assembly and cutting-welding).

- The limited contribution of local added value (less than 30% for hand tools, 30 to 50% for animal-draught equipment), the limited relationships with the existing industrial environment and the impossibility of obtaining supplies of raw materials and finished products on the local markets lead to this dependence on overseas companies being maintained, with difficult transport conditions and late deliveries and, sometimes, a situation of competition with imported products.

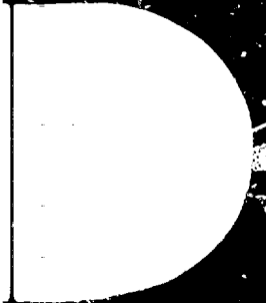
- Craftsman production by local blacksmiths, generally ignored in development, is high, but has never been quantified. Blacksmiths continue to supply the peasants with simple equipment, but are increasingly experiencing competition from products of better quality and industrial origin, either imported or manufactured locally.

- The present trend affecting local industrial and craftsman production reflects a situation of crisis:

- . destruction of the traditional craftsman environment,
- . structural difficulties of the (semi)-industrial companies, with a noticeable reduction in their activities and their turnover,
- . a low level of development of new industrial projects,

- . generalized disengagement of private investors (linked to the weakness and irrationality of the market).

- The priorities granted by the developing countries to agriculture have led to an increase in orders for agricultural equipment and of recourse to external technologies. This trend, encouraged by foreign bilateral or multilateral assistance and the difficulties



of obtaining supplies on the local markets have contributed towards reinforcing dependence through the importing of products at all levels (raw materials, finished products, sophisticated products, spare parts). This situation is becoming impossible for many countries - generally the poorest - confronted with problems of increasing balance of payments deficits.

- This impasse situation leads to a dangerous distancing of the accomplishment of the object of agricultural mechanization (reduction of agricultural productivity and of food products, under-employment and the rural depopulation, deterioration of the traditional environments - increasing dependence on developed countries).

These major characteristics of a crisis situation for agricultural mechanization in Africa are summarized in Issue No. 1, entitled "Present situation, prospects and strategical choices for the development of agricultural machinery in Africa in the context of the Lagos Plan of Action" which furthermore provides an explanatory framework for the situation.

Amongst all the reasons evoked a dominant cause is related to the present limits of technological systems for mechanization applied in the rural environment.

In manual cultivation the use of simple tools (hoe - machete) does not provide any assistance towards satisfying many priority needs of the small farmer (harvesting - processing of food products - transport) and only improves to a very small extent the possibilities of production, rarely making it possible to advance beyond a state of self-sufficiency in food products.

The use of animal-draught cultivation is linked with the possibilities of the acquisition and utilization of animals and equipment to carry out agricultural work, but many crops and operations cannot be mechanized in this way (tubers and fruits - harvesting work in general), and this technique only makes it possible to increase production by a limited increase in the surface areas cultivated in zones with a cattle-raising tradition and good land.

The widespread use of the system of motorized cultivation based on the use of the tractor and of adapted equipment necessitates the entire prior development of farms and of the land (ground clearing - regrouping of plots - opening of access roads - depots for fuel and spares - workshops, etc.), changes in production techniques (in general those applied to food crops remain of low performance), and high technical ability in those operating the systems. These conditions are rarely found together, leading to a

reduction in the efficiency of the equipment, an increase in costs and an overall failure of the system in accelerating the means of rural development and the production of farmer units.

It seems therefore to be essential to improve and to enlarge the present systems of mechanization, or even to develop new equipment and technologies. This research has to meet two basic conditions:

- . to meet the true needs of the farmer and rural communities, by facilitating a controlled transition between the traditional system and a modern system,
- . to promote local production on the basis of existing technologies and capabilities, considering the craftsmen and industry as two complementary and essential poles (with craftsmen playing the role of link between agriculture and industry for the supply of various services).

Three new ways are therefore proposed:

- Route 1 : The promotion of basic equipment for traditional farming units, giving priority to food production;
- Route 2 : The progressive modernization of agricultural units by the use of simple machines (motorized or not), within the framework of individualized mechanization of the various operations;
- Route 3 : A process of equipment based on the essential function of transport.

These new technological routes which are submitted for discussion correspond to the real possibilities of development of agricultural mechanization in the African countries where many and positive experiments have already been carried out. The implications, both at the level of utilization and also of local manufacture, could radically transform the situation which prevails today in Africa.

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*/ The study concerning this country has been written at the Secretariat,
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UNIDO
Industrial Studies Division
Sectoral Studies Branch

Study of the agricultural machinery industry in Africa

Data sheets for countries
relating to the production of agricultural machinery

Sub-regions and countries studied

North Africa : Algeria, Egypt, Sudan

West Africa : Senegal, Mali, Ivory Coast, Togo, Nigeria

Central Africa: Cameroon, Zaire, Burundi

East Africa : Ethiopia, Kenya, Tanzania, Zambia, Madagascar.

PROMOTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN:

ALGERIA

Industrial production

4 enterprises^{a/}

Name(s) (date set up)

The National Corporation for Mechanical Engineering (SONACOME) which comprises the following factories:

SACRA and DAHOUN

Legal status

State owned (100%)

Number of employees (cadres/ skilled workers/unskilled labourers)

440

Constantine Engines and Tractors Complex (1972-1979)

3,620

Sidi-Bel-Abbès Agricultural Machinery Complex (1977)

1,000

Dahoun:

100

Turnover

\$80 million (in 1980)

\$37 million (in 1980)

Added value

Proportion of capacity used

100% (the programme is respected)

100% (idem)

100% (idem)

100%

Type of products manufactured and production

Ploughing equipment, trailers and cisterns

Engines(8,000 units) four-wheeled tractors (4,280 units in 1980), assembly(CKD in 1972); manufacture of parts since 1974

Ploughing, seeding, harvesting, forage and treating machinery(tractor-drawn implements) and combine harvesters (238 units in 1979) (33 products in all)

Above all tractor-drawn implements for soil preparation (12,300 units per year)

Technical nature of operations

Forge/machining/fabrication shop/assembly

Forge/foundry/machining/heat treatment/plating/assembly

Forge/machining/heat treatment/assembly

Welding/machining/plating

Study and research capacity

extremely limited

extremely limited

extremely limited

Nature and extent of relations abroad

Purchase of some components

Manufacture under licence Deutz(FRG), 80% of supplies from abroad (Deutz)

Licences: Class, Busatis -Platz(FRG); 82% of supplies from abroad (FRG)

No data given

Nature of any operational assistance

Since 1980 the State has been making up SONACOME's deficit due to continued low prices for agricultural equipment.

See under marketing

Marketing networks

ONAMA, a body under the protection of KAIZA, has been responsible for distribution since 1970

Equipment purchased by SONACOME at the prices higher than the official sales price and re-sold to ONAMA at support prices

Other characteristics

Handicraft production

Structured handicrafts

Non-structured handicrafts

very minor

Linkage with the metallurgical and engineering sector

Characteristics of the sector

National Metal Company (SN Metal) - State Company, has 20 manufacturing units, employs 15,000 people, achieves a turnover of 261 million dinars; manufactures metal structures, cranes, concrete mixers, railway carriages, etc.

Links with agricultural machinery enterprises

SONACOME which has a total of 17 production units, employs 24,000 people, has a turnover of 10 billion dinars for 1980; essentially manufactures transport equipment and machine tools, valves, agricultural equipment, bolt and nut articles, pumps.

Potential for developing links with the agricultural machinery sector

Overlap already very extensive.

Maintenance operations

- ONAMA has 27 decentralized workshops (good equipment, 30% of capacity utilized due to lack of technicians)
- 700 Communal General Agricultural Co-operative Services (CAPCS) of which 20% are fully operational
- 100 mobile workshops equipped for work in the field
- Private handicraftsmen for repairs in the private agricultural sector

Imports/exports

Imports necessary for local production of agricultural machinery

cf. "dependence on abroad"

Size of local production in relation to imports

Tractors imports represented around 60% of manufacture in 1980

Exports

No exports (grants to various African countries)

Projects announced and prospects

- Expansion of the Constantine complex for 1981 (to increase production by 1,000 tractors and 4,000 engines)
- Expansion of the Sidi-Bel-Abbès complex for 1983 (to increase production of combine harvesters by 500 units per year) and the transfer of ploughing equipment manufacture to another site

a/ National Bureau of Agricultural Equipment (ONAMA) (1969) which is concerned with importing spare parts has production units for cultivating equipment (5,700 units in 1977, a record year) its production is marginal.

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN:

E G Y P T

<u>Industrial production</u>	5 enterprises of which 3 are major			
Name(s) (date set up)	BEHERA COMPANY ^a (1958)	TANTA MOTOR COMPANY	NASCO	EL SALLAM WORKS and SISMAN COMPANY
Legal status	Public	Private	Public	Private
Number of employees (cadres/ skilled workers/un- skilled labourers)	500	200	11,000 for the whole enterprise, all acti- vities included	
Turnover (local currency)				
Added value				
Proportion of capacity used		Maximum		
Type of products manufactured and production	Many activities in- cluding agricultural and cultivating equip- ment (3,400 units), transport (300 units) and harvesting (600 threshing machines) equipment	Essentially manufac- tures cultivating equip- ment, threshing machi- nes, motor pumps, mills and trailers	SKD and CKD assembly of tractors: Massey Ferguson (300 units), IMR-Yugoslavia (900 units) and UTB-Roma- nia (1,260 units)	Simple agricultural equipment and trailers
Technical nature of operations	Metal structures/ foundry/forge/assembly	Cutting/welding/mo- chining/assembly	Assembl./machining/ heat treatment	Machining/forge/heat treatment
Study and research capacity	No designs, but abili- ty to copy anything			
Nature and extent of relations abroad	Technical co-operation with GDR, some parts (high quality steel) are imported from GDR		Import of sets	
Nature of any operatio- nal assistance				
Marketing networks	Direct sale	Direct sale with main- tenance service	Through private and public distributors	Through private distributors
Other characteristics	Its main activity is not agricultural ma- chinery. Many parts are sub-contracted locally.	Agricultural machinery is its main activity. Imports tractors and walking tractors.	Agricultural machine- ry is a secondary activity.	Many activities

Handicraft production

Structured handicrafts

Non-structured handi-
crafts

Production of medium quality hand tools by blacksmiths.

Linkage with the metal-
lurgical and engineering
sector

Characteristics of the
sector

Metallurgical and iron and steel industries: provision of steel and pig iron, forging, production of mechanical, electric and other components. Units for diesel motor assembly (high and low power). Well developed industrial network

Links with agricultural
machinery enterprises

Very close as regards the supply of steel and components. Several enterprises manufacture equipment for industry and agriculture.

Potential for developing
links with the agricultu-
ral machinery sector

Maintenance operations

Through retailers for locally manufactured equipment, through importers (public or private), through private garages.

Imports/exports

Imports necessary for lo-
cal production of agri-
cultural machinery

Imports of sets for tractor assembly

Size of local production
in relation to imports

Tractor assembly accounts for 53 per cent of tractor imports.

Exports

Projects announced and
prospects

^{a/} This enterprise has existed since 1881 and has been manufacturing agricultural equipment since 1958

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN: S U D A N

<u>Industrial production</u>	None
Ma. / (s) (date set up)	
Legal status	
Number of employees (cadres/ skilled workers/ un- skilled labourers)	
Turnover (local currency)	
Added value	
Proportion of capacity used	
Type of products manufactured and production	
Technical nature of operations	
Study and research capacity	
Nature and extent of relations abroad	
Nature of any operational assistance	
Marketing networks	
Other characteristics	
<u>Handicraft production</u>	
Structured handicrafts	None
Non-structured handicrafts	Well developed for hand tools; traditional technology; use of recovered scrap iron.
<u>Linkage with the metallurgical and engineering sector</u>	
Characteristics of the sector	196 listed mechanical workshops, 4 foundries
Links with agricultural machinery enterprises	
Potential for developing links with the agricultural machinery sector	Potential exists.
<u>Maintenance operations</u>	Carried out mainly by 35 state-aided private mechanical workshops, and by the five major concessionaries importers (Massey Ferguson, International Harvester, Ford, Leyland, John Deere)
<u>Imports/exports</u>	
Imports necessary for local production of agricultural machinery	Insignificant
Size of local production in relation to imports	Everything is imported
Exports	
<u>Projects announced and prospects</u>	<ul style="list-style-type: none">- A study was carried out in 1978 for a hand tool unit in collaboration with China; negative results.- MASUDAN project for a CKD tractor assembly factory with Massey Ferguson, capacity 4,000 units per year. Initial study carried out in 1974. Suspended due to financial difficulties.- Agricultural equipping project using funds provided by Arab States.

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN:

SENEGAL

Industrial production 1 enterprise
Name (s) (date set up) SISCOA (1964)
Legal status Mixed since 1976 (50% state capital)
Number of employees (cadres/ skilled workers/unskilled labourers) 350 permanent + 100 to 500 seasonal workers
Turnover (local currency) 1 to 2.5 billion CFA Francs (1.9 in 1979)
Added value 40 to 50% on average
Proportion of capacity used Capacity: 200,000 units (see below)
Type of products manufactured and production Animal drawn equipment and various machines (about 20 types of product); 123,000 units in 1979; 179,000 in 1977
Technical nature of operations Cutting workshops/general engineering/swaging/welding/boiler work/forging/assembly/prototype maintenance
Study and research capacity A small study unit
Nature and extent of relations abroad 50% of its capital is French. Various licence and patent agreements. Supplies from abroad represent 40% of turnover
Nature of any operational assistance None in particular, except tax exemption
Marketing networks Within Senegal sales made through the State National Office for Development, Co-operation and Assistance (ONCAD), dissolved in 1979 and replaced by SONAR. Free exports
Other characteristics Company specialized in agricultural machinery. Mixed company which however functioned as a private company. (Closed down in September 1980.)
Handicraft production
Structured handicrafts Programmes to train and equip those who promote agriculture, craftsmen and members of co-operatives. About 500 metalworking craftsmen trained between 1968 and 1979. Decentralized throughout regions and villages. Manufacture of various tools, animal drawn equipment and carts at very low prices. Recovery of scrap metal. Progressive technology.
Non-structured handicrafts These exist: manufacture of hand tools, furniture, household utensils.
Links with the metallurgical and engineering sector
Characteristics of the sector A developed sector, with about 17 enterprises. Turnover of 10 billion CFA Francs. Lorry assembly, shipbuilding, general engineering, household articles. 2,000 jobs of which 500 in SISCOA, the leading enterprise in the sector.
Links with agricultural machinery enterprises Links between SISCOA and the aluminium foundry at Thiès (seed drill discs)
Potential for developing links with the agricultural machinery sector
Maintenance operations Scheme for stocking spare parts under the responsibility of agricultural development bodies. SISCOA plays a direct promoting role. Various attempts have failed.
Imports/exports
Imports necessary for local production of agricultural machinery Represent 40% of SISCOA's turnover
Size of local production in relation to imports No industrial manufacture of hand tools, tractors and motorized machines.
Exports Represented between 20 and 30% of SISCOA's production. Client countries: Mali, Ivory Coast, Upper Volta, Caseroon, Niger, etc.
Projects announced and prospects Projects to relaunch SISCOA aiming to increase exports and broaden the range of products manufactured.
Present denomination: SISMAR (December 1981)

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT

M A L I

Industrial production

1 enterprise

Name(s) (date set up)

SMECMA (1974)

Legal status

State owned (83%)

Number of employees (cadres/skilled workers/unskilled labourers)

5 + 8 + 150 = 163 + seasonal workers

Turnover (local currency)

2.9 billion Malian francs in 1976; 1.2 in 1979

Added value

8.7% in 1976; 28.3% in 1979

Proportion of capacity used

Estimated at 65%

Type of products manufactured and production

Animal drawn equipment: 23,000 units in 1979

Technical nature of operations

Assembly/cutting welding simple machining

Study and research capacity

Responsibility of the Agricultural Mechanization Division (DMA) of the Ministry of Agriculture

Nature and extent of relations abroad

17% of capital is French. Highly dependent for supplies of raw materials and high grade items (France)

Nature of any operational assistance

Tax exemption for the first five years only

Marketing networks

Through a state company, Agricultural Credit and Rural Equipment Company (SCAER), closed down in 1980. Direct sales to agricultural development schemes.

Other characteristics

This unit which specializes in agricultural equipment was financed by the Fund of Aid and Co-operation (PAC) in 1969 (with an initial investment of 110 million Malian francs). Provides village blacksmiths with subcontracting work.

Handicraft production

Structured handicrafts

A total of 310 blacksmiths trained under contract as part of agricult. develop. schemes (Malian Company for the Development of Textile Fibres (CMDT) and the Groundnut Marketing and Food Crops Office (OACV). Repairs of animal drawn equipment. Modern equipment with a welding unit. Retail price of products 25% less than industrial prices.

Non-structured handicrafts

About 3,000 farmers/blacksmiths, manufacture of hand tools

Linkage with the metallurgical and engineering sector

Characteristics of the sector

10 enterprises. Principal activities: structures/carpentry/foundry/cycle/vehicle body construction/metal construction; 30 to 50% of capacity used

Links with agricultural machinery

Very weak

Potential for developing links with the agricultural machinery sector

Opportunity for links with foundries and metal construction

Maintenance operations

Spare parts supplied by SMECMA. Craftsmen are important for repairs. Centralized and local workshops for tractors.

Imports/exports

Imports necessary for local production of agricultural machinery

Imports represent 70% of SMECMA's turnover (steels, moving parts, bolts, etc.)

Size of local production in relation to imports

All tractors and motorized equipments are imported.

Exports

Non-existent except for exports to Upper Volta initiated in 1980

Project announced and prospects

One unit for the assembly of threshing machines and other fixed equipment, with the objective of a sustained increase in SMECMA's exports.

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN:

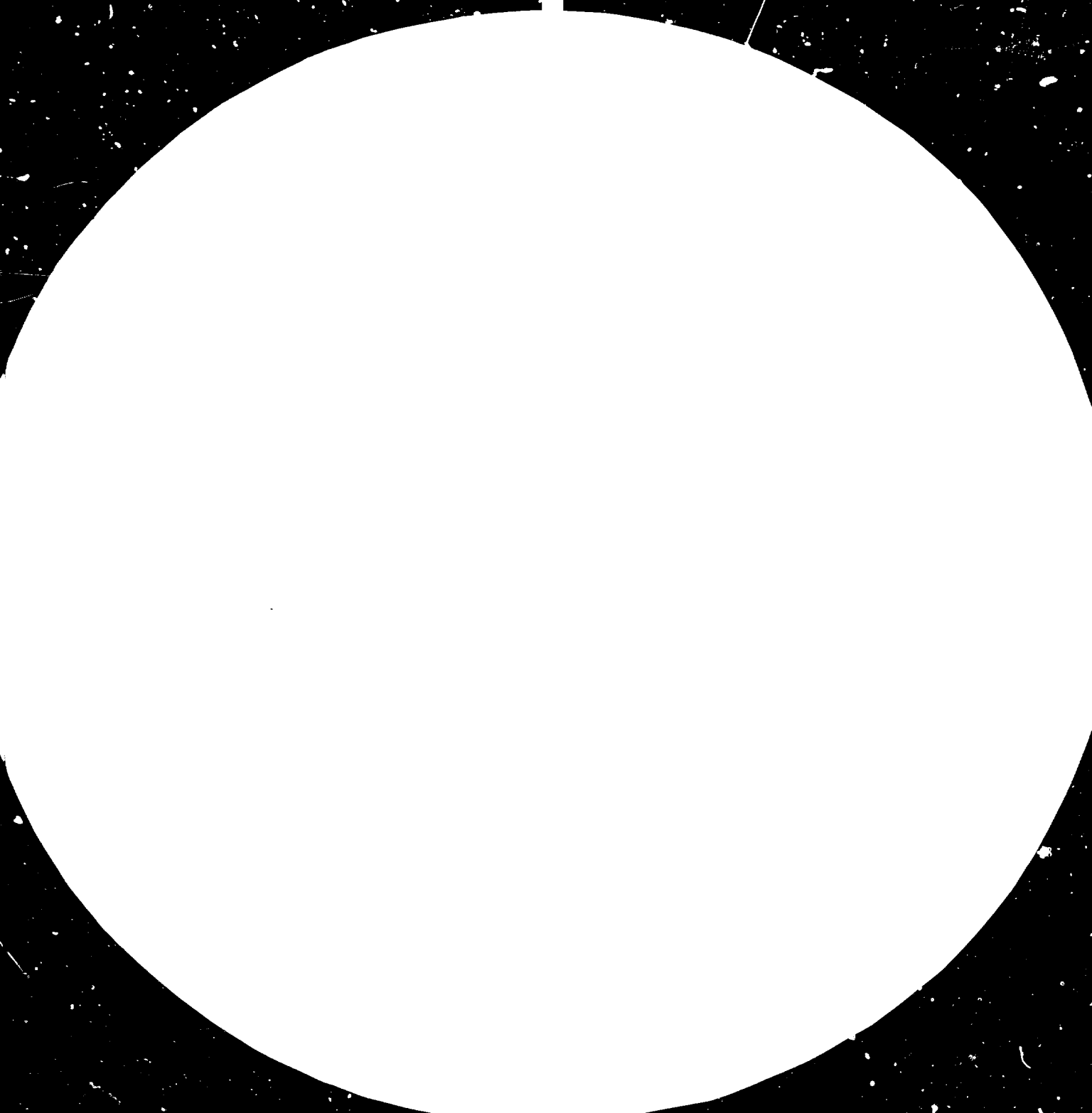
IVORY COAST

<u>Industrial production</u>	2 enterprises	
<u>Name(s) (date set up)</u>	Abidjan Industrie (ABI)(1960)	FRACASSI
<u>Legal status</u>	private	private
<u>Number of employees (cadres/ skilled workers/unskilled labourers)</u>	400	50
<u>Turnover</u>	unknown	unknown
<u>Added value</u>	unknown	unknown
<u>Proportion of capacity used</u>	unknown	unknown
<u>Type of products manufactured and production</u>	matchets, axles, animal drawn equipment, pumps, food processing equipment	land trailers and tanks, mixers, hods
<u>Technical nature of operations</u>	foundry, machinery, heat treatment	boiler-making, cutting welding
<u>Study and research capacity</u>	No	No
<u>Nature and extent of relations abroad</u>	Foreign contribution (France)	-
<u>Nature of any operational assistance</u>	Holds a priority agreement	-
<u>Marketing networks</u>	Direct sale and through agricultural development schemes	Direct sale
<u>Other characteristics</u>	5 specialised workshops: railroad, foundry, cold, fixtures, manufacturing. Agricultural machinery is a side activity further enlarged by the capital takeover from Ivoir Outils	All boiler-making activities
<u>Handicraft production</u>		
<u>Structured handicrafts</u>	Small-scale production co-operatives supported by ONPR	
<u>Non-structured handicrafts</u>	Traditional blacksmiths, production of hand tools and various items	
<u>Linkage with the metallurgical and engineering sector</u>		
<u>Characteristics of the sector</u>	Developed industrial network, assembling (vehicles-electrogenous groups), processing (tinning), manufacturing units for various products (cables - batteries - metallic framework)	
<u>Links with agricultural machinery enterprises</u>	Weak	
<u>Potential for developing links with the agricultural machinery sector</u>	Possibilities with machining, metallic construction and assembling units for fixed or mobile equipment	
<u>Maintenance operations</u>	Many workshops service the motorized fleet (road vehicles, civil engineering equipment, motors, gears, electric or hydraulic equipment)	
<u>Imports/exports</u>		
<u>Imports necessary for local production of agricultural machinery</u>	Purchase of steel and other elements from local importing companies	
<u>Size of local production in relation to imports</u>	Local production covers needs for animal drawn equipment and matchets (1 million units/year, started in 1980); Imports of all motorized equipments, except a few fixed equipments (moto- pumps, mill) and land trailers, otherwise in competition with imports.	
<u>Exports</u>	None	
<u>Projects announced and prospects</u>	- Reinforcement of ABI activities for agricultural machinery since the takeover from Ivoir Outils - Assembling of simple tractors - Plans for assembling of standard tractors and production of trailers pending since 1970	

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN:

T O G O

<u>Industrial production</u>	1 enterprise
Name(s) (date set up)	UPROMA (1980)
Legal status	Parapublic
Number of employees (cadres/ skilled workers/unskilled labourers)	5 + 5 + 5 = 15 + seasonal workers
Turnover (local currency)	100 million CFA Francs (1980)
Added value	Not given
Proportion of capacity used	60 per cent in 1980 but a large increase anticipated
Type of products manufactured and production	Animal drawn equipment (700 multicultivators in 1980) and simple machines (rice threshers)
Technical nature of operations	Cutting welding and assembly of kits from Regional Workshop for the Manufacture of Agricultural Machines (ARCOMA) (Upper Volta)
Study and research capacity	None
Nature and extent of relations abroad	Supplies from France at present through ARCOMA
Nature of any operational assistance	Aid supplied through the National Centre for the Promotion of Small and Medium-Scale Industries (CNPPME). Technical assistance from UNIDO.
Marketing networks	Various clients (agricultural development scheme, the State, private); independent marketing system.
Other characteristics	Specialized in agricultural machinery.
<u>Handicraft production</u>	
Structured handicrafts	Launching of assembly of ARCOMA animal drawn machinery by craftsmen with improved equipment as part of two agricultural programmes (Nord-Togo and ARAC-ORPV (Regional Office for the Promotion of Food Production))
Non-structured handicrafts	Manufacture of many hand tools
<u>Linkage with the metallurgical and engineering sector</u>	
Characteristics of the sector	One enterprise, the National Steel Company (SNS) which operates using recovered scrap, was launched in 1979 and employs 240 people. None at present.
Links with agricultural machinery enterprises	Links between UPROMA and SNS are being studied at the moment.
Potential for developing links with the agricultural machinery sector	Carried out by structured craftsmen as part of agricult. develop. schemes. Alac importers' workshops. The Togolese Agricultural Equipment Operating Company (SOTEXMA), set up in 1978, is concerned with the exploitation, maintenance and repair of the tractor stock.
<u>Maintenance operations</u>	
<u>Imports/exports</u>	
Imports necessary for local production of agricultural machinery	Purchase of kits from ARCOMA, Upper Volta
Size of local production in relation to imports	All tractors are imported; until now animal drawn equipment has been imported from Upper Volta.
Exports	No exports
<u>Projects announced and prospects</u>	Improvement of UPROMA's capacity and equipment underway. Programme for craftsmen to be trained in maintenance by UPROMA.



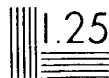


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PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN:

N I G E R I A

Industrial production

6 enterprises^{a/}

Name(s) (date set up)

J.HOLT AGRICULTURAL ENGINEERS (employs 200); NIGERIA ENGINEERING WORKS (hand tools and simple machines, employs 100); SARMUA PROMKOT (hand tools); EX-SERGEANT ABB'S CARPENTRY WORKSHOP (hand tools); JAURO MAKERIS PLOUGH INDUSTRY (share ploughs)

Legal status

Number of employees (cadres/
skilled workers/unskilled
labourers)

Turnover (local currency)

Added value

Proportion of capacity used

Type of products manufactured
and production

Technical nature of operations

Study and research capacity

Nature and extent of relations
abroad

Nature of any operational
assistance

Marketing networks

Other characteristics

No satisfactory information

Handicraft production

Structured handicrafts

Non-structured handicrafts

Substantial, but declining rapidly due to competition from imported products

Linkage with the metallurgical
and engineering sector

Characteristics of the sector

8 small handicraft foundries; no forge or iron and steel working

Links with agricultural
machinery enterprises

Potential for developing links
with the agricultural machinery
sector

Maintenance operations

Since 1954 there has been an equipment hire and maintenance service in each State (Tractor Hire Service Unit (THSU)), established on a large scale in 1960.

Imports/exports

Imports necessary for local
production of agricultural
machinery

Size of local production in
relation to imports

Tractors imported by ten large companies

Exports

No exports

Projects announced and prospects

Four licences for assembly of tractors and utility vehicles^{b/}, total capacity 8-10 thousand tractors per year. (FIAT, STEYR, DAVID BROWN, BRITISH LEYLAND).

a/ Information supplied by A.K.Mitra, UNIDO Regional Adviser, in "A Review of the existing status of the agricultural machinery industry in Africa: A draft background paper", Vienna, August 1980.

b/ The Fiat assembly line at Kano (capacity 4,000 tractors per year) went into operation in 1981.

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN:

C A M E R O O N

<u>Industrial production</u>	1 enterprise
Name(s) (date set up)	TROPIC (Tropics Forge Company) (1965)
Legal status	Limited liability company, private but with state participation
Number of employees (cadres/ skilled workers/un- skilled labourers)	254
Turnover (local currency)	1047 million CFA francs (1980)
Added value	426 million CFA francs (1980)
Proportion of capacity used	40% (in 1979-1980)
Type of products manufactured and production	Hand tools and animal drawn machinery; other simple machines (shellers, sprayers, etc.)
Technical nature of operations	Forge/machining/assembly
Study and research capacity	There is one department for study and new construction comprising one highly qualified technician and specialised workers
Nature and extent of relations abroad	84% of capital is held by the Bastos Company and Sofical
Nature of any operational assistance	Has enjoyed priority status
Marketing networks	TROPIC sells to wholesale and semi-wholesale dealers and agricult. develop. It has no direct retail sales network schemes.
Other characteristics	
<u>Handicraft production</u>	
Structured handicrafts	A list of craftsmen is being drawn up with a view to training and assisting them through the National Centre for Assistance to Small and Medium-sized Enterprises (CAFME) and the National Centre for Studies and Experiments on Agricultural Machinery (CENEMA)
Non-structured handicrafts	The often part time craftsmen manufacture hand tools and animal drawn equipment which represent 3-5% of the total supply of basic equipment. Recovered scrap is used. The products are of medium quality and sold 30-50% cheaper than industrial products. Widespread diffusion of the products is a considerable problem. Some handicraft workshops are large (one of them serves the whole of the North-West of the country).
<u>Linkage with the metallurgical and engineering sector</u>	
Characteristics of the sector	Little developed sector
Links with agricultural machinery enterprises	Few links
Potential for developing links with the agricultural machinery sector	
<u>Maintenance operations</u>	No independent unit to repair and maintain agricultural machinery. Maintenance establishments are linked to agricult. develop. bodies, es, co-operatives, agro-industrial companies and brand representatives.
<u>Imports/exports</u>	
Imports necessary for local production of agricultural machinery	TROPIC imports 2,000 tons of steel from the EEC countries, which represents 90% of its needs.
Size of local production in relation to imports	No imports of animal drawn equipment and hand tools. All tractors are imported.
Exports	20% of TROPIC's production is exported to the countries of the Central African Customs and Economic Union (UDEAC).
<u>Projects announced and prospects</u>	TROPIC is at present building a foundry which will enable the manufacture of parts which until now have been imported, and later of a large number of parts for the simplified Bouyer tractor which it is anticipated will be assembled on the spot in three or four years time.

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN:

Z A I R E

<u>Industrial production</u>	6 industrial enterprises	
Name(s) (date set up)	CHANI METAL, UMAZ, ACNEFON	FIAT ZAIRE, INZAL, MAGIRUS DEUTZ ZAIRE
Legal status	CHANI METAL - private; UMAZ - State owned; ACNEFON - private (sited at Lumumbaschi)	All private and sited at Kinshasa
Number of employees (cadres/skilled workers/unskilled labourers)		
Turnover	\$11 million in 1980 for the 3 companies	
Added value		
Proportion of capacity used		
Type of products manufactured and production	Hand tool manufacture (2.2 million units in 1980) among their various activities (foundry, etc.), except for UMAZ which is specialized	Tractors: 401 units in 1977 and 75 units in 1980
Technical nature of operations	Metallurgy and engineering	Assembly line
Study and research capacity		
Nature and extent of relations abroad	All except UMAZ are subsidiaries of transnational corporations. CHANI METAL belongs to the Chanic group. UMAZ came into being as a result of a co-operation agreement between Zaïre and China	All subsidiaries of transnationals
Nature of any operational assistance		
Marketing networks		
Other characteristics	CHANI METAL and ACNEFON cover a range of activities	FIAT ZAIRE assembles 88% of overall tractor production
<u>Handicraft production</u>		
Structured handicrafts	In Lower Zaïre there are groups of craftsmen in Community Development Centres (CEDECO) where 20 workers produce simple machines. Light equipment (forge and cutting welding)	
Non-structured handicrafts	Village blacksmiths produce an estimated 5% of industrial production. They use recovered scrap.	
<u>Linkage with the metallurgical and engineering sector</u>		
Characteristics of the sector	6 firms including CHANI METAL and ACNEFON. Foundry/manufacture of steels and metal products/steel tubes. Most are subsidiaries of transnationals	
Links with agricultural machinery enterprises	CHANI METAL and ACNEFON produce hand tools.	
Potential for developing links with the agricultural machinery sector		
<u>Maintenance operations</u>		
	Through the maintenance services of industrial enterprises and agro-industrial companies, and through tractor importers.	
<u>Imports/exports</u>		
Imports necessary for local production of agricultural machinery	Parts and "sets" for tractor assembly. The foreign contribution to hand tool manufacture represents 70% of the value of final production	
Size of local production in relation to imports	Tractor assembly accounts for 98% of imports. Hand tool imports represent 27% of production	
Exports	No exports	
<u>Projects announced and prospects</u>	None	

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN:

BURUNDI

Industrial production

Name(s) (date set up)

Project to set up a unit to produce hand tools at Bujumbura in 1972. It appears this plant has never been in operation.

Legal status

Number of employees (cadres/
skilled workers; un-
skilled laborers)

Workforce envisaged: 25 workers

Turnover (local currency)

Added value

Proportion of capacity used

Theoretical capacity: 50,000 hoes/year and 30,000 machetes/year

Type of products manufactured and
production

hoes and machetes

Technical nature of operations

Study and research capacity

Nature and extent of relations
abroad

Unit designed in direct co-operation with the Democratic People's Republic of Korea

Nature of any operational assistance

Marketing networks

Other characteristics

This unit is not in operation for the following reasons:

- products non-competitive and of poorer quality compared with imported tools
- raw materials too expensive (rolled steel alone represents over 50% of production costs)
- unsuitable manufacturing technology

Handicraft production

Structured handicrafts

Non-structured handicrafts

213 registered blacksmiths who manufacture a whole range of products including hand tools (760,000 in 1979)
8,000 traditional blacksmiths with double activities (mainly agriculture).
The manufacturing of hoes faces strong competition from imports; traditional tools and technology, using iron-ore and recovered scrap.

Links with the metallurgical and
engineering sector

Characteristics of the sector

2 large workshops: workshop of the Ministry of Public Works and Housing, ANSAR (a private engineering company) and METALUSA (a private company manufacturing metal goods). General engineering, turning and drilling equipment.

Links with agricultural machinery
enterprises

cf. maintenance

Potential for developing links with
the agricultural machinery sector

Maintenance operations

Maintenance and repairs carried out by the 3 workshops mentioned above

Imports/exports

Imports necessary for local production
of agricultural machinery

Raw materials (especially rolled steel) would be necessary if the plant at Bujumbura were in operation

Size of local production in relation
to imports

40% of imports are hand tools. All tractors, as well as animal drawn and motorized equipments are imported.

Exports

Projects announced and prospects

Expansion of the plant at Bujumbura to cover the total requirements of the country and widen the range of products.

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN:

ETHIOPIA

Industrial production

Name(s) (date set up)
Legal status
Number of employees (cadres/
skilled workers/unskilled
labourers)

One enterprise
ETHIOPIAN HAND TOOLS FACTORY

Public
120

Turnover (local currency)

Added value

Proportion of capacity used

Capacity = 500 tons per year (1 shift)

Type of products manufactured
and production

Hand tools (axes/spades/matchets) : 466 tons in 1978; 600 tons in 1979

Technical nature of operations

Study and research capacity

Nature and extent of relations
abroad

Imports of raw materials

Nature of any operational
assistance

Marketing networks

Other characteristics

Specializes in agricultural machinery, but belongs to the National Metal Works Corporation group

Handicraft production

Structured handicrafts

Within the framework of agricult. develop. schemes (launched in 1953) ARDU and BACKO: trial manufacture of animal drawn equipment and manual threshing machines; operation Nazareth: manufacture of irrigation pumps and snellers. In 1979 1,440 tons of hand tools were produced at Addis Ababa in blacksmiths' co-operatives (86 people)

Non-structured handicrafts

A large proportion of hand tools are produced by village blacksmiths, without the necessary basic equipment and installations.

Linkage with the metallurgical and
engineering sector

5 large enterprises:

- Ethiopian Irons Steel Company (State owned): iron sections, capacity = 6,300 tons per year; production = 3,400 tons (1977) 424 employees (1977); 295 employees (1978);
- Akaki Metal Products: pipes, capacity = 15,000 tons per year 160 employees;
- Kality Steel Industry: iron sheeting, capacity = 2,500 tons per year; 200 employees;
- Truck Assembly Plant: truck assembly (5 and 10 tons), short runs (1.5 lorries per day); 104 employees, is working at 70% of its capacity;
- No foundry

Links with agricultural machinery
enterprises

Very weak apart from through the National Metal Works Corporation.

Potential for developing links with
the agricultural machinery sector

Maintenance operations

The Agricultural Equipment and Supply Corporation has enjoyed a monopoly as regards imports of agricultural machinery since 1974 and takes care of maintenance for State farms. Blacksmiths play a significant role.

Imports/exports

Imports necessary for local production
of agricultural machinery

Raw materials

Size of local production in relation
to imports

All tractors and motorised equipments are imported.

Exports

None

Projects announced and prospects

Projected factory for tractor assembly and motorized equipments together with USSR (2,000 u./year).

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN:

KENYA

Industrial production

12 medium sized manufacturing companies

Name(s) (date set up)

Legal status

Private

Number of employees (cadres/
skilled workers/unskilled
labourers)

Turnover (local currency)

Added value

Proportion of capacity used

Type of products manufactured
and production

Semi-manufacture (with imports of components) of many types of equipment (animal-drawn equipment/fixed equipment/tractor drawn implement). Hand tools are manufactured without any import of raw materials. There is no tractor assembly.

Technical nature of operations

Study and research capacity

Nature and extent of relations
abroad

Nature of any operational assistance

Marketing networks

Other characteristics

Handicraft production

Structured handicrafts

Assistance given to blacksmiths by the "Rural Industrial Development Centre". Their products are of indifferent quality and face competition from imported products and recently from national industrial production

Non-structured handicrafts

Blacksmiths used to manufacture tools for small farms. Declining, their products face increasing competition from imports. Use of recovered scrap.

Linkage with the metallurgical and
engineering sector

Characteristics of the sector

Links with agricultural machinery
enterprises

Potential for developing links with
the agricultural machinery sector

Maintenance operations

A Tractor Hire Service was established in 1966 for tractor hire and maintenance. Maintenance is generally inadequate.

Imports/exports

Imports necessary for local production
of agricultural machinery

Imports of semi-manufactured goods and high-grade components.

Size of local production in relation
to imports

All tractors and motorized equipment are imported.

Exports

Projects announced and prospects

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN:

TANZANIA

<u>Industrial production</u>	Two main units ^{a/}	
Base(s) (date set up)	Ubungo Farm Implements (UPI) Dar-es-Salaam	Tanzanian Agricultural Machinery Testing Unit (TAMTU), Arusha
Legal status	State owned (100%)	State owned (100%)
Number of employees (cadres, skilled workers/unskilled labourers)	About 700	150
Turnover	\$ 7.9 million in 1980	
Added value	20% of turnover	20%
Proportion of capacity used	50%	50%
Type of products manufactured and production	Animal drawn equipment (10,000 units in 1980) and hand tools (1.1 million in 1980)	Animal drawn equipment (3,500 units in 1979) in short runs
Technical nature of operations	Manufacturing for mass production	Unit concentrates on the elaboration and manufacture of suitable equipment in short runs. Research and development activities essential
Study and research capacity		
Nature and extent of relations abroad	Unit set up by China	
Nature of any operational assistance		
Marketing networks		
Other characteristics		Restructuring in 1980. Investments of \$ 8.4 million. Links with international aid.

Close co-operation between UPI and TAMTU. These two enterprises specialize in agricultural machinery.

Handicraft production

Structured handicrafts

There are 70 village groups of craftsmen comprising 25 craftsmen on average per group

Non-structured handicrafts

There are 14,000 blacksmiths. Total handicraft production is estimated at \$ 5.5 million and meets about 15 to 20% of hand tool requirements.

Linkage with the metallurgical and engineering sector

Characteristics of the sector

Highly developed sector. Two large public industrial firms, MMT and NECO (600 and 400 employees) producing 3,500 tons of pig-iron, 500 tons of steel and 500 tons of forged cast-steel.

Links with agricultural machinery enterprises

These enterprises supply the agricultural machinery sector with forged parts, simple parts and pig iron.

Potential for developing links with the agricultural machinery sector

Provided by a new steel/metallurgy project with UNIDO in the South of the country (6,500 tons of pig-iron, 6,000 tons of steel and 2,000 tons of forged cast-steel).

Maintenance operations

Spare parts supplied by MMT and NECO. Repair workshops (Agricultural Mechanisation Centre (AMC) and Rural Craft Workshop (RCW)). Agro-industrial enterprises' (sisal, cotton, sugar cane) and private importers' workshops. Village handicraft units.

Imports/exports

Imports necessary for local production of agricultural machinery

Raw materials and semi-manufactured goods from China, Japan, United Kingdom, Sweden.

Size of local production in relation to imports

30% for hand tools; 94% for animal drawn equipment. All tractors are imported.

Exports

Occasional sales of hand tools to Uganda in 1980 (\$ 1.3 million) through the Board of External Trade (BET)

Projects announced and prospects

Under construction at Mbeya is a unit to produce hand tools, animal drawn machinery and equipment for tractors (4,140 tons per year) financed by the Netherlands and using Indian technology. Expansion of the UPI factory increasing capacity by 3,000 tons to 4,000 tons per year. The Mwanza project in collaboration with Bulgaria for tools, animal drawn equipment and irrigation machinery with anticipated capacity of 6,700 tons per year. Project for assembly of tractors from Valmet, Finland, 1,500 units per year, between 75 and 105 horsepower.

a/ There are two other small units producing simple machinery for tractors at Iringa and Arusha

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT II

Z A M B I A

<u>Industrial production</u>	3 enterprises			
Name(s) (date set up)	NORTHLAND ENGINEERING	SHONGA STEEL	LENCO	12 other small and medium sized firms
Legal status	Private	Private	Parapublic	
Number of employees (cadres/ skilled workers/ unskilled labourers)				
Turnover (local currency)				
Added value				
Proportion of capacity used			appr. 50 per cent	
Type of products manufactured and production	70,000 units of animal drawn equipment per year, 100 grinders and 40,000 hand hoes	300,000 hand hoes; 3,000 units of animal drawn equipment	Trailers (1,000 u. per year)	Hand tools/animal drawn equipment/ fixed equipment
Technical nature of operations				
Study and research capacity				The Agricultural Machinery Research and Development Unit (AMRDU) gives assistance to all small and medium sized enterprises for research into equipment suitable for small farms
Marketing networks	The National Agricultural Marketing Board has a monopoly	Idem	Idem	Idem
Other characteristics	In actual fact 75% of these three enterprises' production is devoted to other sectors than agriculture. They are enterprises for which agricultural machinery is not the main activity.			
<u>Handicraft production</u>				
Structured handicrafts				
Non-structured handicrafts				
<u>Linkage with the metallurgical and engineering sector</u>	Three main companies: ZAMBIA RAILWAYS, TAZANA (foundry/forging/heat treatment); these operate at 60% of production capacity; and LUTANDA FOUNDRY ENGINEERING (foundry) operates below capacity			
Links with agricultural machinery enterprises				
Potential for developing links with the agricultural machinery sector	Very considerable			
<u>Maintenance operations</u>	Importing companies' central workshops (very well equipped); AFE, a para-state organization which possesses six regional repair workshops, very well equipped as regards equipment and technicians; RUCOM INDUSTRY has workshops in every district.			
<u>Imports/exports</u>				
Imports necessary for local production of agricultural machinery				
Size of local production in relation to imports	All tractors and 90% of tractor equipment are imported. No animal drawn equipment is imported			
Exports	No export, despite high demand in neighbouring countries			
<u>Projects announced and prospects</u>	Draft project to set up a tractor assembly and tractor equipment manufacturing unit. Possible expansion of the NORTHLAND ENGINEERING COMPANY to cover animal drawn equipment, tractor implements and hand tools.			

PRODUCTION OF AGRICULTURAL MACHINERY AND EQUIPMENT IN:

M A D A G A S C A R

Industrial production 3 enterprises

Name(s) (date set up)	Industrial Company for the Development of Agricultural Industry (SIDEPA) (1966) at Antananarivo	TOLY (1976) in the South of the country	BARDAY in the North-West
Legal status	Mixed economy company (73% state-owned)	Public	Private
Number of employees (cadres/skilled workers/unskilled labourers)	5 + 20 + 225 = 250	3 + 10 + 137 = 150	2 + 5 + 93 = 100
Turnover (local currency)	500 million francs MG		
Added value	40% on average	40% on average	40% on average
Proportion of capacity used	70%		
Type of products manufactured and production	Hand tools (144,000 units in 1980) and animal drawn equipment (12,800 units in 1980)	Decreasing production, assembly of equipment for tractors (1,500 units in 1978)	Animal drawn equipment (4,000 units per year)
Technical nature of operations	Cutting welding/machining assembly	Machining and also foundry workshop	
Study and research capacity	Methods office (4 people)	idem.	idem.
Nature and extent of relations with abroad	Limited except for raw materials	Limited except for raw materials	Limited except for raw materials
Nature of any operational assistance	French and Swiss subsidies		
Marketing networks	Marketing by the public: Principal Agriculture Supply Centres (CPAA) and by four large specialized public enterprises		
Other characteristics	Many activities, in particular metal construction - bicycle assembling - sales of walking tractors	Carries out foundry work for other sectors. Built with the aid of China (formerly weapon factory, then repair workshop for vehicles)	

Handicraft production

Structured handicrafts	Little developed
Non-structured handicrafts	Many peasant blacksmiths. There are 4 villages of blacksmiths manufacturing hand tools and animal drawn equipment and supplying 5 to 10 per cent of the market. They use recovered scrap. Sales price is 50% that of industrial products. They refuse subcontracting work for industry. Face competition from hand tool imports.

Linkage with the metallurgical and engineering sector

Characteristics of the sector	3 main enterprises - Shipbuilding and Repairs Company (SECREM), the Madagascar National Railways Administration (RNOFM) and CIMELTA. Total of 2,800 employees. Ship, railway and general metal construction.
Links with agricultural machinery enterprises	Exist in the case of the TOLY company
Potential for developing links with agricultural machinery	

Maintenance operations

No after sales service for animal drawn equipment. Blacksmiths are not mobile. The four largest importers have repair workshops at Antananarivo.

Imports/exports

Imports necessary for local production of agricultural machinery	Essentially raw materials
Size of local production in relation to imports	Hand tool imports equal 90% of national production. All tractors are imported.
Exports	No export

Projects announced and prospects

None

