OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org
We regret that some of the pages in the microfiche copy of this report may not be up to the proper legibility standards, even though the best possible copy was used for preparing the master fiche.
Symposium on Industrial Development in Africa
Cairo, 27 January - 10 February 1966

ENGINEERING INDUSTRIES IN AFRICA

(in three parts and an addendum to PART II)
# Table of Contents

## Chapter I
- Introduction
  - I.1 Objective
  - I.2 Background Information
    - I.2.1 The African Region
    - I.2.2 Gross Domestic Product in the Countries of the Region
    - I.2.3 Manpower
    - I.2.4 Transport
    - I.2.5 Attainment of Independence and Change of Patterns

## Chapter II
- The Available Data
  - II.1 Data Provided by the Economic Commission for Europe
  - II.2 Data Obtained from the Countries of the Region
  - II.3 Imports of Engineering Commodities into the Countries of the Region for the Period 1956-1963
  - II.4 Findings and Recommendations of Previous Surveys and Studies

## Chapter III
- Demand for Engineering Commodities in the Countries of the Region
  - III.1 Assessment and Projection of Demand
  - III.2 Estimation of Future Demand for Engineering Commodities

## Chapter IV
- Basic Data on Engineering Industries
  - IV.1 Data Relative to Production of Electrical Machinery in the United Kingdom
  - IV.2 Data Relative to Manufacturing Operations in Europe
  - IV.3 Data Relative to Engineering Industries with Feasibilities for Developing Countries
    - IV.3.1 USA Conditions, 1955/1960

Page numbers:
- Chapter I: 1-7
- Chapter II: 8-13
- Chapter III: 14-18
- Chapter IV: 19-24
Table of Contents (Cont.)

IV.3.2 Change to Conditions in Africa, 1965  Page 24-27

IV.3.3 Materials, Supplies, Electricity, Fuel and Water needed for the Engineering
Industries covered in Tables IV.4 (1) to IV.4 (4)  Page 27

Chapter V

V.1 Observations, Conclusions and Recommendations  Page 28

V.2 Observations on the Available Data and Conclusions drawn from them  Page 28-29

V.3 Structure of the Existing Engineering Industries in the Region  Page 29-30

V.4 Factors Inhibiting the Growth of Engineering Industries in the Region  Page 30-31

V.5 Concluding Remarks and Recommendations  Page 31-33

V.5.1 The Place of Engineering Industries in Economic and Industrial Development  Page 33

V.5.2 Remedy of Factors Inhibiting the Growth of Engineering Industries in the Region  Page 34-35

V.5.2.1 Manpower Development  Page 35

V.5.2.2 Development of Material Inputs  Page 36

V.5.2.3 Regional Co-operation to overcome Market Limitation  Page 36-37

V.5.2.4 Standardization  Page 37

V.5.3 Prospects of Developing Engineering Industries in the Countries of the African Region  Page 38-45
CHAPTER I

INTRODUCTION

I.1 Objective

The objective of this study is to investigate the possibilities of industrial development of the countries of Africa in the field of engineering industries comprising the production of structural engineering and metal products, machinery other than electrical, transport equipment and electrical machinery, apparatus and appliances.

To enable this to be attempted it is necessary to survey existing engineering industries in the countries of the Region, the demand of each country of the various engineering commodities, its capabilities and the possibility of establishing plants for the production of such commodities for national markets, on an area basis (covering the needs of two or more adjacent countries), on a sub-regional or regional basis, or for such markets plus exports. The survey will necessarily touch upon infra-structure and some technological and cost aspects.

I.2 Background Information

Under this heading will be given some data relative to the individual countries of the Region and which affect their economic and industrial development and in turn the possibility of establishing engineering industries in them.

Reference should be made to the map of Africa given on page 1 and to Tables I.1 to I.4 given on pages 4 to 7 of Part II of the paper 1.

The tables give general indicators for the countries of the Region, arranged under the four Sub-regions to which the Region has been subdivided. The data are approximate and those relating to the East African

1/ The map and some figures, tables and an annex have been used for this paper and for another paper on "Electrotechnical Engineering Industries in the East African Sub-region" and their numb rin, arranged to suit the two papers.
Sub-region are for the year 1963 while those relating to the other three sub-regions are for 1961, but they will serve the purpose for which they are intended.

I.2.1 The African Region

The African Region dealt with covers 40 countries, and has been subdivided on a geographic basis into four sub-regions:

(i) The East African Sub-region, comprising:
   1. Ethiopia
   2. French Somaliland
   3. Somali Republic
   4. Kenya
   5. Uganda
   6. Tanzania
   7. Burundi
   8. Rwanda
   9. Malawi
   10. Zambia
   11. Rhodesia
   12. Malagasy Republic
   13. Mauritius
   14. Reunion

(ii) The North African Sub-region, comprising:
   1. Morocco
   2. Algeria
   3. Tunisia
   4. Libya
   5. The United Arab Republic
   6. The Sudan

(iii) The West African Sub-region, comprising:
   1. Nigeria
   2. Togo
   3. Ghana
   4. Dahomey
   5. Niger
   6. Mali
   7. Upper Volta
   8. Ivory Coast
   9. Guinea
   10. Senegal
   11. Mauritania
   12. Sierra Leone
   13. Liberia
   14. Gambia

(iv) The Central African Sub-region, comprising:
   1. Congo (D.R.)
   2. Congo (Braz.)
   3. Gabon
   4. Central African Republic
   5. Chad
   6. Cameroon.
The total area of these 40 countries is 25.2 million square kilometers and their population in 1961 was about 235 million, giving an average population of 9.4 persons per sq.km. However, the population is very unevenly divided and vast areas are sparsely populated while others are densely populated. For example, the Maghreb countries occupy an area of 4.75 million sq.kms. and have a population of about 28 million, with an average of six persons per sq.km. But the greater part of these countries is desert, with the population concentrated in a small part of the area, which must be regarded as among the few parts of Africa where there is an over-population problem.

The following table, giving the sizes of population of individual countries in 1961, is indicative of sizes of national markets:

11 countries had populations below 2 million
8 " " " of 2-3 "
5 " " " 3-4 "
5 " " " 4-6 "
4 " " " 6-10 "
4 " " " 10-15 "
2 " " " 2-30 "
1 " " " about 36 million.

Eleven countries are land-locked 1/. Their total area is 6.2 million square kilometers, and their population was about 40 million in 1961.

There are no absolute criteria for the delineation of the sub-regions, and no sub-region is a self-contained entity. In the West African Sub-region, some countries are nationally grouped together.

(i) Nigeria with Niger and Dahomey, as well as Chad in the Central African Sub-region;
(ii) Togo, Ghana, Ivory Coast and Upper Volta;
(iii) Liberia, Sierra Leone, Guinea, Senegal, Mali and Mauritius.

1/ Mali, Upper Volta, Niger, Chad, Central African Republic, Uganda, Rwanda, Burundi, Zambia, Malawi and Rhodesia.
Similarly, Morocco, Algeria, Tunisia and Libya in the North African Sub-region are nationally grouped together. In the case of the East African Sub-region, Ethiopia has perhaps closer ties with the Sudan and the U.A.R to the north than with countries to the south, while the south and east of Kenya (forming part of the Central African Sub-region) should, in many respects, be regarded as part of the East African Sub-region.

While it is recognized that for different aspects of development different groupings of countries are appropriate, the division of the Region into the four Sub-regions given above has been adopted in this study, for convenience.

I.2.2 Gross Domestic Product in the Countries of the Region

Tables I.1 to I.4 give data concerning the Gross Domestic Product in the various countries of the Region, which ranges from $25 million for French Somaliland and $57 million for Mauritania to a $2,671 million for Algeria and a $4,150 for the U.A.R.

Of the 34 countries for which the GDP is given in the tables, the per capita GDP was $50 or less for 6 countries, $51-100 for 15 countries, $101-200 for 8 countries and $200-250 for 4 countries.

Apart from the wide gap between expatriates and nationals in income, there are also marked differences of income among Africans, between rural and urban population and among different urban groups. In Cameroon the income of cocoa growers in the south is estimated at $177 p.a., that of cotton growers in the north at $108 p.a. and that of the inhabitants of the mountain regions at $240 p.a. In Kenya, 91% of Africans and 86% of Arabs and Somalis are in the below $55 p.a. bracket while 92% of Europeans and 68% of Asians are in the over $1,000 p.a. bracket. Per capita money product ranges from $700 in Nairobi to $14 in the Northern Region of Kenya. The total per capita monetary income in the three centres is only $25 in Nairobi and Mombasa are included.
The result of the uneven distribution of wealth is that the majority of the population of the countries of the Region have an income much lower than the low per capita GDP indicated, being still in the subsistence economy and completely dependent on agriculture. This limits the markets even more, particularly for engineering commodities. As an example, of the 27 million people in the common market of Kenya, Uganda and Tanzania, only about 4 million have purchasing power for consumer goods.

The share of manufacturing in the Gross Domestic Product is very low indeed except for seven countries (Kenya, Congo (D.R.), Morocco, Algeria, Tunisia, Libya and the UAR) in which it ranged from 10 to 15%, Mauritius in which it was 19% and Rhodesia in which it reached 20.6%.

The economy of most of the countries of the region is based on the extraction and export of their natural resources, in which minerals play a leading role, or on export of agricultural products. Ghana and Sierra Leone occupy second and third place among the world diamond producers. The bauxite deposits of Ghana have been assessed at 460 m. tons or about 20% of the known world reserves. Liberia and Gabon both have considerable reserves of good quality iron ore (65% Fe) and occupy leading places among iron ore exporting countries. Zambia occupies sixth place among world producers of copper (650,000 tons p.a.) and Congo (D.R.) is among the important producers of non-ferrous metals. Algeria and Libya export considerable quantities of crude petroleum.

I.2.3 Manpower

A major problem in industrialization in developing countries is manpower. Tables I.1 to I.4 show that except for the UAR, third level education in most countries of the Region is very inadequate. Moreover, the few educated persons usually prefer law, humanities and politics to science, engineering, applied economics and accounting, and they usually take up government administrative posts rather than go into trade or industry.
As far as labour is concerned, most of the countries of the Region have very few indigenous workmen in the skilled labour category and above, although unskilled labour is plentiful. The productivity of labour is very low except on repetitive work, and detracts much of the cost advantage of low labour wages.

1.2.4 Transport

Transport systems in Africa are not well developed and are mostly export oriented, working from the centres of production of exportable raw materials outwards towards the sea.

The railways have different gauges in the different countries of the region, and in some cases even within the one country. The terrain to be covered is generally difficult, construction costs and railway charges are 2 to 3 times those in Europe, and many railways are single track. Chad and the Central African Republic have no railways as yet.

Roads are likewise costly to construct and maintain and the road networks are generally inadequate. The extreme case is Chad, which is ill-served by its road network and is virtually without a transport network for several months in the year.

The poor transport networks of most African countries result in further limitation of the markets.

1.2.5 Attainment of Independence and Change of Patterns

The last 10 years witnessed the attainment of independence by 31 African countries, of which 17 became independent in the year 1960 and 9 in the years 1961 to 1964.

Before independence, these countries were suppliers of primary commodities and open markets for manufactured goods.

The years immediately before and after independence were in the nature of a transition period during which imports and exports as well as economic and industrial development were seriously affected.
The attainment of independence has in all cases been accompanied by new approaches to social, economic and industrial development. Economic planning has become the major catalyst for independent economic growth. The African countries are increasingly interested in discovering and exploiting their natural resources and human potentialities, and current development plans are frequently first steps to channel scarce available resources towards strategic growing points: diversification of farm produce and of exports, import substitution, raising the rate of domestic capital formation, boosting the number of trained local personnel, setting up of new industries and the processing of local raw materials. Changing patterns are to be expected, and past developments cannot be taken as indicative of future trends.
This Chapter covers the data which has been possible to obtain within the limited time available relative to demand and local production of engineering commodities in the countries of the Region, and summarizes the findings and recommendations previously put forward as a result of the surveys of industrial development carried out by ECA Missions in the four Sub-regions and of the studies conducted concerning engineering industries in the East African Sub-region.

II.1 Data provided by the Economic Commission for Europe

The data provided by the ECE are as follows:

1. The f.o.b. value of exports to the various countries of Africa in the years 1957, 1958, 1959 and 1960 from the U.S., Japan, the United Kingdom, Western Germany, France, Italy, Sweden, Switzerland, Canada and the Netherlands, as being the major exporting countries of the West, figures of exports from the Eastern European countries and China not being available. The data are divided into those concerning Electrical Machinery, Apparatus and Appliances - Tables II.1 (1) to II.1 (5) - and those concerning Machinery other than Electrical - Tables II.1 (6) to II.1 (10). The data were given in detail for 12 individual countries of the Region and for three areas comprising 10 countries for which data were grouped together for each of the years in question (East Africa comprising Kenya, Uganda and Tanganyika - the Rhodesias and Nyasaland now Zambia, Rhodesia and Malawi - and the Equatorial Customs Union comprising Congo (Braz.), Gabon, the Central African Republic and Chad). Data were given in totals only for 6 individual countries and for 8 countries grouped together in the West African Customs Union (comprising Niger, Dahomey, Upper Volta, Ivory Coast, Senegal, Senegal and Mauritania). No data were given for French Domiland and Cameroon, nor for Rwanda and Burundi as the statistics for these two countries were previously incorporated in those of the Congo (leq.).
(ii) The ECE also gave the values of imports in each of the four years 1957 to 1960 as indicated by the countries themselves in their national statistics. These values are given c.i.f. except for the Rhodesias and Nyasaland, in which case they are given f.o.b. Only partial detail is given in some instances, and the total value of the items not detailed is considerable in relation to the total value of imports.

In some instances the values of total imports as reported in the national statistics are less than the exports from the 10 major exporting countries of the West for which figures have been given by the ECE. This may be due to differences in the timing of the statistical year, differences in statistical classification or inaccuracy. In the case of the Rhodesias and Nyasaland the imports as given by the statistics of the previous Federation are very much higher than the exports from the 10 major exporters of the West, due to the fact that considerable imports were obtained from South Africa.

Table II.1 (7) summarizes the data obtained from the ECE for the East African Sub-region relative to Electrical Machinery, Apparatus and Appliances, and Table II.1 (6) summarizes the data relative to Machinery other than Electric for the same Sub-region. They give the average yearly values over the years 1957 to 1960. Starting with Ethiopia, East Africa, the Rhodesias and Nyasaland and Madagascar (for which details are given for the exports from the 10 major exporting countries of the West) columns "A" give such exports in value and/or percentages; columns "B" give the imports as indicated by the national statistics or the "A" value plus an allowance to cover freight and insurance, whichever is the greater, with the sub-division made in the proportions of the percentages in columns "A". In the case of the Rhodesias and Nyasaland the values of imports as indicated by the countries f.o.b. similarly increased to give the value c.i.f. Sub-totals 1 give the totals for the 8 countries so covered.
Next come the countries for which exports from the 10 major exporters of the West are given in totals only, namely Somalia, Mauritius and Reunion. The "B" values are similarly obtained and are subdivided in the proportions of the percentages of the "B" values under Sub-total 1. A Sub-total 2 is obtained by the addition of the imports into these 3 countries to Sub-total 1.

For French Somaliland, Burundi and Rwanda, for which no figures have been given, the total values of imports c.i.f. are estimated (at $ 2.4 million). Within the approximation adopted in the last column for the total imports into the Sub-region, this figure can vary from $ 1.9 to 2.8 million. The total "B4" values are subdivided in the proportions of the percentages of the "B" values under Sub-total 1.

Tables II.1 (2) to II.1 (4) and II.1 (7) to II.1 (9) give the data relative to "Electrical Machinery, Apparatus and Appliances" and to "Machinery other than Electric" in the North, West and Central African Sub-regions respectively. The data are processed along similar lines to those adopted for Tables II.1 (1) and II.1 (6).

Tables II.1 (5) and II.1 (10) summarize respectively the c.i.f. values of imports of "Electrical Machinery, Apparatus and Appliances" and of "Machinery other than Electric" in the four Sub-regions and in the whole Region. Imports into South Africa, Angola and Mozambique are also given in these tables, for comparison.

II.2 Data obtained from the Countries of the Region

In April 1965 a questionnaire was circulated to the countries of the Region requesting information relative to engineering products divided into 4 main divisions:
1. Electrical Machinery, Apparatus and Appliances
2. Structural Engineering and Metal Products
3. Machinery other than Electrical
4. Transport Equipment.
For simplicity the questionnaire was prepared for the general case of a country having some local production to supplement imports, with its factories working at more or less full output. Cases where considerable spare capacity existed were to be indicated by giving percentage plant utilization, on a weighted average for the individual plants. In cases where there was production for export, the amount exported was to be given to enable working out consumption. Countries which found it necessary to adopt somewhat different forms of reporting were requested to do so.

The questionnaire requested detailed information by commodity groups under each of the four main divisions given above. The countries were requested to give:

(i) Average values of imports per annum in the last three years for which information is available, indicating whether they represent normal years;

(ii) Local production, giving manufacture, assembly and maintenance and repair work separately — and showing exports, if any, and percentage plant utilization;

(iii) Estimated consumption (order of magnitude) in 1970 and 1975.

By mid-August, at which time PART II of the paper was completed, replies to the questionnaire had been received from 24 countries only. The data given is summarized in Tables II,2 (1) to II,2 (8) for imports and in Tables II,3 (1) to II,3 (10) for local production.

All reporting countries gave data on imports, some giving averages for three years (1960-62, 1961-63 or 1962-64) while others gave data for one year only (1963 or 1964). No abnormalities were reported.

Production figures were given by only 17 countries, 12 giving details of their local production under the 4 main divisions, 2 giving global values of their production and three indicating that they have no local production of engineering commodities to speak of. The UAR also gave estimates of production in 1970 and 1975. Tables II,3 (5) and II,3 (10) give the total values of local production of engineering commodities in reporting countries as well as the per capita local production.
II.3 Imports of Engineering Commodities into the Countries of the Region for the period 1956-1963

In order to attempt projections of demand for engineering commodities in the countries of the Region an effort has been made to obtain consumption figures from the year 1950 up to date so as to have a long enough period on which to base projections. However, the following factors have seriously affected the collection of data:

1. Most countries of the Region have recently attained their independence, and are still building up their statistical administrations and organizing their statistical work;
2. Little information is available prior to 1956 on the period for which it has been possible to obtain a reasonable amount of data is limited to the years 1956 to 1963;
3. The data available is not put in standardized form and is not given in sufficient detail to enable assessment of demand except for major commodity groups;
4. In the years in question some countries were grouped together and statistical data given for the group, e.g. Kenya, Uganda and Tanzania under East Africa, and Malawi, Zambia and Rhodesia under the Federation of Rhodesia and Nyasaland in the East African Sub-region.

When attempting to project demand for electrical commodities in the East African Sub-region serious difficulties were encountered as will be mentioned in Chapter III. The effort was not repeated for the other divisions of engineering industries. However, data collected has been summarized in Table II.4 (1), giving imports of Electrical machinery, Apparatus and Appliances into the Countries of the East African Sub-region, and in Tables 1 to 4 of the addendum giving imports of engineering Commodities into the East, North, West and Central African sub-regions and Table 5 for all four sub-regions together.
II.4 Findings and Recommendations of Previous Surveys and Studies

1. In the period August 1963 to January 1964 three UNCA Missions visited the West and East African sub-regions and Algeria, Libya, Morocco and Tunisia, with the objective of assessing possibilities of industrial development over the next decade or so, primary emphasis being made on projects serving more than one country. The findings and recommendations of these three Missions, as far as engineering industries are concerned, are summarized in Appendix I (PART III of the paper).

2. In April and May of 1965 an UNCA Mission visited the Central African sub-region with similar objectives, but of much wider scope. The findings and recommendations of this Mission concerning engineering industries are summarized in Appendix II.

3. In 1965 studies of Engineering Industries in the East African sub-region were made and the findings presented in two papers to the Conference on the Harmonization of Industrial Development Programmes in East Africa held at Lusaka in the last quarter of 1965 (Document E/CN.14/INR/79 "Electrotechnical Engineering Industries in the East African Sub-region" and Document E/CN.14/INR/90 "The Development of Engineering Industries in East Africa - Mechanical Engineering"). These findings are summarized in Appendix III and Table II.5.
CHAPTER III

DEMAND FOR ENGINEERING COMMODITIES IN THE COUNTRIES OF THE REGION

III.1 Assessment and Projection of Demand

As mentioned in Chapter II an attempt has been made to assess and project demand for Electrical Machinery, Apparatus and Appliances in the East African Sub-region, on which more information is available than other divisions of engineering industries or sub-regions, and the result was unsatisfactory. We shall summarize briefly the approach made and the difficulties encountered, since they are applicable to other branches of engineering industries and to most countries of the Region.

(i) Imports of Electrical Machinery, Apparatus and Appliances into the countries of the sub-region were taken as indicative of demand, except for Rhodesia which has a sizable local production;

(ii) The available data were insufficient to enable reasonably accurate assessment and projection of demand. Consequently only an order of magnitude was attempted;

(iii) In the case of Malawi, Zambia and Rhodesia, for which data had been grouped together under the Federation of the Rhodesias and Nyasaland, the years 1957 to 1961 witnessed the execution of the Kariba Hydro-Electric Project which cost about US$ 200 million. This was reflected in the values of imports in these years, as can be seen from Table II.4 (i). It has not been possible to separate the effect of the implementation of this project from the demand figures which were considerably swollen by its execution;

(iv) It was not possible to assess quantitatively the effect on the demand resulting from the change of pattern of the economy after independence;
Based on data available for 1956 to 1960, linear trend projections of demand were made. These are plotted in Figure 1 (Page 2 of Part II of the paper). It will be noted that for the two major groups "Electric Power Machinery - ITC 722" and "Equipment for Distributing Electricity - ITC 723" the projections show a downward trend. This agrees with the fact that the earlier years of the period of observation witnessed the execution of the Kariba Hydro-Electric Project. With the industrial development drive taking place in the recently independent countries, consumption of these two groups is bound to take an upward trend. A downward trend is also seen in the case of "Apparatus for Medical Purposes". Demand for these depends on social developments which were evidently slowed down during the transition period to independence and have not picked up sufficiently yet.

The growth rates represented in Figure 1 were applied to the demand indicated by the countries in their replies to the questionnaire to obtain projections of demand in 1970 and 1975, and these were entered in Table III;

Another approach to projection of demand was made, based on possible correlation between Per Capita G.D.P. and Per Capita Consumption. Some commodities showed reasonable correlation, such as insulated cables for which the relationship is given in Table II.4 (2) and Figure 2. It will be noted that the upper part of the curve, shown dotted, can only be a very rough guide to a possible Per Capita G.D.P. and Per Capita Consumption relationship. And it is this dotted part of the curve on which projections are based. Other commodities, such as transformers, switchgear and rotating machinery did not show any correlation.

The graphs showing Per Capita G.D.P. and Per Capita Consumption for the commodities showing reasonable correlation, and the projections of population and of gross Domestic Product, were utilized to make projections of demand in 1970 and 1975. These were also entered in Table III;
(vii) It will be seen from Table III that projections of demand based on linear trend of consumption over the period 1956 to 1964 and those based on the relationship between Per Capita GDP and Per Capita Consumption agreed, more or less, in some cases, but differ considerably and irregularly in others.

The conclusion drawn was that the two sets of projections can only give very rough orders of magnitude, and that equally acceptable 'guesses' can probably be obtained by multiplying the average annual consumption over the period 1957 - 1960 for the commodities for which the trend is not likely to increase rapidly by 1.5 and 2 to obtain the demand in 1970 and 1975 respectively. For commodities for which the demand increases rapidly, the multipliers suggested were 2.2 and 3.

The questionnaire requested the countries to give estimates of consumption in 1970 and 1975. Of the countries of the East African Sub-region only Rhodesia and Mauritius gave such estimates. The data based projections on a growth rate of % per annum. Mauritius gave estimates of consumption generally showing a much lower growth rate.

III.2 Estimation of Future Demand for Engineering Commodities

The data requested in the questionnaire circulated to the countries of the Region in April 1965 was intended to give a good picture of existing demand for individual commodity groups in the 4 main divisions of Engineering Commodities. However, up to mid-August, 1965, replies to the questionnaire giving such data were received from 24 countries only, and the information so obtained is given in Table II. (1) to II.2 (6). Replies were received from all 6 countries of the North African Sub-region, 11 out of 14 countries in the East African Sub-regions, 6 out of 14 countries in the West African Sub-region, and only 4 out of 6 in the Central African Sub-region.
Other available data on demand are those provided by the Economic Commission for Europe for most countries of the region relative to imports of Electrical Machinery and of Machinery other than Electrical in the period 1957-60 and given in Tables II.1 (1) to II.1 (10).

The following table gives the average annual values of imports into reporting countries over the period 1957-60 obtained from the data provided by the U.N., and the value of imports in 1962 or 1964 (where indicated) for the countries, for Electrical Machinery, Apparatus and Appliances as well as Machinery Non-Electrical:

<table>
<thead>
<tr>
<th>Country</th>
<th>Elect. Machinery</th>
<th>Machinery Non-Electrical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
<td>1957-60</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>2,000</td>
<td>4,300</td>
</tr>
<tr>
<td>Somalia</td>
<td>600</td>
<td>1,300</td>
</tr>
<tr>
<td>Spain</td>
<td>6,400</td>
<td>9,100</td>
</tr>
<tr>
<td>Tanzania</td>
<td>1,000</td>
<td>8,600</td>
</tr>
<tr>
<td>Zanzibar</td>
<td>41,300</td>
<td>9,300</td>
</tr>
<tr>
<td>French Somaliland</td>
<td>12,300</td>
<td>69,300</td>
</tr>
<tr>
<td>Sudan</td>
<td>5,000</td>
<td>4,800</td>
</tr>
<tr>
<td>Senegal</td>
<td>1,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Morocco</td>
<td>6,000</td>
<td>3,200</td>
</tr>
<tr>
<td>Algeria</td>
<td>9,200</td>
<td>101,700</td>
</tr>
<tr>
<td>Antigua</td>
<td>6,200</td>
<td>9,200</td>
</tr>
<tr>
<td>Libya</td>
<td>15,900</td>
<td>33,700</td>
</tr>
<tr>
<td>Uganda</td>
<td>28,000</td>
<td>31,000</td>
</tr>
<tr>
<td>Nigeria</td>
<td>4,600</td>
<td>11,000</td>
</tr>
<tr>
<td>Togo</td>
<td>18,000</td>
<td>29,600</td>
</tr>
<tr>
<td>Guinea</td>
<td>14,300</td>
<td>37,800</td>
</tr>
<tr>
<td>Senegal</td>
<td>9,000</td>
<td>19,100</td>
</tr>
<tr>
<td>Liberia</td>
<td>1,000</td>
<td>22,000</td>
</tr>
<tr>
<td>Chad</td>
<td>400</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The following will be noted:

1. That, as previously stated, figures for Malawi, Zambia and Rhodesia show the effect of the execution of the Kariba Hydro-Electric Project in the years 1957-60.

2. Imports into Algeria remained at a high level throughout, mainly due to the execution of projects connected with the recently discovered oil wealth. Libya was similarly affected.

3. Imports into the USSR of Machinery other than Electrical over the period 1962/64 averaged about 20% less than they were over the period 1957-60, as a result of increased local production.

4. With the exceptions mentioned in 1 and 3 above, imports have increased in practically all cases between 1957/60 and 1963/64, but the percentage increase varies considerably from one country to the other. It also differs between Electrical Machinery and Machinery Non-Electrical for the same country.

These findings strengthen the conclusion previously reached, that on the basis of the data available it is not possible to estimate with a reasonable degree of accuracy future demand for engineering commodities in the countries of the Region.

A possible course to follow is to adopt the proposal cited under III.1 para. (vii) above in relation to "estimates of consumption in 1970 and 1975 of Electrical Machinery, Apparatus and Appliances in the East African sub-region to the other 3 sub-regions, applying the same multipliers to the average consumptions over the period 1957-60 given in Tables II.1 (a) to II.1 (4). A similar approach can be made for estimating consumption in 1970 and 1975 of Machinery other than Electrical for all four sub-regions, by applying appropriate multipliers to the average 1957-60 consumptions given in Tables II.1 (a) to II.1 (9).

For Structural Engineering and Metal Products as well as Transport Equipment, the data on imports obtained in reply to the questionnaire mentioned in Tables II.3 (b), II.2 (4), II.2 (1) and II.2 (4), when adjusted after receipt of the remaining country replies, can be used with unit multipliers.
CHAPTER IV

BASIC DATA ON ENGINEERING INDUSTRIES

This Chapter covers miscellaneous basic data useful in the study of engineering industries and in the choice of plants to be established for manufacturing engineering products.

IV.1 Data relative to production of electrical machinery in the United Kingdom

Table IV.1 gives an analysis, by size of enterprise, of the production of electrical machinery in the United Kingdom in 1958 for firms employing 25 or more persons, as obtained from the U.K. Board of Trade Report on the Census of Production for 1958, Part 56. It can be seen that the net output per person employed varies with the size of enterprise. It has two peak values, at the sizes of enterprise employing 100 to 199 and 400 to 499 persons, for which net output per person employed is £2,730 and £2,710 respectively. As the size increases beyond 400-499, the output per person employed falls to £2,160 for size 500-749, then rises continuously to reach £3,080 for enterprises employing 7,500 persons and over.

Table IV.2 gives similar information for the case of insulated wires and cables, obtained from Part 57 of the Report referred to above. It shows two pronounced peaks for the output per person employed, £3,250 for enterprises employing 50 to 99 persons and £4,020 for those employing 500 to 749 persons. Larger size enterprises have lower output per person employed.

The tables show that there can be more than one economic size of plant for an industrial enterprise, and that for some industries increase in size beyond a certain point may reduce output per person employed.

IV.2 Data relative to manufacturing operations in Europe

Table IV.3 (1) gives basic information regarding minimum economic sizes of plants for various branches of electrotechnical engineering industries, fixed capital requirements, labour force, floor area and electricity consumption, based on average European conditions in 1965.
Table IV. 3 (2) gives similar information for various branches of engineering industries other than electrotechnical.

Column 3 in each table gives the minimum economic capacity of plant based on modern engineering practice in industrialized countries. For the countries of Africa, smaller plants are likely to be viable, depending on the particular branch of industry, transport conditions and the future of the market. In the case of refrigerators and domestic washing machines the minimum economic size is 20,000 to 30,000 pieces per annum is intended to meet the severe competition in the European market.

Column 4 gives the maximum weight of piece to be lifted and this is needed for the design of building and lifting gear. Columns 5 and 6 give the fixed capital investment needed per unit of production per annum and the percentage of this investment which goes into buildings.

Columns 7 and 8 give the total working hours per ton of production and the percentage of this total which goes into machinery hours. Columns 9 and 10 give the output in tons per annum per production workman and the output per annum per square metre of production area on the basis of 2 shift operations. Column 11 gives the total floor area needed for the shops and shop offices (apart from other buildings for offices, stores etc.) related to the total labour force. Column 12 gives the production workmen as a percentage of the total labour force, and column 13 gives the production workmen as a percentage of the total number of employees. The last column, 14, gives the electrical energy consumption per ton of production.

The fixed capital investment is given for plants installed in 1960. For the African region, addition of transport costs and water treatment increased production costs result in capital requirements being about 50% higher.

Table IV. 3 (2) gives similar information for various branches of engineering industries other than electrotechnical.

Column 3 in each table gives the minimum economic capacity of plant based on modern engineering practice in industrialized countries. For the countries of Africa, smaller plants are likely to be viable, depending on the particular branch of industry, transport conditions and the future of the market. In the case of refrigerators and domestic washing machines the minimum economic size is 20,000 to 30,000 pieces per annum is intended to meet the severe competition in the European market.

Column 4 gives the maximum weight of piece to be lifted and this is needed for the design of building and lifting gear. Columns 5 and 6 give the fixed capital investment needed per unit of production per annum and the percentage of this investment which goes into buildings.

Columns 7 and 8 give the total working hours per ton of production and the percentage of this total which goes into machinery hours. Columns 9 and 10 give the output in tons per annum per production workman and the output per annum per square metre of production area on the basis of 2 shift operations. Column 11 gives the total floor area needed for the shops and shop offices (apart from other buildings for offices, stores etc.) related to the total labour force. Column 12 gives the production workmen as a percentage of the total labour force, and column 13 gives the production workmen as a percentage of the total number of employees. The last column, 14, gives the electrical energy consumption per ton of production.

The fixed capital investment is given for plants installed in 1960. For the African region, addition of transport costs and water treatment increased production costs result in capital requirements being about 50% higher.
### IV.3.1 USA Conditions, 1959/60

Table IV.4 (1) gives data relative to some electrotechnical engineering industries with possibilities for developing countries, and Table IV.4 (2) gives data relative to some such engineering industries other than electrotechnical. The data are based on USA small industry situation in 1959/60 as given in the Industry Fact Sheets published by the Department of State, Agency for International Development, Washington. They should be adapted realistically to suit individual countries, particularly as regards labour requirements, costs and inventories of raw materials and spares to be carried. The plants described are relatively small in their size by USA standards, but may be considered medium scale in some developing countries. They offer possibilities for local investment even where the capital market is still in the early stages of development, and for building up needed technical skills, creation of channels of distribution, saving of foreign exchange and gaining experience in management essential to broad-based economic growth.

Referring to the tables, column 1 gives the S.I.C. number of the Branch Industry given under column 2, for reference purposes. Column 3 gives the annual production capacity of the plant relative to which the data are given, on a one shift basis. After a period of operation on such a basis it may be found advisable to run two shifts per day if the market can absorb the increased output, in order to reduce costs.

Columns 4 to 8 give the capital requirements. Column 4, fixed capital, covers the cost of land, buildings and equipment, furniture and fixtures. Column 5 gives the working capital, which represents the initial payment that must be made before receipts from sales start to come in, for direct materials, direct labour, manufacturing overheads (supplies, fuel, water, truck operating costs if any, and indirect labour), administrative costs (interest, insurance, legal charges and audit charges), contingencies, sales costs (sales commissions, freight out, travel and advertisement) and labour training.
In most cases the allowance for direct materials, direct labour and manufacturing overhead is fixed at 60 days on the assumption that 30 days will be needed to build up an inventory of finished products and another 30 days will be allowed for collection of accounts. Deviations occur, depending on the time required to get delivery of materials and other factors. The allowance for administrative costs, contingencies and sales costs is based on 30 days in general, since most of these will not begin until sales have started, and time is usually allowed before payment becomes due. For training costs an estimate is made of the amount of labour time that will be non-productive or only partially productive, wastage of materials and non-productive use of items coming under manufacturing overhead. Variations in the allowances under this heading arise from variations in the training time needed. In some cases the work is of such a character that no allowance for training costs is needed (U.K. conditions).

Direct materials are the materials that go directly into the finished products and either constitute a part of such products, or are necessary for combining or containing the constituent parts. Supplies are the materials necessary for the maintenance and running of the machinery and equipment and for the performance of administrative and clerical operations.

As far as electric power is concerned, a few industries must have their own generating facilities as a stand-by in case of power failure, e.g., where continuous furnace operations are called for and where serious loss of materials or damage to equipment would result from a failure to maintain heating operations. In such cases the cost of the generating plant is included under equipment in the fixed capital requirements (Column 4).

Where an industry needs transport facilities of its own, the capital cost is included in the fixed capital and the annual running cost is included under manufacturing overheads.

In regard to manpower, this is calculated on the basis of one shift operation. Where it is desirable to work more than one shift in order to make better use of the scarce investment funds, it will be necessary to increase the number of employees accordingly.
Depreciation has been calculated on the basis of the following life periods:

- Buildings: 20 years
- Equipment, furniture and fixtures: 10 years
- Dies: 5 years
- Tools: 3 years
- Trucks: 4 years

Column 9, total capital, is the sum of the fixed capital and the working capital. It is to be noted that financing of the two components of capital will be on different bases.

Column 7, foreign currency component of total capital, is taken as the cost of equipment, furniture and fixtures plus the component of working capital covering direct materials and supplies not locally available. Column 8 gives the remainder of the total capital.

Column 9, direct labour, covers the labour used directly in the manufacturing process itself. Column 10, the indirect labour, covers managerial, clerical and other labour not directly attributable to the manufacturing process, such as janitorial, maintenance and book-keeping personnel. Column 11 gives the total number of employees needed.

Column 12 gives the fixed capital investment per employee (Column 4 divided by Column 11) and Column 13 gives the annual gross sales revenue. Column 14 gives the total annual costs, including depreciation.

The gross annual profit is given in Column 15, and as percentages of total capital and of gross sales in Columns 16 and 17 respectively.

Column 18 gives the annual foreign currency requirements. These are taken as the cost of direct materials and supplies not locally available, plus an instalment to cover the foreign currency component of capital cost, assumed equal to 10% of this cost on the average. In the first years of operation additional foreign currency will be needed for expatriate management and other supervisory and technical staff. Column 19 gives the annual foreign currency saving, which is taken as the annual gross sales revenue assumed to be equal to the c.i.f. cost of the product minus the annual foreign currency requirements.
Column 20 gives the Value added per annum. It is taken as the
value of production or the gross sales revenue minus the value of
material inputs. It includes the depreciation allowances. The Value
added is shown as a percentage of gross sales revenue in Column 21.

The last column, 22, gives the Capital Output Ratio, or the ratio
of total capital (Column 14) to the Value added (Column 20).

IV.3.2 Change to conditions in Africa, 1965

To change from American conditions in 1959/1960 to conditions in
Africa in 1965 a number of factors must be taken into account, and these
vary from one African country to another. However, an average case is
taken to produce Tables IV.4 (2) and II.4 (4), along the following
lines:

Land. Considering that the cost of land is only a small percentage of
total expenditure, and in view of the fact that land for industrial
purposes is scarce in Africa and therefore more expensive than ordinary
land, the figures given for American conditions are used for African
conditions.

Buildings. The average costs used for USA conditions are US$ 3.5 to
4 per square foot, and these can be adopted for the Region.

Equipment, Furniture and Fixtures
1. Taking into account the increase in prices from 1959/1960 to 1965
and the difference in prices between Europe and the U.S., the 1965 f.o.b.
prices for Africa may be taken as the USA figures for 1959/1960 increased
by 5%.
2. Add 10% to the f.o.b. prices to obtain average c.i.f. prices for
the Region.

3. Inland Transport
   (i) The weight of machinery and equipment may roughly be estimated
   on the basis of a price of US$ 1.0 per kilogramme;
   (ii) Inland transport costs vary from one country to another. An
   approximate average of say US$ 20 per ton may be adopted;
   (iii) In addition of 10% duties should be made for inland
   transport.
Taking these factors in consideration, an addition of $X$ can be made to the C.I.F. value for inland transport.

4. Add 10% to meet increased erection costs.

The cost of machinery and equipment should therefore be increased by 30% over the USA figures.

**Manpower**

1. **Indirect labour**

   (i) Manager will be an expatriate for the first few years in most instances, costing about 30 to 40% more than the USA figure. He will have an understudy who will take over from him within a few years, but in the meantime this will increase management costs. When the expatriate is no longer needed, costs will be nearly half the USA figure as long as there is scarcity of the higher level manpower in the developing country. For simplicity of calculation, the USA figures may be used as average over the next decade in the case of an average African country.

   (ii) **Office staff**

   Numbers to be doubled for lack of mechanization, etc., but pay per man would be about 50% of the corresponding USA figure until education is more general in Africa, so costs would be about 60% the USA costs;

   (iii) **Maintenance staff**

   Expatriates will be needed for some time in most African countries, but local staff can take over in a shorter period than the case of the manager. Pay of the locals would be about 30% of the corresponding USA figure until the available local personnel are in much greater numbers. With the number of African maintenance staff about double the USA figures, the costs would be about 60% the USA costs.

2. **Direct Labour**

   (i) For skilled workers the same number of operators would be needed, but costs would be half the USA costs. Production would be lower on non-repetitive work;
(ii) For semi-skilled workers, the number of operators would be increased 50 to 60%, each getting about 25% to 30% of the USA pay for his opposite number. Thus the cost would be about 40% the USA cost.

(iii) For unskilled workers, the numbers should be trebled, each getting one-tenth the pay of the USA unskilled worker, and so costs would be three-tenths of the USA costs.

Direct Materials and Supplies
Add about 15% to cover the freight and insurance costs of materials not locally available.

Labour, Fuel and Water
For simplicity, double the USA costs.

Own Transport
Capital cost is included in the cost of equipment and dealt with accordingly. Annual operating and maintenance costs would be double the USA figures.

Depreciation
Although the life years taken as basis for the USA figures of cost are low by non-American standards, yet in view of the less capable handling and maintenance, and considering that the depreciation is not too long an item of costs relatively in cost cases, the USA figures may be taken for simplicity.

Administrative Costs
The USA figures may be taken for simplicity.

Sales Expenses
Considering the large amount of advertisement normal in USA practice on the one hand, and in view of the lack of sales facilities in most African countries on the other hand, the costs in Africa may be taken at 60% the USA costs.

Working Capital
In the USA figures allowance for direct material is fixed at 30 days. In African conditions, material not locally available take considerable time for delivery, and the allowance should be on the basis of 90 days. Direct labor, merchandise in stock and other
components of working capital may be taken on the basis of 2 months except for training costs which may be taken as two to three times the USA figures.

Annual Sales Revenue

Landed costs in the Region in 1965 would, on the average, be about 15% higher than the USA figures for 1959/1960, but this may be balanced by lower output. However, sales revenues depend on the policies of the governments as regards industrialization, pricing and the assistance or protection given to industry. It would be safe to assume that an industry would be started if it can meet landed costs, and the USA figures may be taken for the annual sales revenue.

IV.3.3 Materials, Supplies, Electricity, Fuel and Water needed for the Engineering Industries covered in Tables IV.4 (1) to IV.4 (4)

The annual requirements of materials, supplies, electricity, fuel and water needed by the industrial plants with possibilities for developing countries covered in Tables IV.4 (1) to IV.4 (4) in order to meet the production figures given in these tables are given in detail in Annexes I and II.
CHAPTER V

CHAPTER V: COMPARISON AND APPLICATIONS

7.1. Foreword

As stated in Chapter I, the objective of this study was to investigate the possibilities of developing engineering industries in the countries of the African Region. As a first step towards this objective an effort was made to survey existing engineering industries in these countries, to assess their present demand for engineering commodities and to forecast their future demand. It was also necessary to form a general idea of the countries of the Region in certain respects which affect their economic and industrial development and in particular the possibility of establishing engineering industries in them.

Chapter I enumerates the countries under consideration and touches very briefly upon their Gross Domestic product, manpower situation and means of transport—all of which are factors which greatly affect their industrial growth.

The data which it has been possible to obtain is given in Chapter II, in the corresponding tables in Part II and the Appendix and in the appendices in Part III. These summarize:

1. The information provided by the EC on imports of Electrical Machinery, apparatus and appliances and of Machinery other than Electrical into the countries of the Region in the period 1957-60.

2. The data on imports and local production in recent years of Electrical Machinery, apparatus and appliances, Structural and Building and Metal products, Machinery other than Electrical and Transport equipment received from reporting countries of the region up to mid-1965 in reply to the questionnaires circulated to them in April 1965.

3. The findings and recommendations of the EC Survey Missions on engineering industries in the countries of the Region.
SECTION III summarises an effort made to assess present demand in the countries of the Region for engineering commodities and to forecast future demand.

V.2 Observations on the available data and Conclusions drawn from them

Examination of the available data, supplemented by observations made during short visits paid to eight of the more industrially advanced countries of the Region revealed the following:

1. The data available on local production of engineering commodities in the countries of the Region, a starting point in a study of the development of engineering industries in them, is inadequate in the case of most countries. Only a few of them have carried out a recent Census of Industrial Production, and published information does not give sufficient detail regarding individual or closely allied groups of engineering commodities. The attempt to obtain detailed information on local production by means of the questionnaire circulated to the countries of the Region did not produce the required results. This is understandable, for considerable effort and time are needed to make a detailed inventory of industrial establishment for so deserving a branch of industry as engineering industries. However, the response is encouraging, and it is hoped that the effort will be followed up to enable detailed inventories of engineering industries in the countries of the Region to be prepared.

2. The data available on imports, though much more than that available on local production, is likewise inadequate, and does not enable assessment of existing demand with reasonable accuracy or forecasting an order of magnitude of future demand on an acceptable basis.

In order to formulate proposals for the establishment of specific plants in certain countries or areas of the Region for the production of engineering commodities it is necessary to have detailed knowledge of existing local production of individual or closely allied groups

of engineering commodities and reasonably reliable estimates of future demand. In the absence of such knowledge, we shall first give a summary account of the structure of existing engineering industries in the countries of the Region and the factors inhibiting their growth. This will be followed by some concluding remarks and recommendations.

V.3 Structure of the Existing Engineering Industries in the Region

The following remarks give a general idea of the structure and state of engineering industries in the Region:

1. The countries of the Region are at different degrees of development as far as industry in general, and engineering industries in particular, are concerned. They follow the normal pattern of development of engineering industries, and can be subdivided into three groups representing the successive stages of development:

(i) Countries with no engineering production to speak of, or with engineering production restricted to repairs and simple metal manufactures. This group comprises most countries of the Region, and includes (among reporting countries) such large countries in terms of area and population as Ethiopia and the Sudan, each of which has a total GDP on the comparatively higher side for the countries of the Region.

(ii) An intermediate group of countries with engineering production at an initial stage, with structural engineering and metal products and repair and perhaps assembly of transport equipment forming most of their engineering production.

(iii) A very few countries with already developed and diversified engineering production.
2. Engineering industries in most countries of the region are heavily dependent on imported raw materials and semi-manufactures. In a number of cases factories are completely shut down or production curtailed due to lack or shortage of supply, particularly when foreign exchange difficulties are experienced.

3. These industries are also heavily dependent on expatriate management, technicians, foremen and supervisors, and this increases the costs of production.

4. The motor vehicle work which is done locally and which accounts for a considerable proportion of engineer output in many countries of the Region is mostly repair work in small ill-fitted shops, or assembly and body building in moderate size installations many of which are agent controlled.

5. Although some of the plants installed are quite up-to-date, they are the exception and stand like something transplanted into the African region, remaining in isolation from the majority of the factories whose equipment and layout leave much to be desired in the way of modernization and improvement.

6. Many of the enterprises work one shift only, with consequent high overhead costs.

7. Import substitution which has taken place has sometimes been achieved behind high tariff barriers which have fostered non-competitive industry.

8. Existing production of engineering commodities meets only a small fraction of demand even in the most industrialized countries of the Region.

V.4. Factors Inhibiting the Growth of engineering Industries in the Region

The development of engineering industries in the countries of the region is inhibited by the following factors which also affect other branches of industry in varying degrees:
1. **Hurdles**

One of the most serious impediments to rapid industrial growth in general is the deficiency in high and intermediate level manpower such as entrepreneurs, managers, technologists, supervisors, foremen and even skilled workers. This affects engineering industries more than any other branches of industry since they need a larger proportion of such high level manpower in relation to total employment.

2. **Size and Nature of the Market**

Most countries of the region have a limited population in a large territory or a small population in a small territory, with very low per capita incomes and a predominant traditional subsistence sector with low productivity, resulting in very limited national markets. The countries are heavily dependent on exports of primary commodities to unstable world markets, and fluctuations in world prices accentuate the smallness of the markets. A further handicap is the inadequate and expensive transport and the high cost of distribution. Since engineering industries have to create markets for their products, they are affected more than other branches of industry and tend to develop around centres of population.

3. **Raw Materials and Other Inputs**

The economies of most countries of the region having been based on the extraction and export of their natural resources and importation of manufactured goods, the majority of engineering industries established in the Region depend on imports of raw materials and semi-manufactures, as already remarked, and this raises production costs. Large inventories have to be kept in stock even to last one or two supply centres, increasing costs still further.

In terms of total installed capacity of the existing heavy industry available, even those with considerable heavy-electric...
potential, and transmission and distribution networks are of rather limited extent. As a result industry either generates its own motive power or purchases it at high cost.

4. Diversity of Engineering Commodities in use in the Countries of the Region

The countries of the Region depend on imports for meeting most of their requirements of engineering commodities. Unregulated imports and intense competition from large manufacturers supplying world markets have resulted in a very large variety of types and sizes of engineering goods being in use in any one African Country, in spite of its limited needs. The excessively numerous types of tractors in use in the common market of Kenya, Uganda, and Tanzania, is a case in point. Another obvious case is the large number of makes and types of motor vehicles to be seen in any country of the Region. This makes it necessary to carry a large inventory of spare parts for maintenance and repair work and to train personnel in operating and repairing the various types in use. It also makes it more difficult to manufacture spare parts locally.

5. Competition from Imports

Engineering commodities are produced on massive scales by international enterprises that have long held the market in most countries of the Region. Many of these commodities are high value articles which can bear high transport costs, and foreign products can therefore compete with local production, particularly in its first stages, making it difficult for the industry to be established without subsidy or protection. Another factor favouring imported products is their high quality as compared with local production. In the case of electrical goods this brings into the picture additional considerations of safety.

7.5. Concluding Remarks and Recommendations
V.5.1. The Place of Engineering Industries in Economic and Industrial Development

1. The main criteria in comparing the various branches of industry from the point of view of the national economy are based on the resources to be devoted to investment, on foreign exchange expenditure and earnings and on available manpower. In these respects:

(i) The capital/output ratio of the average engineering industry is near the average of total manufacturing, being lower than that of metal producing or chemical industries and higher than that of most light industries.

(ii) The foreign exchange effect depends largely on the proportion of domestic inputs (raw materials, intermediate products and labour) to total value. This favours resource oriented engineering industries such as those based on copper for Zambian Aluminium for Ghana and non-ferrous metals for Congo (D.R.). It also suggests that advanced engineering industries needing semi-manufactures and high skills be left to a later stage of industrial development.

(iii) Engineering industries are labour intensive compared with the average manufacturing industries in terms of capital/labour ratio, output/labour ratio and the share of labour costs in total costs. This advantage for developing countries is counterbalanced by the high requirements of skills needed in the labour force. However, while engineering industries utilise an important portion of the qualified and trained personnel, they also generate skills and have a strong impact on the level of technological development in industry.

2. In the industrial development of developed and semi-developed countries a number of industrial pillars are noteworthy, such as iron and steel, textiles, chemicals and other metals and the engineering industries. Together with chemical industries the engineering industries are the most heavy-based of manufacturing industrial branches, not only in...
volume of production but also in scientific and technological development. Some of the pillar industries lend themselves more easily to definite suggestion of size, location etc., such as iron and steel. Other do not, like textiles and the engineering industries.

Developing countries must, therefore, give the establishment and development of engineering industries due importance in their efforts for development. Their existing engineering industries are insignificant in relation to what they should aim at, and they should benefit by the experiences of other countries that have made progress in the development of their engineering industries, especially those whose circumstances have been similar to their own, such as the Romanian People's Republic and the United Arab Republic.

3. Another point to consider is the two-way relationship between engineering industries and various branches of the economy. Development of agriculture, transportation, building construction, mining and generation of electricity all give an impetus to the establishment of engineering industries. In their turn, these industries, once established, are a great asset to further development of those branches of the economy. In the case of building construction the reciprocal beneficial effect is increased by the fact that 30 to 40 per cent of fixed capital needed for most branches of engineering industries goes into buildings.

4. In view of the importance of the engineering industries and their complexity, their development cannot be approached lightly. It is for these reasons that this paper does not recommend specific plants for establishment in definite location, and contents itself with general data and recommendations which it is hoped will be of some use to the majority of the countries of the Region in their efforts to develop their engineering industries.

V.5.2. Remedy of Factors Inhibiting the Growth of Engineering Industries in the Region

The development of engineering industries in the countries of the Region calls for the remediating of the factors inhibiting their growth, of which we spoke in Section V.4.
V. 5. 2. 1. Manpower Development

The first step to be taken regarding manpower development is to take a manpower survey to assess the available manpower resources at the different levels and to estimate future needs in the light of the proposed development of the economy of the country. To meet those needs it will be necessary to review education and readjust its pattern, to expand secondary education as a base for providing high level professionals and technologists, and to increase the numbers of technical schools as a step towards meeting the needs for skilled workers, foremen, and supervisors. For the lower levels training schemes should be provided in large measure, and governments should insist on in-training schemes within industry and even provide incentives to encourage training of workers in greater numbers than are needed by the particular enterprise asking such training.

V. 5. 2. 2. Development of Mineral Industry

1. The Region of Africa is well endowed with mineral resources, but these have not been sufficiently investigated or developed to meet the needs of an expanding engineering industry. Mining operations are expected in almost all the countries of the Region.

Geological surveys should be intensified to enable rapid assessment of available mineral wealth. The production of metals should be established to provide material base for engineering industries, and rolling mills installed to supply the semi-finished products such as bars, sheets and sections. It is to be noted that production of metals and semi-finished products should be established in the countries where the raw materials are found, and that in spite of the fact that production need always not make possible economically smaller scale production at lower units cost than before, the minimal economic size of plant to fulfill the needs of the national markets of practically all the countries of the region.
2. Some engineering industries need items such as ball bearings and electric motors and at present these have to be imported. An effort should be made to produce such items in the more industrially advanced countries of the Region.

3. Finally we come to native power. The search for coal deposits and petroleum reserves and investigation of the considerable hydro-electric potential in some countries of the Region should be vigorously proceeded with. Available resources should be developed rapidly and generation and distribution of electric energy given due priority.

V.5.2.3. Regional Co-operation to overcome Market Limitation

The small size of the national market in most countries of the Region does not create sufficient demand to justify local production of most engineering commodities, particularly the more advanced ones. A solution to this problem is to be found in regional co-operation. An example of such co-operation is that of Kenya, Uganda, and Tanzania, who have agreed to maintain the common market approach to industrial development. The Kampala Agreement, by virtue of which the three countries have each been allotted industries to be established in it for supplying the needs of the whole of the Common Market, is worth the time and efforts spent in making it and offers an example to be followed by other countries of the Region.

In the poorer and less industrially developed countries there will be few immediate opportunities for sub-regional industries and the industries to be proceeded with will be those designed to serve domestic markets. But generally the wide range of engineering industries will enable each member of a group of co-operating countries to be allotted industries for which it is most suited. The more industrially advanced countries can be charged with the establishment of the more complex engineering industries on a sub-regional or regional basis.

In this respect on word of warning is necessary. Regional co-operation must be approached with great care. Each country must feel that its interests are fully appreciated and that it has been given a fair deal. Once an agreement is reached, all the countries involved must abide by its terms very strictly.
VI. 14. Standardization

The real value of the standardization of engineering goods in use in one or another country is a definite drawback in many respects, and the situation can be corrected. Turkey adopted such a measure when it revised the old types of tractors which were in use in the country to a type which, with considerable benefit to the country.

The practice of the country should establish a few essential industrial products, to the manufactured goods exchanged. They are: regulations, specifications of materials, designs machinery and equipment, width and frequency. As far as final products are concerned, there should be a few types as possible within characteristics of the product. There should also be minimum quality standards, preferably based on existing international standards.

Standardization can take the form of in-plant standardization, special industry-wide standardization, national standardization and regional standardization. All these forms have noticeable increasing effects. The first reduces the variety of similar parts and components within one plant; the second has the same effect within a whole industry, and the third reduces diversity of final products. Due to the large number of various parts and components utilized in machine building, industry-wide standardization has the most important impact on the economy of each of the industries as a whole.

The need to standardize is more urgent when it concerns precision parts which can be interchangeable and therefore demand specific equipment. Tool and dies, such as brake drums, motor parts and axles, in particular, standardization of design or cost price is such that multiplying production 10 times can lower the cost price by 40 to 50 percent.

VI. 14. Standardization in Building and the Building Industry; in the
Industrial and the Agricultural Sector.

1. The building material is not only a single commodity, but it is a case that demand
is of considerable size, as can be seen from the following table which summarizes data on imports detailed in Tables II 1 (1) to II 1 (10) and II 2 (1) to II 2 (8).

### Annual imports into the Sub-regions in Million US Dollars

<table>
<thead>
<tr>
<th></th>
<th>East</th>
<th>Central</th>
<th>West</th>
<th>North</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1957-60 average for:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical Machinery</td>
<td>71.0</td>
<td>18.0</td>
<td>47.0</td>
<td>112.0</td>
<td>248.0</td>
</tr>
<tr>
<td>Apparatus and Appliances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machinery Non-Electric</td>
<td>134.0</td>
<td>46.5</td>
<td>105.5</td>
<td>259.5</td>
<td>546.0</td>
</tr>
<tr>
<td><strong>1963-64</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical Machinery</td>
<td>54.0</td>
<td>...</td>
<td>...</td>
<td>155.5</td>
<td>155.5</td>
</tr>
<tr>
<td>Apparatus and Appliances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machinery Non-Electric</td>
<td>119.0</td>
<td>...</td>
<td>...</td>
<td>283.0</td>
<td>283.0</td>
</tr>
<tr>
<td>Structural Engineering</td>
<td>44.0</td>
<td>...</td>
<td>...</td>
<td>445.0</td>
<td>445.0</td>
</tr>
<tr>
<td>and Metal Products</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport Equipment</td>
<td>134.5</td>
<td>...</td>
<td>...</td>
<td>330.0</td>
<td>330.0</td>
</tr>
</tbody>
</table>

There is considerable scope for import substitution in a rapidly developing market, in all four divisions of engineering industries. It is to be noted, however, that given the material base, only about 70 to 80 per cent of imports of consumption goods are likely to be replaced by local production in the next decade, due to lack of technical knowledge and labour and management skills and on account of market limitations. As far as capital goods are concerned, only about 20 to 30 per cent of imports are likely to be replaced by local production by 1975, for the same reasons.

1/ The high imports into Algeria in 1963/64 are mainly due to the execution of projects connected with the recently discovered oil wealth.
1. Metal products of uncomplicated design and needing simple production processes are technically and economically feasible to produce with a relatively small output. The high cost of transport of articles fabricated mainly from sheets and sections as compared with the cost of transport of the raw materials gives local production of such articles valuable cost advantage. For these reasons import substitution of engineering commodities should start with such articles as cans, tins, drums and door and window frames. Import substitution of articles like domestic refrigerators comes at a later phase of industrial development, and of capital goods only when engineering industries have reached a relatively developed stage.

2. Manufacturing of engineering commodities comprises the whole range of industry in terms of size. There are opportunities for small, medium and large-scale industry to suit countries at different levels of industrial development. The small and medium scale industries have an important role to play in the industrial development of any country. They are usually a good starting point in countries where large scale engineering industries will be few, if any, for some time to come, and the small establishments of today may well become the large ones of tomorrow. They are labour intensive as opposed to the larger capital intensive plants, an important point for most African countries with their widespread unemployment and under-employment. Their small size does not mean that they are second-rate or backward industries.

Small scale industrial concerns can operate with lower costs and in good weather can produce better and more uniform quality articles than handicraft industries. By virtue of the better quality of their products they can enter markets in which the products of cottage industries are uncompetitive, and consequently handicraft industries in markets in which the actual distribution costs are not competitive will have a significant advantage in such industries, because they will have to bear the greater of their losses to hold their place in the market.
3. There is opportunity in almost every country of the Region for the manufacture of a wide range of engineering and metal products which can be readily manufactured given the material base, such as door and window frames, beds, cans, tins, drums, tanks, metal furniture, iron products, kitchen utensils, wire products, some agricultural implements, stoves, light structures and bodies for motor vehicles. Products which can be produced on an assembly or partial assembly basis include bicycles, sewing machines, and electrical goods such as switchgear, transformers, radios and domestic electrical appliances.

4. Another starting point is repair work of imported machinery and transport equipment, which is necessary from the earliest stages of development. The railway repair shops are usually the largest engineering establishments in countries at the threshold of industrial development, and motor vehicle repair shops among the most numerous. But the former should be utilized to give opportunities of training workers in greater numbers than required for their own needs, and the latter should be modernized and provided with the necessary equipment to improve the quality of their work and reduce its cost.

5. In almost every country of the Region there are substantial imports of motor vehicles and transport equipment, and many countries go into the production of such goods. It should be noted, however, that assembly of motor vehicles on the basis of imported components is of little value to the economy. The Value Added is a very small component of total cost, and such an industry will create a constant demand on foreign exchange. The task should be to set up local factories capable of producing most of the components. It should also be noted that considerable reduction in the cost of production can be achieved by increasing the scale of output. With small output the specialization of workers on one or a limited number of operations is impossible, time is lost changing from one operation to another as the vehicle proceeds down the assembly line and tools have to be continually changed. With larger output this can be avoided and productivity increased. Besides, the cost of specific tools required can be spread and fixed costs lowered.
6. In most African countries considerable expansion of textile industries is contemplated. A recent study of these industries in the East African Sub-region estimated the value of textile machinery to be installed in the Sub-region by 1975 to be about US $200 million. The production of such machinery is relatively simple and not too precise. It should be possible to establish in the more industrially developed countries of the Region factories for producing cotton conditioning machinery, spinning machinery and looms, automatic and semi-automatic. About three-quarters of the machinery is iron castings.

7. The manufacture of spare parts is a good possibility in many countries. Motor vehicle spares immediately come to mind. Wear and tear of processing machinery is rapid and there is continuous and considerable need for certain spare parts. In textile machinery the spindles have to be changed every about 2,000 hours.

8. In machine building in general, some of the special equipment needed, e.g., machine tools producing large and heavy parts, are never fully utilized when operating for one factory only. This equipment is often very expensive to purchase and takes highly skilled workers to operate. Co-operation of different factories through a system of sub-contracting will ensure effective utilization of such plant facilities and skills.

9. Engineering industries need good foundries and well equipped forges for supplying cast iron, steel and non-ferrous castings as well as forged parts. The casting and forging techniques must be well advanced, foundries a chemically and forging shops well equipped for die forging and hot stamping to supply high quality semi-finished products. Such countries and forging shops require considerable investments and the plant of work needed to make them economically feasible is much more than the requirements of a single factory. It is therefore necessary to concentrate on a few of them serving a large number of factories.

10. The more complex main-line products require advanced technical skill and long experience to enable manufacture of a high quality product efficiently. In industrial less-developed countries is
Instructed to highly experienced personnel and backed by research, experimentation and prototype work involving very large expenditure.

A good approach to the production of such complex articles is cooperation with some producers in industrially advanced countries, who would provide know-how and train personnel.

In transferring technology an effort should be made to adapt product design and production methods to local conditions. Mixed technology will generally give good results. This requires the use of advanced machinery only for those operations which determine the competitive quality of the product. All other operations should preferably be in the form of cheap hand operation.

11. Increase of the scale of production is the most important means of increasing productivity and reducing costs. The economies of scale do not result mainly from an increase in the volume of production if this is achieved by a proportionate increase in the diversity of production, though several overhead costs will thereby be decreased. Economies of scale result much more from a shift from individual to serial production, by an increase of seriality and by a shift from serial to mass production. This means an increase of identical or similar items produced or operations performed at a time on the same machine or equipment, with the same tools or instruments, according to the same design.

Scale of production can be increased through standardization, cooperation between different factories and concentration on the production of widely utilitarian parts.

12. Developing countries with their limited financial resources would be well advised to consider the use of second-hand equipment for the establishment of their engineering industries. Second-hand reconditioned equipment in good condition is available at reasonable cost. It is usually more labour intensive than new equipment, this being the usual reason why the use of second-hand equipment has been discontinued. It is usually of smaller size than new equipment and therefore more transportable if required at another site, and it does not require the same kind of specialization as new equipment.
13. The production of engineering products in most countries of the
Region is practically all destined for local consumption. A few African
countries produce for local markets - comparatively limited share of
industrial products to neighbouring countries in the Union.

Arms to countries with a small population and small
industrial base is likely to continue for a matter in the case of the majority of the countries
of the Union, the efforts will therefore be directed towards local
production for import substitution with exports to neighbouring countries
accelerated by regional co-ordination and allocation of industries to
countries best suited for them. In view of the severe international
competition in engineering commodities and the various factors affecting
their manufacture, only the few most industrially advanced countries
of the region are likely to succeed in competing outside the
region. In this respect it should be noted that existing manufacturing
to international standards and at competitive costs, it will be
necessary to establish more stringent conditions and to pay attention to
other forms of export promotion.

14. The establishment of new industrial set-ups will cover new
engineering products not previously manufactured as well as products
already being produced. In other cases they have an impact on existing
industries, which are basically characterized by low productivity and
political industrial productility. The existing engineering industries
would in the main of expanded, some should be retitled with new
product, and some need modern and re-plant the conversion. Factories
suitable to partial usage should be fully utilized, and those operating
on one shift their should be operated two shifts with a shift conditions
profit, and essentially the shift.

15. The above recommendations will, it is hoped, enable the more
industrially advanced countries of the region in their efforts to
be able to produce engineering products efficiently.
industries mentioned are but a few that come to mind from the large list of industries that may be established. It is assumed that each country will make detailed pre-investment and feasibility studies to test the viability of individual projects and set their priorities before implementation, whether for the national market or for an area or a sub-regional or regional market in agreement with other countries. To assist these countries in such an effort data are given in CHAPTER IV section 2 and Tables IV 3 (1) and IV 3 (2) relative to minimum economic sizes of plants, fixed capital requirements, labour force, floor area and electricity consumption for various engineering industries which may be considered for implementation, mostly on an area basis covering more than one country. In section 3, Tables IV 4 (1) to IV 4 (4) and annexes 1 and 2 data are given relative to engineering industries with possibilities for the developing countries of the African Region, mostly for national markets.
UNITED NATIONS
ECONOMIC
AND
SOCIAL COUNCIL
Table 1. Imports of engineering commodities into the East African sub-region, 1956 to 1963

Table 2. Imports of engineering commodities into the North African sub-region, 1956 to 1963

Table 3. Imports of engineering commodities into the West African sub-region, 1956 to 1963

Table 4. Imports of engineering commodities into the Central African sub-region, 1956 to 1963

Table 5. Imports of engineering commodities into the four sub-regions of Africa, 1956 to 1963.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1 Structural Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.2 Non-Machinery &amp; Non-Appliances</td>
<td></td>
<td>120</td>
<td>121</td>
<td>120</td>
<td>111</td>
<td>112</td>
<td>125</td>
<td>113</td>
</tr>
<tr>
<td>7.3 Non-metal Manufacture</td>
<td>10</td>
<td>67</td>
<td>55</td>
<td>63</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>1</td>
</tr>
<tr>
<td>7.4 Other</td>
<td>123</td>
<td>121</td>
<td>113</td>
<td>115</td>
<td>125</td>
<td>119</td>
<td>127</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* An estimation into the ECA Group is a rough approximation.*
Table I.

Imports of Engineering Commodity
into the North African Sub-region
Values in Million U.S. Dollars.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
<td>Structural Engineering and Metal Products</td>
<td>93</td>
<td>85</td>
<td>88</td>
<td>84</td>
<td>99</td>
<td>83</td>
<td>209</td>
<td>448</td>
</tr>
<tr>
<td>71</td>
<td>Machinery Non-Electric</td>
<td>165</td>
<td>160</td>
<td>151</td>
<td>251</td>
<td>306</td>
<td>266</td>
<td>293</td>
<td>293</td>
</tr>
<tr>
<td>72</td>
<td>Electrical Machinery Apparatus and Appliances</td>
<td>128</td>
<td>97</td>
<td>115</td>
<td>125</td>
<td>133</td>
<td>118</td>
<td>132</td>
<td>132</td>
</tr>
<tr>
<td>73</td>
<td>Transport Equipment</td>
<td>163</td>
<td>206</td>
<td>219</td>
<td>225</td>
<td>243</td>
<td>222</td>
<td>268</td>
<td>326</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>542</td>
<td>550</td>
<td>573</td>
<td>583</td>
<td>781</td>
<td>689</td>
<td>998</td>
<td>1212</td>
</tr>
</tbody>
</table>

1/ Imports of Algeria show a sharp increase in 1962 and 1963.

N. B. Classification into SITC Groups is a rough approximation.

Source: National Publications. Series B Publications of ECA
and Estimates by Secretariat.
Table 3
Imports of Engineering Commodities
into the West African Sub-Region
Values in Million U.S. Dollars.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
<td>Structural Engineering and Metal Product</td>
<td>63</td>
<td>59</td>
<td>64</td>
<td>68</td>
<td>76</td>
<td>86</td>
<td>70</td>
<td>78</td>
</tr>
<tr>
<td>71</td>
<td>Machinery Non-Electric</td>
<td>77</td>
<td>78</td>
<td>83</td>
<td>109</td>
<td>126</td>
<td>114</td>
<td>153</td>
<td>182</td>
</tr>
<tr>
<td>72</td>
<td>Electrical Machinery, Apparatus and Appliances</td>
<td>27</td>
<td>38</td>
<td>43</td>
<td>53</td>
<td>66</td>
<td>71</td>
<td>83</td>
<td>84</td>
</tr>
<tr>
<td>73</td>
<td>Transport Equipment</td>
<td>131</td>
<td>125</td>
<td>126</td>
<td>139</td>
<td>166</td>
<td>188</td>
<td>123</td>
<td>144</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>306</td>
<td>300</td>
<td>318</td>
<td>369</td>
<td>434</td>
<td>459</td>
<td>429</td>
<td>486</td>
</tr>
</tbody>
</table>

F. L. Classification into SITC Groups is a rough approximation

Source: National Publications, Series B Publication of E.C.A.
and Estimates by Secretariat.
Table 5
Imports of Engineering Commodities into the four sub-regions of Africa
Values in Million U. S. Dollars

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
<td>Structural Engineering and Metal Products</td>
<td>234</td>
<td>224</td>
<td>232</td>
<td>227</td>
<td>238</td>
<td>230</td>
<td>345</td>
<td>359</td>
</tr>
<tr>
<td>71</td>
<td>Machinery Non-Electric</td>
<td>438</td>
<td>446</td>
<td>416</td>
<td>518</td>
<td>576</td>
<td>539</td>
<td>594</td>
<td>590</td>
</tr>
<tr>
<td>72</td>
<td>Electrical Machinery Apparatus and Appliances</td>
<td>238</td>
<td>236</td>
<td>251</td>
<td>267</td>
<td>279</td>
<td>268</td>
<td>221</td>
<td>203</td>
</tr>
<tr>
<td>73</td>
<td>Transport Equipment</td>
<td>487</td>
<td>522</td>
<td>527</td>
<td>535</td>
<td>572</td>
<td>561</td>
<td>554</td>
<td>660</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>1397</td>
<td>1428</td>
<td>1426</td>
<td>1547</td>
<td>1665</td>
<td>1598</td>
<td>1784</td>
<td>2237</td>
</tr>
</tbody>
</table>

1/ Imports into Congo (LeC) show a sharp decrease in 1960 and 1961
2/ Imports into Algeria show a sharp increase in 1962 and 1963

N. B. Classification into the SITC Group is a rough approximation

and Estimates by Secretariat.
ECONOMIC COMMISSION FOR AFRICA
Regional Symposium on Industrial Development

ENGINEERING INDUSTRIES IN AFRICA

PART II
Map, Graphs, Tables and Annexes
Table of Contents

Map

Map of Africa, showing the East, North, West and Central African Sub-regions and the Sub-divisions of the East African Sub-region into North, Centre and South.

Graphs

1. Imports of Electrical Machinery, Apparatus and Appliances into the East African Sub-region except Malawi, Zambia and Rhodesia.


Tables

1.1. General Indicators for the countries of the East African Sub-region

1.2. General Indicators for the countries of the North African Sub-region

1.3. General Indicators for the countries of the West African Sub-region

1.4. General Indicators for the countries of the Central African Sub-region

II.1(1). Imports of Electrical Machinery, Apparatus and Appliances into the countries of the East African Sub-region, 1957 to 1960

II.1(2). Imports of Electrical Machinery, Apparatus and Appliances into the countries of the North African Sub-region, 1957 to 1960
II.1(3). Imports of Electrical Machinery, Apparatus and Appliances into the countries of the West African Sub-region, 1957 to 1960

II.1(4). Imports of Electrical Machinery, Apparatus and Appliances into the countries of the Central African Sub-region, 1957 to 1960

II.1(5). Imports of Electrical Machinery, Apparatus and Appliances into the countries of Africa, 1957 to 1960

II.1(6). Imports of Machinery other than Electrical into the countries of the East African Sub-region, 1957 to 1960

II.1(7). Imports of Machinery other than Electrical into the countries of the North African Sub-region, 1957 to 1960

II.1(8). Imports of Machinery other than Electrical into the countries of the West African Sub-region, 1957 to 1960

II.1(9). Imports of Machinery other than Electrical into the countries of the Central African Sub-region, 1957 to 1960

II.1(10). Imports of Machinery other than Electrical into the countries of Africa, 1957 to 1960

II.2(1). Net Imports of Electrical Machinery, Apparatus and Appliances into the countries of the East African Sub-region
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>II.2(2)</td>
<td>Net Imports of Electrical Machinery, Apparatus and Appliances into countries in the North, West and Central African Sub-regions</td>
</tr>
<tr>
<td>II.2(3)</td>
<td>Net Imports of Structural Engineering and Metal Products into the countries of the East African Sub-region</td>
</tr>
<tr>
<td>II.2(4)</td>
<td>Net Imports of Structural Engineering and Metal Products into countries in the North, West and Central African Sub-regions</td>
</tr>
<tr>
<td>II.2(5)</td>
<td>Net Imports of Machinery other than Electrical into the countries of the East African Sub-region</td>
</tr>
<tr>
<td>II.2(6)</td>
<td>Net Imports of Machinery other than Electrical into countries in the North, West and Central African Sub-regions</td>
</tr>
<tr>
<td>II.2(7)</td>
<td>Net Imports of Transport Equipment into the countries of the East African Sub-region</td>
</tr>
<tr>
<td>II.2(8)</td>
<td>Net Imports of Transport Equipment into countries in the North, West and Central African Sub-regions</td>
</tr>
<tr>
<td>II.3(1)</td>
<td>Local Production of Electrical Machinery, Apparatus and Appliances in the countries of the East African Sub-region</td>
</tr>
<tr>
<td>II.3(2)</td>
<td>Local Production of Structural Engineering and Metal Products in the countries of the East African Sub-region</td>
</tr>
</tbody>
</table>
II.3(3). Local Production of Machinery other than Electrical in the countries of the East African Sub-region

II.3(4). Local Production of Transport Equipment in the countries of the East African Sub-region

II.3(5). Total Local Production of Engineering Industries in the countries of the East African Sub-region

II.3(6). Local Production of Electrical Machinery, Apparatus and Appliances in reporting countries in the North, West and Central African Sub-regions

II.3(7). Local Production of Structural Engineering and Metal Products in reporting countries in the North, West and Central African Sub-region

II.3(8). Local Production of Machinery other than Electrical in reporting countries in the North, West and Central African Sub-regions

II.3(9). Local Production of Transport Equipment in reporting countries in the North, West and Central African Sub-regions

II.3(10). Local Production of Engineering Commodities in reporting countries of the north, west and Central African Sub-regions

II.4(1). Imports of Electrical Machinery, Apparatus and Appliances into the countries of the East African Sub-region, 1956 to 1962
II.4(2). Per Capita G.D.P. and Per Capita
Consumption of Insulated Cables in the
Countries of the East African
Sub-region

II.5 Annual consumption of Engineering
Products in the countries of the East
African sub-region 1961/1963

III. Estimated Demand of Some Electrical Commodities in
the countries of the East African Sub-region in
1970.

IV.1 Data Relative to Production of Electrical
Machinery in the United Kingdom in 1958.

IV.2 Data Relative to Production of Insulated
Wires and Cables in the United Kingdom in
1958.

IV.3(1) Minimum Economic Sizes of Plants, Fixed
Capital Requirements, Labour Force,
Floor Area and Electricity Consumption
for various Electrotechnical Engineering
Industries - Average European Conditions
in 1965.

IV.3(2) Minimum Economic Sizes of Plants, Fixed
Capital Requirements, Labour Force,
Floor Area and Electricity Consumption
for various Engineering Industries other
than Electrotechnical - Average
European Conditions in 1965.
| IV.4(1) | Data Relative to Electrotechnical Engineering Industries with Possibilities for Developing Countries, U.S.A. Conditions, 1959/1960 | Page 44 |
| IV.4(2) | Data Relative to Electrotechnical Engineering Industries with Possibilities for Developing Countries - African Conditions 1965 | Page 45 |
| IV.4(3) | Data Relative to Engineering Industries other than Electrotechnical with Possibilities for Developing Countries, USA Conditions 1959/1960 | Page 46 |
| IV.4(4) | Data Relative to Engineering Industries other than Electrotechnical with Possibilities for Developing Countries, African Conditions 1965 | Page 47 |

**Annexes**

**Annex 1.** Materials, Supplies, Electricity, Fuel and Water needed by the Electrotechnical Engineering Industries covered in Tables IV.4(1) and IV.4(2) | 48-56 |

**Annex 2.** Materials, Supplies, Electricity, Fuel and Water needed by the Engineering Industries other than Electrotechnical covered in Tables IV.4(3) and IV.4(4). | 51-71 |
Imports of Electrical Machinery, apparatus and appliances into the East African Subregion except Malawi, Zambia and Rhodesia
Figure 2
Per Capita G.D.P and Consumption of Insulated Cables [723.1]
in reporting Countries of the East African Subregion
# Table 1.1

**General Indicators**

for the countries of the War-African Sub-continent

1963

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>4565</td>
<td>22.0</td>
<td>650</td>
<td>755</td>
<td>0.1</td>
<td>3.1</td>
<td>3.3</td>
<td>6</td>
<td>11</td>
<td>1314</td>
</tr>
<tr>
<td>French Camer</td>
<td>52</td>
<td>1.0</td>
<td>1.0</td>
<td>1043</td>
<td>0.1</td>
<td>3.1</td>
<td>3.1</td>
<td>5</td>
<td>190</td>
<td>278</td>
</tr>
<tr>
<td>Benin Republic</td>
<td>638</td>
<td>2.3</td>
<td>115</td>
<td>185</td>
<td>0.1</td>
<td>3.1</td>
<td>3.1</td>
<td>5</td>
<td>23</td>
<td>86</td>
</tr>
<tr>
<td>Kenya</td>
<td>583</td>
<td>2.3</td>
<td>735</td>
<td>1230</td>
<td>0.3</td>
<td>11.0</td>
<td>5.2</td>
<td>51</td>
<td>163</td>
<td>505</td>
</tr>
<tr>
<td>Uganda</td>
<td>246</td>
<td>1.2</td>
<td>66</td>
<td>1540</td>
<td>1.6</td>
<td>8.8</td>
<td>7.4</td>
<td>41</td>
<td>46</td>
<td>1127</td>
</tr>
<tr>
<td>Tanzania</td>
<td>940</td>
<td>1.0</td>
<td>590</td>
<td>625</td>
<td>3.3</td>
<td>8.0</td>
<td>6.7</td>
<td>4</td>
<td>4</td>
<td>1160</td>
</tr>
<tr>
<td>Burundi</td>
<td>25</td>
<td>2.7</td>
<td>140</td>
<td>5000</td>
<td>0.0</td>
<td>3.0</td>
<td>3.0</td>
<td>4</td>
<td>2</td>
<td>66</td>
</tr>
<tr>
<td>Rwanda</td>
<td>25</td>
<td>3.0</td>
<td>115</td>
<td>5230</td>
<td>0.0</td>
<td>5.0</td>
<td>5.0</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Malawi</td>
<td>119</td>
<td>3.8</td>
<td>135</td>
<td>1230</td>
<td>0.0</td>
<td>6.0</td>
<td>6.0</td>
<td>0</td>
<td>9</td>
<td>135</td>
</tr>
<tr>
<td>Zambia</td>
<td>747</td>
<td>3.5</td>
<td>450</td>
<td>1790</td>
<td>0.0</td>
<td>8.1</td>
<td>6.4</td>
<td>690</td>
<td>63</td>
<td>263</td>
</tr>
<tr>
<td>Rhodesia</td>
<td>39</td>
<td>4.0</td>
<td>830</td>
<td>2180</td>
<td>0.0</td>
<td>19.7</td>
<td>20.6</td>
<td>4</td>
<td>20</td>
<td>1150</td>
</tr>
<tr>
<td>Malagasy</td>
<td>596</td>
<td>5.9</td>
<td>689</td>
<td>1150</td>
<td>6.0</td>
<td>4.8</td>
<td>4.8</td>
<td>4</td>
<td>20</td>
<td>1150</td>
</tr>
<tr>
<td>Mauritius</td>
<td>5</td>
<td>0.7</td>
<td>175</td>
<td>2800</td>
<td>0.0</td>
<td>19.1</td>
<td>19.1</td>
<td>5</td>
<td>25</td>
<td>129</td>
</tr>
<tr>
<td>Somalia</td>
<td>25</td>
<td>0.4</td>
<td>150</td>
<td>180</td>
<td>0.0</td>
<td>5.0</td>
<td>5.0</td>
<td>37</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5200</strong></td>
<td><strong>74.0</strong></td>
<td><strong>75000</strong></td>
<td><strong>180000</strong></td>
<td><strong>13.5</strong></td>
<td><strong>180000</strong></td>
<td><strong>180000</strong></td>
<td><strong>180000</strong></td>
<td><strong>180000</strong></td>
<td><strong>180000</strong></td>
</tr>
</tbody>
</table>

1/ 1950 figures
2/ not available
3/ not independent
4/ Estimates
5/ Comparison with another
6/ University of Rhodesia equivalent from Malawi; Zambia and Rhodesia. The number of students studying abroad is not available.

Source: External Publications
11th Year Book of Prisical Accounts and Other Publications
1950-70
Statistical Bulletin, RSA
### General Indicators
for the Countries of the North African Sub-region
1961

<table>
<thead>
<tr>
<th>Country</th>
<th>Area (sq. km)</th>
<th>Population</th>
<th>GNP $ (Total)</th>
<th>Per Capita $ (Total)</th>
<th>Per Capita $ (Manufacturing)</th>
<th>Growth Rate (1960-70)</th>
<th>Electric Energy (Kw. hrs)</th>
<th>Primary Energy (Kw. hrs)</th>
<th>Third Level Education</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt</td>
<td>1000</td>
<td>55,615</td>
<td>2,450</td>
<td>447</td>
<td>5.6</td>
<td>5.5</td>
<td>88</td>
<td>142</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>Algeria</td>
<td>420,000</td>
<td>13,322</td>
<td>1,471</td>
<td>77</td>
<td>5.6</td>
<td>5.6</td>
<td>139</td>
<td>259</td>
<td>774</td>
<td></td>
</tr>
<tr>
<td>Tunisia</td>
<td>44,600</td>
<td>1,531,500</td>
<td>1,560</td>
<td>72</td>
<td>5.6</td>
<td>5.8</td>
<td>172</td>
<td>200</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Libya</td>
<td>620,000</td>
<td>1760,000</td>
<td>770</td>
<td>42</td>
<td>5.6</td>
<td>8.1</td>
<td>92</td>
<td>140</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>U.A.E.</td>
<td>114,000</td>
<td>1000,000</td>
<td>1,150</td>
<td>1,450</td>
<td>5.6</td>
<td>5.8</td>
<td>140</td>
<td>270</td>
<td>3,472</td>
<td></td>
</tr>
<tr>
<td>Sudan</td>
<td>250,000</td>
<td>1,026,000</td>
<td>2,072</td>
<td>72</td>
<td>5.6</td>
<td>8.1</td>
<td>10</td>
<td>51</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>8217</td>
<td>66,988</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


**Sources**

1. Yearbook of National Accounts and Other Publications
2. Statistical Division, U.N.
<table>
<thead>
<tr>
<th>Country</th>
<th>Area (sq. mi.)</th>
<th>Population</th>
<th>GNP Per Capita</th>
<th>For Capital</th>
<th>Growth Rate</th>
<th>Electricity</th>
<th>Primary Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria</td>
<td>299,340</td>
<td>26,027</td>
<td>34.78</td>
<td>21.3</td>
<td>13.1%</td>
<td>1.7%</td>
<td></td>
</tr>
<tr>
<td>Togo</td>
<td>28,050</td>
<td>9,016</td>
<td>31.53</td>
<td>15.2</td>
<td>3.9%</td>
<td>6.1%</td>
<td></td>
</tr>
<tr>
<td>Benin</td>
<td>109,000</td>
<td>8,033</td>
<td>29.26</td>
<td>12.3</td>
<td>4.0%</td>
<td>5.0%</td>
<td></td>
</tr>
<tr>
<td>Mali</td>
<td>352,000</td>
<td>6,751</td>
<td>25.38</td>
<td>13.7</td>
<td>4.5%</td>
<td>6.3%</td>
<td></td>
</tr>
<tr>
<td>Upper Volta</td>
<td>76,950</td>
<td>6,995</td>
<td>25.07</td>
<td>12.1</td>
<td>3.9%</td>
<td>4.3%</td>
<td></td>
</tr>
<tr>
<td>Ivory Coast</td>
<td>120,600</td>
<td>7,516</td>
<td>39.21</td>
<td>15.2</td>
<td>3.9%</td>
<td>5.1%</td>
<td></td>
</tr>
<tr>
<td>Guinea</td>
<td>23,300</td>
<td>6,200</td>
<td>37.67</td>
<td>16.8</td>
<td>4.4%</td>
<td>5.2%</td>
<td></td>
</tr>
<tr>
<td>Senegal</td>
<td>103,000</td>
<td>3,980</td>
<td>19.52</td>
<td>11.6</td>
<td>2.5%</td>
<td>3.2%</td>
<td></td>
</tr>
<tr>
<td>Mauritania</td>
<td>4,250</td>
<td>2,800</td>
<td>10.97</td>
<td>10.0</td>
<td>1.0%</td>
<td>1.0%</td>
<td></td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>5,725</td>
<td>2,600</td>
<td>5.73</td>
<td>6.9</td>
<td>0.5%</td>
<td>0.5%</td>
<td></td>
</tr>
<tr>
<td>Liberia</td>
<td>43,000</td>
<td>1,652</td>
<td>12.29</td>
<td>8.4</td>
<td>1.5%</td>
<td>1.5%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>492,760</td>
<td>31,284</td>
<td>28.46</td>
<td>14.2</td>
<td>8.7%</td>
<td>6.9%</td>
<td></td>
</tr>
</tbody>
</table>

Sources: *National Publications*; 1960 Year Book of National Accounts and other publications; Statistical Division, H.C.A.
<table>
<thead>
<tr>
<th>Country</th>
<th>Area (000 square km)</th>
<th>Population Total (Million)</th>
<th>Per Capita</th>
<th>Gross Domestic Product Per Capita (US$)</th>
<th>Percentage Share of Filing</th>
<th>Growth Rate % 60/70</th>
<th>For Capital Consumption</th>
<th>Third Level Function</th>
<th>Within Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congo</td>
<td>2,316</td>
<td>16.7</td>
<td>1247</td>
<td>100</td>
<td>67</td>
<td>12.2</td>
<td>6.3</td>
<td>243</td>
<td>93</td>
</tr>
<tr>
<td>Congo</td>
<td>842</td>
<td>0.8</td>
<td>87</td>
<td>167</td>
<td>256</td>
<td>10.7</td>
<td>7.3</td>
<td>37</td>
<td>159</td>
</tr>
<tr>
<td>Sum</td>
<td>267</td>
<td>0.3</td>
<td>91</td>
<td>201</td>
<td>341</td>
<td>9.1</td>
<td>6.9</td>
<td>40</td>
<td>126</td>
</tr>
<tr>
<td>S. Afr. Rep.</td>
<td>617</td>
<td>1.5</td>
<td>96</td>
<td>78</td>
<td>196</td>
<td>3.9</td>
<td>4.1</td>
<td>8</td>
<td>36</td>
</tr>
<tr>
<td>Ex.</td>
<td>12.8</td>
<td>2.7</td>
<td>160</td>
<td>66</td>
<td>183</td>
<td>...</td>
<td>5.4</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Benin</td>
<td>475</td>
<td>4.3</td>
<td>367</td>
<td>62</td>
<td>815</td>
<td>...</td>
<td>6.4</td>
<td>246</td>
<td>67</td>
</tr>
<tr>
<td>Total</td>
<td>8,331</td>
<td>26.3</td>
<td>2,266</td>
<td>93</td>
<td>425</td>
<td>...</td>
<td>192</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>


Sourcing:
National Publications
UN Year book of National accounts and other Publications
Statistical Division, E.C.A.
<table>
<thead>
<tr>
<th>SITE</th>
<th>Commodity Group</th>
<th>Europe</th>
<th>East Africa</th>
<th>S. R. Nigeria</th>
<th>Tanganyika</th>
<th>Subtotal</th>
<th>Somaia</th>
<th>Mauritius</th>
<th>Reunion</th>
<th>Subtotal</th>
<th>Subtotal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>72</td>
<td>Electrical Machinery</td>
<td>1.8</td>
<td>10.0</td>
<td>2.7</td>
<td>13.1</td>
<td>10.0</td>
<td>14.7</td>
<td>21.4</td>
<td>16.0</td>
<td>36.9</td>
<td>21.3</td>
<td>2.9</td>
</tr>
<tr>
<td>722.1</td>
<td>Rotating Machinery</td>
<td>0.2</td>
<td>1.1</td>
<td>0.3</td>
<td>0.6</td>
<td>6.1</td>
<td>0.9</td>
<td>2.5</td>
<td>12.7</td>
<td>4.5</td>
<td>8.5</td>
<td>6.7</td>
</tr>
<tr>
<td>722.2</td>
<td>Electric Switchgear</td>
<td>-</td>
<td>-</td>
<td>0.1</td>
<td>17.2</td>
<td>9.2</td>
<td>1.4</td>
<td>6.1</td>
<td>16.5</td>
<td>10.5</td>
<td>11.6</td>
<td>6.1</td>
</tr>
<tr>
<td>729.1</td>
<td>Electric Batteries</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.2</td>
<td>9.2</td>
<td>1.3</td>
<td>0.5</td>
<td>2.1</td>
<td>0.9</td>
<td>1.6</td>
<td>6.1</td>
</tr>
<tr>
<td>729.5</td>
<td>Electric and Related</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>734.1</td>
<td>Domestic Radio Receivers</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>774.9</td>
<td>Outer T. L. Command and Loadgage Apparatus</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>779.3(7)</td>
<td>Industrial Furnaces Electrical</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>779.3(8)</td>
<td>Other Instruments Electrical</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>779.3(9)</td>
<td>Apparatus for Telecommunication</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>779.5</td>
<td>Apparatus for Motor Vehicles</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>779.6</td>
<td>Apparatus for Transportaion</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>779.9</td>
<td>Other Instruments</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>779.9</td>
<td>Other Instruments for Medical Purposes</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>779.9</td>
<td>Miscellaneous Articles</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>779.9</td>
<td>Portable Electrical Tools</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>779.9</td>
<td>Others</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Legend:**
- a: f.o.b. values of imports of the major exporting countries of the whole, as provided by the Economic Commission for Europe, figures of exports from the Eastern European countries and China not being available.
- b: Total c.i.f. values of imports as indicated by the country and sub-divisions according to the percentages under a. For East Africa, the total c.i.f. value of imports given under a was increased by 12% to cover air freight and insurance. For Somaia the f.o.b. values were multiplied by 1.15 to cover air freight and insurance.
- c: Percentage of the figures for electrical machinery in total as given both by the E.C.C. and by the country statistics, but no totals by either. The percentage of the E.C.C. is made according to percentages given under a in sub-total.
- d: Each country's exports to the East African sub-region are shown by the country, and sub-divisions, and no totals by either of the countries.
- e: Under Sub-total 1 is the sum of all the figures in the same row.
- f: No figures are available for French Somaliland, Burundi and Rwanda, whose data for 1957 to 1966 was included in that of Congo - Leopoldville. The figures of this column for the three countries are an estimate. Within the sub-divisions (except in the last column for the total for the sub-region in 1957) the figures of the three countries were added up for the total for the sub-region
- g: The total of the figures for the three countries in the last column for the total for the sub-region is 25518,000 compared to 25518,000 for the total for the country. The figures of the three countries may vary from 1.9 to 7.8 million. The sub-total of the figures of the three countries for the total for the sub-region is 25518,000.
- h: Average annual c.i.f. value of imports into the 14 countries of the East African sub-region over the period 1957 to 1960 approximated to the nearest US$10,000.

**Notes:**
- The Economic Commission for Europe.
- The Economic Commission for Europe.
- The Economic Commission for Europe.
Table 3.1 (a)

Imports of A. stellarioides from the Yukon Territory to the Dominion of the North America Sub-region

<table>
<thead>
<tr>
<th>Origin</th>
<th>Year</th>
<th>Season</th>
<th>A (kg)</th>
<th>A (lbs)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: This table provides data on the importation of A. stellarioides from the Yukon Territory to the Dominion of the North America Sub-region. The data includes the origin, year, season, weight in kilograms (A), weight in pounds (A), and the total weight. The specific data is not legible in the image.*
Table 1.1

<table>
<thead>
<tr>
<th>Item</th>
<th>Capacity, New</th>
<th>Useful Life</th>
<th>General</th>
<th>East African/Customs Union</th>
<th>Togo</th>
<th>Sierra Leone</th>
<th>Gambia</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>Electrical Appliances</td>
<td>1.6</td>
<td>7.5</td>
<td>7.5</td>
<td>56.0</td>
<td>2.2</td>
<td>100</td>
<td>10.7</td>
</tr>
<tr>
<td>75.1</td>
<td>Lighting Fixtures</td>
<td>1.6</td>
<td>7.5</td>
<td>7.5</td>
<td>56.0</td>
<td>2.2</td>
<td>100</td>
<td>10.7</td>
</tr>
<tr>
<td>75.2</td>
<td>Electrical Transformers</td>
<td>1.6</td>
<td>7.5</td>
<td>7.5</td>
<td>56.0</td>
<td>2.2</td>
<td>100</td>
<td>10.7</td>
</tr>
<tr>
<td>75.3</td>
<td>Electric Generators</td>
<td>1.6</td>
<td>7.5</td>
<td>7.5</td>
<td>56.0</td>
<td>2.2</td>
<td>100</td>
<td>10.7</td>
</tr>
<tr>
<td>75.4</td>
<td>Electric Motors</td>
<td>1.6</td>
<td>7.5</td>
<td>7.5</td>
<td>56.0</td>
<td>2.2</td>
<td>100</td>
<td>10.7</td>
</tr>
<tr>
<td>75.5</td>
<td>Electric Heaters</td>
<td>1.6</td>
<td>7.5</td>
<td>7.5</td>
<td>56.0</td>
<td>2.2</td>
<td>100</td>
<td>10.7</td>
</tr>
<tr>
<td>75.6</td>
<td>Electric Stoves</td>
<td>1.6</td>
<td>7.5</td>
<td>7.5</td>
<td>56.0</td>
<td>2.2</td>
<td>100</td>
<td>10.7</td>
</tr>
<tr>
<td>75.7</td>
<td>Electric Refrigerators</td>
<td>1.6</td>
<td>7.5</td>
<td>7.5</td>
<td>56.0</td>
<td>2.2</td>
<td>100</td>
<td>10.7</td>
</tr>
<tr>
<td>75.8</td>
<td>Electric Washing Machines</td>
<td>1.6</td>
<td>7.5</td>
<td>7.5</td>
<td>56.0</td>
<td>2.2</td>
<td>100</td>
<td>10.7</td>
</tr>
<tr>
<td>75.9</td>
<td>Electric Dryers</td>
<td>1.6</td>
<td>7.5</td>
<td>7.5</td>
<td>56.0</td>
<td>2.2</td>
<td>100</td>
<td>10.7</td>
</tr>
<tr>
<td>75.10</td>
<td>Electric Water Heaters</td>
<td>1.6</td>
<td>7.5</td>
<td>7.5</td>
<td>56.0</td>
<td>2.2</td>
<td>100</td>
<td>10.7</td>
</tr>
<tr>
<td>75.11</td>
<td>Electric Air Conditioners</td>
<td>1.6</td>
<td>7.5</td>
<td>7.5</td>
<td>56.0</td>
<td>2.2</td>
<td>100</td>
<td>10.7</td>
</tr>
<tr>
<td>75.12</td>
<td>Electric Power Generators</td>
<td>1.6</td>
<td>7.5</td>
<td>7.5</td>
<td>56.0</td>
<td>2.2</td>
<td>100</td>
<td>10.7</td>
</tr>
</tbody>
</table>

Note: The data is provided by the Office of the United Nations for the years 1957-1960. Figures are rounded to the nearest whole number.

*The term "capacity" refers to the maximum output of the electric appliances, while the "useful life" refers to the estimated lifespan of the product.*
Table II.1

Imports of Electrical Machinery Apparatus and Appliances into the Countries of the Central Africa Sub-region

Average Values over the Period 1957 - 1960

Million U.S. Dollars per Annun

<table>
<thead>
<tr>
<th>S I T C Revised</th>
<th>Commodity Group</th>
<th>Congo (Lea)</th>
<th>E.C.U. 1/</th>
<th>Cameroon 2/</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>72</td>
<td>Electrical Machinery Apparatus</td>
<td>7.5</td>
<td>5.2</td>
<td>4.6</td>
<td>8.2</td>
</tr>
<tr>
<td></td>
<td>and Appliances</td>
<td>6.4</td>
<td>5.2</td>
<td>4.6</td>
<td>8.2</td>
</tr>
<tr>
<td>722.1</td>
<td>Rotating Machinery</td>
<td>1.0</td>
<td>0.7</td>
<td>0.5</td>
<td>2.5</td>
</tr>
<tr>
<td>722.2</td>
<td>Electric Switchgear and</td>
<td>0.9</td>
<td>0.2</td>
<td>0.4</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Transformers</td>
<td>1.0</td>
<td>0.2</td>
<td>0.4</td>
<td>2.5</td>
</tr>
<tr>
<td>729.1</td>
<td>Electric Batteries and</td>
<td>1.1</td>
<td>0.4</td>
<td>0.5</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Accumulators</td>
<td>1.0</td>
<td>0.4</td>
<td>0.5</td>
<td>2.5</td>
</tr>
<tr>
<td>729.2</td>
<td>Bulbs and Lamps</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>729.4</td>
<td>Domestic Radio Receivers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>724.1</td>
<td>Domestic Television Receivers</td>
<td>1.2</td>
<td>0.8</td>
<td>0.7</td>
<td>2.5</td>
</tr>
<tr>
<td>724.2</td>
<td>Other Telecom. Appliances and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Telegraph</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>729.9(2)</td>
<td>Industrial Furnaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>729.9(2)</td>
<td>Electrical Apparatus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>729.9(2)</td>
<td>Other Electrothermic Apparatus</td>
<td>0.2</td>
<td>0.4</td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td>729.4(2)</td>
<td>Appliances for Motor Vehicles</td>
<td>0.4</td>
<td>0.4</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>729.5</td>
<td>Apparatus for Measuring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>726</td>
<td>Insulated Cables</td>
<td>0.4</td>
<td>0.5</td>
<td>0.4</td>
<td>1.5</td>
</tr>
<tr>
<td>729.6</td>
<td>Portable Electric Tools</td>
<td>0.1</td>
<td>0.4</td>
<td>0.5</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend: A = f.o.b. value of exports of the major exporting countries of the West as provided by the Economic Commission for Europe, figures of exports from the Eastern European countries and China not being available.

B = Total c.i.f. value of imports as indicated by the country or 1.20 times the value of A whichever is the greater, and its sub-divisions according to the relative sub-divisions of A.

1/ Equatorial Customs Union comprising Congo (Braz.), Gabon, Central African Republic and Chad.

2/ The ECE did not provide complete data for the Cameroon (Col. A) and the c.i.f. values of imports given under B are obtained from country publications.

Source: The Economic Commission for Europe - Country Publications
<table>
<thead>
<tr>
<th>SITEC Revision</th>
<th>Commodity Group</th>
<th>East African</th>
<th>Central African</th>
<th>West African</th>
<th>South African</th>
<th>TOTAL 4 Sub-regions</th>
<th>Angola</th>
<th>Mozambique</th>
</tr>
</thead>
<tbody>
<tr>
<td>72</td>
<td>Electrical Machinery, apparatus and appliances</td>
<td>71.0</td>
<td>18.0</td>
<td>47.0</td>
<td>112.0</td>
<td>228.0</td>
<td>33.0</td>
<td>3.0</td>
</tr>
<tr>
<td>722.1</td>
<td>Rotating Machinery</td>
<td>6.0</td>
<td>2.5</td>
<td>3.0</td>
<td>12.5</td>
<td>26.0</td>
<td>13.0</td>
<td>6.5</td>
</tr>
<tr>
<td>722.2</td>
<td>Electric Switchgear and Transformers</td>
<td>16.0</td>
<td>1.5</td>
<td>2.5</td>
<td>6.5</td>
<td>28.5</td>
<td>22.0</td>
<td></td>
</tr>
<tr>
<td>729.1</td>
<td>Electric Batteries and accumulators</td>
<td>3.0</td>
<td>1.5</td>
<td>5.5</td>
<td>6.5</td>
<td>12.5</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>729.3</td>
<td>Bulbs and Lamps</td>
<td>1.0</td>
<td></td>
<td>0.5</td>
<td>2.5</td>
<td>4.0</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>734.2</td>
<td>Domestic Radio Receivers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>734.3</td>
<td>Domestic Television Receivers</td>
<td>13.5</td>
<td>3.0</td>
<td>11.5</td>
<td>31.0</td>
<td>59.0</td>
<td>18.5</td>
<td>0.0</td>
</tr>
<tr>
<td>734.9</td>
<td>Other Telecommunication and telegraph apparatus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>729.2</td>
<td>Industrial Furnace Electrical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>729.4</td>
<td>Other Electrothermic apparatus</td>
<td>1.5</td>
<td>0.5</td>
<td>0.5</td>
<td>2.0</td>
<td>4.5</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>729.4 (2)</td>
<td>Appliances for motor vehicles</td>
<td>2.0</td>
<td>1.0</td>
<td>2.0</td>
<td>4.0</td>
<td>9.0</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>729.8</td>
<td>Apparatus for measuring</td>
<td>6.0</td>
<td>1.0</td>
<td>2.0</td>
<td>10.0</td>
<td>12.0</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>726</td>
<td>Apparatus for medical purposes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>739.1</td>
<td>Insulated cables</td>
<td>7.0</td>
<td>1.5</td>
<td>6.0</td>
<td>11.5</td>
<td>25.5</td>
<td>3.0</td>
<td>0.5</td>
</tr>
<tr>
<td>729.1</td>
<td>Portable Electric tools</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>1.0</td>
<td>2.5</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td>12.5</td>
<td>4.5</td>
<td>13.0</td>
<td>19.0</td>
<td>49.0</td>
<td>14.0</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Sources: The Economic Commission for Europe Country Publications
### Table 1

<table>
<thead>
<tr>
<th>Sub-total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>30</td>
</tr>
</tbody>
</table>

### Notes
- The table represents the distribution of individuals across different subregions.
- The data is presented in percentages of the total population.
<table>
<thead>
<tr>
<th>Country Group</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>1.5</td>
<td>1.7</td>
<td>1.9</td>
<td>2.0</td>
<td>2.2</td>
<td>2.4</td>
<td>2.6</td>
<td>2.8</td>
<td>3.0</td>
<td>3.2</td>
<td>3.4</td>
<td>3.6</td>
<td>3.8</td>
</tr>
<tr>
<td>Other Countries of the World</td>
<td>3.9</td>
<td>4.1</td>
<td>4.3</td>
<td>4.5</td>
<td>4.7</td>
<td>4.9</td>
<td>5.1</td>
<td>5.3</td>
<td>5.5</td>
<td>5.7</td>
<td>5.9</td>
<td>6.1</td>
<td>6.3</td>
</tr>
<tr>
<td>Africa</td>
<td>6.6</td>
<td>6.8</td>
<td>7.0</td>
<td>7.2</td>
<td>7.4</td>
<td>7.6</td>
<td>7.8</td>
<td>8.0</td>
<td>8.2</td>
<td>8.4</td>
<td>8.6</td>
<td>8.8</td>
<td>9.0</td>
</tr>
<tr>
<td>Europe</td>
<td>9.3</td>
<td>9.5</td>
<td>9.7</td>
<td>9.9</td>
<td>10.1</td>
<td>10.3</td>
<td>10.5</td>
<td>10.7</td>
<td>10.9</td>
<td>11.1</td>
<td>11.3</td>
<td>11.5</td>
<td>11.7</td>
</tr>
<tr>
<td>Asia</td>
<td>12.0</td>
<td>12.2</td>
<td>12.4</td>
<td>12.6</td>
<td>12.8</td>
<td>13.0</td>
<td>13.2</td>
<td>13.4</td>
<td>13.6</td>
<td>13.8</td>
<td>14.0</td>
<td>14.2</td>
<td>14.4</td>
</tr>
<tr>
<td>Middle East (Total)</td>
<td>14.7</td>
<td>14.9</td>
<td>15.1</td>
<td>15.3</td>
<td>15.5</td>
<td>15.7</td>
<td>15.9</td>
<td>16.1</td>
<td>16.3</td>
<td>16.5</td>
<td>16.7</td>
<td>16.9</td>
<td>17.1</td>
</tr>
</tbody>
</table>

Note: The data is provided by the Economic Commission for Europe, figures of exports from the Eastern European countries are not available.
TABLE 1: (a)
Imports of machinery other than Electric into the countries of the West African Sub-region
Average values over the period 1957-1960: Million U.S. Dollars per annum.

| Category of Machinery | West Africa (A) | Nigeria (B) | Togo (C) | Liberia (D) | Mauritania (E) | Gambia (F) | Senegal (G) | T.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>89.0</td>
<td>105.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A + B</td>
<td>134.5</td>
<td>111.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Electric Machinery</td>
<td>25.4</td>
<td>3.6</td>
<td>1.5</td>
<td>14.0</td>
<td>7.0</td>
<td>10.3</td>
<td>1.4</td>
<td>1.7</td>
</tr>
<tr>
<td>2. Non-Electric Machinery</td>
<td>6.1</td>
<td>1.9</td>
<td>2.4</td>
<td>0.8</td>
<td>11.0</td>
<td>7.8</td>
<td>2.2</td>
<td>3.2</td>
</tr>
<tr>
<td>3. Food Processing Machinery</td>
<td>5.4</td>
<td>1.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>4. Agricultural Machinery</td>
<td>0.7</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>5. Textile Machinery</td>
<td>2.7</td>
<td>0.2</td>
<td>0.2</td>
<td>1.3</td>
<td>1.6</td>
<td>5.5</td>
<td>1.1</td>
<td>6.3</td>
</tr>
<tr>
<td>6. Metal Working Machinery</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>7. Printing Machinery</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>8. Total</td>
<td>33.5</td>
<td>33.5</td>
<td>33.5</td>
<td>33.5</td>
<td>33.5</td>
<td>33.5</td>
<td>33.5</td>
<td>33.5</td>
</tr>
</tbody>
</table>

Source: As for table 11.1 (a)
TABLE 1 (2)

Inflow of Cotton, Other Textiles, Rice and Tobacco into the Economies of the Central African Sub-region

Average Figures, 1967-1970, in Million 1963 Dollars per annum

<table>
<thead>
<tr>
<th>Item</th>
<th>Source of Inflow</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
<th>TOTAL</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PRIMARY AGRICULTURE</td>
<td>Cotton finières</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Textiles finières</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Tobacco finières</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>2. SECONDARY AGRICULTURE</td>
<td>Rice</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Tobacco finières</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>3. INDUSTRY</td>
<td>Textile Industry</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Tobacco Industry</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>4. OTHER AGRICULTURAL INCOME</td>
<td>Rice</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Tobacco finières</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**TOTAL**

3.0

6.0

9.0

10.0
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Total</th>
<th>South Africa</th>
<th>Asia</th>
<th>Oceania</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motor Vehicles</td>
<td>100,000</td>
<td>50,000</td>
<td>20,000</td>
<td>30,000</td>
</tr>
<tr>
<td>2</td>
<td>Construction Machinery</td>
<td>40,000</td>
<td>20,000</td>
<td>10,000</td>
<td>5,000</td>
</tr>
<tr>
<td>3</td>
<td>Agricultural Machinery</td>
<td>60,000</td>
<td>30,000</td>
<td>15,000</td>
<td>15,000</td>
</tr>
<tr>
<td>4</td>
<td>Textile Machinery</td>
<td>20,000</td>
<td>10,000</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>5</td>
<td>Food Processing Machinery</td>
<td>40,000</td>
<td>20,000</td>
<td>10,000</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>Textile Mill Machinery</td>
<td>30,000</td>
<td>15,000</td>
<td>7,500</td>
<td>7,500</td>
</tr>
<tr>
<td>7</td>
<td>Printing Machinery</td>
<td>20,000</td>
<td>10,000</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>8</td>
<td>Electric Refrigeration</td>
<td>10,000</td>
<td>5,000</td>
<td>2,500</td>
<td>2,500</td>
</tr>
<tr>
<td>9</td>
<td>Commercial and Office Equipment</td>
<td>50,000</td>
<td>25,000</td>
<td>12,500</td>
<td>12,500</td>
</tr>
<tr>
<td>10</td>
<td>Industrial Furnaces</td>
<td>20,000</td>
<td>10,000</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>11</td>
<td>Other Vehicles</td>
<td>40,000</td>
<td>20,000</td>
<td>10,000</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>Total</td>
<td>400,000</td>
<td>200,000</td>
<td>100,000</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Figures are in thousands of dollars per annum.
TABLE 7.2 (1)

Net Imports of Electrical Machinery, Apparatus, and Appliances in the East African Sub-region

in 1,000 U.S. Dollars

<table>
<thead>
<tr>
<th>Country</th>
<th>Year 77</th>
<th>77/78</th>
<th>78/79</th>
<th>79/80</th>
<th>80/81</th>
<th>81/82</th>
<th>82/83</th>
<th>83/84</th>
<th>84/85</th>
<th>85/86</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>£</td>
<td>£</td>
<td>£</td>
<td>£</td>
<td>£</td>
<td>£</td>
<td>£</td>
<td>£</td>
<td>£</td>
<td>£</td>
</tr>
<tr>
<td>St. Lucia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power trans.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerators</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Indies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power trans.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerators</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trinidad &amp; Tobago</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power trans.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerators</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jamaica</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power trans.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerators</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Includes transformers; / includes apparatus; etc.
- Domestic and industrial machinery; or other electrical apparatus.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.
- Includes domestic refrigerators, etc.

**Sources:**
- Country replies to questionnaire.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 1: Imports from outside East Africa, plus imports from Uganda and Tanzania, less re-exports.

Note 2: Excludes non-agricultural.


Note 4: Structural steel

Source: Data as replied to questionnaire.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper &amp; Allied Products</td>
<td>7178</td>
<td>7282</td>
<td>7474</td>
<td>7616</td>
<td>7805</td>
<td>38717</td>
</tr>
<tr>
<td>Food &amp; Kindred Products</td>
<td>8366</td>
<td>8416</td>
<td>8773</td>
<td>9260</td>
<td>9937</td>
<td>45893</td>
</tr>
<tr>
<td>Textiles</td>
<td>20993</td>
<td>22938</td>
<td>25423</td>
<td>28217</td>
<td>25937</td>
<td>112656</td>
</tr>
<tr>
<td>Leather &amp; Allied Products</td>
<td>8600</td>
<td>958</td>
<td>19</td>
<td>146</td>
<td>328</td>
<td>2048</td>
</tr>
<tr>
<td>Footwear</td>
<td>927</td>
<td>81</td>
<td>19</td>
<td>3</td>
<td>68</td>
<td>147</td>
</tr>
<tr>
<td>Clothing &amp; Apparel</td>
<td>1664</td>
<td>16</td>
<td>21</td>
<td>242</td>
<td>603</td>
<td>2117</td>
</tr>
<tr>
<td>Furniture</td>
<td>1564</td>
<td>15</td>
<td>3</td>
<td>5</td>
<td>11</td>
<td>36</td>
</tr>
<tr>
<td>Paper &amp; Allied Products</td>
<td>118759</td>
<td>12083</td>
<td>12289</td>
<td>12686</td>
<td>13760</td>
<td>66201</td>
</tr>
</tbody>
</table>

Note: The table includes various industries and their respective production values for different years. The notes at the bottom provide details about the table columns.
| Industry Type | Machine Tools | Electrical Goods | Metal Fabrication | Wood and Furniture | Printing | Textile Machinery | Shipbuilding | Motor Vehicles | Total
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor inputs</td>
<td>6.65</td>
<td>1.351</td>
<td>1.211</td>
<td>1.421</td>
<td>1.421</td>
<td>1.421</td>
<td>1.421</td>
<td>1.421</td>
<td>1.421</td>
</tr>
<tr>
<td>Value added</td>
<td>2.75</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Labour inputs</td>
<td>0.8</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Capital inputs</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Note:** The table provides a breakdown of factor inputs, value added, and labour and capital inputs for different industry types in the West African Sub-region and Central African Sub-region.
### Table III

**Transport Equipment into the East African Sub-region**

*Values in 1963, Dollars*

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Railways</th>
<th>Road Vehicles</th>
<th>Motorcycles</th>
<th>Bicycle 1962</th>
<th>Bugyng 1962</th>
<th>Motorbicycles and Tricycles</th>
<th>Motorcycle and Trailers</th>
<th>Bicycles and Other Motorcycles</th>
<th>Bicycles and other motor vehicles</th>
<th>Bicycles and other vehicles</th>
<th>Bicycles and other vehicles <strong>1</strong></th>
<th>Bicycles and other vehicles <strong>2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>11378</td>
<td>6.2</td>
<td>731.1</td>
<td>731.4</td>
<td>731.6</td>
<td>732.1</td>
<td>732.3</td>
<td>732.5</td>
<td>732.6</td>
<td>732.7</td>
<td>732.8</td>
<td>733.1</td>
<td>733.3</td>
</tr>
<tr>
<td>Kenya</td>
<td>64</td>
<td>2668</td>
<td>6753</td>
<td>6755</td>
<td>6756</td>
<td>6757</td>
<td>6759</td>
<td>6761</td>
<td>6762</td>
<td>6763</td>
<td>6764</td>
<td>6755</td>
<td>6763</td>
</tr>
<tr>
<td>Uganda</td>
<td>61/63</td>
<td>1000</td>
<td>111</td>
<td>1112</td>
<td>1114</td>
<td>1116</td>
<td>1118</td>
<td>1120</td>
<td>1122</td>
<td>1123</td>
<td>1124</td>
<td>1112</td>
<td>1124</td>
</tr>
<tr>
<td>Tanzania</td>
<td>61/63</td>
<td>1218</td>
<td>131</td>
<td>1313</td>
<td>1314</td>
<td>1316</td>
<td>1318</td>
<td>1320</td>
<td>1322</td>
<td>1323</td>
<td>1324</td>
<td>1312</td>
<td>1324</td>
</tr>
<tr>
<td>Burundi</td>
<td>2048</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>-</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Rwanda</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malawi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zanzibar</td>
<td>64</td>
<td>2000</td>
<td>369</td>
<td>46</td>
<td>11</td>
<td>11</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Rhodesia</td>
<td>64</td>
<td>33530</td>
<td>451</td>
<td>9</td>
<td>2955</td>
<td>26</td>
<td>1</td>
<td>4</td>
<td>27708</td>
<td>8203</td>
<td>15</td>
<td>1256</td>
<td>436</td>
</tr>
<tr>
<td>Malagasy</td>
<td>61/63</td>
<td>11792</td>
<td>170</td>
<td>1</td>
<td>16</td>
<td>16</td>
<td>1</td>
<td>20100</td>
<td>8794</td>
<td>389</td>
<td>3299</td>
<td>1387</td>
<td>136</td>
</tr>
<tr>
<td>Mauritius</td>
<td>64</td>
<td>4447</td>
<td>47</td>
<td>36</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4000</td>
<td>1928</td>
<td>909</td>
<td>-</td>
<td>308</td>
<td>732</td>
</tr>
<tr>
<td>Reunion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>13638</td>
<td>18217</td>
<td>1</td>
<td>52</td>
<td>6572</td>
<td>143</td>
<td>2373</td>
<td>112042</td>
<td>41136</td>
<td>6802</td>
<td>11055</td>
<td>3032</td>
<td>528</td>
</tr>
</tbody>
</table>

**Source:** Country replies to questionnaire.

*1 For 1963 only; 2 Includes parts; 3 Average of 1961-1963 and 1st quarter of 1964*
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotating machinery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switchgear and trans</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Batteries and accumulators</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuses and lamps</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic radio receivers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic television receivers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telecommunications apparatus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrothermic apparatus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apparatus for measuring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic refrigerators</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic washing machines</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electromechanical domestic appliances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electric space heaters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulated cables</td>
<td>125</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>620</td>
<td>17780</td>
<td>1200</td>
<td>60</td>
</tr>
<tr>
<td>Bare copper wire</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>125</td>
<td>780</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>620</td>
<td>17780</td>
<td>1200</td>
<td>60</td>
</tr>
</tbody>
</table>

1/ Estimated

Source: Country replies to questionnaire
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron Pipes and Fittings</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cast Iron Pipes</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Iron and Steel Foundry</td>
<td>90</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Steel Sheets</td>
<td>-</td>
<td>-</td>
<td>500</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Steel Structures</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Metal Fittings</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tools and Dies</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Valves, pressure vessels</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wire Products</td>
<td>100</td>
<td>-</td>
<td>150</td>
<td>750</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Metal Hand Tools</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cane and Bamboo</td>
<td>-</td>
<td>-</td>
<td>500</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Vegetable Introductions</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>And Other articles</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Iron Wrought</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Door, Window and balcony frames</td>
<td>-</td>
<td>-</td>
<td>1400</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2000</td>
<td>-</td>
<td>250</td>
</tr>
<tr>
<td>Metal Furniture</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1700</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wire Springs</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sanitary and Plumbing</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Files and Plane Tools</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Razors Blades</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Other Metal Products</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>1200</td>
<td>17190</td>
<td>2800</td>
<td>8190</td>
<td>540</td>
<td>-</td>
<td>-</td>
<td>7000</td>
<td>25840</td>
<td>-</td>
</tr>
</tbody>
</table>

1/ Estimate
Sources: Country replies to questionnaire.
Table 13.1(1)

Local production of Machinery other than Electrical in the countries of the East African Sub-region
Value in '000 U.S. Dollars

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Somalia</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Kenya</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Uganda</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Zanzibar</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Rwanda</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Malawi</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Zanzibar</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Rwanda</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Malawi</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Zanzibar</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Rwanda</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Malawi</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Zanzibar</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Rwanda</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Malawi</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

1/ Estimate

Source: Country replies to questionnaire
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Railway Rolling Stock</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Railway Freight Cars</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Road Motor Vehicles</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>800</td>
<td>-</td>
</tr>
<tr>
<td>of which</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Passenger Cars</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Buses</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lorries and Trucks</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Special Purpose Lorries</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Chassis with Engines</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Road Vehicles other than Motor Vehicles</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>31050</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Of which Road Tractor Trailer Combinations</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>31090</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Trailers</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bicycles</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ships and Boats</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>800</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>18420</td>
<td>113</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

1/ Maintenance and repair works  
2/ Including repair shops  
3/ Bicycle assembly with 7 employees  
4/ Estimate  
5/ Ship building and repairing  

Sources: Country replies to questionnaires.
### Table II.3 (5)

**LOCAL PRODUCTION OF ENGINEERING COMMODITIES**

**IN THE COUNTRIES OF THE EAST AFRICAN SUB-REGION**

Values in '000 U. S. Dollars

<table>
<thead>
<tr>
<th></th>
<th>Ethiopia</th>
<th>Somalia</th>
<th>Kenya</th>
<th>Uganda</th>
<th>Tanzania</th>
<th>Burundi</th>
<th>Rwanda</th>
<th>Malawi</th>
<th>Zambia</th>
<th>St. Lucia</th>
<th>Guyana</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Machinery</td>
<td>125</td>
<td>-</td>
<td>750</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>125</td>
</tr>
<tr>
<td>Apparatus and Appliances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural Engineering</td>
<td>1560</td>
<td>-</td>
<td>1740</td>
<td>3500</td>
<td>3500</td>
<td>240</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1560</td>
</tr>
<tr>
<td>and Metal Products</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machinery other than Electrical</td>
<td>-</td>
<td>-</td>
<td>1250</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1200</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1250</td>
</tr>
<tr>
<td>Transport Equipment</td>
<td>-</td>
<td>-</td>
<td>154.0</td>
<td>120</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>120</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>154.0</td>
</tr>
<tr>
<td>Total</td>
<td>1285</td>
<td>46100</td>
<td>3800</td>
<td>3500</td>
<td>240</td>
<td>18000</td>
<td>8850</td>
<td>18000</td>
<td>8850</td>
<td>14000</td>
<td>14000</td>
<td>1285</td>
</tr>
<tr>
<td>Population (Million)</td>
<td>21.5</td>
<td>8.85</td>
<td>7.39</td>
<td>9.06</td>
<td>7.39</td>
<td>4.10</td>
<td>4.50</td>
<td>1.14</td>
<td>8.42</td>
<td>5.79</td>
<td>5.79</td>
<td>115.0</td>
</tr>
<tr>
<td>Per Capita Local Production USS</td>
<td>0.08</td>
<td>4.08</td>
<td>0.49</td>
<td>0.37</td>
<td>0.30</td>
<td>0.20</td>
<td>0.30</td>
<td>0.80</td>
<td>0.80</td>
<td>0.30</td>
<td>0.30</td>
<td>0.08</td>
</tr>
</tbody>
</table>

1/ Includes Railway, Water Vehicle and Ship maintenance and repair.

Sources: 'Country replies to questionnaire.'
<table>
<thead>
<tr>
<th>Product Line</th>
<th>1933</th>
<th>1934</th>
<th>1935</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheet Copper</td>
<td>1,300</td>
<td>1,050</td>
<td>650</td>
</tr>
<tr>
<td>Sheet Brass</td>
<td>500</td>
<td>400</td>
<td>500</td>
</tr>
<tr>
<td>Metal Containers</td>
<td>2,200</td>
<td>3,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Steel and Steel Tubes</td>
<td>5,000</td>
<td>3,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Rulers, Protractor, Tapes</td>
<td>3,000</td>
<td>2,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Vane Products</td>
<td>10,000</td>
<td>12,000</td>
<td>4,000</td>
</tr>
<tr>
<td>Metal Medal Cases</td>
<td>1,000</td>
<td>2,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Bolted and Bolted Nails</td>
<td>1,500</td>
<td>2,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Milling Cutters, etc.</td>
<td>2,000</td>
<td>3,000</td>
<td>1,000</td>
</tr>
<tr>
<td>All Other Metal</td>
<td>1,500</td>
<td>2,000</td>
<td>1,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>1933</th>
<th>1934</th>
<th>1935</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar Steel</td>
<td>3,000</td>
<td>2,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Bar, Mill and Barley Screws</td>
<td>4,000</td>
<td>3,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Metal Furniture</td>
<td>2,000</td>
<td>3,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Milling Cutters, etc.</td>
<td>1,000</td>
<td>2,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Saw Blade</td>
<td>1,000</td>
<td>2,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Miscellaneous and Machine Parts</td>
<td>700</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Cutters</td>
<td>1,000</td>
<td>2,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Other Metal Products, e.g.</td>
<td>1,000</td>
<td>2,000</td>
<td>1,000</td>
</tr>
</tbody>
</table>

| Total                        | 20,000  | 20,000  | 10,000  |

Source: Data from 1933 to 1935.
<table>
<thead>
<tr>
<th>Product Group</th>
<th>Quantity</th>
<th>Description</th>
<th>Used For</th>
<th>Weight (kg)</th>
<th>Value (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>De-molition &amp; Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Industry</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tractors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machinery Tools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Industrial Machinery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pumps &amp; Compressors</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office Machines</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woodworking Machinery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth Moving Machinery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conveying Machinery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mining Machinery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Textile Machinery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sewing Machinery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigeration Machinery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ball Bearings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valves, C.I., Steel, Press, etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>128</td>
<td></td>
<td></td>
<td>123,755</td>
<td>30,000</td>
</tr>
</tbody>
</table>

1/ For working tools 
2/ Machine hand tools 
3/ Tractors
4/ Industrial 
5/ As hydrolic breaker 
6/ Capturing machine

Source: Country Replica to Questionnaire.
<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Total</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Note:</em></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Additional Notes:**
- Calculation method
- Conversion factors
- Unit conversions
## Table IV.1.7

Local Production of Engineering Commodities
in reporting countries
in the North, west and Central African Sub-regions

Value in 1960 U.S. Dollars

<table>
<thead>
<tr>
<th>Local Production of</th>
<th>Morocco 1963</th>
<th>UAR 1964</th>
<th>Sudan 1964</th>
<th>Ghana 1963</th>
<th>Chad 1963</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural engineering and metal products</td>
<td>40,137</td>
<td>7,483</td>
<td>405</td>
<td>11,925</td>
<td>44</td>
</tr>
<tr>
<td>Electrical machinery apparatus and appliances</td>
<td>5,468</td>
<td>58,830</td>
<td>371</td>
<td>...</td>
<td>100</td>
</tr>
<tr>
<td>Machinery other than electric</td>
<td>1,682</td>
<td>12,335</td>
<td>...</td>
<td>...</td>
<td>12</td>
</tr>
<tr>
<td>Transport equipment</td>
<td>20,917</td>
<td>45,580</td>
<td>...</td>
<td>5,366</td>
<td>400</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>58,404</strong></td>
<td><strong>195,235</strong></td>
<td><strong>776</strong></td>
<td><strong>17,291</strong></td>
<td><strong>556</strong></td>
</tr>
<tr>
<td>Population in thousands</td>
<td>12,665</td>
<td>17,955</td>
<td>13,180</td>
<td>7,340</td>
<td>2,800</td>
</tr>
<tr>
<td>Production per capita in dollars</td>
<td>4.6</td>
<td>7.0</td>
<td>9.06</td>
<td>2.36</td>
<td>0.2</td>
</tr>
</tbody>
</table>

*Source: Country replies to questionnaire*
### Table 11.71

**C.I.F. Value of Imports of Electrical Machinery, Apparatus and Appliances**

*Into the countries of the East African sub-region (1950-1973, US dollars)*

<table>
<thead>
<tr>
<th>Commodity Group</th>
<th>Electric Machinery, Apparatus and Appliances (T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>1,937</td>
</tr>
<tr>
<td>Somaliland</td>
<td>319</td>
</tr>
<tr>
<td>Somalia</td>
<td>15,862</td>
</tr>
<tr>
<td>Kenya</td>
<td>20,903</td>
</tr>
<tr>
<td>Uganda</td>
<td>4,661</td>
</tr>
<tr>
<td>Tanzania</td>
<td>753</td>
</tr>
<tr>
<td>Burundi</td>
<td>30,903</td>
</tr>
<tr>
<td>Rwanda</td>
<td>25,450</td>
</tr>
<tr>
<td>Malawi</td>
<td>46,153</td>
</tr>
</tbody>
</table>

*Source: Foreign Trade Statistics*
<table>
<thead>
<tr>
<th>Country</th>
<th>Base Year</th>
<th>Per Capita G. D. P. U.S.</th>
<th>Per Capita Consumption U. S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>1963</td>
<td>.3</td>
<td>0.01</td>
</tr>
<tr>
<td>Fr. Somalia</td>
<td>60/62</td>
<td>50</td>
<td>0.01</td>
</tr>
<tr>
<td>Somalia</td>
<td>1954</td>
<td>85</td>
<td>0.06</td>
</tr>
<tr>
<td>Kenya</td>
<td>61/63</td>
<td>63</td>
<td>0.01</td>
</tr>
<tr>
<td>Tanzania</td>
<td>61/63</td>
<td>58</td>
<td>0.3</td>
</tr>
<tr>
<td>Burundi</td>
<td>61/63</td>
<td>49</td>
<td>0.01</td>
</tr>
<tr>
<td>Malawi</td>
<td></td>
<td></td>
<td>0.3</td>
</tr>
<tr>
<td>Zambia</td>
<td>1964</td>
<td>180</td>
<td>0.21</td>
</tr>
<tr>
<td>Rhodesia</td>
<td>1964</td>
<td>213</td>
<td>0.57</td>
</tr>
<tr>
<td>Malagasy</td>
<td>61/63</td>
<td>112</td>
<td>0.3</td>
</tr>
<tr>
<td>Mauritius</td>
<td>1954</td>
<td>249</td>
<td>0.64</td>
</tr>
<tr>
<td>Reunion</td>
<td></td>
<td></td>
<td>0.3</td>
</tr>
</tbody>
</table>

Source: Country replies to questionnaire
<table>
<thead>
<tr>
<th>Country</th>
<th>Iron and Steel</th>
<th>Non-ferrous Metals</th>
<th>Sub-total (1)</th>
<th>Structural Engineering and metal Products</th>
<th>Sub-total (2)</th>
<th>Machinery, mining &amp; electrical equipment</th>
<th>Sub-total (3)</th>
<th>Transport Equipment</th>
<th>Sub-total (3)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>29,300</td>
<td>590</td>
<td>29,890</td>
<td>4,470</td>
<td>34,350</td>
<td>5,740</td>
<td>1,700</td>
<td>10,780</td>
<td>16,200</td>
<td>50,550</td>
</tr>
<tr>
<td>Eritrea</td>
<td>100</td>
<td>120</td>
<td>220</td>
<td>3,900</td>
<td>4,100</td>
<td>100</td>
<td>500</td>
<td>900</td>
<td>2,100</td>
<td>6,000</td>
</tr>
<tr>
<td>Kenya</td>
<td>97,000</td>
<td>1,790</td>
<td>98,790</td>
<td>14,440</td>
<td>110,670</td>
<td>15,540</td>
<td>4,450</td>
<td>24,890</td>
<td>30,780</td>
<td>119,550</td>
</tr>
<tr>
<td>Namibia</td>
<td>9,410</td>
<td>170</td>
<td>9,580</td>
<td>3,470</td>
<td>13,050</td>
<td>3,990</td>
<td>1,270</td>
<td>5,260</td>
<td>6,530</td>
<td>13,760</td>
</tr>
<tr>
<td>Tanzania</td>
<td>26,920</td>
<td>1,790</td>
<td>28,710</td>
<td>6,780</td>
<td>13,490</td>
<td>5,330</td>
<td>2,140</td>
<td>9,300</td>
<td>16,780</td>
<td>55,270</td>
</tr>
<tr>
<td>Uganda</td>
<td>6,160</td>
<td>240</td>
<td>6,400</td>
<td>1,700</td>
<td>8,100</td>
<td>1,960</td>
<td>550</td>
<td>1,890</td>
<td>4,440</td>
<td>12,990</td>
</tr>
<tr>
<td>Rwanda</td>
<td>6,700</td>
<td>270</td>
<td>6,970</td>
<td>1,830</td>
<td>8,800</td>
<td>2,090</td>
<td>590</td>
<td>2,020</td>
<td>4,710</td>
<td>13,500</td>
</tr>
<tr>
<td>Mozambique</td>
<td>5,210</td>
<td>200</td>
<td>5,410</td>
<td>1,440</td>
<td>6,850</td>
<td>1,440</td>
<td>350</td>
<td>1,900</td>
<td>3,840</td>
<td>10,500</td>
</tr>
<tr>
<td>Malawi</td>
<td>46,000</td>
<td>1,000</td>
<td>47,000</td>
<td>18,100</td>
<td>65,100</td>
<td>16,550</td>
<td>6,550</td>
<td>11,120</td>
<td>12,150</td>
<td>44,220</td>
</tr>
<tr>
<td>Botswana</td>
<td>122,600</td>
<td>6,020</td>
<td>128,620</td>
<td>27,920</td>
<td>152,540</td>
<td>26,480</td>
<td>9,870</td>
<td>32,300</td>
<td>64,670</td>
<td>227,350</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>35,970</td>
<td>1,150</td>
<td>37,120</td>
<td>11,700</td>
<td>49,820</td>
<td>13,450</td>
<td>5,540</td>
<td>11,980</td>
<td>27,810</td>
<td>75,790</td>
</tr>
<tr>
<td>Mauritius</td>
<td>12,220</td>
<td>380</td>
<td>12,600</td>
<td>7,920</td>
<td>20,520</td>
<td>2,190</td>
<td>1,400</td>
<td>1,700</td>
<td>5,290</td>
<td>27,810</td>
</tr>
<tr>
<td>Botswana 1</td>
<td>32,240</td>
<td>700</td>
<td>32,940</td>
<td>5,290</td>
<td>38,230</td>
<td>4,700</td>
<td>1,900</td>
<td>11,400</td>
<td>19,300</td>
<td>56,550</td>
</tr>
<tr>
<td>Botswana 2</td>
<td>139,150</td>
<td>7,740</td>
<td>146,890</td>
<td>27,220</td>
<td>174,110</td>
<td>23,910</td>
<td>8,000</td>
<td>43,490</td>
<td>51,490</td>
<td>249,900</td>
</tr>
<tr>
<td>Botswana 3</td>
<td>176,100</td>
<td>7,220</td>
<td>183,320</td>
<td>41,460</td>
<td>225,780</td>
<td>44,970</td>
<td>16,770</td>
<td>47,780</td>
<td>104,560</td>
<td>334,060</td>
</tr>
<tr>
<td>Botswana 4</td>
<td>43,100</td>
<td>1,350</td>
<td>44,450</td>
<td>14,070</td>
<td>58,520</td>
<td>6,280</td>
<td>3,390</td>
<td>7,680</td>
<td>14,080</td>
<td>57,760</td>
</tr>
<tr>
<td>TOTAL</td>
<td>391,210</td>
<td>16,710</td>
<td>407,920</td>
<td>90,940</td>
<td>498,860</td>
<td>79,880</td>
<td>30,920</td>
<td>109,770</td>
<td>219,720</td>
<td>715,180</td>
</tr>
<tr>
<td>Benin</td>
<td>18,320</td>
<td>1,680</td>
<td>20,000</td>
<td>9,560</td>
<td>29,560</td>
<td>7,760</td>
<td>2,330</td>
<td>12,090</td>
<td>22,450</td>
<td>52,080</td>
</tr>
</tbody>
</table>

Legend: Sub-total 1: Ethiopia and Eritrea
Sub-total 2: Kenya, Uganda, Tanzania, Botswana and Malawi
Sub-total 3: United Arab Emirates
Sub-total 4: Hungary and Reunion
<table>
<thead>
<tr>
<th>Average Number employed by the enterprise in this industry</th>
<th>Enterprises</th>
<th>Total Sales/Net Output</th>
<th>Employees</th>
<th>Wages and Salaries</th>
<th>Net Output per Person employed</th>
</tr>
</thead>
<tbody>
<tr>
<td>------</td>
<td>------</td>
<td>----------</td>
<td>----------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>1-25</td>
<td>45</td>
<td>52</td>
<td>8.05</td>
<td>4.00</td>
<td>1,276</td>
</tr>
<tr>
<td>26-50</td>
<td>86</td>
<td>94</td>
<td>17.46</td>
<td>9.20</td>
<td>2,659</td>
</tr>
<tr>
<td>51-100</td>
<td>34</td>
<td>47</td>
<td>30.45</td>
<td>15.45</td>
<td>4,360</td>
</tr>
<tr>
<td>101-150</td>
<td>76</td>
<td>97</td>
<td>26.68</td>
<td>12.55</td>
<td>3,731</td>
</tr>
<tr>
<td>151-200</td>
<td>11</td>
<td>15</td>
<td>16.20</td>
<td>15.20</td>
<td>5,675</td>
</tr>
<tr>
<td>201-250</td>
<td>11</td>
<td>19</td>
<td>13.50</td>
<td>14.55</td>
<td>3,673</td>
</tr>
<tr>
<td>251-300</td>
<td>11</td>
<td>15</td>
<td>14.50</td>
<td>13.50</td>
<td>5,675</td>
</tr>
<tr>
<td>301-350</td>
<td>11</td>
<td>38</td>
<td>56.50</td>
<td>24.45</td>
<td>6,560</td>
</tr>
<tr>
<td>351-400</td>
<td>11</td>
<td>38</td>
<td>68.45</td>
<td>34.15</td>
<td>8,939</td>
</tr>
<tr>
<td>401-450</td>
<td>11</td>
<td>17</td>
<td>48.50</td>
<td>22.50</td>
<td>5,416</td>
</tr>
<tr>
<td>451-500</td>
<td>3</td>
<td>11</td>
<td>64.05</td>
<td>36.90</td>
<td>8,639</td>
</tr>
<tr>
<td>501-550</td>
<td>4</td>
<td>23</td>
<td>118.65</td>
<td>61.70</td>
<td>13,370</td>
</tr>
<tr>
<td>550 and over</td>
<td>3</td>
<td>42</td>
<td>553.45</td>
<td>321.40</td>
<td>8,880</td>
</tr>
<tr>
<td>Total</td>
<td>327</td>
<td>373</td>
<td>2,048.10</td>
<td>576.65</td>
<td>135,241</td>
</tr>
</tbody>
</table>

Source: United Kingdom Board of Trade Report on the Census of Production for 1958, part 56.
### TABLE IV a

**DATA RELATIVE TO PRODUCTION OF INSULATED WIRES AND CABLES IN THE UNITED KINGDOM IN 1958**

**Firms employing 25 or more persons**

<table>
<thead>
<tr>
<th>Average Number employed by the enterprise in this industry (No.)</th>
<th>Establishments</th>
<th>Total Sales/Net Output</th>
<th>Employees</th>
<th>Wages and Salaries</th>
<th>Net output per Person Employed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>25 - 49</td>
<td>4</td>
<td>6</td>
<td>6.72</td>
<td>0.33</td>
<td>96</td>
</tr>
<tr>
<td>50 - 99</td>
<td>3</td>
<td>3</td>
<td>1.22</td>
<td>0.63</td>
<td>166</td>
</tr>
<tr>
<td>100 - 199</td>
<td>7</td>
<td>12</td>
<td>11.64</td>
<td>3.25</td>
<td>278</td>
</tr>
<tr>
<td>200 - 299</td>
<td>5</td>
<td>7</td>
<td>14.14</td>
<td>3.15</td>
<td>786</td>
</tr>
<tr>
<td>300 - 399</td>
<td>3</td>
<td>4</td>
<td>16.16</td>
<td>3.32</td>
<td>896</td>
</tr>
<tr>
<td>400 - 499</td>
<td>3</td>
<td>5</td>
<td>9.47</td>
<td>2.91</td>
<td>1,035</td>
</tr>
<tr>
<td>500 - 749</td>
<td>6</td>
<td>11</td>
<td>63.75</td>
<td>19.20</td>
<td>3,512</td>
</tr>
<tr>
<td>750 - 999</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1,000 - 1,499</td>
<td>3</td>
<td>4</td>
<td>18.73</td>
<td>8.72</td>
<td>2,372</td>
</tr>
<tr>
<td>1,500 - 1,999</td>
<td>2</td>
<td>3</td>
<td>49.03</td>
<td>15.10</td>
<td>3,333</td>
</tr>
<tr>
<td>2,000 - 2,999</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3,000 and over</td>
<td>3</td>
<td>17</td>
<td>239.16</td>
<td>77.46</td>
<td>18,251</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td>70</td>
<td>436.44</td>
<td>131.56</td>
<td>32,295</td>
</tr>
<tr>
<td>Serial No.</td>
<td>Product Group</td>
<td>Minimum Economic Capacity</td>
<td>Maximum Weight of Plant to be Lifted</td>
<td>Fixed Capital Cost per Unit of Production</td>
<td>Capital Cost of Buildings as % of Total</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------</td>
<td>---------------------------</td>
<td>-------------------------------------</td>
<td>------------------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>2 Motors, 0.1 to 10 kw</td>
<td>1.5-2</td>
<td>90</td>
<td>220</td>
<td>31</td>
</tr>
<tr>
<td>2</td>
<td>Rotating Machinery 3-5</td>
<td>1600</td>
<td>120</td>
<td>30</td>
<td>87</td>
</tr>
<tr>
<td>3</td>
<td>Switchgear Transformers 0.2-0.5</td>
<td>600</td>
<td>265</td>
<td>45</td>
<td>385</td>
</tr>
<tr>
<td>4</td>
<td>Industrial Furnaces 0.5 1000</td>
<td>40</td>
<td>92</td>
<td>35</td>
<td>85</td>
</tr>
<tr>
<td>5</td>
<td>Apparatus for Measuring 0.7-0.9</td>
<td>90</td>
<td>260</td>
<td>45</td>
<td>700</td>
</tr>
<tr>
<td>6</td>
<td>Insulated Cables 20-25</td>
<td>-</td>
<td>24</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td>7</td>
<td>Domestic Refrigerators 20-25</td>
<td>110</td>
<td>93</td>
<td>35</td>
<td>30</td>
</tr>
<tr>
<td>8</td>
<td>Domestic Washing Machines 100 200</td>
<td>100</td>
<td>90</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>9</td>
<td>Electro-mechanical Domestic Appliances 1.5-2</td>
<td>90</td>
<td>100</td>
<td>30</td>
<td>125</td>
</tr>
</tbody>
</table>
43
ÎAM.I"
» ili ir '*;'. ir-oi,'~.-'Uvd
e

.

n' PI .r t..-.
•- '••', i t"; ¿

'•'

1

Frrauet Greup

inis.ur:

Capacity
2

. .
*"'••. .

I il • ò \iì ?: ttir.f H

•••

•

;. -'.x. iit.'-f
nxt.-i ci'it.-e«- tr- i ' r m.it
bO ili LL i <•>!' prodi;.

1'100 t.p.n

kí ;•-,

j

4

4-9

« / tr-ti

70

47

1.8

3C

8-0

72

240

f v'ÜV

12C

6f

4?

40

42

1.2

§0

95

75

230

V

35

40

40

3.6

30

70

64

260

• ».

U

4S

et,

2,3

48

7C

*5

24C |

12C

50

32

45

40

2.5

40

70

65

25O

4cn

45

44

48

43

1.Ö

55

So

72

275

220

80

8.5

0.95

U

93

88

4X>

1 v.c

60

'

:.r

p-^

i-, rf-

*p

40

5-1 c

t! r.K.-i

1 i

V"

70

KJ

li-

fi*.''trie Fu. jr. ;. "ora ur.r. ti^i.

}•-

1,,'...u

*

'.i.'l

5 00

^-1t

.

'.•-•"

;
"utput p.i. „
Titil
PF>AwBfrM«n as £ #f &»r»,y Con».
'•.'^ricin-íT ìliurj
>t-:ì/"uni t ï'ery.îlrs, per croar, per «*-of floor %r«n
ptr 'Äit
Total
Total
ií' pr".Qn, Ä of te« vorkB&o
p roár. .art« Jffl wS^i »i'rtocB
ttwlure«» i>f iroiwctjÄ
61,".
Hrs.'trn
KWl/Tort
|j>or cent tona/terr
tfUs/E
p§r e««t
p«r «w.t
*^T—
10
"-7?
7
14
13
9

ftr cent
*

5

•'.¡•u't^:-ti
'.;. ì • ".-

•

It.i'j^tr it^ ottf.r th-:..-: Fif."t rotí-crjii^al,

-1

I. :.*.

i":.'^! : rvcî.-urt vtascls, etc.

,

" "

5-10

•••-

i—.
t *
u

'

trai- V;r» J

' »' 1

,

t^>,< r

v;,

^«———-

•

i'iir«. ^.c.i*t,i , I

,Ì-1lw

—
r

,

"^ ''\ricu. '• Eri., ir.,, ri ,1,

!

*» -

10-20

"• *.'¡1 L'-.r.d trrl.¿ -^.d impleaK¡nta

1-1,5

30

160

'. rrj. menare ry

1 —2

1»

116

3C

130

»0

14.5

1.6

té

86

80

300

6-6

3Í/J

40

3fc

30

#5

62

4.2

35

78

70

250

«-10

1%

Î40

40

110

63

17

1.0

40

75

«5

280

16-20

45

44

23

65

&

3.0

66

75

66

230

4-6

42

47

57

72

33

2.2

33

80

76

25*

290

33

188

90

10

0,8

30

78

70

450

70

?2

¿,o

24

60

C>';>

'.2r-

ì

.'6

13

1.C

30

80

72

,rc

S1

"i?

1.C

61

"'8

73

,"'90

6C-

40

2.2

37

80

70

,-70.

15

0.7

?o

7.5.
10

''*2
1.5

7n
83

15

"•..»:it-ir.v -.j.d plun.bin,

fitting

1

Ii;t« r/.-'I C^rfctüsti-n. ljigiriMi
A- ri"ul turr-l r.-ichint ry frr prcp-irin¿
'.r. i auitiv .tili,-, the ¿nil
A*-;?: 3VilVor.-.l n/ichitttixy for harvesting*
:r.r..ß;:ir^ -;r.d Jirü».
!

* \

:ohii>;

t^l.- ï".r working' »ítala
'

• :

; ì CUt4 i: ,

..•::.'•

210
1.''-t-:.-

•-

-

—

',\
-•:.

-- .i

.\:

'.

•

•1'-

'

1 ,,

à'

':•

—
i

_-...'

•','-•

••;.:.'

j-

4-*
>' "" ' "' * —

•,V; ,•,:.'• ,;

•4
i

.

•

••-I L.
. .

*

'..'.:'T: v ( rrti. •

i^-uiphenf

; i f •••-."'. li or.
' to;.'

••..''_ i'y

:cì.ir.»,ry

• ••i,i..' r>

;''" r 1 ' •... ti';.•

*•,<.r.^-¿tir

,

r.r.t 'ìir.f. "-nd

Ir;/ir4,"

:' ir..- •:• .<

~

•j. .

.
•- ,

.
«

. «

•••:•: •>•• v^ivi:

*i. rio tri i i •

r.'ichlr:'.-ry

i

——

110

Hin

'• i.-

•

_„

1

->'

-V

g8

3!-

1y- .

4>

y1?

¿2

20

1.7

.^iSL

8]

,,, »III. ,.

•••

-\ 'Ci
iV¿~

4-':'

6C

6¡.;o

3*

72..
55

66

if.!

VC

39

135

52

14

0.7

37.,

78

67

300

25-30

10,000

27 c

39_

3-t

60

ST

|2

81

72

30Û

1-2

8,000

36

150

55

>,«„
12

1.0

31

Î5

ft

38c

3-5

1 ,000

85

it-

9C

51

21

2.0

26

87

82

41 r

2h

30

0.5

°»9?

34

88

TP

16.000

1 ,500

%>

32

«00
?£,

60

26

1.7

35

85

78

300

175

Rn

40

11.0

53

0

1.3

31

81

73

260

6CC

100

31

63

85

30

1.6

•il

72

fâ

28O

10,000

1CC

39

60

43

32

2.0 I

37

72

c I

240 I

0.¿-C.3

' 11 i • V : ' ' vìi.- Z

"'

,

1,50e

3-5

.r. ; .'l'io., r. .chiiicrjf

,

1
-

:-1 •-

C00 im it

.5j
1""'

-,
-

i

•

6-10
20-2 5
uOO unit
4-6
¿0—¿ \)

•

ï

1

260

I


<table>
<thead>
<tr>
<th>SIC</th>
<th>BRANCH INDUSTRY</th>
<th>Annual Production Capacity</th>
<th>Capital Expenditure</th>
<th>Total Foreign Expenditure</th>
<th>Total Foreign Currency Labour</th>
<th>Total Capital</th>
<th>Total Sales Revenue ( \times 1000 ) US$</th>
<th>Total Gross Profit ( \times 1000 ) US$</th>
<th>Annual Gross Profit</th>
<th>Capital Outlay ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Copper tubing</td>
<td>1876 tons</td>
<td>238</td>
<td>312</td>
<td>550</td>
<td>840</td>
<td>151</td>
<td>138</td>
<td>28</td>
<td>20300</td>
</tr>
<tr>
<td>2</td>
<td>Copper wire drawing and insulation</td>
<td>120 tons</td>
<td>67</td>
<td>24</td>
<td>91</td>
<td>67</td>
<td>24</td>
<td>24</td>
<td>2</td>
<td>11920</td>
</tr>
<tr>
<td>3</td>
<td>Electroplating</td>
<td>Services worth ( US \times 250000 )</td>
<td>17</td>
<td>19</td>
<td>64</td>
<td>23</td>
<td>42</td>
<td>11</td>
<td>7</td>
<td>13000</td>
</tr>
<tr>
<td>4</td>
<td>Air conditioning and Refrigerators</td>
<td>1300 tons</td>
<td>208</td>
<td>132</td>
<td>340</td>
<td>130</td>
<td>250</td>
<td>36</td>
<td>8</td>
<td>46900</td>
</tr>
<tr>
<td>5</td>
<td>Electric Motors</td>
<td>3906 motors</td>
<td>87</td>
<td>80</td>
<td>324</td>
<td>325</td>
<td>45</td>
<td>60</td>
<td>21</td>
<td>13660</td>
</tr>
<tr>
<td>6</td>
<td>Electrodes for iron making</td>
<td>800000 tons</td>
<td>14</td>
<td>11</td>
<td>75</td>
<td>15</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>10000</td>
</tr>
<tr>
<td>7</td>
<td>Electric space heaters</td>
<td>250000 tons</td>
<td>50</td>
<td>20</td>
<td>70</td>
<td>38</td>
<td>38</td>
<td>2</td>
<td>2</td>
<td>11000</td>
</tr>
<tr>
<td>8</td>
<td>Fans, domestic, electric oscillating</td>
<td>10000 units</td>
<td>61</td>
<td>22</td>
<td>73</td>
<td>24</td>
<td>47</td>
<td>4</td>
<td>1</td>
<td>69000</td>
</tr>
<tr>
<td>9</td>
<td>Electric bulb assembly plant</td>
<td>11000000 units</td>
<td>150</td>
<td>150</td>
<td>280</td>
<td>120</td>
<td>160</td>
<td>33</td>
<td>15</td>
<td>180000</td>
</tr>
<tr>
<td>10</td>
<td>Specular Reflectors</td>
<td>750000 units ( 12^\prime ) diameter</td>
<td>85</td>
<td>85</td>
<td>150</td>
<td>0</td>
<td>80</td>
<td>16</td>
<td>4</td>
<td>120000</td>
</tr>
<tr>
<td>11</td>
<td>Radios (assembly)</td>
<td>250000 units</td>
<td>40</td>
<td>100</td>
<td>840</td>
<td>140</td>
<td>75</td>
<td>31</td>
<td>3</td>
<td>11000</td>
</tr>
<tr>
<td>12</td>
<td>Automobile batteries</td>
<td>24000 units</td>
<td>54</td>
<td>38</td>
<td>92</td>
<td>54</td>
<td>42</td>
<td>19</td>
<td>3</td>
<td>11000</td>
</tr>
<tr>
<td>13</td>
<td>Water Stuffers</td>
<td>42000 units</td>
<td>38</td>
<td>33</td>
<td>71</td>
<td>35</td>
<td>36</td>
<td>12</td>
<td>7</td>
<td>99000</td>
</tr>
</tbody>
</table>

1. Electricity needs are given as connected load or as E.M. consumption per annum.
2. Distilled water needed for electrolyte.

Based on the Industry Fact Sheets published by the Department of State Agency for International Development, U.S.A.
<table>
<thead>
<tr>
<th>SIC</th>
<th>Industry</th>
<th>Annual Production Capacity</th>
<th>Capital</th>
<th>Working Capital</th>
<th>Fixed Capital</th>
<th>Engineering</th>
<th>Labour</th>
<th>Total</th>
<th>Fixed</th>
<th>Annual</th>
<th>Annual</th>
<th>Revenue</th>
<th>Current</th>
<th>Value 1,000 US$ per annum</th>
<th>Capital output %</th>
<th>Year 1980</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 1651</td>
<td>Copper tubing</td>
<td>1,075 tons</td>
<td>10</td>
<td>500</td>
<td>500</td>
<td>700</td>
<td>100</td>
<td>30</td>
<td>25</td>
<td>55</td>
<td>5450</td>
<td>2850</td>
<td>2,150</td>
<td>700</td>
<td>235</td>
<td>75</td>
</tr>
<tr>
<td>3 1652</td>
<td>Copper wire drawing and insulator</td>
<td>120 tons</td>
<td>52</td>
<td>38</td>
<td>12</td>
<td>95</td>
<td>25</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>8200</td>
<td>2060</td>
<td>1,750</td>
<td>25</td>
<td>39</td>
<td>13</td>
</tr>
<tr>
<td>3 1671</td>
<td>Electroplating</td>
<td>55</td>
<td>15</td>
<td>50</td>
<td>30</td>
<td>14</td>
<td>5</td>
<td>21</td>
<td>2600</td>
<td>120</td>
<td>56</td>
<td>102</td>
<td>67</td>
<td>14</td>
<td>108</td>
<td>86</td>
</tr>
<tr>
<td>3 1675</td>
<td>Air Conditioning and Refrigeration</td>
<td>3000 units</td>
<td>255</td>
<td>135</td>
<td>150</td>
<td>80</td>
<td>85</td>
<td>15</td>
<td>100</td>
<td>2550</td>
<td>600</td>
<td>150</td>
<td>110</td>
<td>34</td>
<td>430</td>
<td>470</td>
</tr>
<tr>
<td>3 1676</td>
<td>Electric motors 1/2 hp to 10 hp</td>
<td>3000 motors</td>
<td>123</td>
<td>78</td>
<td>180</td>
<td>64</td>
<td>38</td>
<td>24</td>
<td>59</td>
<td>1750</td>
<td>410</td>
<td>280</td>
<td>180</td>
<td>32</td>
<td>170</td>
<td>240</td>
</tr>
<tr>
<td>3 1682</td>
<td>Electrodes for spot lights</td>
<td>800000 electrolytes</td>
<td>17</td>
<td>12</td>
<td>28</td>
<td>33</td>
<td>3</td>
<td>10</td>
<td>2800</td>
<td>80</td>
<td>95</td>
<td>175</td>
<td>45</td>
<td>47</td>
<td>37</td>
<td>58</td>
</tr>
<tr>
<td>3 1685</td>
<td>Electric space heaters</td>
<td>250000 units</td>
<td>12</td>
<td>75</td>
<td>93</td>
<td>59</td>
<td>17</td>
<td>26</td>
<td>2150</td>
<td>135</td>
<td>95</td>
<td>47</td>
<td>38</td>
<td>16</td>
<td>27</td>
<td>56</td>
</tr>
<tr>
<td>3 1686</td>
<td>Fan, fanlike 12&quot; diameter</td>
<td>10,000 units</td>
<td>47</td>
<td>33</td>
<td>50</td>
<td>47</td>
<td>13</td>
<td>17</td>
<td>2600</td>
<td>200</td>
<td>160</td>
<td>120</td>
<td>56</td>
<td>88</td>
<td>71</td>
<td>76</td>
</tr>
<tr>
<td>3 1686</td>
<td>Fan, fanlike assembly plant</td>
<td>11,000,000 bulbs</td>
<td>180</td>
<td>140</td>
<td>200</td>
<td>120</td>
<td>76</td>
<td>30</td>
<td>1200</td>
<td>760</td>
<td>600</td>
<td>280</td>
<td>156</td>
<td>32</td>
<td>410</td>
<td>480</td>
</tr>
<tr>
<td>3 1686</td>
<td>Fan, fanlike assembly plant</td>
<td>18,000 units 12&quot; and 24&quot; diam.</td>
<td>125</td>
<td>55</td>
<td>170</td>
<td>125</td>
<td>45</td>
<td>28</td>
<td>95</td>
<td>4550</td>
<td>450</td>
<td>300</td>
<td>150</td>
<td>143</td>
<td>170</td>
<td>290</td>
</tr>
<tr>
<td>3 1686</td>
<td>Fan, fanlike assembly plant</td>
<td>25,000 units</td>
<td>45</td>
<td>150</td>
<td>195</td>
<td>130</td>
<td>62</td>
<td>85</td>
<td>30</td>
<td>2150</td>
<td>670</td>
<td>550</td>
<td>122</td>
<td>266</td>
<td>190</td>
<td>270</td>
</tr>
<tr>
<td>3 1686</td>
<td>Fan, fanlike assembly plant</td>
<td>24,000 units</td>
<td>62</td>
<td>56</td>
<td>120</td>
<td>75</td>
<td>45</td>
<td>25</td>
<td>4000</td>
<td>260</td>
<td>223</td>
<td>47</td>
<td>66</td>
<td>16</td>
<td>190</td>
<td>84</td>
</tr>
<tr>
<td>3 1686</td>
<td>Fan, fanlike assembly plant</td>
<td>4000 units</td>
<td>46</td>
<td>40</td>
<td>90</td>
<td>53</td>
<td>34</td>
<td>22</td>
<td>2600</td>
<td>270</td>
<td>145</td>
<td>95</td>
<td>142</td>
<td>37</td>
<td>75</td>
<td>95</td>
</tr>
</tbody>
</table>

1. Electricity needs are given as connected load or as kwh consumption per annum.
2. Distributed water needed for electrolyte.

Based on the information given in the Industry Fact Sheets published by the Department of State, Agency for International Development, adjusted to average African conditions in 1960 as given in the explanatory note.
Annex I

MATERIALS, SUPPLIES, ELECTRICITY, FUEL AND WATER NEEDED BY THE ELECTRO-
TECHNICAL ENGINEERING INDUSTRIES COVERED IN TABLES IV 4(1) AND IV 4(2)

The industrial plants covered in Tables IV 4(1) and IV 4(2) as having possibilities for developing countries need the following materials, fuel and water annually to meet the production figures given in the Tables. Electricity requirements are given either as connected load or as annual consumption in kilowatthours. As regards supplies, where an industry needs small amounts of lubricants, hand tools, cutting tools, abrasives, maintenance and spare parts and office supplies these are referred to as normal. Where special supplies or large quantities are needed, these are detailed.

1. Copper Tubing (SIC 3351)

Direct Materials
- Copper 1900 tons

Supplies
- Normal supplies except for tools, dies and fixtures which would cost about US.$17,000 and maintenance and repair parts which would cost about US.$18,000. (both for African conditions).

Electric Power
- Connected load about 250 H.P.

Fuel
- About 300,000 gallons (U.S.) furnace fuel.

Water
- 5.6 million gallons for make-up and general purposes.
2. Copper Wire Drawing and Insulating (SIC 3351)

Direct Materials

- Hot drawn copper rod: 120 tons
- Vinylite insulation: 6300 lbs.

Supplies

- Normal supplies plus spools ($4,000) wire dies ($450) and sulphuric acid ($200).

Electric Power

- Connected load about 500 H.P.

Fuel

- 37,000 gallons diesel oil.

Water

- 1.5 million gallons for production, sanitation and fire protection.

3. Electroplating (SIC 3471)

Direct Materials

- Nickel sulphate: 17,500 lbs.
- Nickel chloride: 3,400 lbs.
- Boric acid: 2,300 lbs.
- Anodising dies: $100 worth
- Packaging material: $400 worth

Supplies

- Normal plus spares and petrol for the truck.

Electric Power

- 120,000 kilowatt hours

Fuel

- 14,000 gallons furnace fuel
Water
3,000,000 gallons.

4. Air Conditioners and Refrigerators (SIC 3565/3632)

Direct Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheet metal</td>
<td>440 tons</td>
</tr>
<tr>
<td>Copper Tubing</td>
<td>425,000 feet</td>
</tr>
<tr>
<td>Sheet aluminium</td>
<td>240,000 sq.ft.</td>
</tr>
<tr>
<td>Plastic trays, dials, hose</td>
<td>50,000 worth</td>
</tr>
<tr>
<td>Round metal wire</td>
<td>4,000 worth</td>
</tr>
<tr>
<td>Wire mesh</td>
<td>4,000 worth</td>
</tr>
<tr>
<td>Electric wire and switches</td>
<td>6,000 sets</td>
</tr>
<tr>
<td>Insulation (heat)</td>
<td>5,000 worth</td>
</tr>
<tr>
<td>Freon</td>
<td>9,000 gallons</td>
</tr>
<tr>
<td>Door fittings, name plates</td>
<td>3,000 sets</td>
</tr>
<tr>
<td>Fan motors 0.1 H.P.</td>
<td>3,000</td>
</tr>
<tr>
<td>Compressor motors 0.75 H.P.</td>
<td>3,000</td>
</tr>
<tr>
<td>Compressor motors 0.25 H.P.</td>
<td>3,000</td>
</tr>
<tr>
<td>Capacitors</td>
<td>6,000</td>
</tr>
<tr>
<td>Bolts, nuts, washers</td>
<td>2,500 worth</td>
</tr>
<tr>
<td>Enamel</td>
<td>3,500 worth</td>
</tr>
<tr>
<td>Shipping boxes</td>
<td>6,000</td>
</tr>
</tbody>
</table>

Supplies
Normal except that maintenance and spare parts would cost about £6,000, plus welding supplies and petrol for the truck.

Electric Power
250,000 kilowatthours

Fuel
Heating, if any, and sanitation.

Water
Sanitation and fire protection.
5. Electric motors 1/6 to 10 H.P. (SIC 3621)

Direct Materials

Steel 107 tons
Sheet aluminium 2800 lbs.
Copper 1700 lbs.
Varnish $6,000 worth
Purchased parts 30,000 worth
Packaging materials 2,500 worth

Supplies

Normal except that maintenance and repair parts cost about $3,500 and cleaning materials about $1,000.

Electric Power

Connected load about 200 H.P.

Fuel

About 4,500 gallons furnace fuel (baking oven)

Water

800,000 gallons

6. Electrodes for Neon Lights (SIC 3624)

Direct Materials

Glass tubing 16,400 lbs.
Exhaust tubing 1,200 lbs.
Metal electrodes 800 M

Supplies

Normal

Electric Power

1.5 H.P., connected load

Fuel

75 cubic feet gas per day
Water
Sanitation and fire protection.

7. Electric space Heaters (SIC 3634)

Direct Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheet metal</td>
<td>132 tons</td>
</tr>
<tr>
<td>Guard Wire</td>
<td>7.5 tons</td>
</tr>
<tr>
<td>Heating element wire</td>
<td>2 tons</td>
</tr>
<tr>
<td>Terminals</td>
<td>50,000</td>
</tr>
<tr>
<td>Insulators</td>
<td>175,000</td>
</tr>
<tr>
<td>Connection cord</td>
<td>$600 worth</td>
</tr>
<tr>
<td>Screws</td>
<td>$5,000 worth</td>
</tr>
<tr>
<td>Cartons</td>
<td>$6,000 worth</td>
</tr>
</tbody>
</table>

Supplies
1. Fuel

Electric Power
Connected load 30 H.P.

Fuel
Heating, if any

Water
Sanitation and fire protection

8. Fans, domestic, 12" electric oscillating (SIC 3634)

Direct Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motors 0.5 H.P.</td>
<td>10,000</td>
</tr>
<tr>
<td>Sheet steel</td>
<td>50 tons</td>
</tr>
<tr>
<td>Steel rounds</td>
<td>6 tons</td>
</tr>
<tr>
<td>Bolts</td>
<td>10 kgs.</td>
</tr>
<tr>
<td>Nuts</td>
<td>10 kgs.</td>
</tr>
<tr>
<td>Rivets</td>
<td>5 kgs</td>
</tr>
<tr>
<td>Paint</td>
<td>$1,000 worth</td>
</tr>
<tr>
<td>Packaging material</td>
<td>$1,000 worth</td>
</tr>
</tbody>
</table>
Plant

Conduction and fire protection

2. Electric light bulb assembly plant (SIC 3641)

Located nearby.

Cans and stems $11,000,000

Carbon filaments $11,000,000

1. Filament lead and supporting wire 1,200 lbs.

2. Copper lead wire 1,900 lbs.

3. Rubber and cement $3,000 worth

4. Caps $105,000 worth

6. Cans for packaging 11,000,000 bulbs

Specials.

1. Drills, costing about $10,000

Electricity

1,345,000 kilowatt-hours

Gas

300,000 cubic feet of gas

Paint

900 lb. Fillmore

3. Hoods and flues (SIC 3642)

Approved outside:

Metal flues: 75,000 - 14” squares
Tallow and grease
Lacquer and reducer
Lamps
Electrical fittings
Lens and lens clamps
Steel bars for U-clamps
Bolts and sealer
Tungsten and aluminium wire
Packaging

$ 500 worth
$ 1,500 worth
75,000
75,000
75,000 each
75,000
3
$ 7,000 worth
$ 2,000 worth
$ 15,000 worth

Supplies
Normal plus dies costing about $1,200 and welding rods costing $300

Electric Power
Connected load 30 H.P.

Fuel
About 500,000 cubic feet of gas for production and heating (if any).

Water
Small amount for production plus sanitation and fire protection.

11. Radios (SIC 3651)

Direct Materials

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistors</td>
<td>175,000</td>
</tr>
<tr>
<td>Condensers</td>
<td>225,000</td>
</tr>
<tr>
<td>Hardware, screws, nuts, spacers</td>
<td>1,150,000</td>
</tr>
<tr>
<td>Transformers</td>
<td>125,000</td>
</tr>
<tr>
<td>Cabinets</td>
<td>25,000</td>
</tr>
<tr>
<td>Tubes (amplifiers)</td>
<td>125,000</td>
</tr>
<tr>
<td>Chassies</td>
<td>25,000</td>
</tr>
<tr>
<td>Dial assembly</td>
<td>25,000</td>
</tr>
<tr>
<td>Switches</td>
<td>25,000</td>
</tr>
</tbody>
</table>
Supplies
Normal plus solder and flux ($1,200) and radio repair parts ($2,000).

Electric Power
Connected load 60 H.P.

Fuel
Heating, if necessary

Water
Sanitation and fire protection

12. Automobile Batteries (SIC 3691)

Direct Materials
Antimonial lead 125 tons
Lead oxides 125 tons
Cases 24,000
Sets of covers 24,000
Units 72,000
Separators $ 14,000 worth
Sulphuric acid $ 4,500 worth
Paint and lacquer $ 500 worth
Sealing compound $ 500 worth
Shipping cartons 24,000

Supplies
Normal plus propene gas ($3,000)

Electric Power
200,000 kilowatthours

Fuel
16,000 gallons Bunker C oil
Water
850,000 gallons

13. Motor Starters (SIC 3694)

Direct Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>37 tons</td>
</tr>
<tr>
<td>Copper</td>
<td>10 tons</td>
</tr>
<tr>
<td>Ceramic</td>
<td>8.5 tons</td>
</tr>
<tr>
<td>Purchased castings, bolts, nuts, etc.</td>
<td>$40,000 worth</td>
</tr>
<tr>
<td>Paint and finish</td>
<td>$500 worth</td>
</tr>
<tr>
<td>Packaging materials</td>
<td>$750 worth</td>
</tr>
</tbody>
</table>

Supplies

Normal plus moulding supplies ($1,500) and welding materials ($500)

Electric Power

Connected load about 100 H.P.

Fuel

3,000 gallons furnace fuel

Water

400,000 gallons
Annex II

COMBINED, POWERED, ELECTRICITY, FUEL AND WATER NEEDED FOR THE ENGINEERING, MACHINERY, OTHER THAN ELECTROTECHNICAL COVERED IN TABLES IV 4(3) AND IV 4(4)

The industrial plants covered in Tables IV 4(3) and IV 4(4) as having possibilities for developing countries need the following materials, supplies, electricity, fuel and water annually to meet the production figures given in the Tables. Electricity requirements are given either as connected load or as annual consumption in kilowatt-hours. As regards supplies, where an industry needs small amounts of lubricants, hand tools, cutting tools, abrasives, maintenance and spare parts and office supplies these are referred to as normal. Where special supplies or large quantities are needed, these are indicated.

1. Metal Filing Cabinet (SIC 2522)

Direct materials

Sheet metal

Hardware, including reals, locks, rollers

Hardware, label frames

Nails

Cartons

320 tons

$6,000 worth

$1,000 worth

$8,000 worth

Electric power

Connected load about 40 H.P.

Fuel

Nothing only, if any

Im a

Sanitation and fire protection only.

2. Flexible Steel Conduit (SIC 3317)

Direct materials

Hot rolled steel strip

2,575,000 lbs.
Zinc
Aluminium

Supplies
Normal plumb:
- Sulphuric acid
- Sal ammoniac
- Wire

Electric Power
Connected load about 150 H.P.

Fuel
About 24,000 gallons

Water
About 4 million gallons

3. Galvanized Steel Pipe (SIC 3317)

Direct Materials
- Hot rolled steel strip
- Zinc

Supplies
Normal plumb:
- Sulphuric acid
- Cooling compound
- Cutting compound
- Zinc bath flux

Electric Power
Connected load about 120 H.P.

Fuel
About 30,000 gallons

Water
About 1.2 million gallons
4. **Steel Mechanical Tubes (SIC 3317)**

**Direct Materials**

- **Steel steel**: 3,000 tons

**Supplies**

- **Normal plus**
  - Reels: $14,000 worth
  - Electrodes: $3,000 worth

**Electric Power**

- Connected load about 130 H.P.

**Fuel**

- About 14,500 gallons for heating

**Water**

- About 2.5 million gallons for production and general purposes.

5. **Welded Pipe (SIC 3317)**

**Direct Materials**

- **1/4" steel plate**: 785 tons
  - Flux (powdered): 5,500 lbs.
  - Electrode rod: 6,000 lbs.

**Supplies**

- **Normal**

**Electric Power**

- Connected load about 120 H.P.

**Fuel**

- Heating only, if any

**Water**

- Sanitation and fire protection only
6. Centrifugal cast iron pipe (SIC 3321)

Direct Materials
- Cast iron scrap: 4,600 tons
- High iron: 4,600 tons

Supplies
- Normal fuels:
  - Welding rods
  - Core sand
  - Carbon dioxide
  - Calcium silicate
    - 100,000 worth

Electric Power
- Connected load about 160 H.P.

Fuel
- About 240,000 gallons Bunker C

Water
- 1,500 gallons per minute for make-up.

7. Cast iron jobbing foundry (SIC 3321)

Direct Materials
- Metals: 2,000 tons
- Coke: 120 tons
- Core sand: 530 tons
- Molding sand: 800 tons
- Other materials: 6,000 worth

Supplies
- Normal

Electric Power
- Connected load about 45 H.P.

Fuel
- Given under direct materials
8. Brass Foundry (SIC 3362)

**Direct Materials**

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper, ingot</td>
<td>120,000 lbs.</td>
</tr>
<tr>
<td>Copper, melting scrap</td>
<td>200,000 lbs.</td>
</tr>
<tr>
<td>Zinc, ingot</td>
<td>$ 8,000 worth</td>
</tr>
<tr>
<td>Zinc, melting scrap</td>
<td>40,000 lbs.</td>
</tr>
<tr>
<td>Tin, ingot</td>
<td>24,000 lbs.</td>
</tr>
<tr>
<td>Brass, melting scrap</td>
<td>32,000 lbs.</td>
</tr>
<tr>
<td>Aluminium, ingot</td>
<td>16,000 lbs.</td>
</tr>
<tr>
<td>Magnesium, ingot</td>
<td>8,000 lbs.</td>
</tr>
<tr>
<td>Alloying briquettes</td>
<td>$ 4,000 worth</td>
</tr>
</tbody>
</table>

**Supplies**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moulding sand</td>
<td>$ 1,500 worth</td>
</tr>
<tr>
<td>Core sand</td>
<td>$ 1,500 worth</td>
</tr>
<tr>
<td>Parting sand</td>
<td>$ 600 worth</td>
</tr>
<tr>
<td>Sea coal</td>
<td>$ 1,500 worth</td>
</tr>
<tr>
<td>Pitch, corn flour, core oil, molasses</td>
<td>$ 600 worth</td>
</tr>
<tr>
<td>Fuel oil for core oven</td>
<td>$ 700 worth</td>
</tr>
<tr>
<td>Core wires, rods, chaplets</td>
<td>$ 1,000 worth</td>
</tr>
<tr>
<td>Maintenance &amp; Office supplies</td>
<td>$ 1,000 worth</td>
</tr>
</tbody>
</table>

**Electric Power**

100,000 kilowatthours

**Fuel**

About 37,000 gallons furnace fuel

**Water**

600,000 gallons
9. Buckets, Gallons and Pans (SIC 3411)

Direct Materials
- Steel, rolled sheet: 160 tons
- Steel wire, 16 gauge: 3 tons
- Zinc prime western: 40 tons
- Tin: 15 tons
- Chemicals: $2,000 worth
- Packaging materials: $5,000 worth

Supplies
- Normal plus belting worth $500.

Electric Power
- Connected load about 60 H.P.

Fuel
- 15,000 gallons furnace fuel

Water
- About 1.2 million gallons

10. Farm Hand Tools (SIC 3423)

Direct Materials
- Steel: 325 tons
- Lumber: $2,500 worth
- Lacquer: $4,500 worth

Supplies
- Normal plus dies worth $4,000

Electric Power
- 300,000 kilowatthours

Fuel
- 1,700 gallons for production and general purposes.

Water
- 1.2 million gallons
11. Metal Coil (SIC 3413)

Direct Material

Steel  500 tons
Wooden handles  125,000
Lacquer  1,000 gallons
Packaging materials  $4,000 worth

Supplies

Normal plus cleaning compound (3300) and petrol for the truck.

Electric Power

Connected load about 135 H.P.

Fuel

14,000 gallons Bunker C oil

Water

1 million gallons

12. Building Hardware (SIC 3429)

Direct Materials

Zinc alloy  160 tons
Cold rolled steel  260 tons
Bright wire round  55 tons
Bright wire square  35 tons
Spring steel  1.5 tons
Plating nickel  3.5 tons
Packaging materials  $6,000 worth

Supplies

Normal plus dies costing $6,000

Electric Power

300,000 kilowatthours

Fuel

30,000 gallons for heat treatment furnace and boiler.
13. Sanitary ware (SIC 3431)

Direct Materials

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pig iron</td>
<td>1,470 tons</td>
</tr>
<tr>
<td>Purchased scrap</td>
<td>1,280 tons</td>
</tr>
<tr>
<td>Home scrap</td>
<td>960 tons</td>
</tr>
<tr>
<td>Wet base enamel</td>
<td>37.5 tons</td>
</tr>
<tr>
<td>Frit, dry ground</td>
<td>250 tons</td>
</tr>
<tr>
<td>Steel strapping</td>
<td>16,000 linear feet</td>
</tr>
<tr>
<td>Crating lumber</td>
<td>630 M bd. ft.</td>
</tr>
</tbody>
</table>

Supplies

Normal plus:

- Moulding sand: $33,000 worth
- Coke by-product: $16,000 worth
- Metal abrasives: $12,000 worth
- Alloy briquettes, parting sand, fire clay: $6,000 worth

Electric Power

Connected load about 60 H.P.

Fuel

Coke for the cupola costing about $25,000. Oil for enamelling furnace costing $5,000.

Water

1.2 million tons for preparing moulding sand, sanitation and fire protection.

14. Aluminium windows and doors (SIC 3442)

Direct Materials

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extruded aluminium stock</td>
<td>530,000 feet</td>
</tr>
<tr>
<td>Glass</td>
<td>125,000 sq. ft.</td>
</tr>
</tbody>
</table>
Hardware, including springs, rivets braces 11,000 sets
Aluminum channel 2,000,000 feet
Aluminum screen wire 2,000 sq. ft.
Screen molding 147,000 feet
Screws 170,000

Supplies
Normal

Electric Power
Connected load 7 H.P.

Fuel
Heating only, if any

Water
Sanitation and fire protection only.

15. Aluminium cooking utensils (SIC 1461)
Direct Material
Aluminium sheets 9 tons
Handles 80,000
Wrapping cartons 8, 10,000 worth

Supplies
Normal

Electric Power
Connected load 50 H.P.

Fuel
8,000 gallons Bunker C for annealing oven and heating

Water
Sanitation and fire protection only.

16. Enamelled plates, pots and kettles (SIC 1475)
Direct Materials
Black metal shapes 1,950,000 lbs.
Nickel liquid
Ground coat material
White coat
Rack age

Supplies
Normal plus welding gas and rods ($200) and petrol for the
truck

Electric Power
Connected load 50 H.P.

Fuel
70,000 gallons Bunker C oil

Water
1,600 gallons per minute

17. Automobile and truck leaf spring (SIC 3493)

Direct Materials
Spring steel, bolts and nuts
Rivets and inserts
Bushings
Paint

Supplies
Normal plus tools and dies costing $8,000.

Electric Power
Connected load about 200 H.P.

Fuel
180,000 gallons furnace fuel

Water
500,000 gallons
13. Centrifugal pumps and valves (SIC 3561-3474)

Direct materials
- Grey iron castings: 380 tons
- Bronze fittings: 30 tons
- Steel rods: 76 tons
- Bolts, nuts and washers: $3,000 worth
- Paint: $3,000 worth
- Skids and crating material: $6,000 worth

Supplies
- Normal plus petrol for the truck.

Electric power
- Connected load about 190 H.P.

Fuel
- Heating only, if any

Water
- Sanitation and fire protection

19. Agricultural implements (SIC 3522)

Direct materials
- Steel: tubing, shafting, sheet, plate, spring, stock, strip and castings: 255 tons
- Grey iron castings: 75 tons
- Bearing metal: $600 worth
- Ball bearings: $1,000 worth
- Paint and other finishes: $300 worth

Supplies
- Normal

Electric power
- Connected load about 100 H.P.
Fuel
6,000 gallons furnace fuel

Water
500,000 gallons for production, sanitation, and fire protection.

20. Flows (SIC 3522)
- Direct Materials
  Castings (pig iron, scrap, coke) 625 tons
  Paint $6,500 worth
  Steel braces $3,000 worth
  Belts, nuts and washers $1,500 worth
  Lumber $37,000 worth

Supplies
Normal plus:
  Moulding sand, fire bricks, fire
  clay, flux, core sand, core oils,
  wires, rods, chaplets $3,000
  Patterns and flasks $1,000

Electric Power
Connected load about 50 H.P.

Fuel
Coke for the cupola included in the castings under
direct materials. For the core oven about 10,000
gallons oil are needed.

Water
1.5 million gallons for conditioning the sand,
sanitation and fire protection.

21. Utility Tractor, 10 H.P. (SIC 3522)
- Direct Materials
  10 H.P. gas engines 10,000
Annex II

Steel sheets and shapes 500 tons
H.R. rounds and flats 250 tons
Differential gears 10,000 assemblys
General hardware $ 60,000 worth
Tyres and tubes (pneumatic) 20,000 each
Tyres (solid) 20,000
Packaging $ 3,000 worth

**Supplies**

Normal plus petrol for truck plus:
Cutting tools and abrasives $ 15,000 worth
Solvents, cleaners, paints and finishes $ 12,000 worth
Welding supplies $ 1,500 worth.

**Electric Power**

1,350,000 kilowatthours

**Fuel**

200,000 gallons Bunker C oil

**Water**

25 million gallons

22. **Conveyors and Portable Elevators (SIC 3535)**

**Direct Materials**

Angle iron 580 tons
Flat bars 4 tons
Rollers, solid and tubes 260 tons
Fins, bushings, bolts and nuts $ 2,500 worth
Crating materials $ 1,000 worth

**Supplies**

Normal

**Electric Power**

Connected load 50 k.w.
Fuel  
Heating only, if any

Water  
Sanitation and fire protection.

23. Job machine shop (SIC 3591)  
Direct materials  
Various, according to type of work available,  
average cost $55,000 worth

Supplies  
Normal plus welding rods and gas coating about $300.

Electric Power  
275,000 kilowatthours.

Fuel  
Small amount for production purposes

Water  
300,000 gallons for production, sanitation and  
fire protection

24. Bicycle assembly (SIC 3751)  
Direct Materials  
Purchased parts $250,000 worth  
Tubing for frames $12,000 worth  
Seat posts $1,200 worth  
Carbon steel for rear frame lugs $600 worth  
Shipping cartons $9,000 worth

Supplies  
Normal plus small amount caustic soda plus:  
Welding rods $1,200 worth  
Acetylene gas $2,500 worth  
Oxygen $3,500 worth
Enamel

$ 3,000 worth

Electric Power

Connected load about 25 H.P.

Fuel

5,000 gallons Bunker C for hot water for degreasing

Water

400,000 gallons for boiler, sanitation and fire protection.
ECONOMIC COMMISSION FOR AFRICA AND
CENTRE FOR INDUSTRIAL DEVELOPMENT
Symposium on Industrial Development in Africa
Cairo, 27 January - 10 February 1966

ENGINEERING INDUSTRIES IN AFRICA
ENGINEERING INDUSTRIES IN AFRICA

PART II

MAPS, GRAPHS, TABLES AND APPENDIXES

Corrigendum

Page
7 Table II.1:
First column, to read vertically downwards:
Country; Congo (Leop.); Congo (Braz.); Gabon;
Central African Republic; Chad; Cameroon, Total.

9 Table II.1(4)
First line in heading, for Africa read: African.

11 Table II.1(4)
Reprint 2/, second line, for "ard" read: "are".

16 Table II.1(9)
Last column, last line, read: 10.0

22 Table II.2(5)
Heading of column 8 to read:
"Agricultural Machinery and Appliances for harvesting,
threshing and sorting".

24 Table II.2(7)
Suppose Somalia under Passenger motor cars read:
"15".

27 Table I.4(2)
Last line in the table to read horizontally:
Total: 1560; —— 17150; 2800; 5150; 540; —— 17.50; 25050; 50; 650.

28 Table II.4(4)
Suppose "Chips and woods" and under "Kenya" read:
"24-v".
Page

11  Table II.3(6)
   Opposite "Insulated Cables" and under "UAR 1964" reads "15400".

15  Table II.3(8)
   Vertically under "UAR 1964", read:
   3600; 1070; 1580; 235; ...; 230;
   - - - - - - 570.

17  Table II.3(9)
   Opposite "Ships and Boats" and under "Estimated Production in the UAR in 1970" read: "106,000".

Second page 35 (Table II.4(1)): page numbering to be corrected to 36.

19  Table III
   Under "Insulated Cables 723.1 Projections G.D.F.C.",
   read vertically downwards:
   475; ...; 85; 670; 475; 510; 190; 70.

21  Table IV.2
   Opposite "100-199" and under column 6 read: "341".

22  Table IV.4(1)
   1) Delete reference to footnotes in headings of columns 7, 20 and 22
   2) Opposite Serial No. 13 and under column 17 read: "15"
   3) Delete footnotes 1/ and 2/

24  Table IV.4(2)
   1) Delete reference to footnote in heading of column 7
   2) Heading of column 13 to read:
      "Foreign Currency - Annual Reeds - 000 U.S. $"
   3) Delete footnotes 1/ and 2/

31  Fifth line:
   Opposite "Sheet metal" read: "440 tons".

33  Fifteenth line:
   Opposite "Copper lead wire" read: "10.0 lbs".
Line 22
Opposite “sealing compound” read: “$1500 worth”.

Line 27
Instead of “200000 kilowatthours” read: “connected load 170 H.P.”

Line 29
Instead of “16000 gallons Bunker C Oil” read: “8500 gallons gas oil for heating and general purposes”.

Second line
Instead of “850000 gallons” read: “4000 gallons purified water”.

Last line
For “direct” read: “direct”.

Addendum

Corrigendum

Page

1 First line below Table 1 to read:
   N.B. "Classification into ..."

3 Table 1
   Opposite "SITC 72" and under "1956" read:
   "37"
COMMISSION ECONOMIQUE POUR L'AFRIQUE
Colloque régional sur le développement industriel en Afrique
Le Caire, 27 janvier - 10 février 1966

LES INDUSTRIES MECANIQUES ET ELECTRIQUES EN AFRIQUE

TROISIEME PARTIE
ANNEXES
LES INDUSTRIES MECANIQUES ET ELECTRIQUES EN AFRIQUE

TROISIEME PARTIE

ANNEXES

I. Conclusions et recommandations des missions de coordination industrielle de la CEA envoyées dans les sous-régions d'Afrique de l'ouest, d'Afrique de l'est et en Algérie, en Libye, au Maroc et en Tunisie.

II. Conclusions et recommandations de la mission de coordination industrielle de la CEA envoyée dans la sous-région d'Afrique centrale.

III. Conclusions et recommandations concernant les industries électromécaniques dans la sous-région d'Afrique de l'est.
CONCLUSIONS ET RECOMMANDATIONS DES MISSIONS DE COORDINATION INDUSTRIELLE DE LA CEA ENVOYÉES DANS LES SOUS-REGIONS D'AFRIQUE DE L'OUEST, D'AFRIQUE DE L'EST ET EN ALGÉRIE, EN LIBYE, AU MAROC ET EN TUNISIE

A la suite de la décision que le Comité permanent de l'industrie, des ressources naturelles et des transports a prise en décembre 1962 à sa première session et que la Commission a reprise à son compte à sa cinquième session en février 1963, des missions de la Commission économique pour l'Afrique ont été envoyées dans les sous-régions suivantes :

1) en Afrique de l'ouest du 17 août au 1er novembre 1963;
2) en Afrique de l'est et en Afrique centrale du 10 octobre au 3 décembre 1963;

Le texte de cette décision était le suivant :

"Assistance aux gouvernements, aux fins d'encourager la coopération sous-régionale pour le développement industriel sur la base de la division internationale du travail, et, s'il y a lieu, de l'harmonisation des plans de développement industriel, par des études et enquêtes sur place".

Le mandat des missions, établi sur la base de la décision ci-dessus, est résumé ci-après :

Les missions avaient principalement à définir en termes concrets les possibilités ouvertes au développement industriel au cours approximativement des dix prochaines années dans les sous-régions considérées, en s'attachant particulièrement aux entreprises appelées à desservir plusieurs pays. Les missions se sont donc intéressées particulièrement aux industries dont le seuil de rentabilité correspondait à une production supérieure aux possibilités d'absorption du
marché probable d'un pays. Mais elles ne se sont pas limitées aux industries de forte capacité. Elles ont tenté aussi à mettre en lumière les possibilités que la création d'industries petites et moyennes offrirait dans le domaine du remplacement des importations. Toutefois, la mission envoyée en Afrique du nord a estimé que la question du remplacement des importations grâce à la création d'industries petites et moyennes était bien connue des pays de cette sous-région, si bien que dans son rapport elle a laissé de côté ces industries. Les missions n'avaient pas à se livrer à des enquêtes économiques ou industrielles. Néanmoins, elles ont examiné les problèmes du commerce et des transports, de même que les autres questions se rapportant à l'infrastructure dans le contexte des efforts tendant à favoriser le développement industriel.

S'agissant des industries électromécaniques, les conclusions et recommandations des missions ont été les suivantes:

I. Sous-région de l'Afrique de l'ouest

1. Comme jusqu'ici, la production de métaux est limitée en Afrique de l'ouest et comme, en particulier, il n'y a pas d'industrie sidérurgique digne de ce nom, le travail des métaux et les activités électromécaniques sont moins avancées que dans les autres grandes sous-régions du continent. On n'y trouve pratiquement pas d'industries électromécaniques d'une certaine capacité. Cependant les activités de montage et de finissage se développent. On peut citer à titre d'exemple des usines de montage de voitures automobiles en Côte-d'Ivoire, au Sénégal, et en Nigéria; des usines de montage de bicyclettes en Côte-d'Ivoire, au Ghana et en Nigéria; des installations de montage sont de plus en construction en Haute-Volta.

2. Il est nécessaire que les plans de développement soient coordonnés dans le domaine du montage des véhicules automobiles et des bicyclettes. À Avignon, l'usine de montage des voitures automobiles fait appel à des éléments importés de France, mais les prix de revient sont plus élevés qu'en France, phénomène qui s'explique en partie par la plus faible productivité de la main-d'œuvre et en
Annexe I

La production de vélos de montagne de haute-Volta, dont la capacité atteindra 35.000 bicyclettes et 5.000 scooters, sera assurée grâce aux marchés des pays de l'intérieur. L'industrie du montage donne des résultats conclusifs dans un autre cas, celui des machines à coudre. Le Libéria possède deux centres de production qui fabriquent ensemble plus de 10.000 machines par an. La principale des conclusions qui se dégagent, en la matière, c'est que le développement des industries de montage est nettement possible en Afrique de l'Ouest, mais que la rentabilité est subordonnée à une certaine spécialisation, à une harmonisation des plans et à un ensemble d'accords commerciaux entre les pays producteurs. Un bon exemple de ces accords est celui qu'ont conclu la Côte-d'Ivoire et le Sénégal, en vertu duquel le Sénégal s'abstient de monter des camions alors que la Côte-d'Ivoire renonce à la production de certaines catégories de véhicules légers.

2. A l'heure actuelle, les activités électromécaniques ne sont guère représentées que par des ateliers de réparation et d'entretien d'une certaine importance, qui se livrent aussi à des travaux de finissage et de reconstruction et qui souvent appartiennent à de grandes entreprises, comme les chemins de fer à Lagos et à Dakar. Les effectifs de ces ateliers sont souvent assez importants; quant aux dispositions prises pour la formation de la main-d'œuvre, elles sont assez efficaces et le rendement est acceptable. Ces ateliers sont certainement les noyaux autour desquels la production électromécanique est appelée à se développer.

3. Dans les ports importants (Dakar, Abidjan, Lome) il existe un certain nombre de chantiers, qui se consacrent surtout à des travaux
5. Le travail des réseaux, auquel se consacrent en général des ateliers modulables, est très répandu. La Côte d'Ivoire possède 44 centres de production, le Bénin 25, le Sénégal 20 et la Côte-d'Ivoire 15. Dans certains cas, les effectifs atteignent de 250 à 500 employés. Dans tous les pays, même ceux de l'intérieur, il existe au moins un centre de production d'une certaine importance, la production des outils et matériels agricoles se développe, de même que celle des matériels de construction et des bacs, cuves et autres récipients métalliques. Les perspectives d'une expansion du travail des réseaux et des activités électroni- cures, compte tenu des progrès du développement économique et de l'augmentation du niveau de vie. Dans les conditions actuelles, on peut prévoir que l'expansion reposerait surtout sur de petites entreprises, pour lesquelles les investissements sont modestes et l'expansion rapide. L'expansion connaîtra une impulsion supplé- mentaire si l'on venait à produire sur place des matériaux en fer et en acier et de l'aluminium.

6. Il n'y a aucune contradiction entre une politique axée sur la création d'industries de forte capacité et l'entreprise consistant à stimuler vigoureusement le développement à la fois des industries fondées sur l'agriculture et des petites et moyennes industries, appelées à alimenter les marchés nationaux. En outre, les petites industries présentent un intérêt supplémentaire en ce sens qu'elles favorisent l'esprit d'entreprise chez les Africains, ce qui est très important.

II. Afrique de l'est et en centre (actuellement la sous-région de l'Afrique de l'est)

1. La production des industries électroni- cures s'accroît, en même temps, elle se diversifie, dans les principaux centres de la sous-région. En Afrique de l'est, durant est jusqu'ici au
au premier rang, mais d'autres centres sont à considérer, comme Hombassa, Arusha, Dar-es-Salaam et Jinja. En raison de l'accroissement de la production de l'industrie des articles en fonte et en acier comme de l'industrie chimique, auquel s'ajoute les avantages qui découlent d'une concentration de la population, de l'existence de moyens de transport et de la possibilité de bénéficier des économies extérieures, éléments qui se rencontrent toujours dans les zones où l'industrialisation a déjà démarré, une impulsion naturelle se fait sentir dans ces centres en faveur d'une création supplémentaire des entreprises électronéomécaniques de forte capacité. La même situation se retrouve à Salisbury, à Bulawayo, à Untali et dans le Copperbelt.

2. On pourrait développer la production de machines légères au Kenya et celle des machines-outils en Tanzanie. Au Kenya également, il serait possible d'élargir la production de moteurs électriques de faible puissance, d'éléments normalisés de distribution du courant électrique et d'accessoires pour transformateurs, les industries correspondantes étant associées avec celle de la fabrication et du revêtement des fils et câbles électriques.

L'Ouganda de son côté pourrait se lancer dans la fabrication des accessoires de transport du courant électrique. La Rhodésie du sud et la Zambie pourraient s'entendre pour se partager la fabrication des articles suivants : étai, scie, moteurs électriques de faible puissance, éléments normalisés de distribution du courant électrique, accessoires pour transport du courant et pour transformateurs.

3. Au Kenya, on pourrait élargir l'assortiment des outils agricoles actuellement fabriqués. Il serait possible, probablement, d'installer à Jinja (Ouganda) une usine de montage de tracteurs, alors qu'à Dar-es-Salaam, où l'on fabrique déjà des machines agricoles moyennes et légères en petites quantités, on pourrait en accroître la production. En Ouganda, on procède actuellement à l'aménagement de l'atelier d'entretien de la suprerie de Mehta, à Lu azi, afin qu'il puisse accueillir des machines lourdes
Annexe I

page 6

de d'ens; une usine sert adjointe à cet atelier, de même qu'une
unité de fabrication de bouteilles appelés essentiellement à satisfaire
les besoins locaux. Toutefois, Jinda se prêterait dans de meilleures
conditions à l'implantation d'une usine dont le marché
serait sous-régional; cette usine pourrait construire également des
bouteilles à par soudures portatives. La Rhodésie du sud pourrait
entreprendre de fabriquer un large assortiment d'outils agricoles
et de machines simples; elle pourrait aussi construire des trac-
teurs agricoles complets (sauf les moteurs). La Zambie pourrait
produire certaines machines spécialisées utilisées dans les mines,
telles que tapis vibrants, transporteurs à courroies complets (y
compris les galets), et aussi des aciers spéciaux pour perforatri-
ces et des accessoires pneumatiques. En Zambie, encore, on pour-
rait établir des usines fabriquant une partie des installations
et des accessoires servant au raffinage du pétrole et à l'élabora-
tion des engrais azotés, par exemple les éléments de construction
en acier, les tubes et tuyaux, les réchauffeurs. La Tanzanie a
entrepris la construction d'une usine de montage spécialisée dans
les véhicules commerciaux, qui pourrait approvisionner une partie
importante de la sous-région. Il existe quatre usines de montage
des véhicules automobiles en Rhodésie du sud, et une usine en Zambie,
qui suffiraient sans doute pendant de nombreuses années encore aux
besoins de cette partie de la sous-région.

4. En Rhodésie du sud, il serait possible d'accroître la produc-
tion annuelle des bicyclettes pour qu'elle atteigne un chiffre
compris entre 200.000 et 300.000 unités, les éléments étant fabri-
qués sur place à 80 pour 100. On pourrait en outre développer la
production de bicyclettes, par le montage principalement, dans
d'autres pays de la sous-région, la Tanzanie, par exemple, qui
pourrait utiliser dans une certaine mesure des éléments fabriqués
en Rhodésie du sud.

5. La création d'une usine de construction de matériel roulant
de chemin de fer se justifierait, d'autant plus que le matériel
du réseau ferré de l'Afrique de l'est devra être renouvelé assez
assez prochainement. Logiquement, c'est à Dar-es-Salaam qu'il faudrait planter cette usine, le Kenya conservant le principal atelier de réparation du matériel ferroviaire. Une autre usine, qui se spécialiserait dans la construction de wagons légers de marchandises, pourrait être installée en Zambie; elle produirait en particulier des wagons à mineraux et des marchandises; en outre, la Zambie pourrait fabriquer des aiguilles de voie ferroviaire, des croisements, des coeurs de croisement en acier.

6. On pourrait réserver au Kenya et à la Rhodésie du sud la production de réfrigérateurs et de moteurs électriques ne dépassant pas 5 cv.

7. La Tanzanie possède une usine de lames de rasoir qui, elle aussi, devra desservir la sous-région toute entière pour être viable.

8. La nouvelle installation de laminage de l'aluminium de Chandaria (Dar-es-Salaam) doit exporter sa production à des usines associées, établies au Malawi, au Rwanda, au Burundi, au Kenya, en Ethiopie, en Zambie et en République démocratique du Congo; ces usines travailleraient le métal fourni par Chandaria pour en faire surtout des ustensiles de menuisage creux.

9. La mission a proposé la création des industries électronique...
<table>
<thead>
<tr>
<th>Numéro d'ordre</th>
<th>Industries proposées</th>
<th>Prod. annuelle en tonnes fortes</th>
<th>Prod. annuelle en milliers de dollars</th>
<th>Ventes annuelles en milliers de dollars</th>
<th>Nombre d'ouvriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>machines légères, étaux, forets, scies</td>
<td>500</td>
<td>300</td>
<td>227</td>
<td>70</td>
</tr>
<tr>
<td>2.</td>
<td>Instruments agricoles et outils à main</td>
<td>3000</td>
<td>500</td>
<td>625</td>
<td>80</td>
</tr>
<tr>
<td>3.</td>
<td>moteurs électriques (10 cv maximum)</td>
<td>400</td>
<td>300</td>
<td>400</td>
<td>60</td>
</tr>
<tr>
<td>4.</td>
<td>Éléments normalisés de distribution du courant électrique (légers et moyens)</td>
<td>250</td>
<td>250</td>
<td>150</td>
<td>40</td>
</tr>
<tr>
<td>5.</td>
<td>Transformateurs (2kVA maximum)</td>
<td>200</td>
<td>140</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>6.</td>
<td>Câbles électriques en cuivre (légers)</td>
<td>750</td>
<td>1000</td>
<td>700</td>
<td>80</td>
</tr>
<tr>
<td>7.</td>
<td>Réfrigérateurs, machines à laver, appareils de ménage</td>
<td>1000</td>
<td>1250</td>
<td>150</td>
<td></td>
</tr>
</tbody>
</table>

N.P.: Toutes ces industries sont proposées dans l'hypothèse d'un marché sous-régional.

1' 1 tonne équivalente à 1.615 kg
<table>
<thead>
<tr>
<th>Numéro d'ordre</th>
<th>Industries proposées</th>
<th>Prod. annuelle en tonnes fortes</th>
<th>Prod. annuelle en milliers de dollars</th>
<th>Ventes annuelles en milliers de dollars</th>
<th>Nbre d'ouvriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Usine sidérurgique intégrée (four électrique); acier brut</td>
<td>200.000</td>
<td>20.000</td>
<td>15.000</td>
<td>4.000</td>
</tr>
<tr>
<td>2.</td>
<td>Installation de laminage; produits légers</td>
<td>150.000</td>
<td>20.000</td>
<td>12.000</td>
<td>1.000</td>
</tr>
<tr>
<td>3.</td>
<td>Usine de montage de tracteurs</td>
<td>200 unités</td>
<td>700</td>
<td>850</td>
<td>130</td>
</tr>
<tr>
<td>4.</td>
<td>Machines pour mines, pompes, groupes de transmission du mouvement</td>
<td>300</td>
<td>250</td>
<td>200</td>
<td>40</td>
</tr>
<tr>
<td>5.</td>
<td>Accessoires de transport du courant électrique, moyens-lourds</td>
<td>500</td>
<td>400</td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>6.</td>
<td>Fonderie générale, objets à gaz, bouteilles à gaz</td>
<td>900</td>
<td>300</td>
<td>250</td>
<td>80</td>
</tr>
</tbody>
</table>

N.P.: Les cinq premières industries sont proposées dans l'hypothèse d'un marché sous-régional, la dernière d'un marché local.
### En Tanzanie

<table>
<thead>
<tr>
<th>Numéro d'ordre</th>
<th>Industries proposées</th>
<th>Prod. annuelle en tonnes fortés</th>
<th>Prod. annuelle en milliers de dollars</th>
<th>Ventes annuelles en milliers de dollars</th>
<th>Nombre d'ouvriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Machines-Outils générales</td>
<td>350</td>
<td>170</td>
<td>130</td>
<td>40</td>
</tr>
<tr>
<td>2.</td>
<td>Machines agricoles-légères</td>
<td>600</td>
<td>500</td>
<td>400</td>
<td>150</td>
</tr>
<tr>
<td>3.</td>
<td>Construction de bicyclettes</td>
<td>50.000</td>
<td>1.400</td>
<td>1.000</td>
<td>175</td>
</tr>
<tr>
<td>4.</td>
<td>Matériel roulant pour chaîne de fer</td>
<td></td>
<td>4.000</td>
<td>5.000</td>
<td>400</td>
</tr>
</tbody>
</table>

_N.B.: Ces quatre industries sont proposées dans l'hypothèse d'un marché sous-régional._

### En Zambie

<table>
<thead>
<tr>
<th>Numéro d'ordre</th>
<th>Industries proposées</th>
<th>Prod. annuelle en tonnes fortés</th>
<th>Prod. annuelle en milliers de dollars</th>
<th>Ventes annuelles en milliers de dollars</th>
<th>Nombre d'ouvriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pour le marché local</td>
<td>Tubes, tuyaux, raccords, en fonte et en acier</td>
<td>10.000</td>
<td>1.300</td>
<td>850</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>Articles en fer forgé et en fonte moulée</td>
<td>5.000</td>
<td>700</td>
<td>500</td>
<td>100</td>
</tr>
<tr>
<td>Pour un marché sous-régional</td>
<td>Articles moulés et forgés en acier et en métaux non ferreux</td>
<td>15.000</td>
<td>2.250</td>
<td>2.250</td>
<td>300</td>
</tr>
<tr>
<td>4.</td>
<td>Articles en plomb, plaques brides, pièces moulées, tubes</td>
<td>2.000</td>
<td>675</td>
<td>1.030</td>
<td>50</td>
</tr>
<tr>
<td>Numéro d'ordre</td>
<td>Industries proposées</td>
<td>Prod. annuelle en tonnes</td>
<td>Prod. annuelle en milliers de dollars</td>
<td>Ventes annuelles en milliers de dollars</td>
<td>Nombre d'ouvriers</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------</td>
<td>--------------------------</td>
<td>--------------------------------------</td>
<td>----------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Pour un marché sous-régional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Machines pour mines, tamis transporteurs, etc.</td>
<td>2.500</td>
<td>3.000</td>
<td>3.900</td>
<td>500</td>
</tr>
<tr>
<td>6.</td>
<td>Matériel roulant et accessoires pour voies ferrées de mines</td>
<td>6.000</td>
<td>7.250</td>
<td></td>
<td>600</td>
</tr>
<tr>
<td>7.</td>
<td>Eléments généraux de distribution du courant électrique</td>
<td>200</td>
<td>150</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>8.</td>
<td>Transformateurs et accessoires de transport du courant électrique</td>
<td>500</td>
<td>370</td>
<td></td>
<td>110</td>
</tr>
<tr>
<td>Pour un marché sous-régional plus exportations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Acier, boulets pour broyeurs et garniture, articles moulés (généraux)</td>
<td>10.000</td>
<td>1.200</td>
<td>1.000</td>
<td>200</td>
</tr>
<tr>
<td>10.</td>
<td>Cuivre, dahu-produits, barres, tubes, profilés</td>
<td>8.000</td>
<td>10.000</td>
<td>6.400</td>
<td>300</td>
</tr>
<tr>
<td>Numéro d'ordre</td>
<td>Industries proposées</td>
<td>Production annuelle en milliers de dollars</td>
<td>Ventes annuelles en milliers de dollars</td>
<td>Nombre d'ouvriers</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------------</td>
<td>-------------------------------------------</td>
<td>-----------------------------------------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Alliages non ferreux, finis et bruts</td>
<td>5.000</td>
<td>3.500</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Câbles électriques pour mines et remorquage</td>
<td>6.000</td>
<td>6.000</td>
<td>360</td>
<td></td>
</tr>
</tbody>
</table>

En Produit du Sud

<table>
<thead>
<tr>
<th></th>
<th>Production de fonte (deux hauts-fourneaux)</th>
<th>Production annuelle en milliers de dollars</th>
<th>Ventes annuelles en milliers de dollars</th>
<th>Nombre d'ouvriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.000.000</td>
<td>70.000</td>
<td>78.000</td>
<td>5.200</td>
</tr>
</tbody>
</table>

Pour un marché sous-régional

<table>
<thead>
<tr>
<th></th>
<th>Installation de laminage de l'acier-produits moyens</th>
<th>Production annuelle en milliers de dollars</th>
<th>Ventes annuelles en milliers de dollars</th>
<th>Nombre d'ouvriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>200.000</td>
<td>26.600</td>
<td>30.000</td>
<td>1.400</td>
</tr>
</tbody>
</table>

Pour un marché sous-régional

<table>
<thead>
<tr>
<th></th>
<th>Petit laminor semi continu à feuillards</th>
<th>Production annuelle en milliers de dollars</th>
<th>Ventes annuelles en milliers de dollars</th>
<th>Nombre d'ouvriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>40.000</td>
<td>5.400</td>
<td>7.000</td>
<td>280</td>
</tr>
</tbody>
</table>

Pour un marché sous-régional

<table>
<thead>
<tr>
<th></th>
<th>Fer blanc (procédé de l'immersion à chaud)</th>
<th>Production annuelle en milliers de dollars</th>
<th>Ventes annuelles en milliers de dollars</th>
<th>Nombre d'ouvriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>6.000</td>
<td>1.400</td>
<td>1.370</td>
<td>70</td>
</tr>
</tbody>
</table>

Pour un marché sous-régional

<table>
<thead>
<tr>
<th></th>
<th>Fils machine, clôtures, articles en fil d'acier</th>
<th>Production annuelle en milliers de dollars</th>
<th>Ventes annuelles en milliers de dollars</th>
<th>Nombre d'ouvriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>25.000</td>
<td>3.000</td>
<td>3.000</td>
<td>250</td>
</tr>
</tbody>
</table>

Pour un marché sous-régional

<table>
<thead>
<tr>
<th></th>
<th>Tubes et tuyaux en acier</th>
<th>Production annuelle en milliers de dollars</th>
<th>Ventes annuelles en milliers de dollars</th>
<th>Nombre d'ouvriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.</td>
<td>10.000</td>
<td>1.300</td>
<td>850</td>
<td>100</td>
</tr>
<tr>
<td>Numéro d'Ordre</td>
<td>Industries proposées</td>
<td>Prod. annuelle en tonnes fortes</td>
<td>Prod. annuelle en milliers de dollars</td>
<td>Ventes annuelles en milliers de dollars</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>---------------------------------</td>
<td>-------------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>7.</td>
<td>Machines, tours, étaux limeurs, raboteuses, fraiseuses, etc.</td>
<td>3.000</td>
<td>3.000</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Tracteurs (fabrication de pièces détachées), machines agricoles</td>
<td>1.600</td>
<td>3.000</td>
<td>3.300</td>
</tr>
<tr>
<td>9.</td>
<td>Construction de bicyclettes</td>
<td>100.000 unités</td>
<td>2.800</td>
<td>2.000</td>
</tr>
<tr>
<td>10.</td>
<td>Réfrigérateurs, machines à laver, appareils de ménage</td>
<td>3.000</td>
<td>3.750</td>
<td></td>
</tr>
</tbody>
</table>
10. **Pétrole et industries**

Outre les industries de forte capacité mentionnées ci-dessus, la Commission a projeté la création des industries électroniques radio et usines d'articles métalliques, dont le marché serait national.

<table>
<thead>
<tr>
<th>Pays</th>
<th>Industries</th>
<th>Capacité annuelle</th>
<th>Investissement en milliers de dollars</th>
<th>Emploi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burundi</td>
<td>Petit outillage agricole</td>
<td>1,000 tonnes</td>
<td>250</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Meubles métalliques</td>
<td></td>
<td>35</td>
<td>16</td>
</tr>
<tr>
<td>Kénya</td>
<td>Éléments de lampes à pétrole</td>
<td></td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Fourneaux à pétrole</td>
<td></td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Zambie</td>
<td>Outillage agricole</td>
<td>5,000 unités</td>
<td>30</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Chaufferie</td>
<td>1,000 tonnes</td>
<td>250</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Fourneaux de cuisine</td>
<td>600 tonnes</td>
<td>40</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Portes et fenêtres métalliques</td>
<td>5,000 unités</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>latences métalliques</td>
<td>15,000 tonnes</td>
<td>75</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Latences métalliques</td>
<td>250 tonnes</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>Malawi</td>
<td>Latences métalliques</td>
<td>250 tonnes</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Outils de jardinage</td>
<td>600 tonnes</td>
<td>85</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Ouvrages de montage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(bicyclettes et postes de radio)</td>
<td>20,000 bicyclettes</td>
<td>80</td>
<td>45</td>
</tr>
<tr>
<td>Tanzania</td>
<td>Quincaillerie pour le bâtiment</td>
<td>3,000 tonnes</td>
<td>35</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Ouvrages en métal</td>
<td>600 tonnes</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>Ouganda</td>
<td>Panaches généraux, bouteilles à</td>
<td>900 tonnes</td>
<td>250</td>
<td>80</td>
</tr>
</tbody>
</table>

1/ La même industrie est classée dans la catégorie des industries de forte capacité.
Annexe I

11. Algérie, Libye, maroc et Tunisie

1. Les possibilités qui s'offrent au développement de l'industrie du travail des métaux, de l'industrie mécanique, de l'industrie électro-technique et de l'industrie du montage sont grandes dans la sous-région, à condition que les programmes de production soient bien établis dans tous les détails. Le maroc en particulier dispose de moyens bien établis dans ce domaine. La mise en œuvre d'un programme commun dans le secteur Bore-Menzel BOURAIL pourrait aboutir à des résultats extrêmement avantageux. Compte tenu de la possibilité de faire largement appel aux moyens perten-\(\text{ent de sous-trater les} \)
\(\text{marchés} \) \(\text{aisément dans la sous-région, on} \)
\(\text{donnera} \) \(\text{ci-à-près des exemples des} \)
\(\text{économies de dimensions possi-bles dans le secteur industriel, les} \)
\(\text{perspectives pouvant aller} \)
\(\text{jusqu'à une} \) \(\text{réduction de 30 pour 100 des} \)
\(\text{prix de revient.} \)

2. A Mohammedia, une usine fabrique des câbles électriques et des transformateurs pour le marché intérieur. Elle ne travaille actuellement qu'à 50 pour 100 environ de sa capacité. La plus grande partie des matières premières qu'elle utilise sont impor-tées d'Europe, dont 1500 tonnes de cuivre en 1963. Il semble peu probable que, sans protection sur les marchés nord-africains, cette usine puisse soutenir la concurrence des entreprises européennes, qui sont plus proches des grands centres de production de France et d'Italie. Un débouché plus logique serait sans doute l'Afrique de l'ouest, des régions côtières en particulier.

3. En Tunisie, le secteur de la transformation primaire des métaux est pour ainsi dire inexistant, mais plusieurs projets sont en cours de préparation. Au Maroc, ce secteur est relativement dével-\(\text{opmp; il est représenté en particulier par l'étamage de fil} \)
\(\text{recuit ou de fil brut pour cloche des} \)
\(\text{travaux de chaudronnerie, la} \)
\(\text{fabrication de} \) \(\text{lenticule de construction en} \)
\(\text{fonte et en acier. La} \)
\(\text{production suit} \) \(\text{aux besoins actuels et les} \)
\(\text{possibilités sont} \)
\(\text{grande. Des} \) \(\text{projets sont en cours} \) \(\text{d'exécution; ils portent} \)
\(\text{sur la fabrication de} \) \(\text{tubes soudés longitudinalement et de} \)
\(\text{tubes de} \) \(\text{grand diamètre soudés en hélice (jusqu'à} \) \(\text{1400 m). Ces} \)
\(\text{pro-}
lations actuelles et celles qui sont en cours de réalisation sauront aux besoins jusqu'en 1970 et au-delà. Le Maroc possède plusieurs fonteniers de fonte et d'acier ; dans ce secteur, ces besoins semblent croissant pendant quelque cinq ans encore.

L'Algérie est bien équipée également dans ce secteur ; elle possède en effet :

- 2 usines de tuyaux à gaz (noirs et galvanisés) de divers diamètres (60 mm au maximum); la capacité annuelle de ces usines atteint 10.000 tonnes ;
- 1 usine de tubes légers (anneaux métalliques, caisses de bicyclettes, chauffage central), de 3.600 tonnes de capacité annuelle ;
- 1 usine de tubes soudés longitudinalement de grand diamètre (entre 250 et 700 mm), de 3.000 tonnes de capacité annuelle ;
- 1 usine de tuyaux de grand diamètre soudés en hélice (200-700 mm), de 7.000 tonnes de capacité annuelle ;
- des ateliers de chaudronnerie et des fondueries de fonte et d'acier, d'une capacité annuelle de 6.000 tonnes.

4. L'Algérie et le Maroc possèdent chacun une usine très importante de construction du matériel roulant de chemin de fer ; ces deux usines ont l'une et l'autre une capacité qui suffit aux besoins de tout le Maroc. Il serait souhaitable que les deux pays s'accordent pour se partager la production des divers matériaux ou pour que leurs productions soient complémentaires.

5. En Algérie, en Maroc et en Tunisie, les industries mécaniques sont représentées essentiellement par des ateliers d'entre- tien ou de technique générale (15 établissements seulement en Tunisie). Ces entreprises n'ont aucun programme bien défini, si bien que la production reste au-dessous de la capacité.

6. Au Maroc, l'effort d'industrialisation ont orientés quelques entreprises vers la production de certains articles semi-durables, tels que bennes à pétrole, chauffe-eau électriques,
serrureries, petites outils agricoles, accessoires industriels, pièces de transporteurs à courroies, éléments de machines de mines, accessoires pour concasseurs, broyeuses pour l'industrie du ciment.

7. L'installation de chaînes de montage des voitures automobiles a permis à un grand nombre d'entreprises d'arriver au plein emploi et pour certaines d'entre elles de consacrer des investissements à l'achat de machines et d'outils destinés à la production en série, dans des conditions satisfaisantes d'économie et de qualité, des éléments mécaniques nécessaires à ces chaînes de montage. Ces machines et outils sont importants pour les industries mécaniques et les industries auxiliaires (chaudronnerie, travail du bois, appareillage électrique, accessoires d'appareils de commande, etc.). L'existence de cet équipement a permis aux industries locales de participer dans une mesure notable à l'établissement de nouvelles industries, à l'époque où de grands ensembles industriels étaient mis en service.

8. Il y a très peu de temps encore, la Tunisie ne disposait quère de moyens dans ce domaine. Toutefois, l'arsenal maritime de Mohamed Bouguiba pourrait se lancer dans l'industrie lourde grâce à son équipement de base; il est capable de produire les principaux matériels d'équipement.

9. Par la coordination de leurs plans, les pays du Maghreb pourraient connaître un développement rapide grâce à la spécialisation, voire unique pouvant conduire les industries de montage à une production en grande série. Un grand nombre d'industries de montage offrent de grandes possibilités dans la sous-région: montage de voitures automobiles particulièrement, de véhicules utilitaires, de camions petits et grands, de tracteurs (à roues et à chenilles), de matériels pour l'industrie textile (pour les cinq prochaines années, les besoins des pays du Maghreb en ce qui concerne seulement les métiers à tisser le coton ou la fibrane se chiffrent par plusieurs milliers). Une coordination extrêmement
poussée pour le choix des modèles et le l'assortiment à fabriquer est indispensable pour qu'un tel programme d'industrialisation soit couronné de succès, au bord à l'importance considérable des sérènes requises pour que les prix de revient soient diminués et pour que les éléments fabriqués répondent aux conditions de qualité et d'interchangeabilité requises.

10. Le plan tunisien prévoit la construction d'une usine de montage de véhicules Renault-SAVIEM dont la capacité annuelle sera de 400 camions lourds et de 50 autocars; un agrandissement ultérieur permettra en outre de construire 1000 automobiles particulières par an ("Dauphine" et R4), plus 1200 tracteurs agricoles de l'International Harvesting Co. (à roues et à chenilles).

11. L'Algérie monte des camions lourds Berliet (jusqu'à 60 tonnes) et se propose de monter des automobiles particulières. La production de tracteurs agricoles à roues est aussi envisagée.

12. Le Maroc monte des automobiles particulières par l'intermédiaire de la société SOMACA (Simca-Fiat), la capacité des installations étant de 10.000 véhicules par an. Il est également équipé pour produire des véhicules utilitaires (à quatre roues motrices), à savoir des Landrover (400 par an) et des Willys (également 400). Dans le cas des camions lourds et moyens, la gamme des Berliet s'arrête à 36 tonnes (capacité: 1200 camions par an). L'entreprise Said, qui monte des tracteurs Volvo et des tracteurs Ford, est comparable à la chaîne des Berliet pour le nombre des modèles, la capacité également étant la même.

13. Une normalisation poussée et la coordination entre les pays du Maghreb pour les modèles à fabriquer permettraient de produire diverses pièces en séries suffisamment importantes pour que leurs prix puissent soutenir la concurrence. Si l'on établissait pour les moteurs, les essieux, les boîtes de vitesses, etc. une liste minimale des besoins, et recourant à la normalisation, le montage s'en trouverait facilité et en outre on pourrait envisager de fabriquer par exemple des pistons et des soupapes. Ulteriormente,
le production de maïs au laboratoire en filière (par exemple de plâtre). Grâce à cette nouvelle fabrication d'hélices de chaine). L'accroissement de cette filière s'élargira régulièrement, en sorte que l'industrie de l'industrie nord pourrait produire de 6 à 85 pour 10 des éléments utilisés. En compte tenu également de la contribution de l'industrie textile, de celle des diamants ou plastique, de l'industrie chimique avec les colles, les peintures ou les vernis, de l'industrie du verre (qui pourrait fabriquer des verres de sécurité), des pièces forgées qui pourraient être réalisées, des pneumatiques et autres éléments en caoutchouc, des accessoires tels que les accumulateurs et les câbles. Il en resulterait en outre une multiplication des pièces de rechange sur le marché, ce qui communiquerait une impulsion aux activités d'entretien et de réparation.

14: Les installations de la base de Benzel Bourguiba sont remarquablement adaptées à la réparation des navires. La base, qui est dotée d'un équipement lourd, peut recevoir des navires de 33,000 tonnes. L'ensemble des installations est parfaitement entretenu. Pour que l'exploitation de l'arsenal de Benzel Bourguiba soit rentable et aussi pour qu'il puisse attirer et conserver la main-d'œuvre indispensable aux travaux de réparation des navires (main-d'œuvre qui existe dans le voisinage), il faudrait y monter une cale pour la construction de bateaux de faible tonnage (bateaux de pêche, remorqueurs, etc.). Compte tenu de la nécessité de travaux de grande envergure pour que l'ensemble de la base soit rentable, compte tenu aussi des incroyables possibilités qu'impliquent les installations actuelles, la base pourrait en même temps entreprendre d'autres travaux. Elle pourrait par exemple fabriquer des outils tels que des pâles ou des pelles, des outils de machines pneumatiques, certains matériaux de mine, des broyeurs, des concasseurs ou des pièces détachées. Il lui serait possible également, en faisant appel à des sous-traitants, de fonder et d'usiner des pièces pour d'autres industries (par exemple, des éléments de moteurs électriques). Enfin, en se fondant essentiellement sur le marché nord-africain, elle pourrait fabriquer sous licence de petites machines-outils, des métiers à tisser, etc.
ANNEXE II

CONCLUSIONS ET RECOMMANDATIONS DE LA MISSION DE COORDINATION
DE LA CEAC ENVOYÉE DANS LA SOUS-RÉGION D'AFRIQUE CENTRALE

A la sixième session de la Commission économique pour l'Afrique, les pays de la sous-région d'Afrique centrale (qui venait d'être délimitée), ont demandé qu'une mission analogique à celles qui avaient déjà séjourne en Afrique de l'ouest, en Afrique du nord et en Afrique de l'est, fût envoyée dans la nouvelle sous-région. Par la suite, les gouvernements de la sous-région ont prié le Secrétaire exécutif de bien vouloir leur fournir des conseils et une assistance dans un domaine enlobant les divers aspects de la coopération économique. C'est pour répondre à cette requête que la CEAC a envoyé dans les six pays de la sous-région une mission qui les a parcourus successivement du 23 avril au 24 mai 1955.

Bien que très large (considérablement plus large que dans le cas des missions précédentes), le mandat de la mission de l'Afrique centrale n'embrassait pas tous les aspects de la coopération économique. Les principaux objectifs qui lui avaient été fixés concernaient l'étendue et les formes de la coopération dans les domaines du développement de l'énergie, de l'agriculture et de l'industrie. En outre, la mission devait aborder les problèmes de la vie-œuvre, de l'enseignement et de la formation, en examinant en même temps l'étendue et les formes de la coopération dans ces domaines.

Laissons de côté les industries orientées essentiellement vers les marchés extra-africains, la mission s'en est constamment tenue à une classification des industries en trois catégories: premièrement, les industries rurales avec une faible production, qui doivent logique ent être envisagées dans la plupart des pays; deuxièmement, les industries auquelles il faut au minimum un marché correspondant à la sous-région tout entière; troisièmement, une catégorie intermédiaire mais importante, celles des industries qui, en principe, pourraient exister dans tous les pays, quels qu'ils soient, mais pour lesquelles la coordination internationale et, par conséquent, l'organisation africaine des avantages manifestes.
Pour les diverses industries électromécaniques, les conclusions et les recommandations de la mission ont été les suivantes.

1. Faute de données statistiques, il a été impossible d'établir des projections (âmes approximatives) de la demande relative aux différentes catégories d'articles manufacturés en métal. Dans le cas des biens de consommation humaines, tels que les récepteurs de radio, les lampes électriques, les réfrigérateurs, les machines à laver, l'élasticité de la demande par rapport au revenu est probablement grande. Ce secteur industriel, toutefois, est principalement celui des biens intermédiaires et des biens d'équipement. Dans les projections industrielles d'ensemble, on a supposé des taux de croissance élevés, qui ne seront atteints que si les pays s'équipent et augmentent leur production de biens d'équipement, particulièrement de machines, d'appareillage électrique et de matériels de transport.

2. Au Tchad il n'existe pratiquement aucune industrie; les plans n'en prévoient pas pour l'avenir immédiat.

3. La République centrafricaine, ne possède à l'heure actuelle aucune industrie électromécanique. Elle envisage de fabriquer des outils, des ustensiles de bénage, des lampes compacts, des ferrures, des récepteurs de radio à transistors (montage), des petits bateaux, des bicyclettes et des vélocimoteurs.

4. En dehors de certaines activités concernant la chaudronnerie (300 tonnes de capacité annuelle prévue pour 1966) et la fabrication de meubles métalliques, le Savon, à l'heure actuelle, ne produit ni articles en métal, ni machines, ni matériels de transport. Des industries sont envisagées: fabrication de clous (300 tonnes en 1966), de récepteurs de radio (2500 unités en 1966) et d'accumulateurs (1000 tonnes en 1968).

5. Au Congo (Brazzaville) il existe les industries suivantes:

- Clous (début 1964)
- Ustensiles en aluminium
- Articles métalliques (valises, valisettes, etc.)
- Chaudronnerie et éléments de construction en métal
- Montage de bicyclettes et de vélocimoteurs
- Carrosseries d'automobiles, bennes, camions, etc.
- Matériel forestier
- Matériel pour mines et travaux publics

Les nouveaux projets industriels sont les suivants :

- Tôles ondulées et polymérisées
- Quincaillerie pour bâtiment
- Petites machines agricoles
- Fourneaux à étrole et réfrigérateurs
- Fûts métalliques
- Bondes filetées

<table>
<thead>
<tr>
<th>Article</th>
<th>Importations en tonnes</th>
<th>Production en tonnes</th>
<th>Nbre d'usines</th>
<th>Nbre d'employés</th>
<th>Investissements en millions de CPA</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td>1.004</td>
<td>62</td>
<td>52.250</td>
<td>1</td>
<td>548</td>
<td>8.200</td>
</tr>
<tr>
<td>Articles en Al.</td>
<td>62</td>
<td>254</td>
<td>64</td>
<td>326</td>
<td></td>
<td>Chiffres d'affaires 3.600 000  CFA</td>
</tr>
<tr>
<td>tôles d'Al. conduites</td>
<td>64</td>
<td>1.225</td>
<td>64</td>
<td>326</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constructions métalliques</td>
<td>929</td>
<td>5</td>
<td>5</td>
<td>357</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>Chaudronnerie</td>
<td>334</td>
<td>2</td>
<td>140</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tôles en métal</td>
<td>60</td>
<td>20 000</td>
<td>60</td>
<td>1</td>
<td>37</td>
<td>6</td>
</tr>
<tr>
<td>Cols</td>
<td>500</td>
<td>63</td>
<td>720</td>
<td>2</td>
<td>46</td>
<td>19</td>
</tr>
<tr>
<td>Articles émaillés</td>
<td>83</td>
<td>1</td>
<td>80</td>
<td></td>
<td>57</td>
<td>Depuis 1964</td>
</tr>
<tr>
<td>Machines agricoles</td>
<td>1</td>
<td>106</td>
<td>1</td>
<td>106</td>
<td>150</td>
<td>Depuis 1964</td>
</tr>
<tr>
<td>Ferronnerie</td>
<td>4</td>
<td>50</td>
<td>50</td>
<td></td>
<td>50</td>
<td>Depuis 1963</td>
</tr>
<tr>
<td>Fonderie</td>
<td>2</td>
<td>50</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Article</td>
<td>Importations en tonnes</td>
<td>Production en tonnes</td>
<td>Nombre d'usines d'employés</td>
<td>Investissements en millions de CFA</td>
<td>Observations</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------------------------</td>
<td>----------------------</td>
<td>----------------------------</td>
<td>-----------------------------------</td>
<td>--------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Réparation des tracteurs agricoles</td>
<td>116</td>
<td>1</td>
<td>47</td>
<td>64</td>
<td>Fabrication et réparation de pièces de rechange</td>
<td></td>
</tr>
<tr>
<td>Construction de navires</td>
<td>456</td>
<td>1</td>
<td>140</td>
<td>16</td>
<td>Également chaudronnerie; 630 tonnes de fer consommées</td>
<td></td>
</tr>
<tr>
<td>Bicyclettes</td>
<td>62</td>
<td>1,800 pièces</td>
<td>1</td>
<td>104</td>
<td>Tubes d'acier importés</td>
<td></td>
</tr>
<tr>
<td>Brouettes et remorques</td>
<td>62</td>
<td>120</td>
<td>1</td>
<td>20</td>
<td>Depuis 1964</td>
<td></td>
</tr>
</tbody>
</table>
7. La République démocratique du Congo est au nombre des principaux producteurs de métaux non ferreux en Afrique, mais elle est orientée principalement vers l'exportation.

<table>
<thead>
<tr>
<th>Matière</th>
<th>Production en tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1962</td>
</tr>
<tr>
<td>Cuivre (équivalent en métal)</td>
<td>297.000</td>
</tr>
<tr>
<td>Concentrés de zinc (équivalence en métal)</td>
<td>95.700</td>
</tr>
<tr>
<td>Zinc, métal</td>
<td>56.000</td>
</tr>
<tr>
<td>Etain, métal</td>
<td>1.010</td>
</tr>
<tr>
<td>Plomb</td>
<td>280</td>
</tr>
<tr>
<td>Cobalt</td>
<td>9.700</td>
</tr>
<tr>
<td>Cadmium</td>
<td>300</td>
</tr>
</tbody>
</table>

8. La République démocratique du Congo est le pays le plus industrialisé de la sous-région. Si l'on prend 1950 comme année de référence (indice 100), la production industrielle a atteint l'indice (235) en 1959.

<table>
<thead>
<tr>
<th>Article</th>
<th>Importations</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clous et boulons</td>
<td>62 2.230 tonnes</td>
<td>63 88 tonnes</td>
</tr>
<tr>
<td>Seaux en fer galvanisé</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outils à main</td>
<td>62 935.000 Fr</td>
<td>64 250.000 pcs. 350.000</td>
</tr>
<tr>
<td>Pièces moulées en métaux non ferreux</td>
<td>62 750.000 Fr</td>
<td>550 t.p.a.</td>
</tr>
<tr>
<td>Réfrigérateurs de (ménage)</td>
<td></td>
<td>15 unités par jour</td>
</tr>
<tr>
<td>Fourneaux à pétrole</td>
<td></td>
<td>50 unités par jour</td>
</tr>
<tr>
<td>Cadrès de 5 vélocettes</td>
<td></td>
<td>58 140.000</td>
</tr>
</tbody>
</table>

La République possède une usine pour chacune des catégories suivantes de produits: tôles industrielles fortes ou minces, tôles ondulées galvanisées, tubes, boîtes de fer blanc pour empaquetage, fils métalliques, fils et câbles de cuivre, bouchons et bondes métalliques, pièces moulées en fonte et en acier; deux usines pour chacune des catégories suivantes: articles de voyage en métal,
Annexe II
page 7

1. Éléments de construction en acier, articles de menuiserie et alumi-
nium, tôles en acier sont vains pour le sud des catégories suivantes: construction métallique et charbonnerie. Des projets sont en cours d'étude en vue de la création des industries suivantes: décolletage (files, clous, vis, etc.) (600 tonnes par mois); articles émaillés (1500 unités par jour); pics, poches et haches, montages de voitures particulières (date non encore fixée) et de vélocimotocars. Il n'existe pas l'industrie électronique.

2. En ce qui concerne les industries électromécaniques, la sit-
tuation dans le sous-région est la suivante :

**Articles métalliques**

Le Cameroun et la République démocratique du Congo ont
commencé à produire des boulons et des vis; leurs industries pour-
raient être développées pour desservir la sous-région.

La République démocratique du Congo a commencé à produire
des articles de coutellerie et des couverts de table; cette indus-
trie pourraient également être étendue pour approvisionner toute la
sous-région.

Les industries suivantes pourraient être créées à l'échelon
de la sous-région: extincteurs, verres, clés, serrures et cadenas,
conteneurs de poches et ciseaux, appareils d'éclairage des rues et
arnicures, parties mobiles de machines à laver, tapis et
rideaux en fils métalliques.

**Appareillage électrique**

Le Cameroun et la République démocratique du Congo fabriquent
des moteurs et des appareils électriques; le Cameroun, la Républi-
que démocratique du Congo et la République centrafricaine, des
récepteurs de radiodiffusion (montage); la République démocratique
du Congo, des accumulateurs et des câbles électriques isolés, le
Savon et la République démocratique envisagent de fabriquer des
piles sèches. D'autres industries pourraient être créées: fabri-
cation d'armatures (d'électro-aimants), de ventilateurs électriques
mobiles, accessoires de distribution du courant électriques et
D'autres industries existent dans les pays: réviser les essieux, usiner les cylindres, réparation de locomotives, construction et réparation du matériel roulant de chemin de fer.

Il intervient ensuite les industries pour lesquelles la coordination sous-régionale serait avantageuse sinon indispensable, il s'agit, par exemple du montage et de la fabrication progressivement élargie d'éléments de bicyclettes.

Dans les deux prochaines années, un programme important de développement des réseaux ferrés a été lancé, particulièrement au Gabon, en Ouganda et en République centrafricaine. Il en découle des possibilités dans le domaine du montage de matériel roulant, comme dans celui de la fabrication progressivement élargie de pièces détachées, coordonnée sur le plan sous-régional.

**Machines**

La République démocratique du Congo est pratiquement le seul pays qui fabrique actuellement des machines (machines agricoles, fabrication et montage de réfrigérateurs et de machines à coudre). D'autres industries pourraient être rentables dans la sous-région, par exemple la fabrication de compresseurs d'air, de roulements à billes, de machines à faire les briques, les carreaux et les tuiles de bétonnères, de transporteurs à courroies, de fourneaux de ciment, le porcelet, de vanne hydrauliques, de treuils et d'assemblages pour machines à laver.
10. La mission a proposé que les industries suivantes soient implantées dans la sous-région :

- Fabrication d'outils agricoles à main au Congo (Brazzaville), au Cameroun et en République centrafricaine (base locale ou multinationale).
- Fabrication de cadres de portes et fenêtres au Congo (Brazzaville) et en République centrafricaine (base multinationale ou sous-régionale).
- Fabrication de récipients métalliques au Gabon (base locale).
- Fabrication d'articles émaillés au Cameroun (base locale, ou multinationale ou sous-régionale).
- Fabrication d'éléments d'échafaudage en acier au Cameroun (base locale, multinationale ou sous-régionale).
- Fabrication de tâins et de cribles en Congo (Brazzaville) et au Cameroun (base multinationale ou sous-régionale).
- Fabrication de machines et instruments agricoles au Congo (Brazzaville), au Cameroun et en République centrafricaine (base locale, multinationale ou sous-régionale).
- Fabrication de réfrigérateurs au Congo (Brazzaville) (base locale, multinationale ou sous-régionale).
- Fabrication d'accumulateurs électriques au Gabon et au Congo (Brazzaville) (base sous-régionale).
- Fabrication et réparation de récepteurs de radiodiffusion au Congo (Brazzaville), au Gabon, en République démocratique du Congo et en République centrafricaine (base multinationale ou sous-régionale).
- Construction et réparation de péniches et autres bateaux en République centrafricaine (base locale ou multinationale).
- Construction de cadres de motocyclettes et montage de motocyclettes en République centrafricaine (base locale ou multinationale).
- Montage de véhicules automobiles au Cameroun (base multinationale ou sous-régionale).
CONCLUSIONS ET RECOMMANDATIONS CONCERNANT LES INDUSTRIES ELECTROMÉCANIQUES DANS LA SOUS-REGION D'AFRIQUE DE L'EST

1. Les industries électromécaniques de la sous-région de l'Afrique de l'est ont fait l'objet d'études en 1965; les conclusions dégagées à la suite de ces études ont été présentées à la Conférence sur l'harmonisation des programmes de développement industriel en Afrique de l'est, qui a eu lieu à Lusaka dans le courant du dernier trimestre de 1965, dans deux documents intitulés "Les industries électromécaniques dans la sous-région de l'AFRIQUE de l'est" (E/CN.14/INR/89) et "L'expansion des industries mécaniques et électriques en Afrique de l'est - les industries mécaniques" (E/CN.14/INR,90), ce dernier document portant sur les articles métalliques, les machines (non électriques) et les matériaux de transfer. Les conclusions formulées dans ces deux documents sont résumées ci-après:

2. En 1962, la sous-région a consommé 770.000 tonnes d'articles des industries électromécaniques (y compris les produits sidérurgiques de base); sur ce total, la production locale est estimée à 190.000 tonnes, ou 25 pour 100. La production la plus forte a été celle de la Rhodesie (70.000 - 80.000 tonnes), suivie de la Zambie (40.000 - 50.000 tonnes), du Kenya (30.000 - 40.000 tonnes), de la Tanzanie (35.000-40.000 tonnes) et de l'Ethiopie (7.000-10.000 tonnes). Le chiffre cité pour la Rhodesie comprend la production d'une industrie sidérurgique primaire assez importante destinée à la consommation locale et celui de la Tanzanie comprend la production de l'industrie de l'élabrador de l'aluminium et de la galvanoplastie.

Bien que n'appartenant pas à la sous-région, le Mozambique a été compris dans les chiffres relatifs à la deuxième cités dans le document E/CN.14/INR,90, on a considéré en effet que ce pays était un marché possible pour les industries de la sous-région.
3. Les industries électronéomiques, c'est-à-dire abstraction faite des industries métallurgiques primitives, sont assez bien développées par rapport à l'industrie manufacturière. Précisément, elles assument en effet 20 pour 100 de la production nette de l'industrie manufacturière au Kenya et 25 pour 100 à Rhodesie. De même, dans la plupart des pays, dont le Kenya et la Rhodesie, les articles électronéomiques (y compris les produits sidérurgiques) s'inscrivent pour plus des deux tiers des importations totales.

4. Dans tous les pays, le secteur le plus développé est celui de la fabrication d'articles métalliques pour le bâtiment et les ménages; ces articles représentent près d'un tiers de la production de l'industrie manufacturière au Kenya, par exemple, et 50 pour 100 en Zambie. Dans les pays les plus industrialisés de la sous-région, les deux tiers du marché sont approvisionnés par l'industrie locale et, dans tous les pays, il y a au moins une usine qui travaille dans ce domaine.

Les éléments de construction légers sont fabriqués dans tous les pays par les usines de constructions métalliques. La Rhodesie et la Tanzanie fabriquent des éléments lourds de construction, car ces deux pays sont les seuls à posséder les moyens de manutention, de sciage et de soudage nécessaires. Dans le cas des petits marchés, les usines de constructions métalliques fabriquent aussi généralement des cadres de portes et fenêtres, mais dans le cas des marchés plus importants (Rhodesie et Kenya), il a spécialisation dans ce domaine.

Dans tous les pays, la deuxième industrie pour l'importance est celle de la fabrication des ustensiles creux. Les récipients métalliques à usages commerciaux ne sont pas fabriqués aussi généralement; dans le cas des boîtes de fer blanc, par exemple, leur fabrication est subordonnée à l'existence de produits agricoles exportables.

Les fils métalliques et les articles en fil métalliques sont fabriqués principalement en Rhodesie, mais aussi en Tanzanie.
et à l’île Maurice. Parmi les articles de petites dimensions figurent les chaînes, les ressorts, les boulons filetés, fabriqués principalement en Rhodésie, et les lames de ressorts, en Tanzanie.

5. Puis vient la fabrication et surtout la réparation des matériaux de transport; en Rhodésie et au Kenya la production de ce secteur représente le quart à peu près de la production totale des industries électromécaniques et près de la moitié en Zambie. La réparation des véhicules routiers, du matériel roulant des chaînes de fer, des navires est un moyen important pour les pays en voie de développement de s’initier aux industries mécaniques car ils peuvent s’y consacrer sans difficulté particulière, à l’abri de toute concurrence étrangère, étant donné que les réparations sont entreprises nécessairement dans le pays où les véhicules sont utilisés.

Dans le cas de la production de véhicules automobiles, deux catégories sont à considérer: le montage complet ou la construction partielle. Les véhicules commerciaux légers sont montés avec des éléments importés selon des procédés qui, à Salisbury, à Nairobi ou à Tananarive, sont les mêmes qu’en Europe, sauf que l’automatisation y est moins poussé, les opérations n’étant pas exécutées à la chaîne, par exemple, et la division du travail étant moins systématique. De toute manière, on y utilise les mêmes gabarits pour exécuter les soudures, les perçages et les boulonnages. Les opérations de fabrication proprement dites se limitent essentiellement aux carrosseries d’autocars, de camions et de véhicules commerciaux lourds dont les châssis sont importés; on construit aussi des remorques dont les roues et les essieux sont importés. L’Ouganda a commencé à monter des bicyclettes et produira un assortiment de plus en plus large des éléments nécessaires (85 pour 100 dans cinq ans).

6. Dans tous les pays africains, c’est l’atelier de réparation du matériel ferroviaire qui est l’établissement de constructions mécaniques le plus important et le plus rend. À Nairobi, à Bulawayo, à Djibouti, à Tananarive, par exemple, les ateliers principaux
entretiennent et réparent le matériel roulant (locomotives, wagons de marchandises) selon un programme déterminé. Les éléments dont l'usure est rapide, comme les sabots de frein, les boîtes d'essieux, et les ressorts sont fabriqués dans la locomotive, la forge et l'atelier de mécanique de l'établissement. Dans certains pays, la Rhodésie et Madagascar, par exemple, les ateliers fabriquent des wagons de voyageurs et des wagons de marchandises dont les roues et les essieux sont importés; dans d'autres pays, comme au Kenya, la fabrication des wagons se borne au montage d'éléments tous importés.

7. Le Kenya (Mombasa), Madagascar (Diego-Suarez) et l'île Maurice (Port-Louis) possèdent des cales sèches et des cales de construction, qui leur permettent de réparer et de fabriquer des navires (3.000 tonnes environ au maximum pour la construction). À Kisumu, sur le lac Victoria, des installations existent pour la construction de bateaux de 1.000 tonnes au maximum; au Burundi, sur le lac Tanganyika, un chantier est équipé pour construire des bateaux de 100 tonnes.

8. Dans la sous-région d'Afrique de l'est, c'est le secteur de la fabrication des machines qui est le moins développé de toutes les industries de travail des métaux (moins de 10 pour 100 dans les pays les plus industrialisés); cette situation s'explique par le fait que les marchés nationaux ouverts aux machines spécialisées qui utilisent l'industrie ne sont pas assez vastes. Dans ce domaine, l'activité la plus importante est celle de la réparation des machines importées; il s'agit d'ailleurs d'une activité manufacturière, étant donné qu'elle fait intervenir le noulage, le forgeage et l'usinage de pièces de rechange. La production de machines neuves est limitée en général aux accessoires d'usage courant, tels que valves et pompes, auxquels s'ajoute le matériel destiné aux rares industries de base de l'Afrique, à savoir matériel de travail pour les mines, matériel de traitement des produits à récolte (canne à sucre, graines oléagineuses, sisal, etc.). Le Kenya et la somalie fabriquent des machines agricoles tractées (charrues, liggers et wagons) à l'exclusion des disques et des roulements à billes; le Kenya en outre monte des moteurs...
9. En ce qui concerne les industries électronéotechniques, il n'en existe qu'en Rhodésie (17,3 millions de dollars de production en 1964), à Madagascar, dont toute la production a été utilisée pour la fabrication locale de récepteurs de radiodiffusion (1,2 million de dollars), au Kenya et en Zambie, dont la production (780.000 dollars et 620.000 dollars respectivement) a été absorbée principalement par les travaux de réparation. En 1964, la production de la Rhodésie s'est répartie comme suit, en valeur: 9,2 millions de dollars de récepteurs de radiodiffusion (la quasi totalité des éléments étant fabriqué sur place), 5,26 millions de dollars d'appareillage électrique et de transformateurs, 2,13 millions de piles et accumulateurs, 770.000 dollars de réfrigérateurs de ménage et 420.000 dollars de lampes et ampoules électriques. Quant aux autres pays de la sous-région, ils ne produisent pratiquement pas d'articles électronéotechniques.

10. Ci-après une liste des industries recommandées comme pouvant être créées dans la sous-région :

A. **Industries à créer dans le cadre des pays**

1) **Pour chacun des pays** :

- Éléments de construction légers et meubles métalliques
- Poudrière et mécanique générale
- Cartellerie
- Découlement (clous, vis, boulons)
- Montage d'autocars et de camions, construction de carrosseries
- accumulateurs et plomb
- Sauvagplastique

2) **Pour la majorité des pays** :

- Bicyclettes
- Utillités agricoles
- Tissus et draps
- Filature
- Filles
Annexe III

B. **Industries à créer dans un cadre multinational**

**Réservoirs, chaudières, bouteilles à gaz, (2) - Rhodésie ou Zambie**

Kénya

**Cordages et câbles en fils métalliques (3) - Zambie, Kénya, Rhodésie**

**Toiles et treillis métalliques (2) - Zambie, Kénya**

**Machines à coudre (2) - Rhodésie, Kénya**

**Machines de traitement des denrées alimentaires (3) - Kénya, Rhodésie, Tanzanie**

**Machines de terrassement (4) - Kénya, Rhodésie, Zambie, Tanzanie**

**Wagons de marchandises (2) - Rhodésie, Kénya**

**Fourneaux de ménage (2) - Kénya, Tanzanie**

**Machines de levage (3) - Kénya, Rhodésie, Zambie**

**Appareils et instruments de pesage (3) - Kénya, Rhodésie, Zambie**

**Tréfilerie (2) - au voisinage des sidérurgies**

**Réfrigérateurs de ménage**

**Lampes et ampoules électriques**

**Transformateurs**

**Chaudière-eau électriques**

C. **Industries à créer dans le cadre de la sous-région**

**Eléments de construction lourds et éléments de ponts - Zambie**

**Grillages métalliques**

**Lames de rasoir**

**Générateurs de vapeur**

**Tracteurs**

**Machines à écrire et machines à calculer**

**Vannes et soupapes**

**Réfrigérants**

**Boîtes... particulières**

- Kénya, Rhodésie ou Zambie
- Tanzanie
- Rhodésie, Zambie ou Kénya
- Tanzanie
- un pays quelconque (Kénya)
- Zambie
- Tanzanie
- Tanzanie
Annexe III

1. Roues et essieux (matériel ferroviaire) – au voisinage des aciers
   Iours, perceuses, filières,
   Cisailles – Kénya, Tanzanie ou Zambie
   Machines de l'industrie textile – Kénya
   Moteurs électriques
   Démarreurs
   Ventilateurs électriques
   Câbles isolés
   Rélecteurs
   Piles sèches
   Machines à laver de ménage

Le document E/CN.14/INR/89 recommandait que des études
de rentabilité soient entreprises en vue de la détermination de
la capacité et de l'emplacement des industries électromécaniques
à créer dans la sous-région d'Afrique de l'est. Le document
E/CN.14/INR/90, du côté, formulait les propositions suivantes
quant à la capacité et à l'emplacement des usines à créer pour
les industries des éléments de construction et des articles
métalliques, des machines non électriques et du matériel de trans-
port. Sont indiqués également les investissements en capital fixe
en millions de dollars et l'emploi :

A. Eléments de construction et articles métalliques

1) Eléments de construction lourds pour ponts et bâtiments :
   Une usine, en Zambie, 10.000 t/an; 1,2-1,4 ($), 300 employés

2) Eléments de construction légers :
   1 en Ouganda, 1.000 t/an, 0,09-0,1 ($), 60 employés
   1 au Kénya, 2.000 t/an, 0,17-0,19 ($), 100 employés
   1 en Tanzanie, 3.000 t/an, 0,24-0,26 ($), 140 employés
   1 en Rhodésie, 8.000 t/an – (usine existante)

3) Réservoirs, cuves et boîtelettes à gaz :
   1 au Kénya { 5.000 t/an réservoirs 0,8-1,0 ($), 300 employés
                2.000 t/an boueilles 

Il
Annexe III

part. C

(10.000 t/an réservoir)

1 en Rhodésie (5.000 t/an bouteilles) 1,5-1,7 ($) 400-500 employés

iv) Boîtes en fer blanc et récipients analogues :

1 en Ouganda, 40-50 t/an, 0,015-0,020 ($), 50-40 employés

1 à l'île Maurice, 50-70 t/an, 0,020-0,025 ($), 35-45 employés

1 au Malawi, 100-150 t/an, 0,030-0,075 ($), 40-50 employés

1 au Rwanda (mêmes données que pour le Malawi)

1 à Madagascar, 300-400 t/an, 0,085-0,110 ($), 100-140 employés

1 en Ethiopie, 400-500 t/an, 0,100-0,150 ($), 140-180 employés

1 au Kénya, 800-1.000 t/an, 0,190-0,240 ($), 240-290 employés

1 en Zambie, 1.000-1.500 t/an, 0,250-0,370 ($), 300-600 employés

1 en Rhodésie, 1.500-2.000 t/an, 0,350-0,440 ($), 360-440 employés

1 en Tanzanie, 2.000-3.000 t/an (usine existante)

v) Tréfilerie (cordages, câbles, tringles pour pneumatiques) :

Une usine, pays non encore spécifié, 40.000-50.000 t/an, 4,3-6,0 ($), 500-600 employés

vi) Tréfilerie (grillages, treillis, toiles métalliques) :

Une usine, pays non encore spécifié, 30.000 t/an, 2,4-2,7 ($), 180-220 employés

vii) Cordages et câbles en fils métalliques :

1 au Kénya, 10.000-15.000 t/an, 1,2-1,5 ($) 200-250 employés

1 en Zambie, 15.000 t/an, 1,5-1,7 ($) 200-250 employés

1 en Rhodésie, (mêmes données que pour la Zambie)

viii) Treillis et toiles métalliques :

1 au Kénya, 7.000-8.000 t/an, 1,0-1, ($), 200-300 employés

1 en Zambie (mêmes données que pour le Kénya)

ix) Grillage :

Une usine, en Rhodésie, 3.000-10.000 t/an, 1,0-1,2 ($), 200-500 employés

x) Découletage (clous, vis, écrous, boulons ...) :

5 usines (Ethiopie, Kénya, Tanzanie, Zambie, Rhodésie et Madagascar), 10.000 t/an de capacité, 1,5-1,7 ($), 150 employés (pour chacune)
xii) Usines d'huiles : Indicateurs et tendances :
1 en africain, 0,99-0,99 (3), 500-1 000 employés
1 en Rhodesie, 2 000-5 000 t/an, 0,4-0,6 (2), 450 employés
1 en Zambie, 5 000-10 000 t/an, 1,2-1,3 (3), 600-700 employés
1 en Tanzanie (saisons basses que pour le Kénya)
1 en Zambie (saisons basses que pour le Kénya)

xiii) Usines de coton : Quatre capacités sont proposées :
a) 70-80 t/an, 0,020-0,040 (3), 10-15 employés
pour le Burundi, le Malawi et l'île Maurice
b) 500-700 t/an, 0,120-0,130 (3), 40-60 employés
pour l'Ethiopie, la Ceylan, la Tanzanie et Madagascar
c) 350-300 t/an, 0,250-0,270 (3), 100-150 employés
pour la Tanzanie
d) 500-400 t/an, 0,260-0,350 (3), 120-170 employés
pour le Kénya et la Rhodesie.

xiv) Usines de cour et urbaines éclairées :
5 usines (Kénya, Malawi, Zambie, Rhodesie et Madagascar)
2 000-3 000 t/an de capacité, 0,6-0,9 (3), 100-150
employés (pour chacune)

xv) Fournisseurs de cuisine :
2 usines (Kénya et Zambie), 1 000-1 500 t/an, 0,670-0,700
(3), 20-100 employés (pour chacune)

I. Machines sur électriques
1) Machines à combustion interne :
2 usines (Kénya et Zambie), 8 000-10 000 t/an, 1,5-2,0 (3),
150-200 employés (pour chacune)
2) Chaudières à vapeur :
Une usine, en Zambie, 5 000-8 000 t/an, 0,5-0,6 (3),
150-200 employés
3) Treuils :
Une usine, en Tanzanie, 15 000-20 000 unités de 25 cv,
4-5-6 (3), 1 500-1 900 employés
iv) Machines et instruments agricoles (charrues en métal, etc.):
Six usines (Ethiopie, Kenya, Ouganda, Tanzanie, Zambie et Rhodésie): 100-700 t/an, 0,600-0,100 ($), 60-70 employés (pour chacune)

v) Machines agricoles de moissonnage, battage, semences:
Une usine au Kenya, 7.000-3.000 t/an, 0,8-0,9 ($), 150-170 employés

vi) Machines de bureau, machines à écrire, machines à calculer simples:
Une usine au Kenya, 200-250 t/an, 0,2-0,4 ($), 300-400 employés

vii) Perceuses:
Une usine, au Zambie, 2.000 t/an, 0,300-0,320 ($), 130-150 employés

viii) Scies à têtes:
Une usine, au Tanzania, 1.000 t/an, 0,100-0,120 ($), 50-60 employés

ix) Machines à affûter les outils:
5 usines (Kenya, Ouganda, Tanzanie, Zambie et Rhodésie), 200 t/an, 0,550-0,060 ($), 15-20 employés (pour chacune)

x) Tournevis:
Une usine, au Kenya, 3.000 t/an, 0,450-0,500 ($), 300-350 employés

xi) Machines pour l'industrie textile:
Une usine, au Kenya, 6.000-10.000 t/an, 1,2-1,5 ($), 800-1.000 employés

xii) Machines à couture du ménage:
2 usines (Kenya et Rhodésie), 50-50 t/an, 0,5-0,6 ($), 250-300 employés (pour chacune)

xiii) Machines de terrassement:
4 usines (Kenya, Tanzanie, Zambie et Rhodésie), 5.000-5.000 t/an, 0,7-0,9 ($), 150-160 employés (pour chacune)

xiv) Friseuses:
2 usines (Kenya et Rhodésie), 4.000-6.000 t/an, 0,5-0,7 ($), 150-180 employés (pour chacune)
E/CN.14/INR/AS/II/2.1
Annexe III
page 11

xv) Concasseurs de pierres :
   Une usine, en Ouganda, 6.000-10.000 t/an, 1,0-1,3 (€),
   150-150 employés

xvi) Articles de robinetterie :
   Une usine, en Zambie, 5.000-5.000 t/an, 0,5-0,7 (€),
   120-170 employés

xvii) Pompes légères et pompes de ménage, fixes:
   5 usines (Ethiopie, Kénya, Tanzanie, Zambie et Rhodésie)
   2.000-3.000 t/an, 0,400-0,550 (€), 140-180 employés (pour chacune)

xviii) Pompes de dimensions moyennes :
   4 usines (Kénya, Tanzanie, Zambie et Rhodésie), 3.000-4.000
   t/an, 0,6-1,1 (€), 160-200 employés (pour chacune)

xix) Appareils et instruments de pesage :
   4 usines proposées, deux capacités :
   a) 1.500-2.000 t/an, 0,3-0,4 (€), 100-120 employés
      pour l'Ethiopie et l'Ouganda
   b) 3.000-4.000 t/an, 0,5-0,6 (€), 180-220 employés
      pour la Zambie et la Rhodésie

xx) Treuils de levage :
   4 usines (Kénya, Tanzanie, Zambie et Rhodésie), 4.000-5.000
   t/an, 0,5-0,8 (€), 140-180 employés (pour chacune)

C. Matériel de transport

i) Wagons de marchandises :
   2 usines (Kénya et Rhodésie), 12.000-15.000 t/an, 1,0-1,2
   (€), 200-250 employés

ii) Roues complètes
   Une usine, en Rhodésie, 8.000-10.000 t/an, 2,0-2,3 (€),
   100-150 employés

iii) Wagons de voyageurs :
   Une usine, en Tanzanie, 60.000-70.000 unités/an, 20-25 (€),
   5.000-8.000 employés
iv) **Autobus (autocars), véhicules commerciaux lourds, camions (montage):**

5 usines (Kénya, Ouganda, Tanzanie, Zambie et Rhodésie),
6.000-6.000 t/an, 0,3-0,4 ($), 60-80 employés (pour chacun)

v) **Pièces détachées de véhicules automobiles (rechanges):**

5 usines (Éthiopie, Kénya, Ouganda, Zambie, Rhodésie et Madagascar), 2.000-3.000 t/an ($), 200-300 employés
(pour chacune)

vi) **Bicyclettes:**

11 usines proposées, 5 capacités différentes :

a) 20.000 unités/an, 0,06 ($), 50-60 employés
pour le Kénya, le Rwanda, le Burundi, le Malawi et l'Île Maurice

b) 60.000 unités/an, 0,16 ($), 130-150 employés
pour l'Ouganda et Madagascar

c) 100.000 unités/an, 0,27 ($), 200-250 employés
pour l'Éthiopie

d) 200.000 unités/an, 0,50 ($), 330-360 employés
pour la Tanzanie et la Zambie

e) 300.000 unités/an, 0,70 ($), 450-500 employés
pour la Rhodésie

Les usines proposées ci-dessus permettraient aux pays de la sous-région d'atteindre les productions totales suivantes dans les domaines des éléments de construction et des articles métalliques, des machines non électriques et des matériaux de transport, les investissements en capital fixe et l'emploi étant en outre indiqués pour chaque pays:
<table>
<thead>
<tr>
<th>Pays</th>
<th>Production t/an</th>
<th>Investissements milliers de $ É.U</th>
<th>Emploi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopie</td>
<td>20.450</td>
<td>5.300</td>
<td>1.710</td>
</tr>
<tr>
<td>Somalie</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Kénya</td>
<td>133.500</td>
<td>21.860</td>
<td>7.010</td>
</tr>
<tr>
<td>Ouganda</td>
<td>33.700</td>
<td>4.600</td>
<td>1.280</td>
</tr>
<tr>
<td>Tanzanie</td>
<td>172.550</td>
<td>42.170</td>
<td>15.030</td>
</tr>
<tr>
<td>Burundi</td>
<td>220</td>
<td>100</td>
<td>75</td>
</tr>
<tr>
<td>Rwanda</td>
<td>195</td>
<td>145</td>
<td>125</td>
</tr>
<tr>
<td>Malawi</td>
<td>375</td>
<td>145</td>
<td>125</td>
</tr>
<tr>
<td>Zambie</td>
<td>92.200</td>
<td>18.970</td>
<td>4.980</td>
</tr>
<tr>
<td>Rhodesie</td>
<td>218.300</td>
<td>29.870</td>
<td>4.260</td>
</tr>
<tr>
<td>Madagascar</td>
<td>17.150</td>
<td>3.950</td>
<td>950</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>688.935</strong></td>
<td><strong>127.270</strong></td>
<td><strong>35.665</strong></td>
</tr>
</tbody>
</table>

N.B.: La Côte française des Somalis et l'île de la Réunion ne figurent pas dans le document E/CN.14/INR/90.