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ECONOMIC COMMISSION FOR AFRICA  
JOINT ECA/UNIDO INDUSTRY DIVISION  
ADDIS ABABA

PROJECT DESCRIPTION  
FOR  
ENGINEERING INDUSTRY DEVELOPMENT PROGRAMME

PROPOSED MANUFACTURE OF SELECTED SPARE PARTS AND COMPONENTS  
FOR TRANSPORT EQUIPMENT, AGRICULTURAL MACHINERY AND CAPITAL  
GOODS IN AFRICAN COUNTRIES  
AT NATIONAL AND SUBREGIONAL LEVEL\*

Preliminary Document  
for  
Field Mission

Follow-up of ECA/UNIDO Basic Metal and  
Engineering Industries Development Programme

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Prepared by:  
A.K. Mitra  
UNIDO Regional Adviser

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## LIST OF CONTENTS

	<u>Page</u>
- Introduction	1
- Proposed Product Grouping of Spare-Parts Manufacture at National and Subregional Level	2
- Proposed Spare-Parts Manufacture at National Level	2
- Proposed Spare-Parts Manufacture at Subregional Level	4
- Product Grouping at National and Subregional Level	5
- Proposed Products, Specification and Production Volume for Projects at National and Subregional Level	6
- Product Grouping and Linkage	7
- Proposed Location for the Manufacture of Selected Spare-Parts for Agricultural Machinery, Transport Equipment and Machine Tools	7
- Minimum Plant Capacity	7
(i) Spare Parts for Agricultural Machinery	8
(ii) Spare Parts for Transport Equipment	11
(iii) Spare Parts for Machine Tools	13
(iv) Spare-Parts Reconditioned	14
(v) Spare-Parts for Ancillary Industries	15
(vi) Integrated Spare-Parts Manufacture and Maintenance Workshop	16
(vii) Casting, Forged Parts for Spare-Parts	17
- Estimates of Import of Selected Spare-Parts in the African Region	21
(i) Lusaka MULPOC	21
(ii) Tangiers MULPOC	22
(iii) Niamey MULPOC	23
(iv) Younde MULPOC	24
(v) Giseny MULPOC	24
- Investment Required	25
- Demand for Spare-Parts	25
- Raw Material Specification and Requirement	25
- Requirement of Common Engineering Service Facilities at National and Subregional Level	26
- Requirement of Ancillary Industries	26
- Subregional Linkages	26
- Implementation Modalities	26
- Follow-up Action	26



## PROJECT DESCRIPTION

Title: Selected Spare-Parts Manufacture in MULPOC Regions.

### Introduction

The continued dependence on spare-parts and accessories from developed regions has become a traditional industrial phenomena in African developing countries particularly for transport equipment, agricultural machinery and capital goods. The spare-parts and related components are important inputs to all industrial activities particularly in the field of engineering industries. The production and productivity largely depends on the timely procurement and availability of spare-parts. Industrial breakdowns not only jeopardise the production, but at the same time adversely effects the investment recovery and financial obligations, those are closely linked with the very existance of industry.

To-day most of the African developing countries are importing transport equipment, agricultural machinery and capital goods to a high magnitude from the developed world. During 1972-1977 African developing countries have imported US \$ 04 billion F.O.B. worth of engineering products from the developed and developing regions. These substantial imported products have spare-parts consumptions throughout the economic life of plant and machinery. Moreover, the imported spare-parts are expensive and procurement of imported parts even take more than years in many cases. It is true that developing African countries may not be able to manufacture all spare-parts requirements which the industries require for some decades to come.

Be that as it may be, there exists a significant scope for the African countries to manufacture indigenously selected spare-parts and related components for the priority industries and economic activities. This has been high-lighted and identified by the ECA/UNIDO Basic Metal and Engineering Industries Development Programme Mission in November-December 1970 and subsequently endorsed by the African Expert Group Meeting 3-8 December 1979 that the local development of selected spare-parts should be given top priority.

The development and manufacture of engineering spare-parts require the following development aspects:

- engineering design and copying of engineering products;
- installation and application of engineering product and process standards;
- quality control;
- expansion of existing foundry, forging, heat treatment, machine shop, tool room, repair and maintenance workshops;
- expansion of ancillary industries.

The investment requirements for setting-up institutions, technology, knowhow, raw materials (procurement and distribution), plant, machinery and equipment for the manufacture of spare-parts for selected engineering products e.g. transport equipment, agricultural machinery and capital goods are considerable. This brief project description therefore intend to lay out the preconditions for setting-up of selected



spare-parts manufacture within the African industries at national and subregional level, in order to minimize investment costs through the participation of MULPOC countries within the framework of objectives set out in National Development Plans.

Proposed Product Grouping for Manufacturing of Spare-Parts at National and Subregional Levels

The following product groupings are designed according to the requirement of primary manufacturing operations, i.e. the types of spare-parts manufactured according to basic engineering operations like casting, forging, welding etc. This in other words portray the real need of manufacturing facilities according to the basic processes required to produce the spare-parts both at national and subregional level. The priority areas indicated are:

- selected spare-parts for Agricultural Machinery;
- selected spare-parts for Transport Equipment;
- selected spare-parts for Machine Tools.

Proposed Spare-Parts Manufacture at National Level

Group	Types of Spare-Parts According to Primary Manufacturing Operation	Required For	Description of Spare-Parts
I	Cast Parts (ferrous and non-ferrous)	Agricultural Machinery	Brackets; Levers; Bush bearings; Bearing housing; Tool holders; Flanges; Pulleys; Pump impellers; Sprockets.
		Transport Equipment	Brakedrums; Hub; Bush bearings; Brake shoes; Sleeves, Levers; Valve body; Flange; Piston; Cylinder liners; Sprockets and Wheels, Door handles.
		Machine Tools	Guides; Bush bearings; Gears; Sleeves; Levers; Gibs; Housing; body; Wheels and Pulleys; Brackets.



Group	Types of Spare-Parts According to Primary Manufacturing Operation	Required For	Description of Spare Parts
II	<u>Cast and Die</u> <u>Cast Forged Parts</u> (Heat treated)	Agricultural Machinery	Hubs; Pins; Axel; Axel shafts; Gears; Shafts; Tool Chisels; Tines;
		Transport Equipment	Axel, Axel shafts; Gears; Propeller shafts; Sleeves; Bushings; Engine valves and rockers; Cams; Cam shafts; Sprockets; Chains.
		Machine Tools	Gears; Shafts; Sleeves; Quill; Yokes, etc.
III	<u>Sheet metal Stamped and Pressed Parts</u> (if required heat treated or welded)	Agricultural Machinery	Tines; Discs; Chisels; Tool bars;
		Transport Equipment	Rotor and Armature laminations; Leaf springs; Chassis; Exhaust pipes.
IV	<u>Wire Product Parts</u> (heat treated)	Agricultural Machinery	Tie bolts; Pins; Spring (coil); Special Bolts and Nuts.
		Transport Equipment	Kingpins; Coiled spring; Special Bolts and Nuts; Tie rods; Pins.
		Machine Tools	Jig bushes; Dowel pins; Bolts, Nuts, Washers; Fixtures parts;
V	<u>Welded and Brazed Parts</u> (ferrous and non-ferrous)	Agricultural Machinery	Pipes; Tubes flanges
		Transport Equipment	Exhaust pipes; Suspension mountings; Railway tyres with rims; Brackets levers; Hubs;



Group	Types of Spare-Parts According to Primary Manufacturing Operation	Required For	Description of Spare-Parts
VI	<u>Non-Metallic Parts</u>	Agricultural Machinery	Rubber Bushings
		Transport Equipment	Clutch plates; Rubber bushings; Gaskets; Oil seals, Plastic parts.
VII	<u>Reconditioned Parts</u>	Agriculture Machinery	Tractors; Trailors; and Power operated machinery
		Transport Equipment	Wagon; Railcars; Locomotives; Trucks; Lorry; Trailors; Cars; Mopeds; Cycle.
		Machine Tools	Machine beds; Guides etc.
VIII	<u>Ancillary Industries</u>	Common to all	Filter; Exhaust pipes; Gasket; Seals, Pumps; Tyres; Wheels; Rims; Bolts and Nuts etc.

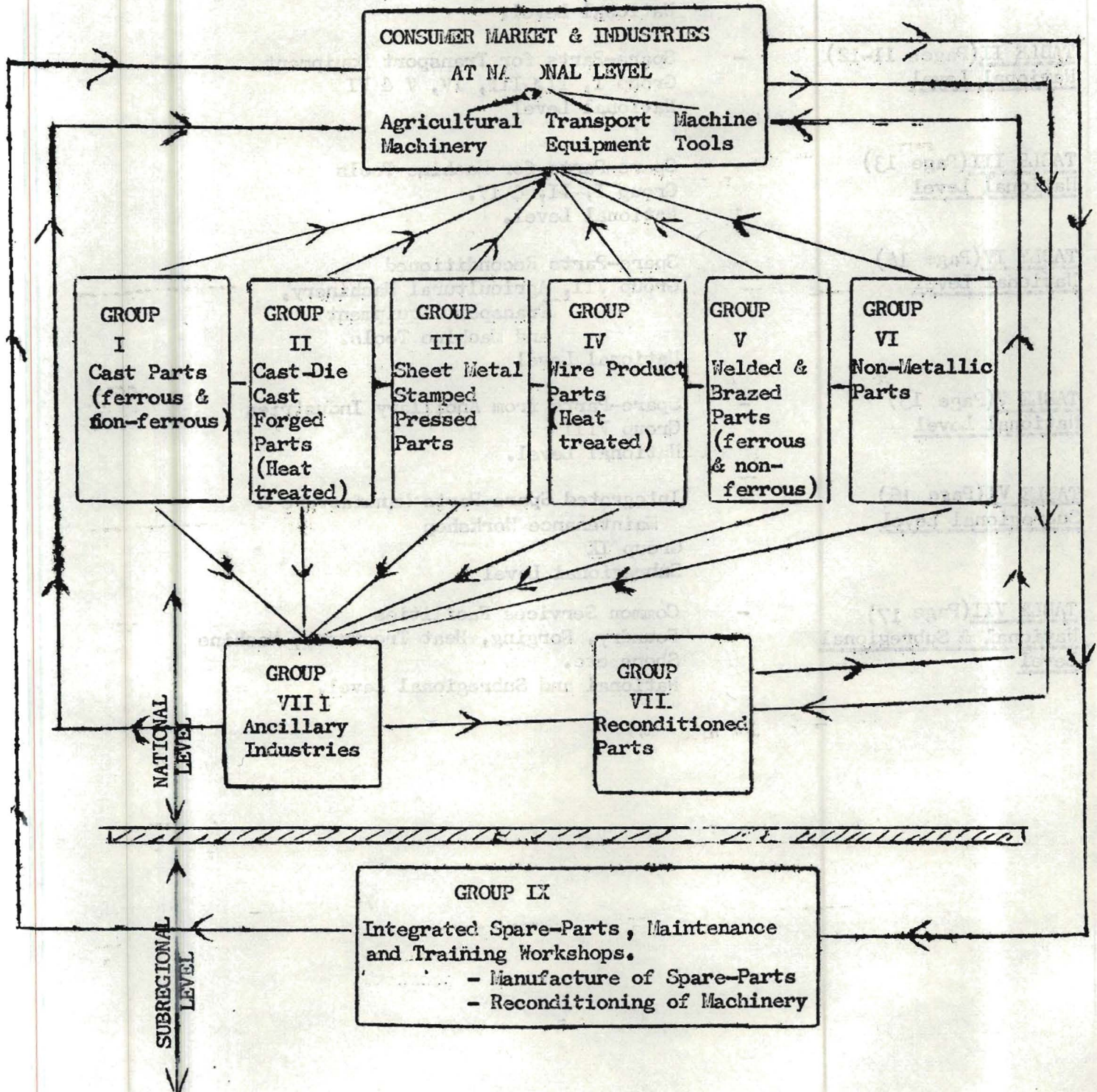
Spare-Parts Manufacture at Subregional Level (High Capital Intensive)

IX	<u>Integrated Spare-Parts Manufacture and Maintenance Workshop for:</u> a) Training b) Manufacture of Selected Spare-Parts c) Reconditioning and Overhauling of Machinery	Agricultural Machinery	a) 500 personnel to train/annum b) Spurgear; Helical gear; Hypoid gears, etc. c) Tractors; Engines; etc.
		Transport Equipment	(a) 1000 personnel to train/year (b) Spurgear; Helical gear; Hypoid gears, etc. (c) Engines; Trucks; Lorries; Wagon; Railway; Locomotive. etc.
		Machine Tool	(a) 300 Operative/annum (b) Spurgear; Helical and Bevel gears; (c) Machine Tools and Machining.



MANUFACTURE OF SELECTED SPARE PARTS  
PRODUCT GROUPING AT NATIONAL AND SUBREGIONAL LEVEL

Types of Spare-Parts According to Primary Manufacturing Operation (to be followed by finish machining)



**FIGURE 1**



Proposed Products, Specification and Production Volume for Projects at National and Subregional Level

TABLE I (Pages 9-10)  
National Level

- Spare-Parts for Agricultural Machinery  
Group I, II, III, IV, V & VI.  
National Level.

TABLE II (Pages 11-12)  
National Level

- Spare-Parts for Transport Equipment  
Group I, II, III, IV, V & VI  
National Level

TABLE III (Page 13)  
National Level

- Spare-Parts for Machine Tools  
Group I, II, & IV.  
National Level.

TABLE IV (Page 14)  
National Level

- Spare-Parts Reconditioned  
Group VII, Agricultural Machinery,  
Transport Equipment  
and Machine Tools.  
National Level

TABLE V (Page 15)  
National Level

- Spare-Parts from Ancillary Industries  
Group VIII  
National Level.

TABLE VI (Page 16)  
Subregional Level

- Integrated Spare-Parts Manufacture &  
Maintenance Workshop  
Group IX  
Subregional Level

TABLE VII (Page 17)  
National & Subregional Level

- Common Services Facilities  
Foundry, Forging, Heat Treatment, Machine  
Shops etc.  
National and Subregional Level.



### Product Grouping and Linkage

The following chart shows the inter-linkage of product groups and ancillary products identified for the manufacture of spare-parts for Agricultural Machinery, Transport Equipment and Machine Tools at national and subregional level (see page 8, Figure 2).

### Proposed Location for the Manufacture of Selected Spare-Parts for Agricultural Machinery, Transport Equipment and Machine Tools

The trend of imports reveal that substantial demand for spare-parts exist in the following MULPOC areas in African region.

1. Lusaka MULPOC countries;
2. Niamey MULPOC countries;
3. Tangiers MULPOC countries.

In otherwards these areas would justify the setting-up of subregional spare-parts manufacturing workshops which will also cater for Younde and Giseny MULPOCs areas.

Accordingly it is suggested to set up at subregional level the following workshops:

- (a) Integrated spare-parts and repair maintenance workshop in LUSAKA MULPOC;
- (b) Integrated spare-parts and repair maintenance workshop in NIAMEY MULPOC;
- (c) Integrated Spare-parts and repair maintenance workshop in TANGIERS MULPOC.

Due consideration should be given to expand the existing large repair and maintenance workshops in these areas.

### Minimum Plant Capacity

In order to cater for the demand of subregions the minimum volume of production is reflected in Group IX outlining product specification and Product Volume Sheets in page 16 and for subregional maintenance workshops. Some of the spare-parts indicated in Group I to VI may also be included in the manufacturing programme of the proposed subregional workshops. The purpose of the subregional workshops will be to cater the need for training of personnel, production of selected spare-parts and repair and overhauling of machinery and equipment.

As far as the spare-parts products identified for the manufacture at national level, greater mobilization will be required to expand the existing industries and industrial estates to include greater number of spare-parts production as envisaged in Table I to V (pages 9-15).



PROPOSED PRODUCT GROUP LINKAGE OF NATIONAL & SUBREGIONAL SPARE-PARTS  
MANUFACTURING OPERATION AT VARIOUS LEVEL WITH SUPPORTING COMMON  
SERVICES FACILITIES AND ANCILLARY INDUSTRY SUPPORT

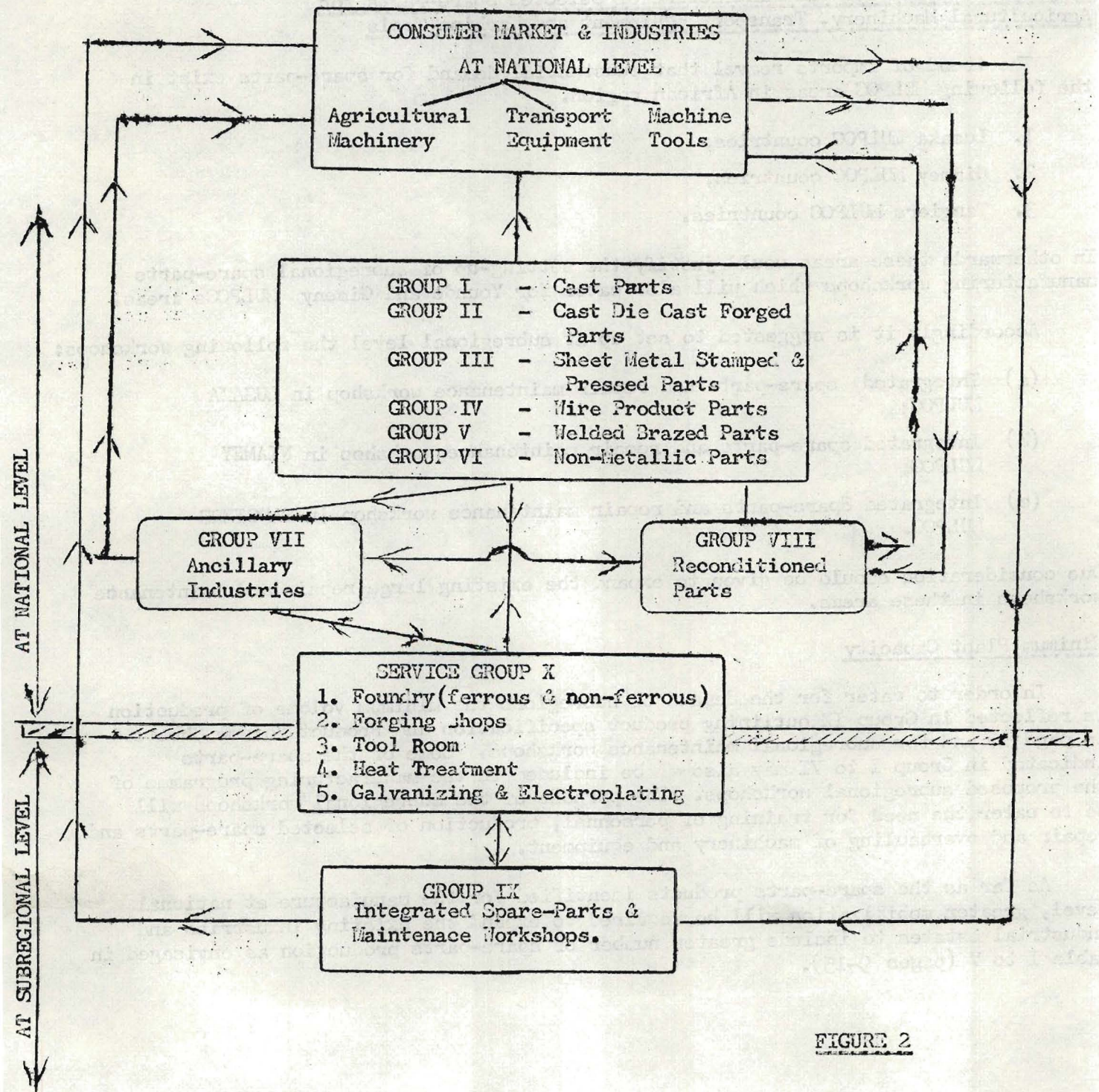


FIGURE 2



TABLE I

PROPOSED PRODUCTS, SPECIFICATION AND PRODUCTION VOLUME

PRODUCT DESCRIPTION: Spare-Parts for Agricultural Machinery

PRODUCT LEVEL: Group I, II, III, IV, V &amp; VI

INDUSTRY LEVEL: Small Scale and Medium Industry

LOCATION: National Level

Group	Product Description	Specification	Minimum Production Volume, Units/Year	Existing Establishments	Present Production Units/Year	Last 5 Years Production	Demand 1980-1990	Government's Remarks
I Cast Parts (ferrous and non-ferrous)	Brackets, levers, bush bearing, bearing housing, tool holders, flanges, pulleys, pump impellers, sprockets etc.	Upto 100kg weight castings	Mixed products upto 200,000 pieces					
II Cast and Die Cast Forged Parts (heat treated)	Hubs, pins, axles, axle shaft; gears shafts, tool holders, chisels, tines	Upto 50kg weight forged parts	Mixed products upto 500,000 pieces					
III Sheet Metal Stamped and Pressed Parts (if required heat treated and welded)	Tines, discs, chisels, tools bars etc.	Upto 10kg weight	Mixed products 1,000,000 pieces					
IV Wire Product Parts (heat treated)	Tie bolts, pins spring (coil), special bolts and nuts.	Upto 5kg weight	Mixed products 300,000 pieces					







TABLE II

PROPOSED PRODUCTS, SPECIFICATION AND PRODUCTION VOLUME

PRODUCT DESCRIPTION: Spare Parts for Transport Equipment

PRODUCT LEVEL: Group I, II, III, IV, V and VI

INDUSTRY LEVEL: Medium and Large Industry

LOCATION: National Level

Group	Product Description	Specification	Minimum Production Volume, Units/Year	Existing Establishments	Present Production Units/Year	Last 5 Years Production	Demand 1990-1999	Governments Remarks
I Cast Parts (ferrous and non-ferrous)	Brake drums, hub, bush bearings, bearing housing, brake shoes, sleeves, levers, valve body, flange, piston, cylinder liners, sprockets and wheels door handles etc.	Upto 10kg weight	Mixed products 500,000 pieces					
II Cast and Die Cast Forged Parts (heat treated)	Axle, axle shafts, gears, propeller shaft, sleeves, bushings, engine valves and rockers, cams, cam shaft, sprockets, chains etc.	Upto 30kg weight	Mixed products 1,000,000 pieces					
III Sheet Metal Stamped and Pressed Parts (If required heat treated and welded)	Rotor and armature laminations, leaf springs, chassis, exhaust pipes etc.	Upto 10kg weight	Mixed products 500,000 pieces					



TABLE II  
Page 2

Group	Product Description	Specification	Minimum Production Volume, Units/Year	Existing Establishments	Present Production Units/Year	Last 5 Years Production	Demand 1980-1990	Governments Remarks
IV Wire Product Parts (heat treated)	King pins, coiled springs, special bolts and nuts, tie rods, pins etc.	Upto 5kg weight	Mixed products 300,000 pieces					
V Welded and Brazed Parts (ferrous and ferrous)	Exhaust pipes, suspension mountings, railway tyres with rims, brackets, levers, hubs etc.	Upto 100kg weight	Mixed product 200,000 pieces					
VI Non-Metallic Parts	Clutch plates, rubber bushings, gaskets, oil seals, plastic parts.	Upto 500gms weight	Mixed product 1,000,000 pieces					



TABLE III

PROPOSED PRODUCTS, SPECIFICATION AND PRODUCTION VOLUME

PRODUCT DESCRIPTION: Spare Parts for Machine Tools

PRODUCT LEVEL: Group I, II, IV

INDUSTRY LEVEL: Medium Size Industry

LOCATION: National Level

Group	Product Description	Specification	Minimum Production Volume, Units/Year	Existing Establishments	Present Production Units/Year	Last 5 Years Production	Demand 1980-1990	Governments Remarks
I Cast Parts (ferrous and non-ferrous)	Guides, bush bearings, gears, sleeves, levers, gibs, housings, body wheels, pulleys brackets.	Upto 50kg weight	Mixed products 10,000 pieces					
II Cast and Die Cast Forged Parts (heat treated)	Gears, shafts, sleeves, quills, yokes, etc.	Upto 20kg weight	Mixed products 10,000 pieces					
III Sheet Metal Stamped and Pressed Parts	-	-	-					
IV Wire Product Parts (heat treated)	Jig bushes, dowel pins, bolts, nuts, washers, fixtures parts.	Upto 500gms weight	Mixed products 500,000 pieces					
V Welded and Brazed Parts (ferrous and non-ferrous)	-	-	-					
VI Non-Metallic Parts	-	-	-					



TABLE IV

PROPOSED PRODUCTS, SPECIFICATION AND PRODUCTION VOLUME

PRODUCT DESCRIPTION: Spare Parts Reconditioned

PRODUCT LEVEL: Group VII

INDUSTRY LEVEL: Small Scale Industries

LOCATION: National Level

Product Description	Specification	Minimum Production Volume, Units/Year	Existing Establishments	Present Production Units/Year	Last 5 Years Production	Demand 1980-1990	Governments Remarks
Agricultural Machinery	Electrical motors springs, hubs, tines, tractor engines, gear box etc. Tractor engine crank shaft.	20,000 pieces					
Transport Equipment	Wagon wheels and rims, axle shaft bush bearings, crank shafts, hubs, brake drums, etc. Electrical starters, motors:	40,000 pieces					
Machine Tools	Machine beds, guides, motors, clutch etc.	1,000 units					







TABLE VI

PROPOSED PRODUCTS, SPECIFICATION AND PRODUCTION VOLUME

PRODUCT DESCRIPTION: Integrated Spare Parts Manufacture and Maintenance Workshop  
 PRODUCT LEVEL: Group IX, Training, Selected Spare-Parts Manufacture and Reconditioning and Overhauling of Machinery

INDUSTRY LEVEL Large Industry

LOCATION: Subregional Level

Group	Product Description	Specification	Minimum Production Volume, Units/Year	Existing Establishments	Present Production Units/Year	Last 5 Years Production	Demand 1980-1990	Governments Remarks
IX Agricultural Machinery	(a) Training		(a) 500 persons					
	(b) Wide range of gear manufacture		(b) 10,000 units					
	(c) Overhauling tractors, engines etc.		(c) 1,000 units					
Transport Equipment	(a) Training		(a) 1,000 persons					
	(b) Wide range of gear manufacture		(b) 50,000 units					
	(c) Overhauling of engines, trucks, lorries, wagon, railway locomotives etc.		(c) 500 units					
Machine Tools	(a) Training		(a) 300 persons					
	(b) Wide range of gear manufacture		(b) 5000 units					
	(c) Overhauling of machine tools and machinery		(c) 500 units					



TABLE VI

PROPOSED PRODUCTS, SPECIFICATION AND PRODUCTION VOLUME

PRODUCT DESCRIPTION:  
Castings, Forged Parts, etc. for Spare-Parts  
PRODUCT LEVEL:  
Group VI Product Mixed Component Manufacture High  
Volume Production  
INDUSTRY LEVEL:  
III Medium and Large Scale Industry  
LOCATION:  
National or Subregional Level

Item	Service Description	Specification	Minimum Production Volume	Existing Establishments	Present Production Units/Year	Last 5 Years Production	Demand 1980-1990	Governments Remarks
1	Foundry and Forging Shops(ferrous and non-ferrous).		<p><u>Foundry</u> 1. 20,000 tons of liquid metal per annum(8 tons/day, 250 working days) (a) 5000 t/a high duty grey cast iron. (b) 9000 t/a S.G. iron and malleable iron. (c) 1000 t/a steel casting. (d) 5000 t/a of special steel ingots for forging. 2. 1000 tons per annum of brass castings. 60% Cu + 40%Zn -750 t/a 80% Cu + 20%Zn -250 t/a 3. 300 ton per annum Aluminium castings.</p>					



TABLE VI  
Page 2

Item	Service Description	Specification	Minimum Production Volume	Existing Establishments	Present Production Units/Year	Last 5 Years Production	Demand 1980-1990	Governments Remarks
2	Tool Room		<p><u>Forging</u></p> <p>The minimum factory production of the forging shop will be 5000 tons per annum finished forged parts i.e. 20 tons of parts per day. 250 working days.</p> <p>Tool room will be geared for precision work upto 0.0001 inch. and surface finish upto 0.2 micro inch.</p> <p>(a) Grinding of 10,000 units of small and simple tools.</p> <p>(b) Grinding and lapping of 1,000 milling cutters, including high speed steel (HSS) and carbide tipped tools.</p> <p>(c) 500 jigs and fixtures weighing 100 tons.</p> <p>(d) 1000 simple jigs and fixtures weighing 100 tons.</p> <p>(e) Sharpening of 200 broaches.</p> <p>(f) Grinding of 500 special gear cutters.</p>					



TABLE VI  
Page 3

Item	Service Description	Specification	Minimum Production Volume	Existing Establishments	Present Production Units/Year	Last 5 Years Production	Demand 1990-1990	Governments Remarks
3	Heat Treatment Shop		<p>The following processes should be available:</p> <ul style="list-style-type: none"> <li>(a) Normalizing and annealing.</li> <li>(b) Case hardening</li> <li>(c) Carburizing, hardening</li> <li>(d) Induction hardening</li> <li>(e) Cyanide and neutral salt hardening and tempering.</li> </ul>					
4	Galvanizing Electroplating and Phosphating Shops		<p>The metal surface treatment should include the following:</p> <ul style="list-style-type: none"> <li>(a) Bright-zinc plate</li> <li>(b) Copper and nickel plate</li> <li>(c) Copper, nickel and chrom plate.</li> <li>(d) Phosphate, stain and oil process.</li> <li>(e) Parkolubrize process.</li> </ul> <p>The central repair and maintenance shop should include the following facilities:</p> <ul style="list-style-type: none"> <li>(a) Turning and screw cutting.</li> <li>(b) Boring and grinding.</li> <li>(c) Shaping and planning.</li> <li>(d) Milling and gear cutting.</li> </ul>					
5	Traning, Repair and Maintenance Shop							







Estimates of Import of Selected Spare-Parts in the African Region

The following are the estimates of import of selected spare-parts for Agricultural Machinery, Transport Equipment and Machine Tools in African MULPOC areas, from 35 developed and developing countries.

As the exact figures of import are not available it is estimated that the spare-parts consumptions stand at 10 to 15% of the imported value of the selected engineering products. These figures merely show in the magnitude of spare-parts import in the MULPOC countries.

Estimates of import of spare parts and accessories to LUSAKA MULPOC in '000 US\$ FOB.

	1974	1975	1976	1977	1978	1979	1980
<u>TRANSPORT EQUIPMENT</u>							
<u>SITC 73</u>							
Angola	10,000	5,000	12,000	22,000			
Kenya, Uganda,							
Tanzania	25,000	25,000	22,000	53,000			
Ethiopia	7,000	5,000	90,000	9,000			
Madagascar	3,000	4,000	3,000	4,000			
Malawi	2,000	3,000	2,000	2,000			
Mozambique	9,000	3,000	3,000	7,000			
Zambia	16,000	19,000	15,000	11,000			
Other countries	15,000	16,000	18,000	24,000			
Total.....	87,000	80,000	165,000	132,000			
<u>MACHINERY (Non-electrical)</u>							
<u>SITC 719</u>							
Angola	5,000	3,000	6,000	2,000			
Kenya, Uganda							
Tanzania	6,000	8,000	8,000	11,000			
Ethiopia	1,000	1,000	1,000	1,000			
Madagascar	1,000	1,000	1,000	1,000			
Malawi	200	300	300	1,000			
Mozambique	2,000	1,000	1,000	1,000			
Zambia	5,000	7,000	7,000	5,000			
Other countries	3,000	4,000	5,000	8,000			
Total.....	23,200	25,300	29,300	30,000			
<u>AGRICULTURAL M/C SITC 712</u>							
Angola	2,000	400	20	80			
Kenya, Uganda							
Tanzania	2,000	3,000	3,000	5,000			
Ethiopia	1,000	400	400	1,000			
Madagascar	300	400	200	400			
Malawi	50	200	200	200			
Mozambique	1,000	1,000	300	2,000			
Zambia	1,000	1,000	300	1,000			
Other countries	1,000	1,000	1,000	2,000			
Total.....	8,350	7,400	5,420	10,600			



Estimates of import of spare-parts and accessories to TANGIRRS MULPOS in '000US\$ FOB

	1974	1975	1976	1977	1978	1979	1980
<b>TRANSPORT EQUIPMENT</b>							
<b>SITC 73</b>							
Algeria	56,000	119,000	137,000	150,000			
Egypt	33,000	67,000	90,000	93,000			
Libyan Arab Jamah.	65,000	96,000	117,000	140,000			
Morocco	24,000	44,000	66,000	80,000			
Sudan	140,000	24,000	23,000	21,000			
Tunisia	15,000	22,000	23,000	32,000			
Total.....	207,000	372,000	456,000	524,000			

**MACHINERY (Non-electric)**  
**SITC 719**

Algeria	3,200	7,000	60,000	94,000			
Egypt	14,000	24,000	32,000	39,000			
Libyan Arab Jamah.	22,000	35,000	35,000	33,000			
Morocco	3,000	13,000	18,000	22,000			
Sudan	3,000	4,000	7,000	7,000			
Tunisia	6,000	10,000	11,000	13,000			
Total.....	85,000	93,000	163,000	208,000			

**AGRICULTURAL M/C**  
**SITC 712**

Algeria	7,000	9,000	6,000	6,000			
Egypt	1,000	3,000	2,000	4,000			
Libyan Arab Jamah.	5,000	8,000	6,000	5,000			
Morocco	2,000	3,000	200	4,000			
Sudan	1,000	3,000	3,000	2,000			
Tunisia	2,000	3,000	3,000	3,000			
Total.....	18,000	29,000	20,200	24,000			



Estimates of import of spare-parts and accessories to NIAMEY MULPOC in '000 US\$ FOB

	1974	1975	1976	1977	1978	1979	1980
<b>TRANSPORT EQUIPMENT</b>							
<b>SITC 73</b>							
Ghana	15,000	13,000	14,000	21,000			
Guinea	1,000	3,000	2,000	3,000			
Liberia	465,000	501,000	605,000	509,000			
Nigeria	53,000	140,000	233,000	291,000			
Togo	2,000	5,000	8,000	5,000			
Other countries	46,000	47,000	54,000	72,000			
Total.....	502,000	709,000	915,000	981,000			

**MACHINERY (Non-electrical)**  
**SITC 719**

Ghana	3,000	4,000	6,000	6,000
Guinea	1,000	1,000	1,000	1,000
Liberia	2,000	3,000	3,000	2,000
Nigeria	15,000	31,000	39,000	54,000
Togo	400	1,000	1,000	1,000
Other countries	9,000	11,000	14,000	24,000
Total.....	30,400	51,000	64,000	88,000

**AGRICULTURAL M/C**  
**SITC 712**

Ghana	1,000	1,000	2,000	2,000
Guinea	70	400	60	200
Liberia	300	1,000	1,000	1,000
Nigeria	2,000	8,000	7,000	10,000
Togo	80	80	400	400
Other countries	2,000	3,000	3,000	5,000
Total.....	5,450	13,480	13,450	18,600



Estimates of import of spare-parts and accessories to YOUNDE MULPOC in '000 US\$ FOB

	1974	1975	1976	1977	1978	1979	1980
<u>TRANSPORT EQUIPMENT</u>							
<u>SITC 73</u>							
CEUCA countries	27,000	36,000	49,000	47,000			
<u>MACHINERY (Non-electric)</u>							
<u>SITC 719</u>							
CEUCA countries	6,000	10,000	10,000	13,000			
<u>AGRICULTURAL M/C</u>							
<u>SITC 712</u>							
CEUCA countries	1,000	3,000	2,000	2,000			

Estimates import of spare-parts and accessories to GISENY MULPOC in '000 US\$ FOB

<u>TRANSPORT EQUIPMENT</u>							
<u>SITC 73</u>							
Burundi, Rwanda	2,000	2,000	3,000	2,000			
Zaire	29,000	29,000	16,000	15,000			
Total.....	31,000	31,000	19,000	17,000			
<u>MACHINERY (Non-electrical)</u>							
<u>SITC 719</u>							
Burundi, Rwanda	200	300	500	500			
Zaire	6,000	6,000	3,000	5,000			
Total.....	6,200	6,300	3,500	5,500			
<u>AGRICULTURAL M/C</u>							
<u>SITC 712</u>							
Burundi, Rwanda	30	50	50	50			
Zaire	1,000	1,000	200	400			
Total.....	1,030	1,050	250	450			



### Investment Required

The products identified for subregional workshops in Group IX and subsequent manufacture require heavy investment in terms of machinery and working capital. It will be difficult for a single country to implement such project by itself.

### Demand for Spare-Parts Requirement

Due to the limited information available in the Secretariat, the mission will have to collect from the subregion as referred to page 9 to 15 outlined in product specification and product volume.

### Raw Material Specification and Requirement

As spare-parts manufacture require a wide range of input materials e.g. castings, forgings, steel hardware, intermediate products, wood products, non-metallic products and various other finished and semi-finished components, it is suggested that the basic metal engineering and ancillary industries should be developed at national level in respective MULPOC countries.

Type of Material	Specification	Quantity Required in Tons
(a) Cast Iron Shape Castings	High duty gray cast iron grade 17 or meehanite specification. (B.S. 1452:1961 Gr4)	
(b) S.G. Iron Shape Castings	B.S. 2709:1973 MGr6	
(c) Pearlitic Malleable Iron Castings	B.S. 3333:1972 MGr4	
(d) Brass Shape Castings	60% Cu + 40% Zn ) B.S.1400:1973 30% Cu + 20% Zn ) MGr3	
(e) Mild Steel Section	B.S. 2094 Part 3, 1954 Gr3	
(f) Electrode quality Carbon Steel Sections	B.S. 4155:1971 MGr7	
(g) Hardening and Tempering quality Carbon Steel Sections	B.S.970 Part 2, 1970 Gr2	
(h) Carbon, Carbon Manganese and Silico Manganese quality Spring Steel	B.S.970 Part 5, 1972 Gr6	
(i) Carbon Tool Steels	B.S.970 Part 1, 1972 Gr2	
(j) Case Hardening quality Carbon Sulphur Steel	B.S.970 Part 3, 1971 Gr3	
(k) Mild Steel Plates and Sheets	B.S. 1449:1956 Gr3	
(l) Hot Crossed Rolled Steel (for agricultural discs production)	B.S.2094 Part 4, Gr3 B.S.1449 Part 1, 1972 MGr2	

Total requirement of raw material should be assessed after the products identification and model-weights are established.



### Requirement of Common Engineering Services Facilities at National and Subregional Level

The common engineering services facilities as identified in Group X page will be required for the spare-parts manufacture at the national and subregional levels. The minimum production volume is already outlined in Group X product range. It is desirable to develop and upgrade the existing engineering facilities at the national level:

- foundry and forging shops;
- tool rooms;
- heat treatment shops;
- galvanizing, electroplating and phosphating shops.

### Requirement of Ancillary Industries

Ancillary industries at national level are important supply source for spare-parts components. Sub-contracting of parts and components not only reduces the product costs but also improves the quality of the product and creates established source for spare-parts requirement. The ancillary industries are divided into two main categories:

- Ancillary industries at small level with medium volume production having lower investment costs;
- Ancillary industries at medium and large scale level with high volume production having relatively higher investment cost.

The proposed identified product grouping for ancillary industries at national level are reflected in Group VIII in page 4 for spare-parts requirement.

### Subregional Linkages

In order to develop these multinational spare-parts industries in the 3 MULPOC areas, it is suggested that the existing national spare-parts machinery industries should be expanded. The main national - subregional linkage will be in the form of supply of parts, components and basic raw materials from existing facilities to the subregional facilities. Greater sub-contracting arrangements between the subregional and national facilities will assist the multinational companies in the MULPOC areas.

### Implementation Modalities

For the implementation of these projects it is suggested that African multinational companies should be established in each MULPOC area with equity participation of interested member States which will join the companies. It is suggested that design and collaboration should be based on joint ventures with companies in other regions which are engaged in manufacturing the products concerned.

Each company will have a Board of Directors and should be responsible to the share holders i.e. the member States. The management of the company will be visited on the Managing Director of the company.

### Follow-up Action

In order to follow-up the projects, it is suggested that detailed feasibility studies for each subregional project mentioned above should be undertaken followed by implementation of these projects which would prove to be viable or desirable.