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of the Industrial Development Decade for Africa (IDDA)*

Harare, Zimbabwe, 31 October - 4 November 1988

SUPPLEMENTARY BACKGROUND DOCUMENT

ON

CONCEPTUAL FRAMEWORK AND CURRENT ACTIVITIES

IN THE FIELD OF INDUSTRY AND ENERGY

OF THE

PREFERENTIAL TRADE AREA FOR EASTERN AND SOUTHERN AFRICAN STATES (PTA)**

Prepared by the Secretariat of the
Preferential Trade Area for Eastern and Southern African States (PTA)

* Organized by UNIDO, in co-operation with the Secretariat of the Preferential Trade Area for Eastern and Southern African States (PTA), the Southern African Development Co-ordination Conference (SADCC) and the Government of Zimbabwe.

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INTRODUCTION

1. Article 24 of Annex VIII of the PTA Treaty which is on Co-operation in the Field of Industrial Development states that meaningful Preferential Trade Area arrangements between countries at different levels of economic development and pursuing economic and political policies cannot be realized without the restructuring of their economies through co-operation in industrial development. It goes on to state that co-operation in industrial development offers favourable and good prospects not only for a more rapid and self-sustained industrialization but also for the expansion of trade between the member States, through exports to and imports from each other. In this regard, trade and the monetary sectors, are the lead sectors, in the integration process. Equally important are the productive sectors of industry and agriculture as well as the transport and communications, which are engaged in the production of goods and provision of services.

2. The PTA integrated programme on the promotion of economic co-operation in all sectors especially in the sectors of trade, monetary affairs, and intra-subregional co-operation in industry, agriculture and transport and communications among the countries of Eastern and Southern Africa has now entered the implementation phase; in earnest.

3. A programme on intra-PTA trade promotion which includes a timetable for the relaxation and eventual elimination of tariff and non-tariff barriers to intra-subregional trade is in place. The PTA Trade and Development Bank is now operational and, through its Trade Window the Bank provides for export credit export pre-financing and for financing export oriented industrial projects. Other PTA instruments for the promotion and facilitation of intra-subregional trade include: clearing and payments arrangements through the PTA Clearing House, to encourage the use of local currencies in intra-PTA trade transactions; integrated trade promotion programme through the PTA Trade and Documentation Information Network, demand and supply studies and buyers and sellers meetings; simplification and harmonization of customs documents and procedures and adoption of the Harmonised Commodity Description and Coding System.

4. In the sectors of industry and energy, the long-term objective is to promote co-operation in the rationalization and expansion of existing capacities, and for the creation of new capacities, as well as promotion of cross-border, vertically and horizontally integrated production - marketing - distribution systems; based on small, medium and large-scale production enterprises which will operate either as multinational enterprises in the case of large-scale basic production units or under looser forms of co-operation arrangements in the case of medium - scale and small scale production units. A charter on multinational industrial enterprises for promotion or encouragement of multinational industrial enterprises between two or more member States as public enterprises or between two or more national private enterprises has been formulated. The aim is to eventually establish a viable and competitive industrial structure to produce not only consumer goods but also capital and intermediate products.

5. Horizontal and vertical integration of production units in industry and agriculture will generate substantial development in inter-State, inter-sectoral linkages and foster inter-dependence in production enterprises and sectors among the PTA member States. This, in turn, will generate an increase in the volume of intra-PTA trade and improve the economic viability of inter-State multimodal transportation systems.

6. The current activities on industrial development focus on the implementation of specific projects and programmes beginning with the rehabilitation and upgrading of existing national plants, where required. The programme covers rehabilitation and upgrading of existing national iron and steel plants and foundries; establishment of multinational sponge iron plants, rationalization of existing national fertilizer plants and establishment of new multinational fertilizer plants; rationalization of the building industry focussing in the first instance on the existing cement plants, development of agricultural and mineral processing industries and promotion of co-operation in the exploitation and utilization of the energy resources of the subregion.

7. The priority programme activities which embrace projects in the sub-sectors of metal engineering industries, chemicals and fertilizers, agro and agro-allied industries and Energy are summarised below:

METAL AND ENGINEERING INDUSTRIES SECTOR

8. Under this sector the primary objective is to establish a viable metallurgical industries sub-sector because of its vitality in the industrialization process. The manufacture of a wide variety of consumer goods requires accelerated growth of the intermediate industries providing such inputs as iron and steel, aluminium and other metallurgical products which, in turn, depend on the exploitation of the vast mineral resources of the subregion, in particular iron ore, coal, copper and natural gas. Of immediate importance is the establishment of an iron and steel industry.

9. Over the last twenty years, many countries in the PTA subregion have, in their quest to industrialize, undertaken feasibility studies for the establishment of an iron and steel industry. However, the implementation of the envisaged programmes have been constrained due to a number of factors, including:

- (a) the small market size (domestic)
- (b) relatively under-developed engineering sub-sector
- (c) unavailability in any one particular country of all the necessary resources such as raw materials, finance, etc.
- (d) lack of skilled manpower

10. The subregion as a whole has twenty-three (23) mini steel plants in nine countries. There are eight in Kenya, seven of which are in or around Nairobi; Mauritius accounts for four, Zimbabwe three and two each in Ethiopia, Tanzania and Uganda. Angola, Mozambique and Madagascar have one each.

11. The subregion's largest and only integrated steelworks is the Zimbabwe Iron and Steel Company Limited (ZISCO) at Redcliff, which is equipped with blast furnaces and oxygen converters with production capacity of 850,000 tonnes per year. Eight other plants could fit the definition of "mini mills" in the sense that they operate scrap-based meltshops for producing billets and/or ingots and sections. The balance of the subregion's mills are either meltshops producing billets or pure rolling mills based on local and/or imported billets.

12. The subregion's aggregate liquid steel capacity is about 1.2 million tonnes of which 850,000 tonnes are produced by ZISCO and the rest is shared among the other member States.

13. Because twelve (12) steel plants in the subregion are only re-rollers and because the general tendency is to build rolling capacity in excess of what can be fed from their own billet/ingot capacity, the aggregate subregional rolling capacity of 1.72 million tonnes exceeds the liquid steel capacity by 57%.

14. If steel mills and rollers operated at maximum capacities, the PTA subregion would import billet/ingots of the order of 50% of local production. However, the national rolling mills have been running at well below capacity averaging about 30% of installed capacity. Thus imports of billets average about 0.8 million tonnes per annum

The factors responsible for under-utilization of installed capacity include:

- (a) lack of spare parts
- (b) lack of skilled manpower
- (c) lack of foreign exchange to purchase feedstocks and spare parts; and
- (d) shortage of scrap for those mills which make their own ingots or billets from own meltshops based on scrap

15. It is against this background that the PTA member States have adopted a three-pronged strategy for the development of a PTA iron and steel complex; which comprises:

- (a) The rehabilitation and rationalization of existing national mills including utilization, to the maximum extent, of feedstocks from ZISCO
- (b) Production of sponge iron to supplement scrap as feedstock to the meltshops for production of billets for the national rolling mills; and
- (c) Development of other integrated iron and steel plants as and when it becomes feasible

16. On the rehabilitation and rationalization of existing national plants, the PTA has completed an exercise involving indepth studies of the national steel plants. Remedial measures were implemented on the spot, where possible; but a major rehabilitation programme still remains to be carried out. Technical assistance is being provided by UNIDO and the Commonwealth Secretariat. A study on the manpower requirements was carried out; hence manpower requirements and local training facilities have been identified.

17. As a result of the indepth studies of the rolling mills, training programmes were organized at ZISCO with the technical assistance provided by the Governments of Austria and Britain through UNIDO. By end of December, 1987, some 40 participants had benefited from the programme which focussed on maintenance. The intention is to organize training programmes on a regular basis. Preliminary evaluation results on the two programmes were very encouraging and indeed demonstrated the need for the regular in-plant-training courses tailor-made to suit the requirements of the industry.

18. With regards to sponge iron, the subregion's liquid steel making capacity, apart from that of ZISCOSTEEL, is based on iron scrap which is in short supply. Therefore, there is need to supplement the scrap with sponge iron. In the PTA subregion there are sizeable iron ore deposits in Angola, Mozambique, Tanzania, Uganda, Zambia and Zimbabwe. Total reserves are estimated at 6.3 million tonnes. Coal reserves, also estimated at 50 billion tonnes are available in Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe.

19. The sponge iron route has been chosen because of the scale of operation and more so because it utilizes non-coking coal. Countries with potential for the production of sponge iron include Mozambique, Tanzania, Uganda and Zambia.

20. The other metals which are equally important include copper and aluminium both of which are significant to the economies of Eastern and Southern African States.

21. The development of the metallurgical industries has to be accompanied by a parallel indigenous development of the technological capability. The PTA Policy Organs have approved the establishment of a Metallurgical Technology Centre. The Centre which will be located in Zimbabwe will play a supportive role to the research institutions in the various member States.

22. The Metallurgical Technology Centre will have two functions:-

- (a) Provide technical services through a data bank, library and documentary facilities and, in addition, perform various technical services such as provision of standards and specifications. The Centre will also undertake techno-economic studies;
- (b) Evaluate and assess local raw materials for the development of ferrous and non-ferrous metals. In this connection the Centre will evaluate ore bodies, study the coal, fluxes and other materials used in the production of metals and in particular the iron and steel.

ENGINEERING INDUSTRIES SUB-SECTOR

23. The immediate objective is to promote co-ordinated and integrated subregional projects for manufacture of machine tools, agricultural machinery and equipment, tractors, commercial vehicles and local transport equipment and spare parts. It is expected that these activities will eventually lead to rationalisation and integrated development of the engineering industries.

24. At the moment the engineering industries subsector in the subregion is in the initial stages of development. Machine tools are assembled in Tanzania from imported SKD/CKD and a number of PTA member States including Kenya and Zimbabwe have plans to go into manufacture as well. The demand for machine tools in PTA countries, considering only metal and wood work machines is estimated at 6,900 per annum. The Tanzania plant produced 232 machine tools in 1985 and it is envisaged that 600 machinery would be manufactured in 1988. In this category, projects for the manufacture of simple general purposes metal cutting and wood work machines have been identified but need to be refined. The projects include the expansion of existing plant in Tanzania, and for new plants in Kenya and Zimbabwe.

25. With regard to agricultural machinery, priority is accorded to the manufacture of hand tools, simple manually operated machines animal drawn implements and tractor drawn implements and simple power operated machines. For hand tools, their manufacture is well established in most countries of the region. The installed capacity is well over 8.5 million units per annum. However, the utilization of the capacity is only about 30% because of lack of supply of spare parts, raw materials and lack of skilled manpower to be able to achieve its planned capacity. Technical assistance would be required to upgrade/modernize existing units.

26. On transport equipment, most of the countries have assembly operations for commercial vehicles in varied levels of integration. A wide variety of models/makes are being assembled which poses a problem in developing auto ancillary sector and spare parts. The auto ancillary industries are developed to some extent and the locally manufactured items being incorporated in the original equipment are, tyres and tubes, batteries, radiators, exhaust systems, wiring harness, glasses, gaskets, filters, fuel tanks, etc. However, due to the large number of models/makes being assembled and imported, availability of spare parts is a major problem for proper maintenance of vehicles.

27. Back-up support facilities and ancillaries though existing in most of the countries in varied levels, need to be upgraded/modernized to meet the requirements of capital goods. In this respect a number of projects have been identified.

28. In general, metal forming and fabrication as well as metal coating industries are well developed. As such the existing infrastructure in these areas could easily cater for the needs of the subregion up to 1990. However, the metal forming units need to be equipped with proper toolings. Foundry industry is well established in Zimbabwe and to a lesser scale in Kenya and Zambia. All these facilities require technical assistance as well as balancing facilities in order to manufacture castings and to meet local demand.

29. Forging and heat treatment facilities are available in the subregion, but mostly for captive use. There is need to develop new tool room facilities particularly for high accuracies. Although facilities for the manufacture of moulds and dies do exist in the subregion, the industries which manufacture these dies and moulds do not produce them on commercial basis for want of skilled manpower.

CHEMICALS AND FERTILIZERS

30. Chemical industries provide products directly related to the satisfaction of the basic needs, primarily food and health. The decline of agricultural production in the subregion has resulted in increasing amount of resources being directed to food imports thereby reducing the amount of foreign exchange available for import of industrial inputs required to assure full utilization of installed capacities. The production in the pharmaceuticals and petro-chemicals based on domestic resources, (natural gas, coal, phosphate rock, potash, electrical energy, etc) would stimulate the development of agriculture, industry and other sectors whose viability could not be assured using imported chemical inputs.

31. The immediate objective is to develop a viable fertilizer industry through inter-country specialization and complementarity, initially giving priority to the rehabilitation of existing fertilizer plants and establishing new plants on basis of resources endowments.

29. Total consumption of fertilizers in the PTA subregion is about 1.3 million tonnes. This is expected to increase to 1.8 million tonnes by 1995 and rise to 2.5 million tonnes by the year 2000. The total demand could be significantly higher than the consumption especially with increased usage by peasant farmers and the emphasis on developing agriculture.

32. This may be realised through aggressive promotional efforts such as extension services, credit schemes and favourable agricultural produce prices.

33. The installed capacity of nutrient (straight) fertilizer producing units in the subregion is 900,000 tonnes per year. In addition there are compounding units with a capacity of 620,000 tonnes per year. These units are by and large based on imported intermediate chemicals.

34. The subregion has all the resource endowments required in the manufacture of fertilizers. For instance, the preferred raw materials for manufacture of nitrogenous fertilizers is natural gas, whereas phosphatic fertilizers are produced from phosphate rock with adequate P₂O₅ content acidulated with an acid-sulphuric or nitric, all of which are available in the subregion.

35. The manufacture of potassic fertilizers is based on the ore in the form of sylvinite, kainite and carnallite.

36. Natural gas is available in Angola, Ethiopia, Mozambique and Tanzania whereas phosphate rock is found in Burundi, Tanzania, Uganda, Zambia and Zimbabwe. Brine, which is used to make phosphatic fertilizer, is available in Botswana, Tanzania and Uganda while sylvinite is found in Ethiopia.

NITROGENOUS FERTILIZERS

37. Consumption of nitrogenous fertilizers will reach 1 million tonnes per annum by the year 2000. At present the installed capacity is 150,000 to ammonia from two plants one in Zambia and the other one in Zimbabwe. The ammonia plant in Zambia is coal-based whereas the one in Zimbabwe is based on water electrolysis.

38. There is need to increase ammonia production from less expensive feedstocks like natural gas. A number of projects have been identified. These include the manufacture of ammonia/urea in Tanzania based on natural gas and a similar project in Rwanda based on methane gas from Lake Kivu.

PHOSPHATE FERTILIZERS

39. The projected demand for phosphate fertilizers by the year 2000 is estimated at 600,000 tonnes per annum. Presently the installed capacity is about 190,000 tonnes from two plants, one in Tanzania and the other one in Zimbabwe.

40. Projects which are being promoted are:- Uganda phosphate project which is intended to supply Kenya, Tanzania, Sudan in addition to Uganda; a Single Super Phosphate which will be located in Burundi and will supply Rwanda, Western Tanzania, Zaïre in addition to Burundi.

POTASSIC FERTILIZER

41. By the nature of the soils, potassic fertilizers are not in high demand as nitrogenous and phosphatic fertilizers. And so the projected demand by the year 2000 is 230,000 tonnes. Projects which are being promoted include the exploitation of potash deposits in Ethiopia for export and for PTA market.

HUMAN RESOURCE DEVELOPMENT

42. For the subregion to fully implement the programmes outlined above, efficient marketing, distribution and extension services at national level are necessary. There is also need for trained manpower to operate and maintain the plants.

43. It is therefore, desirable to undertake a survey of the manpower requirements to; identify training facilities available so that regular training programmes could be organized in the sub-region. The PTA has already developed a training programme on plant nutrition, market research, distribution, pricing, promotion and personnel development.

PHARMACEUTICAL INDUSTRY

44. There is considerable divergence in consumption levels of pharmaceutical products in the PTA Member States reflecting not only different sizes of the economy but also uneven degrees of economic development. The annual expenditure of medical drugs per capital ranges from US\$1 in Malawi to over US\$5 in Mauritius with around US\$3 for Zambia, Rwanda and Tanzania.

45. Major causes of morbidity arise from malaria, measles pneumonia, gastroenteritis and nutritional disorders. The potential demand for drugs is much higher than shown by statistics as the large portion of the demand for medicaments is not satisfied.

46. The proliferation of pharmaceutical types and varieties marketed internationally, which runs into several thousand different products, some of which are believed by industry analysts to be unnecessary, ineffective, or even harmful to developing countries; necessitates careful production planning when fostering the development of pharmaceutical industry. It has been argued that 500 to 600 selected pharmaceuticals can give the full range of therapeutic benefits provided by the existing range of drugs. The priority, as recommended by UNIDO and WHO, is for the countries to prepare their own priority lists of essential drugs; taking into consideration national public health objectives and disease patterns using UN lists as a guideline.

47. In the PTA there are 45 drugs which are common to the individual country lists. These reflect the key health requirements of the region.

48. Most Member States have established local formulation units based on imported intermediates. There is no unit for the manufacture of active ingredients. Most of the essential drugs recommend by WHO and over-the-counter drugs are locally formulated from imported active ingredients. However, there is a certain duplication of effort by the manufacturers of pharmaceutical drugs, especially in Kenya, who have concentrated their production range on the essential drug list of WHO. There is therefore, scope for rationalization both at the national and subregional level. Except for certain vaccines, hormonal products, anti-cancer drugs and other sophisticated medicaments, the great majority of pharmaceutical products imported by several PTA Member States are currently produced in Burundi, Kenya, Lesotho and Zimbabwe. The products have been adapted to local conditions of morbidity and cover much of the important therapeutic needs.

49. A serious constraint to intra-PTA trade is the cumbersome and lengthy system of drug registration. There is need to eliminate this duplicatory registration procedures of the manufactured drugs in the PTA which have already been registered and approved in their home country in conformity with the WHO specification and GMP standards.

50. There is need to ensure that good quality drugs are manufactured by designating one of the more appropriate institutions for quality control and applied research on the manufacture and use of pharmaceuticals including facility for testing bio-equivalence and/or bio-availability of drugs.

51. In addition, there is need to assist Member States to assemble and distribute health kits, as proposed by WHO, in countries where such kits are not in use. Alongside this, there is need to assist Member States to promote trade in generic pharmaceuticals.

PESTICIDES

52. Agriculture and food production have been accorded the highest priority in view of the need for the subregion to attain self-sufficiency in food. For the majority of PTA countries agricultural commodities remain, despite continued worsening of terms of trade, dominant export items and earners of foreign exchange and, above all, the major source of supply of basic foodstuffs and employment to both rural and urban populations.

53. The production of pesticides may be broadly differentiated into the manufacture of the active ingredients (technicals) and the formulation of usable compounds by blending or solution with carrying agent, such as dust, wettable powder or emulsifying agent or by granulation or conversion into flowables.

54. Current production figures suggest that even at low levels of consumption; regional output is far from adequate. Production of the basis chemical constituents is almost non-existent. Production of technicals is limited to two copper oxychloride plants in Zambia and Zimbabwe of which the latter is only able to export small quantities.

55. Total installed capacity of copper-oxychloride is about 2000 tonnes per annum owing to lack of foreign exchange to purchase inputs. There are formulation plants with a total capacity of 36,500 tonnes of KL.

56. The development of agro-chemical products would greatly assist in reducing pre-harvest crop losses due to disease and pests average between 10 - 15 percent while post-harvest losses especially in storage average between 20 - 30 percent. The major crops producers in the PTA subregion are:

Maize	:	Ethiopia, Kenya, Malawi, Zimbabwe.
Sorghum/Millet	:	Ethiopia, Kenya, Tanzania, Uganda, Zimbabwe.
Wheat/Barley	:	Ethiopia, Kenya, Lesotho, Zimbabwe.
Rice	:	Madagascar, Tanzania
Groundnuts	:	Malawi, Zimbabwe
Coffee	:	Ethiopia, Kenya, Madagascar, Tanzania, Uganda
Tea	:	Kenya, Malawi, Mauritius, Mozambique
Cotton	:	Tanzania, Zimbabwe
Bananas	:	Angola, Madagascar, Tanzania
Sugarcane	:	Kenya, Mauritius, Swaziland, Zimbabwe
Tobacco	:	Malawi, Zimbabwe.

57. In the light of the foregoing, the PTA policy organs have agreed to undertake the following:

1. To co-operate in the manufacture and trading of active ingredients (i.e., technicals):
 - (a) compile data on indigeneous resources for chemical inter-mediate in the PTA region;

- (b) pre-feasibility study for a copper-oxychloride (COC) for the Eastern part of the PTA to serve, Kenya, Ethiopia and Uganda;
 - (c) pre-feasibility study for the manufacture of malathion; and
 - (d) to encourage trade in pesticides.
2. Rehabilitation of existing units to supply other Member States;
 3. To promote other systems of pests control i.e, research to develop resistant varieties; introduction of predators and parasites; and
 4. To co-operate and liaise efforts with UNEP in the production and application of pesticides, in the environmental control.

BUILDING MATERIALS

58. The promotion of the building materials industry in the subregion would contribute to the satisfaction of one of the populations' basic needs, housing, as well as to the exploitation of natural resources and provide inputs to the construction industry which would pave the way for the establishment of conditions conducive to socio-economic development. The building materials which are of interest are: brickmaking, natural stone, cement, lime, fine ceramics and sheet glass. In this sector, PTA's interest, in the first instance, is to develop cement because of the current poor state of affairs in the the industry.

59. There about 20 cement plants in the PTA subregion which have been established primarily to supply domestic and export markets. The interest in this product stems from its importance as an input into housing and construction sectors. Moreover, this "basic need" industry obtains most of its inputs locally. These comprise limestone, clay, fuel, gypsum, paper sacks, spare parts, refractories and grinding media.

60. The total installed capacity is about 8 million tonnes whereas production is hardly 3.5 million tonnes per annum. The subregion exports about 1 million tonnes and imports similar amount from outside the subregion.

61. Kenya has the largest available capacity for producing cement and Swaziland the smallest. At the moment the Swaziland factory is not in production because of problems of supply of clinker from Mozambique. Cement plants in Mozambique also import clinker from South Africa. All the countries import refractories and all except Zimbabwe also import grinding media. Gypsum is available in some of the countries although a number of them import from Europe.

62. As indicated earlier, capacity utilization is a major problem in Tanzania, Angola, Mozambique and Zambia. Achievable production capacity is estimated at 30%. This suggests that at least for the next five years it will not be necessary to establish new cement production capacities if rehabilitation of existing capacities can be undertaken. The immediate requirement is to rehabilitate cement plants in Uganda, Mozambique, Malawi, Tanzania and Zambia.

AGRO AND AGRO-ALLIED INDUSTRIES

63. The development of agro and agro-industries is critical to the subregion's attainment of self-sufficiency in food production. Priority is therefore, accorded to the reduction of pre and post-harvest losses which would increase food availability and contribute to food security in the subregion. The development of agro-industries would help to reduce imports, increase the value added of raw materials, augment export revenue, raise employment levels and improve income. In this regard, a number of programmes aimed at developing production of chemicals and fertilizers; agricultural machinery and food processing and agro-allied industries have been identified for promotion through co-ordinated effort at the subregional level.

64. In the subsector of food processing, the immediate priority is: grain processing, sugar production, manufacture of oils, fruits and vegetable processing.

65. On sugar, some PTA member States produce surplus which could be sold to deficit countries. There is also need to promote sugar related industries such as alcohol, yeast and biscuits. Animal feeds, baby foods, fish processing and hides and skin and leather products are some of the priority industries and which could utilize local resources. In this regard, the Eastern and Southern African subregion has the largest share of livestock in Africa (69%) which require to be assisted in order to produce suitable hides and skins for manufacture of leather products.

66. Another important area in the agro-industries, is the rationalisation of textile industries, starting with ginning and weaving in order to provide adequate yarn and also to develop forestry and forestry products. Of particular importance is the establishment of efficient factories for timber and related industries and the manufacture of pulp and paper.

67. The PTA has forestry resources which occupy about 2 million square Kilometres or 23% of the total land. Closed coniferous forests occupy about 1.1 million hectares and are found in Ethiopia, Kenya and Somalia while open forests generally considered as savannahs, cover about 87 million hectares, 12% of which is considered productive. The savannah are found in almost every country in the PTA subregion and are the major resources of fuelwood, urban charcoal, building materials of crop production. Industrial wood is produced mainly from closed forests and plantations. There is potential for production of industrial woods in Angola, Madagascar, Mozambique, Swaziland and Zimbabwe. Pulp and paper is produced in Kenya, Tanzania and Zimbabwe. There is potential for paper production in Swaziland and Angola. Swaziland currently produces wood pulp.

6.3. Following projects/programmes have been identified.

1. Grain processing
2. Manufacture of sugar
3. Oil processing
4. Production of stockfeed for animals and poultry

5. Fruits and vegetable processing
6. Fish processing
7. Upgrading quality of raw hides for production of leather and leather products
8. Rationalisation of textile industry
9. The utilisation of forestry resources for wood, pulp and paper

ENERGY

69. The Sixth Meeting of the Authority of the PTA at its Sixth Meeting held in Kampala, Uganda adopted an energy plan of action, which focusses on joint exploration and utilization of energy resources comprising woodfuel, petroleum, hydro-electricity, coal, geothermal, new and renewable sources of energy.

70. Practically all PTA countries rely on fuelwood as the single most important source of energy for domestic cooking, heating and lighting. In 1985 consumption of fuelwood was estimated at 200 million cubic meters. This provides 70 -80 per cent of the total energy consumption for that year. Although petroleum accounts for between 8 - 10 per cent of the total energy supply it consumes about 40% of export revenue.

71. The hydro-power potential of the PTA is estimated at nearly 106,000 MW, capable of producing an average amount of nearly 600 billion Kwh per annum. The current installed capacity is estimated at 6,382 MW representing only per cent of the potential available. Two countries in Southern Africa, Angola and Mozambique, possess almost 30% of this potential. Angola has the largest hydro-power potential with 23,000 MW, followed by Mozambique with 15,00 MW, Zambia with 12,000 MW, Tanzania with 9,500 MW and Zimbabwe with 3,800 MW. In the Eastern part of the subregion, Madagascar has the largest hydro-power potential estimated at 20,000 MW followed by Ethiopia 12,000 MW, Kenya 6,000 MW and Uganda 2000 MW.

72. Although coal is not presently a major factor in the national energy balance of the PTA Member States, a number of countries have sizeable resources, and some have already made progress in developing these especially as a source of energy for power generation and industrial uses. The subregion possesses over 60 billion tons of coal.

73. Geothermal resources are widely distributed along the African Rift Valley but only Kenya, has so far constructed geothermal power generation facilities. Several other countries in Eastern Africa have good geothermal prospects along the African Rift Valley, but the development of this resource particularly in Djibouti, Ethiopia, Uganda, Rwanda, Burundi, Tanzania, Malawi and Mozambique, is limited by lack of indigenous skills.

74. As a result of technological breakthrough and improved competitiveness in cost, a transition is underway in which new and renewable sources are being substituted for high cost petroleum. An African Regional Center for Solar Energy is being set up in Bujumbura, Burundi to focus research development demonstration

and dissemination of new and renewable resources. Already, several PTA Member States have ratified the protocol for its establishment.

75. In the light of the above Member States have agreed to the following priority activities:

Woodfuel Sector

- (i) To reduce the enormous waste in the use of household fuels now prevailing in the Member States.
- (ii) Finding the most suitable trees for various ecological zones as well as fast growing species in order to enhance the supply of woodfuel.
- (iii) Creation of awareness by preparing woodfuel inventory and by assessing sustainable yield and the degree of deforestation in the subregion.
- (iv) Training of personnel in woodfuel management.
- (v) Strengthening institutions in the field of forest management both research and extension services.
- (vi) Control and manage environment especially with regards to desertification and deforestation

Petroleum Sector

- (i) To undertake studies on possible refinery modification consistent with a least cost supply strategy given capital constraints and the uncertainty of future petroleum prices.
- (ii) To intensify exploration programmes for hydrocarbons.
- (iii) To substitute petroleum with domestically available resources in industry and transport.
- (iv) To increase capacities for strategic stocks in Swaziland, Botswana, Zimbabwe, Malawi and Zambia.
- (v) Training of personnel in the petroleum sector

Hydroelectricity Sector

- (i) Establishment of subregional inter-state grid connection in order to take advantage of the economies of scale.
- (ii) Conservation of water catchment areas.
- (iii) To exploit the river basin in existence for the benefit of all countries sharing the basins.
- (iv) To promote/prepare studies on electrification of border towns in order to boost agricultural development, trade and communications.

- (v) To increase use of the abundant electricity generating capability at Cabora Bassa, the Kariba Dam and the Kafue River.
- (vi) To promote/prepare studies on production of electro-mechanical equipment as well as hot plates motor pumps.
- (vii) To promote/prepare studies on production of generation equipment for mini and micro hydro electricity schemes as well as electrical equipment and devices.

Coal Sector

- (i) To undertake research programmes to establish the quantity and of anthracite, lignite and peat in terms of sulphur content, volatile matter, ash content, etc.
- (ii) To encourage exploration for small scale deposits which could be exploited for small industry and domestic use.
- (iii) To undertake a study and analyse the investment required to develop coal resources in Malawi, Somalia, Swaziland, Tanzania, Zambia and Zimbabwe for subregional benefit.
- (iv) To endeavour utilize existing coal research centers which should form part of the network of Metallurgical Technology Center.
- (v) To promote research, development, demonstration, production and marketing coal and peat briquetting as well as coal and peat stove.
- (vi) To examine the possibility of setting up coal based chemical industry in the subregion to produce diesel, petrol, benzol etc.

Geothermal Sector

- (i) To intensify geothermal exploration along the E. African Rift Valley.
- (ii) To encourage sharing Kenya's experience in geothermal resource utilization for power generation with other countries.
- (iii) To promote scientific and technological research for industrial applications of geothermal resources as a source of heat for processing and/or extraction of minerals and production of hot water and steam for industrial purposes.
- (iv) To carry out studies on the environmental impact of using geothermal power.

New and Renewable Energy Sector

- (i) To promote the development; and utilization of new and renewable sources of energy as set out in the Nairobi Programme of action and other international and regional seminars and conferences;

- (ii) To encourage exchange and dissemination of information on new and renewable sources of energy;
- (iii) To heighten national and international efforts in the areas of resource assessment, research development, testing, pilot demonstration projects, planning and marketing studies; and
- (vi) To encourage trade in the field of new and renewable technology (RET) among the Member States.

SUPPORT PROGRAMMES

Industrial Manpower Training

76. Major activities in this area are:

1. Inventory of subregional training facilities and training requirements;
2. Managerial and technical personnel training;
3. Development of industrial consultancy and management capabilities;
4. Development of local entrepreneurship.

MULTINATIONAL INDUSTRIAL ENTERPRISES

77. The modalities required for collaboration within the PTA will vary with the intensification of collaboration in general, the changes in the areas of co-operation, stages of production, as well as the nature of the goods and services. The major mechanism envisaged in the Treaty cover a broad range and includes all conceivable means of industrial co-operation. These include promotion of multinational industrial enterprises, acquisition of modern technology, joint industrial institutions as may be required in selected areas of co-operation. The PTA is in the process of establishing a Charter for Multinational Industrial Enterprises as an instrument for encouraging joint ventures between member States and nationals of the PTA in the promotion of industries that would, amongst other factors require:

- (a) the combined markets of more than one member State and which would require for their consumption large quantities of natural resources;
- (b) for their establishment and operation large sums of capital investment, etc.

78. The Treaty also provides for exchange of information of investment laws and regulations and member States are required to encourage investments by other member States in industries within the PTA.