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ECONOMIC COMMISSION FOR AFRICA

BASIC METALS AND ENGINEERING INDUSTRY
DEVELOPMENT PROGRAMME

Addis Ababa, 3-8 December 1979

Table of Contents

	<u>Page</u>
A. ORGANIZATION AND PARTICIPATION	1
B. AGENDA	1
C. ACCOUNT OF PROCEEDINGS	2
D. AGREED CONCLUSIONS AND RECOMMENDATIONS	8

A. ORGANIZATION AND PARTICIPATION

1. The first Meeting of Experts on Basic Metals and Engineering was organized jointly by the Economic Commission for Africa and the United Nations Industrial Organization at Addis Ababa, Ethiopia, from 3 to 8 December 1979.

Participation

2. Representatives of the following member States participated in the meeting: Burundi, Ethiopia, Guinea, the Ivory Coast, Liberia, Madagascar, Morocco, Nigeria, Senegal, Sierra Leone, the Sudan, the United Republic of Tanzania, Uganda, Zaire and Zambia.

3. The United Nations Conference on Trade and Development (UNCTAD), the United Nations Development Programme (UNDP), the International Labour Organization (ILO), the World Health Organization (WHO) and the African Regional Organization for Standardization (ARSO) were represented in an observer capacity.

4. The meeting unanimously elected Dr. A. Banjo, Nigeria, as Chairman; Mr. A. Diallo, Guinea, as Vice-Chairman and Mr. Leonard M. Yindi, United Republic of Tanzania, as Rapporteur.

B. AGENDA

5. The following provisional agenda was unanimously adopted:

1. Opening of the meeting:

- (a) Opening statement by the Executive Secretary of ECA
- (b) Statement by the representative of UNIDO
- (c) Election of officers
- (d) Adoption of the agenda and organization of work

2. Presentation of country reports by participants, followed by discussions

3. Presentation of the regional report by the Team Leader followed by discussions on:

- (a) Policies and strategies needed to promote the accelerated development of metals and engineering industries at national, multinational and subregional levels
- (b) Institutional requirements and entrepreneurship including incentive schemes for accelerated development of the sectors at national, multinational and subregional levels
- (c) Manpower, technology, etc.

- (d) Modalities for co-operation among member States in the implementation of multinational, subregional, regional and inter-sectoral projects
 - (e) Proposals for an ECA/UNIDO programme for the period 1980-1986.
4. Presentation of the Task Force report by the Team Leader followed by further discussions
 5. Adoption of the report and closing of the meeting

C. ACCOUNT OF PROCEEDINGS

Opening statements

6. In his opening address, the Executive Secretary of ECA drew attention to the rapid rate at which the output of metallic minerals was increasing, and to Africa's important share in the reserves of virtually all the vital minerals. However, Africa's role as a producer was obviously much less impressive than its role as a holder of reserves, and its consumption of mineral resources was mainly for primary processing for export to the developed countries.
7. There was general agreement that the metals and engineering industries should play a major role in the integrated socio-economic transformation of African countries. In that connexion he drew attention to ECA Conference of Ministers resolutions 218(X), 256(XII), 267(XII) and 319(XIII), whose provisions was reflected in the Declaration on Industrialization in Africa adopted by the Conference of African Ministers of Industry in 1973, in the agreed conclusions of their fourth and fifth sessions and in the revised framework of principles for implementation of the New Economic Order in Africa, 1976-1981-1986 (E/CN.14/ECO/90/Rev.3).
8. Each and every African country aspired to achieve a better and higher standard of living, social progress, integrated industrialization and self-reliance, but none of those goals could be attained without developing the engineering subsector. As part of its efforts in that direction, the Joint ECA/UNIDO Industry Division had carried out the basic metals and engineering industries development programmes mission between November 1978 and January 1979. A comprehensive report on that mission had been submitted to the experts for their examination, recommendations and suggestions for follow-up. He emphasized, in connexion with the reports, that it would be impossible to implement the various projects recommended in it without more co-operation among African countries.
9. To strengthen the role of the basic metals and engineering industries, there was need to devise prudent, aggressive, effective and comprehensive policies on capital formation, entrepreneurship, incentive schemes and manpower development and to develop national institutions concerned with industrialization; institutions for regional and subregional co-operation, machinery for subregional and regional investments and ECA, UNIDO and OAU Programmes for providing assistance in the development of institutions. At the regional level, ECA was executing agency for the Institute for Higher Technical Training and Research at Nairobi, Kenya, the African Regional Centre for the Transfer of Technology at Dakar, Senegal, the African Regional Centre for Engineering Design and Manufacturing at Ibadan,

Nigeria, the African Industrial Development Fund at ADB, Abidjan, the Ivory Coast and the African Regional Centre for Consulting Engineering and Management. The mission report contained recommendations for the establishment of three more institutions for regional co-operation, the African Centre for Engineering Repair and Maintenance, the African Centre for the Iron and Steel Industry and the African Centre for the Non-ferrous Metals Industry.

10. He advised African States to make sure they were in a position to design and formulate national technology plans since such plans were essential for bringing about the integrated development of engineering industries.

11. Finally, he called upon the experts to study the report in detail and come out with concrete recommendations.

12. The representative of UNIDO, speaking on behalf of the UNIDO Metallurgical Industries Section, welcomed the experts to the meeting. He emphasized the importance of the exploitation of natural resources, both ferrous and non-ferrous, and stressed the importance of developing the basic metals and engineering industries, referring to some of the essential uses to which products from those industries were put.

13. He pointed out that the Lima Declaration contained a recommendation that developing countries should devote particular attention to the development of the basic industries such as the metals and engineering industries. Accordingly, UNIDO had set up a special division covering that sector and had supplied developing countries with technical assistance for carrying out such activities as the holding of symposia, seminars, workshops, consultations and meetings; the conducting of special studies and the collection and dissemination of information on metals and engineering industries. He said his organization's project delivery for Africa amounted to about \$US 5 million and pledged its continued support for the development of basic metals and engineering industries in Africa.

Presentation of country reports by participants, followed by discussions
(agenda item 2)

14. Representatives of Burundi, Ethiopia, Guinea, the Ivory Coast, Liberia, Madagascar, Morocco, Nigeria, Senegal, Sierra Leone, the Sudan, Uganda, the United Republic of Tanzania, Zaire and Zambia outlined the experience of their countries in the process of developing basic metals and engineering industries; they referred to their local potential and to planned and on-going projects undertaken in those industries and drew attention to some of the major constraints on the development of the sector. Most of the countries represented seemed to suffer from the same constraints and the discussion which followed the presentation of the reports centred around such constraints as:

- (a) Lack of foreign exchange;
- (b) Fluctuation of currency in the main countries serving as sources of foreign exchange;
- (c) Absence of specialized institutions or failure to develop such institutions;
- (d) Inadequate infrastructure;

- (e) Limited size of most markets;
- (f) Lack of skilled manpowers in some cases and or inadequate incentive schemes needed to retain skilled manpowers;
- (g) The land-locked or semi-land-locked position of some countries;
- (h) Lack of co-operation at the regional and subregional levels;
- (i) Insufficient financing for pre-investment and investment activities;
- (j) Inadequate supply of energy and power;
- (k) Problems in the acquisition of patents and technology;
- (l) Shortfalls in the collection and dissemination of information and data;
- (m) Inadequate services dealing with standarization and quality control operations.

15. The discussions showed that participants were well aware of the extent to which those constraints were impeding the development of the basic metals and engineering industries. Measures for overcoming the constraints were further discussed under agenda item 3 are embodied in the recommendations contained in part D of this report.

16. The UNCTAD representative drew attention to the important role of international trade in the development of the basic metals and engineering sector.

Presentation of regional report by the Team Leader (agenda item 3)

17. In introducing the regional report of the first ECA/UNIDO Basic Metals and Engineering Industries Development Programme Mission, the leader of the team which carried out the mission described the background to the main objectives of the mission which had visited a cross-section of countries in Africa for the purpose of achieving an overview of the basic metals and engineering sector and holding discussions with the representatives of concerned institutions and organizations about the need for developing an integrated system in the sector.

18. He described the contents of the report, noting that it covered the various subsectors of the metals and engineering industries and the general economic conditions, development plans, GDP, ability to accumulate capital formation and balance-of-payment situation in the countries visited by the mission. The report also included the mission's findings on such factors as growth patterns and employment structure.

(a) Policies and strategies

19. In connexion with policies and strategies for the accelerated development of metals and engineering industries there was a consensus among participants that, in initiating such policies and strategies, Governments would pay serious attention to protection of markets and to capital formation. Agreed conclusions and recommendations on these issues are contained in part D of this report.

(b) Institutional requirements

20. As a guide to the discussion on institutional requirements and entrepreneurship, the team leader presented a chart suggesting which institutions were necessary at the national, multinational and subregional levels to accelerate the development of the basic metals and engineering industries. The chart was examined by participants, and at their suggestion an institute for standards was included at the national and regional levels and institutions such as ARSO, ADB, BADEA and were included at the regional level.

21. In the discussion on investment incentive schemes, attention was focussed on issues such as fiscal measures and the procurement and transport of raw materials.

22. At the end of the discussion on agenda item 3(b), the experts agreed on a number of recommendations, which appear in part D of this report.

(c) Manpower

23. In introducing the discussion on the issue of manpower, the team leader drew attention to those parts of chapters I and II of the Mission Report which dealt with that subject. He also pointed out that page 19 of addendum 2 to the report referred to a programme for management and manpower development for engineering industries and in connexion with annex IV-D some members drew attention to statistical inaccuracies in the annex of the main report which represented an attempt to show how many engineering establishments existed in the countries visited by the mission and how many people were employed in those establishments.

24. Following the above brief discussion, country representatives described the experiences of their countries with regard to training, utilization, placement, and management of technical manpower.

25. On the question of training the following observations were made during discussions:- (a) the academic curriculum and subsequent practical training for technical manpower was inadequate, theoretical and broad, (b) training was not geared to specific roles needed by the industry at different levels of operations, and (c) there was a tendency to train technical manpower in isolation from industry.

26. With regard to the utilization of technical manpower the following observations were made:- (a) there was a general absence of post-qualification training aimed at imparting practical experience and exposure; (b) technical manpower was not given problem-oriented assignments. That was very necessary in order to develop indigenous expertise; (c) there was a general lack of recognition and appreciation for indigenous expertise and skills; and (d) as a sequel to the above, migration of technical manpower and brain-drain had resulted in a very high social cost in terms of considerable investments in training of such manpower.

27. In their discussions on technology the experts covered the following aspects:- (a) selection of technology; (b) acquisition of technology by:- (i) copying processes and designs; (ii) purchasing designs and processes; (iii) direct foreign investments; (c) adaptation.

28. The development of indigenous technology was discussed with reference to the following topics:- (a) research and development; (b) development of indigenous expertise; and (c) indigenous technological institutions.

29. The discussion of selection, acquisition and adaptation of technology emphasized that trained manpower was a prerequisite. Some important considerations in selecting technology in a systematic way included the availability of manpower to receive the technology, capital and raw materials base.

30. The meeting further observed that a large body of technology was openly available without patent protection. But skilled manpower was needed to copy that technology. The meeting further observed that packaged technology could be purchased covering plant, equipment, designs and services for erection, processes and information systems and training services.

31. The meeting stressed the need to identify and recognize indigenous technology, particularly in areas such as artisan, small-scale and medium-scale sectors.

(d) Modalities for co-operation

32. In discussing modalities for co-operation among member States in the implementation of multinational, subregional, regional and intersectoral projects attention was drawn to main difficulties hampering such co-operation, which included:- (a) Differences in social, political systems; (b) Language differences; (c) Absence of suitable institutions; and (d) Inadequate communication facilities and services.

33. A discussion ensued on some of modalities and instruments that could be used to promote and foster co-operation.

34. Financial instruments were given as examples of modalities which had been used successfully in co-operation projects such as those in the ECOWAS market area. The Nigeria/Benin Cement Factory, Guinea/Nigeria iron ore venture, Nigeria/the Niger/Chad river basin project were some of the examples.

35. Other modalities and instruments of co-operation discussed in detail were company law, markets and exchange of information.

36. The meeting felt that there was a need to make a comparative study of company laws of member States in order to identify problem areas and the need for harmonization of such laws.

37. The meeting noted that very little effort had yet been made towards the identification of areas subregional or regional co-operation.

(e) Programme proposals

38. The meeting examined and discussed the ECA/UNIDO work programme outlined on pages 28, 29, 30, 31 and 32 of the report of the first ECA/UNIDO Basic Metals and Engineering Industries Development Programmes Mission Report (M79-3211).

39. The meeting further discussed and examined proposals for the following regional centres:- (a) African centre for Repair and Maintenance; (b) African centre for iron and steel industry; and (c) African centre for non-ferrous metals industry.

40. The consensus of the meeting on the proposed African centre for repair and maintenance was that the concept required reformulation, clearly indicating the objectives and the structure of the centre, full details of its operations and how the centre would be financed.

41. The secretariat was asked to prepare a project document about the proposed centre on repair and maintenance in order to enable member States to consider the proposal in due course.

42. After discussion on the other two centres the meeting agreed that those centres should be merged into one. The scope should cover research and development, and other activities relevant to basic metals industries. Models were suggested such as the Indian National Metallurgical Laboratories, the French IRSID, the Latin American Institute for research and information for iron and steel.

Presentation of the Task Force report (agenda item 4)

43. The Task Force report was presented by the Team Leader. Considerable discussions took place on chapters III and IV covering conclusions, recommendations and work programme. The report was adopted with the following amendments:-

<u>Page</u>	<u>Paragraph</u>	<u>Amendment</u>
22	94 b	Study teams should include at least one African member and African Governments should release the experts when required. <u>1/</u>
22	94 b (i)	For aluminium industry include under pre-feasibility studies "for setting up and domestication of ownership as well as technology"
24	97	There should be close co-ordination with the African Regional Centre for Engineering Design and Manufacturing
25	103 d (i)	Limited number of standardized product and ARSO should be consulted
25	103 d (ii)	This is premature, because of lack of contributory and ancillary industries
27	106 (continued) 3	Reference was made to models based on India, Canada and Ireland
27	106 3 (i)	Include "problems of assuring a market for small scale industry"
27	106 3 (ix)	Include "provision of incentive schemes"
27	106 5 (vii)	Include "establishment of product standards"

1/ This applies to all studies

<u>Page</u>	<u>Paragraph</u>	<u>Amendment</u>
28	106 6 (iii), (iv)	These are again generalized. The skills needs for the sectors require to be defined such as:- <ul style="list-style-type: none"> - industrial management - operations research - structural engineering - production engineering - industrial engineering etc.
28	106 6 (v)	Include "automobile body building"
29	109	Include "at least once a year"
30	111-116	Restructuring of headings is needed
33	125 (ii)	Include "Central Africa"
34	127 1982	(a) Replace "basic metals" by "integrated iron and steel"
36	127 1986	Add "(e) production of electrodes"
37	131	Line 2 replace 4 by 5 to read "Five product lines" and in line 4 add "foundries and machine tools"
39	133	Transfer studies under item 2, meetings to item 1 studies

Adoption of the report and closure of the meeting (agenda item 5)

44. The draft report of the first ECA/UNIDO Meeting of Experts on Basic Metals and Engineering was adopted with the necessary amendments. After the closing remarks by the secretariat, the Chairman of the first ECA/UNIDO Meeting of Experts on Basic Metals and Engineering declared the meeting closed on 9th December at 10 p.m.

D. AGREED CONCLUSIONS AND RECOMMENDATIONS

45. The experts agreed on the following recommendations in respect of follow-up action on the issues discussed under agenda item 3.

1. Policies and strategies to promote the accelerated development of metals and engineering industries

46. The experts recognized that Governments had a vital role to play in the formulation and implementation of policies and strategies for the accelerated

development of the metals and engineering sector. They noted with concern that some Governments were not sufficiently aware of the importance of their role in that regard. In that connexion they recommended that:-

- (a) Governments should draw up social and economic development plans, assign priorities and indicate the allocation of initiatives and determine which areas should be reserved for Government actions; mixed and private ventures in the implementation of programmes;
- (b) Governments should take the initiative in identifying high-priority projects;
- (c) Governments should endeavour to cease the practice of exporting ores and change gradually to a situation where local ores were processed as far as possible before export in order to promote local processing, if necessary, through subregional or regional co-operation;
- (d) In the case of engineering industries producing import substitutes, priority should be given to those which made use of locally available raw materials.

2. Protection of industries

47. Although experts agreed that there was a need to protect industries, they felt that such protection should not be given or used indiscriminately. In that connexion they recommended that:

- (a) Protected industries should have clearly defined objectives which took into account the market growth, skill and manpower development, efficiency in the production process, the quality of product and capability of generating employment;
- (b) Protected industry should aim at viability, otherwise protection would be meaningless;
- (c) Government machinery should be set up to monitor the over-all progress of protected industries;
- (d) Government machinery should be set up to monitor the efficiency of protected industries and the quality of their production with a view to ensuring that the benefits of protection were passed on to the consumer.

3. Capital formation

48. The experts agreed that capital formation was achieved through self-sacrifice at the consumption level and that member States should therefore try to make their consumption proportional to their production. Consumption should be brought to a level which ensured an adequate volume of savings for reinvestment. A reorientation campaign spearheaded by national leaders and policy makers would be needed if those objectives were to be achieved.

49. It was therefore recommended that:-

- (a) Governments should endeavour to reduce their administration costs;
- (b) Before social services were initiated, their cost should be carefully assessed and an effort should be made to ensure the presence of the production capacity needed to support them;
- (c) Schemes to promote private savings in rural and urban areas should be introduced and encouraged with a view to channelling funds for industrial development;
- (d) Leaders and policy makers should spearhead a campaign against a high level of consumption.

4. Institutional requirements and entrepreneurship including incentive schemes

50. The experts observed the absence of certain vital institutional linkages, such as institutions dealing with finance and standards at the national, subregional and regional levels. They also noted certain shortcomings in some of the existing incentive schemes. They agreed to recommend that:-

- (a) Packages of incentives should be designed for industries of different levels and size;
- (b) Land tenure systems should be simplified with a view to making land easily available for industrial development;
- (c) Institutions for mobilizing and channelling resources for industrial development at the national, subregional and regional levels, including national development banks, ADB and BADEA should be restructured, if necessary, to meet existing needs;
- (d) National standards bodies should be set up in each country and be linked to ARSO.

5. Manpower

51. The experts noted with satisfaction that there had been some success in certain areas of training over the past 10 years. However, they expressed concern that training of technical manpower at the professional and middle levels had been too theoretical and general and had failed to relate to specific roles in industry. In that connexion they recommended that:-

- (a) Changes should be introduced in curricula in an attempt to move away from theoretical and general training towards more specific and practical training aimed at producing master-craftsmen and technicians and it should be borne in mind that technical manpower was not usually trained in isolation from industry;
- (b) New graduates from universities should be given orientation to specific jobs and given definite assignments with a view to avoiding the brain drain of technical personnel that had resulted from job dissatisfaction;

- (c) In order to mitigate the adverse effects of manpower migration, Governments should define their priorities and give recognition to competent personnel so that they were remunerated in proportion to their contribution to the wealth of the country.

6. Technology

52. The consensus was that so far technology had not been selected systematically. The experts recognized that trained manpower was a prerequisite to effective selection, acquisition and adaptation of technology. It was therefore recommended that:-

- (a) An effort should be made to formulate specific criteria for selecting technology, such as capital intensity, low labour costs and the availability of local expertise and economical methods of operation;
- (b) African Governments should ensure that proven and well tested technologies were selected and should not allow themselves to be used as testing grounds for new technologies which had not been tested commercially;
- (c) Since trained manpower was a prerequisite to the acquisition of technology, high priority should be given to the provision of training;
- (d) Advantage should be taken of the considerable amount of technology available openly and not protected by patents;
- (e) Provided that trained manpower was available, technology could be purchased in a package consisting of plant and equipment, operating know-how and assistance in services for installing the plant and in bringing information up to date;
- (f) Direct foreign investment could be used as a means of introducing technology where the recipient country possessed sufficient negotiating strength;
- (g) Technologies designed to meet conditions peculiar to the countries where they were developed should always be adapted to meet local conditions, to make use of locally available raw materials and to take account of other factors characteristic of the recipient country;
- (h) Engineers and technicians should determine the availability of indigenous technology, such as that used in the processing of agricultural products, and capture it before it was lost;
- (i) Considering that the only way to build up expertise was to give trained manpower challenging problems to solve; African qualified manpower should be given the necessary opportunity to solve problems;

- (j) African countries should establish and strengthen specialized technological institutions, such as services for trouble-shooting, maintenance, instrumentation and the like.

7. Modalities for co-operation

53. The meeting observed that the need for co-operation was well known. Political differences in the past had led to the collapse of co-operation. With increasing wider perception of national interests there was more hope for a pragmatic approach to co-operation. The meeting agreed that:-

- (a) member States should stress the importance of the linkage between political development and economic development and guard against a narrow definition of national interests in an effort to promote projects at subregional and regional levels;
- (b) whereas co-operation at political level was increasing, there was need to promote co-operation at technical levels;
- (c) the Joint ECA/UNIDO Industry Division should conduct studies with a view to identifying the possibilities of using stock exchanges, where they existed, as a mechanism for financing co-operation projects among member States;
- (d) there was a need for a comparative study of company laws of member States with a view to identifying areas and need for reforms in the interest of co-operation including harmonizing practices and resolving conflicts;
- (e) full use should be made of the possibility of pooling markets with a view to expanding trade across borders;
- (f) exchange of experiences and information at technical levels should be encouraged by member States in forms such as exchange of published information, study tours and meetings, etc;
- (g) use of task forces and specially assembled project groups should be encouraged as a means of pooling expertise and competence as well as promoting subregional and regional co-operation;
- (h) programmes should be developed with the aim of defining product standards at the national and regional levels and, in that connexion ECA should acquaint ARSO with the priority field, in the sector, which would require the elaboration of African regional standards.

8. Priorities set by the experts for the development of basic metal and engineering industries development

(i) Basic metal development

- (a) Concrete indications should be given for possible subregional co-operation in the basic metals sector in the common interest of African

countries with reference to infrastructure, natural and financial resources, social needs, manpower needs, training and management, provision of services, manufacture of capital, goods, etc.;

- (b) The co-operation of the countries with already established steel industries should be sought to provide training schemes including in-plant schemes for all categories of personnel from the countries just starting steel projects (possibly also be within the framework of UNIDO);
- (c) Efforts for co-operation between the neighbouring countries should be promoted with the aim of strengthening economic, financial and other types of collaboration among them in order to establish a unified strategy in the basic metals industries;
- (d) Study tours should be organized to those developing countries that were working through their steel industry development programmes in order to set out the technical and other criteria to be assessed in establishing a steel industry, including the exploitation of ore and coal fields, and working out plans and projects;
- (e) Contacts and co-operation should be maintained between research and development institutes in developing and developed countries, with the latter providing whatever information may be needed from their institutes;
- (f) to achieve rationalization of existing plants, full utilization should be made of existing capacities and upgrading could yield great benefits. That question should be studied by ECA;
- (g) The above projects contained in the mission report M79-3211 on metals and engineering were considered as priorities by the meeting in the order indicated under basic metals industries: paragraph 97 (a) on pages 28 and 29 (ii), xviii, i, iii, ix, and x.

(ii) Engineering industries development

- (a) An integrated sequenced development programme should be formulated for engineering industries;
- (b) Development corporations should be created where such corporations did not already exist;
- (c) Manpower development programme should be implemented for engineering industries development;
- (d) In every African university and technical institutions should introduce courses in industrial engineering;
- (e) In-plant training courses and engineering courses should be organized in selected engineering disciplines;

- (f) Studies should be undertaken immediately at the national and subregional levels for:-
- expansion of existing foundries, forging, heat-treatment, machine shops, coolrooms, etc.
 - identification and manufacture of selected machines/machine tools in existing railway workshops and in large repair and maintenance workshops;
- (g) - incorporation and expansion of industrial estates, expansion of ancillary engineering industries;
- (h) The above projects contained in the mission report M79-3211 on Metals and Engineering were considered as priorities by the meeting in the order indicated under engineering industries paragraph 97 (b) on page 30: i, iv, ix, x, xi, and xiii;
- (i) The following projects were deleted: paragraph 99 (6) page 31 and paragraph 100 (i) on page 32 of the mission report M79-3211.

(iii) Proposed multinational engineering industries projects in the African region

The development of engineering industries based on further transformation and metallic and alloy outputs of the basic metals industries was a real possibility in Africa. Forward integration starting at the metals/engineering interface and ending with diversified finished products could enable the region to be self-sufficient to a large extent. That would inevitably mean organizing regional markets on the basis of viable product groups at subregional level. On that basis the following project was identified:

African Engineering Consultancy Services (for engineering project development, implementation and training) which might eventually form part of the proposed African Centre for Consulting Engineering and Management.

(iv) Role of ECA, UNIDO and OAU in implementation of the programme

The United Nations system had an important role to play in the development of the African region mainly through such agencies as ECA, UNIDO and UNDP. United Nations programmes would need to be co-ordinated with OAU policies and programmes for Africa. In order to provide expertise for the satisfactory development of the basic metals and engineering industries, the following regional institutes are proposed to be set up with ECA/UNIDO assistance.

(a) African centre for repair and maintenance

Experts did not approve the project, but the secretariat was requested to prepare a document outlining the proposed idea and resubmit the document for further consideration.

(b) African centre for metallurgical research

The project was approved by participants and it was recommended that the centre should cover research and development as well bring together the technologies involved. Experts recommended that the Indian model should be studied.

9. Projects recommended by the experts for the development of basic metals and engineering industries(i) Basic Metals Industries Sector

Project identification studies and pre-investment studies were needed in order to collect programming data required for planning the development of basic metals industries at the national, subregional and regional levels. Since all the studies were a means of improving capability and expertise, such studies must include national experts as members of study teams. Experts expressed the view that in future, suitably qualified Africans should take the opportunity to expand their competence.

The meeting agreed that ECA/UNIDO should implement the following projects:

(a) Iron and steel industries: subregional and regional prefeasibility studies covering the expansion of existing plants and establishment of new plant with a view to increasing the iron and steel output of the African region:-

- alloy and special steel plants
- ferro alloy plants
- ancillary industries related to iron and steel industries

(b) indigenization of ownership, as well as technology for:

- aluminium sheet and sections
- aluminium wire products
- aluminium smelters including additional mining and alumina processing
- production of copper, refineries, etc.
- lead, zinc, and tin: study of consumption patterns in the world market including plants for alloying

(ii) Engineering industries sector

On the basis of the foregoing considerations and bearing in mind the over-all objectives of self-reliance and self-sustained growth of African countries, it was suggested that African countries should endeavour:

- to define a policy for the development of engineering industries
- to strengthen their negotiating capacity vis-à-vis the suppliers of foreign technology and production plants

- to overcome the constraints arising out of the small sizes of national markets through multinational and subregional co-operation
- to establish within the various levels of the administration the machinery required for formulating and defining policies

(a) Agricultural equipment and implements

It was recommended that the activity should be co-ordinated with the African Regional Centre for Engineering Design and Manufacturing.

(b) Machine tools

Reference should be made to the two proposed machine tools factories to be set up in Nigeria and Kenya for the manufacture of machine tools under TCDC.

(c) Capital goods for industry

The capacity of the UGMA plant at Lugazi near Kampala, Uganda, was reflected in the national report, where there was the possibility of manufacturing capital goods.

(d) Transport equipment

- In order to develop the sector the varieties of transport equipment manufactured in African region should be reduced and, in that connexion, ARSO should be invited to collaborate fully by elaborating relevant African regional standards.
- Manufacture of internal combustion engine was not a priority until contributory and ancillary industries were developed in the African region

(e) Manufacture of spare parts

(ii) Development of institutions

1. National institutions: the development of national institutions should be as follows:

(a) Planning

- perspective planning for the long-term development of the metals and engineering industry
- short-term targets for each of the industries in the subsector based on resources, internal requirements, import-export etc.
- forward and backward linkages
- infrastructure facilities e.g. power, transport, etc.
- appraisal of specific projects in the large and medium sectors
- monitoring of progress

(b) Implementation

- project identification, prefeasibility and feasibility study for specific projects
- technological negotiations and advisory services
- preparation of project report including process and engineering designs
- tender specifications and procurement of equipment
- construction, equipment installation, testing and commissioning
- marketing
- operation, maintenance and quality control
- management development and management consultancy services

(c) Development of small-scale industries

- product identification and preparation of project reports
- identification of entrepreneurs and development training
- import of machinery and raw materials
- arranging hire-purchase of machinery
- allocation of scarce materials
- development of infrastructures e.g. industrial estates, water, power, etc.
- small-scale industries services
- provision of incentive scheme

(d) Finance

- long-term loans for establishing medium and large industries undertakings for identified projects in the metal and engineering industries
- co-operative banking system for encouraging the formation of and assisting co-operative ventures
- liberal banking facilities for purchasing capital equipment with nominal margin against hypothecation of the same plant and equipment and providing working capital against hypothecation of raw materials, work in progress and finished products, and discounting of bills at liberal rates of interest.

(e) Research and development

- testing of mineral ores and other inputs, metals, and products
- import substitution of materials and development of new local materials
- development of appropriate technologies including setting up of pilot plants

- design and development of machinery, machine tools, etc. and building up of prototypes
- design and development of components and spare parts
- quality testing of products for certification
- establishment of product standards

(f) Training

- intensive education programme, primary, secondary and higher education in arts, science and commerce
- identification of training needs at the engineer, technician and skilled workers levels
- establishing training facilities and institutions of university level for courses on:-
 - (i) industrial management and operational research
 - (ii) structural engineering; bridge construction engineering; road construction engineering; town planning
 - (iii) industrial design
 - (iv) industrial engineering; production engineering, quality control engineering; machine construction engineering
 - (v) mining and geology
 - (vi) metallurgy
 - (vii) agricultural engineering
 - (viii) material science
 - (ix) electrical power supply; electronics
- establishing training facilities and institutions of polytechnic level for courses which include the above disciplines in the broad field of
 - (i) mechanical engineering
 - (ii) electrical engineering
 - (iii) draughtsmanship
- establishing vocational training centres for training in:
 - (i) automobile body building
 - (ii) pattern making
 - (iii) moulding and core making
 - (iv) heat treatment
 - (v) blacksmithy
 - (vi) mechanical fitting

- (vii) electrical fitting
- (viii) machining
- (ix) turning
- (x) sheetmetal work
- (xi) cupola operation
- (xii) non-ferrous melting furnaces
- (xiii) automobile mechanics
- (xiv) welding

(g) Marketing

- Marketing the products of large and medium industries
- Marketing the products of small-scale units and co-operatives
- Canalization of imports
- Exports and export promotion
- After sales-service

2. Multinational and subregional co-operation should be developed through the development of the following institutions:-

- multinational industrial development corporations for promoting large and medium industries of a capital intensive nature
- multinational marketing organizations for common commodities such as metals and ores
- subregional design and R & D centres for technology development and adaptation and standardization and quality certification
- subregional training centres for organizing training in higher level technical skills, productivity improvement and management

3. Regional co-operation

ECA, in co-operation with OAU and UNIDO, was already setting up a number of regional centres. In furtherance of the policies of ECA in setting up those centres, the following activities might be taken up at the regional level:-

- holding conferences, seminars, workshops, etc. on advanced technical topics relevant to the metal and engineering industry
- recruitment of top management personnel from among experts available in Africa

(iv) Modalities for co-operation

- (a) Modalities for co-operation among member States: the meeting recommended that the secretariat should prepare a more definite study on this subject

(b) Modalities for co-operation among developing countries from different regions:-

- within the context of establishing the New International Economic Order, developing countries had repeatedly point out the need for economic and technical co-operation among themselves
- Governments of developing countries, as well as manufacturing associations, labour unions and other institutions related to the engineering industries sector should look for opportunities for co-operation and enter into agreements. It could be mentioned as an example that the Economic Commission for Latin America was currently sponsoring a study tour of the Indian Engineering Manufactures Association to a number of Latin American countries. Such activities could be organized and promoted systematically
- Furthermore, there were several subregional economic integration schemes being implemented in the developing world such as the Andean Group in Latin America, which were particularly relevant for the development of the engineering industries sector. UNIDO and ECA should continue to disseminate information on those schemes, so as to enable African countries to take into account the experience of those co-operative efforts for their own multinational and subregional projects

(c) Multinational corporations:-

- the task of forming multinational corporation was by no means easy, particularly when according to mission observation, intra-subregional co-operation was yet to develop. It would be therefore necessary for the Joint ECA/UNIDO Industry Division to promote the idea within the subregional States by identifying viable common projects and having frequent meetings with the interested member States. In that respect the modalities recommended by the mission report were worth implementing, particularly the existing multinational corporation exploiting iron ore

(d) Priority areas:-

- For the development of basic metal and engineering industry highest priority should be accorded in the setting up of iron and steel plants and the central foundry forge shops. Since the engineering industry was mainly centred round iron and steel products any delay in setting up those units would hamper the progress of the engineering industry. That however should be interlinked with other priority needs in any member States country plan.