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Follow-up Subregional Meeting on the  
Promotion of Intra-African Industrial Co-operation  
within the Framework of the Industrial  
Development Decade for Africa (IDDA)\*

Harare, Zimbabwe, 31 October - 4 November 1988

**SUBREGIONAL CO-OPERATION**  
**IN THE FIELDS OF**  
**INDUSTRIAL TRAINING, CONSULTANCY AND ENTREPRENEURSHIP\*\***

Background document No. 2

Prepared by  
the UNIDO Secretariat

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## INTRODUCTION

1. This paper has been prepared in connection with the follow-up subregional meeting on the promotion of intra-African industrial co-operation within the framework of the Industrial Development Decade for Africa (IDDA) scheduled to be held at Harare (Zimbabwe) from 31 October to 4 November 1988. It represents an effort to reflect the priorities and significance of the industrial support services and institutions necessary for the sustainment and acceleration of industrial development in the subregion. Consideration has been given to the particular stage of development attained by the subregion and the infrastructure developed in the respective countries for such services during the process of industrialization over the past decades.

2. The first chapter gives a brief rationale for the need for industrial support services in the subregion. The second chapter presents an overview of the state of industrial support services in the subregion in respect of industrial training, industrial consultancy and engineering services and industrial entrepreneurship. The third chapter puts forward proposals for the promotion of subregional co-operation in furthering the development and utilization of the above industrial support services.

3. The proposals have been advanced to launch discussions at the meeting, taking into account both the need for co-operation among the countries of the subregion and the potential contribution that some countries of the subregion can make to the industrialization efforts of the other subregions in Africa. It is expected that discussions at the meeting will result in the adoption of recommendations for intensifying co-operation among the countries of the subregion in the areas of industrial training, consultancy and engineering services and industrial entrepreneurship as well as recommendations for appropriate follow-up action by UNIDO and other organizations.

## I. BACKGROUND

### Industrial training, consultancy and engineering services

4. It is increasingly recognized that the pace and direction of industrial growth and innovation as well as of economic and social development are determined by the availability of the right kind of trained manpower - in the right numbers, at the right time, in the right place and with the right balance of technical knowledge and practical skills. The broad range of occupational categories that are essential to industrial development includes managers, scientists, technologists and professional engineers; supervisors, technicians, craftsmen, skilled, semi-skilled and unskilled workers; and support-service personnel trained in a variety of skills (e.g. engineering design, production technology, testing and quality control, materials management and value engineering, research and development, feasibility studies and consultancy).

5. Similarly, there is need for a core of personnel trained in the surveying, exploration, extraction, development and processing of natural raw materials. Equally essential are skills in such fields as economics, accountancy, information science, sociology, marketing and finance. These are needed for industrial consultancy work and for carrying out such functions as financial management, marketing, inventory control and other related services which complement the engineering and technological services required for industrial operations.

6. In order to develop the capabilities required to cover this broad range of occupational categories, effective institutional structures are needed to provide educational, training and research as well as consultancy engineering and other services. Suitable instruments are needed to co-ordinate, implement and monitor the development of those capabilities, as are effective consultations and co-operation between Government, industry and educational and training institutions. All these steps would need to be backed up by financial, material and other support.

#### Industrial entrepreneurship

7. The development of indigenous entrepreneurial capabilities for small- and medium-scale enterprises has long been recognized as an essential element in the accelerated economic development of the African countries. The activities carried out by local entrepreneurs cover a wide spectrum. In most African countries today, they are concentrated in the areas of trade and commerce, construction, transportation, agriculture (co-operatives) and services. An area which has been greatly neglected is the establishment of small- and medium-scale industries. It is thus considered desirable to focus attention on the accelerated development of local entrepreneurial capabilities for small- and medium-scale industries.

8. The effective development and promotion of small- and medium-scale industries in African countries depends upon the development of industrial entrepreneurship. It is now widely recognized that no industrial or economic development plan and no process of industrialization, whether accelerated or otherwise, can be successfully implemented or sustained without a very large number of entrepreneurs. Industrialization depends not merely on the establishment of large-scale basic industries under the aegis of public or joint enterprises, but even more on the availability of a large number of indigenous entrepreneurs operating small- and medium-scale enterprises.

9. The development and promotion of small- and medium-scale industrial entrepreneurship have also suffered from the lack of local capacity to collect and disseminate information on the type of goods that can be produced locally, raw material sources, the technology involved, and marketing and distribution systems. This may be attributed to the absence of suitable financial and incentive schemes and institutional infrastructure, specifically designed to assist small- and medium-scale industrial entrepreneurs and so enable them to take full advantage of new flows of capital, technology and skills that have emerged in the developing countries during recent years.

## II. OVERVIEW OF THE STATE OF INDUSTRIAL SUPPORT SERVICES IN THE SUBREGION

10. Industrial support services play a crucially important role in the identification, preparation, design, implementation, and efficient operation of industrial projects throughout the industrialization process. The development of local capabilities and capacities and industrial institutions for accelerating industrial development has been emphasized in the Lagos Plan of Action for the economic development of Africa and in the programme for the Industrial Development Decade for Africa (IDDA).

11. The lack of adequate capabilities and capacities at all levels from project inception to the operation of industrial plants, ranging from project identification, preparation, design, appraisal, promotion, procurement of equipment, plant and other materials, contract negotiations, to operation and maintenance of industrial plants, has caused considerable wastage and led to the misdirection of scarce financial resources in some countries of the subregion. This has resulted in a high-level of dependence on expensive expatriate services and know-how. Moreover, the lack of information on and knowledge of the natural resources available within the countries themselves, as well as lapses in decision-making in respect of physical and institutional infrastructure, policy framework and associated legal, fiscal, trade, monetary and financial instruments have been among the most serious constraints on industrial development identified in the programme for the Decade and the Lagos Plan of Action.

12. Chapter I of this document gives a general description of the development of the adjunct industrial support services in respect of industrial training, consultancy and engineering services, which encompass a wide spectrum of activities. There is a need to consolidate the diverse programmes already initiated in the subregion in order to improve, expand and diversify the capabilities required for effectively and efficiently undertaking the many highly sophisticated, professional and specialized tasks related to the pre-investment, investment, implementation and operational phases of industrial projects, enterprises and programmes. Similar capabilities are needed to carry out such tasks as project planning, design and execution, including technology selection and acquisition; contract preparation and negotiation; plant design, construction, erection and management; and cost, material, quality and production control.

13. With regard to industrial entrepreneurship that provides the real thrust to dynamic industrial development, it is essential to fill any gaps in the industrial structure of the countries of the subregion related to small- and medium-scale industries. Considering its unique contribution to the industrialization process and particular and socio-economic development in general, the promotion of industrial entrepreneurship deserves special attention in the subregion.

14. It is generally understood that industrial consultancy and engineering services usually account for some 3-5 per cent of the overall cost of a project. Their real significance lies in the fact that they ensure accuracy throughout all stages of a project, in addition to securing major foreign exchange savings. Furthermore, properly trained manpower is the determining factor in the proper design and implementation of projects and the efficient operation of industrial enterprises. It is also an important element in the capital as well as operational costs of industrial enterprises, but any generalization as to its proportion is difficult. The situation in respect of support services in the subregion is briefly described below.

#### Industrial training

15. In Kenya, the Directorate of Industrial Training (DIT), under the Ministry of Technical Training and Applied Technology, is responsible for all industrial training activities. DIT operates all aspects of the Training Levy Fund, to which all employers of at least four workers must contribute according to different scales of assessment. All contributing employers

benefit from the levy through the payment of training expenses of their indentured learners, craft and technician apprentices, management and supervisory staff, as well as employees on skill-upgrading courses. DIT operates four Vocational Training Centres:

Kenya Textile Training Institute in Nairobi  
Kisumu Industrial Training Centre  
National Industrial Vocational Training Centre, Nairobi  
Mombasa Industrial Training Centre

16. The other major institutions providing industrial training in Kenya include:

African Institute for Higher Technical Training and Research (AIHTTR)  
African Regional Standardization Organization (ARSO)  
Eastern and Southern Africa Trade Promotion and Training Centre  
Kenya Polytechnic  
Kenya Institute of Business Training  
Faculty of Engineering, University of Nairobi  
Kenya Industrial Research and Development Institute (KIRDI)

17. In Ethiopia, the Ethiopian Management Institute (EMI), established in March 1985 as an autonomous public organization, provides management training and consulting services to public enterprises in the country. The areas of training include all aspects of management as well as project analysis and management. EMI has also a productivity improvement centre whose main responsibility is to increase productivity in the agriculture, industry, energy and construction sectors through training, research and consultancy. Also being established is the Engineering Design Centre which provides training and extension services to industry in engineering design.

18. In Tanzania, the Tanzania Engineering, Manufacturing and Design Organization (TEMDO) provides training and consultancy services in the design and manufacture of various industrial products. The Eastern and Southern African Management Institute also provides training and consultancy services in industrial management. Other institutions providing industrial training include the Faculty of Engineering, the University of Dar-es-Salaam and the National Textile Corporation.

19. In Uganda, the Management Training and Advisory Centre (MTAC) and the Uganda Polytechnic provide training in management as well as consulting, advisory, research and information services to private and public enterprises in the country. The Directorate of Industrial Training operates an effective system of industrial/vocational training in the country.

20. In Somalia, the Industrial Vocational Training Centre of Mogadiscio provides training in the mechanical, electrical and automotive fields for professional newcomers as well as for employees who want to upgrade their skills. The Centre was established in June 1985 with the assistance of the Federal Republic of Germany. The Somali Institute for Development Administration and Management (SIDAM) organizes training courses in accounting, management, business and Government administration at diploma, bachelor's degree and post-graduate levels. The Dahrar Training and Consulting Company (DATCO) also provides training in a limited number of industrial areas.

21. In Madagascar, the Institut National de Promotion Formation (INPF), established in 1974, provides initial vocational training for young school leavers and skill-upgrading of workers employed in the fields of industrial electricity and refrigeration, general mechanics and maintenance, motors and engines, painting and woodwork. Two other institutions provide management training in Madagascar: the Centre de Formation des Cadres (CFC) and the Institut National des Sciences Comptables et de l'Administration d'Entreprises (INSCAE).

22. In Mauritius, the Regional Sugar Cane Training Centre for Africa, created in 1980 with UNDP assistance, runs four training courses, in both English and French, on sugar manufacture, sugar cane agronomy, analysis of sugar products and chemical control of sugar factories, and sugar engineering. The courses are of three months duration and participants from sugar-producing countries in Africa, Asia and the Middle East have been attending. The John Kennedy Technical Training Centre provides training in all kinds of craftsmanship to young school leavers.

23. In Zambia, the Pan African Institute for Development East and Southern Africa (PAID-ESA) provides training in support of rural development such as training in management, design and administration of projects and programmes as well as training of trainers. In addition, it is also engaged in non-partisan, action-oriented and participatory research as well as consultancy services in support of rural development.

24. In Zimbabwe, the ZISCO Technical Training Centre provides training in various operations relating to iron and steel production; and in Mozambique, the Centro de Fomacao Industrial provides training in a variety of industrial fields.

#### Industrial consultancy and engineering services

25. Although engineering activities have gained momentum in the subregion during the Decade, it is only recently that industrial consultancy and engineering services have become active and autonomous entities in the different industrial branches. A wide variety of industrial consultancy and engineering organizations have been developed, essentially in the private sector. Their combined activities cover the entire project cycle, i.e. from the conceptual stage to the erection, commissioning and operation of the plant, thus constituting an adequate framework for the acquisition of know-how and the development of local expertise. Some of the organizations, especially in Kenya and Zimbabwe, have acquired extensive experience, covering such areas as iron and steel, metallurgy, building materials, manufacturing industries, mining, metal structures, construction and civil engineering works. Some of the organizations have also developed expertise in such branches of industry as food, sugar and cement. They have developed specialized facilities for testing and quality control, research and development and extension services, especially to small- and medium-scale industries. Some of the most important organizations in the subregion that provide industrial consultancy and engineering services are:



A & E Consult (Somalia)  
Afritek Consulting Ltd (Lesotho)  
All Metal Founders (Zimbabwe)  
Arup Zambia Ltd (Zambia)  
Associated Pan African Consultants (Kenya)  
B. Tennet Consulting Engineer (Malawi)  
Baffoe & Associates Ltd (Botswana)  
Conolly (Zimbabwe)  
Consulting Engineers (Abraham P. Waligo) (Uganda)  
Dahrer Training and Consulting Co. (DATCO) (Somalia)  
Deloitte, Haskins & Sells (Zambia)  
East African Engineering Consultants (Kenya)  
Engineering Design Centre (Ethiopia)  
Entreprise d'Etude de Genie Civil DINIKA (Madagascar)  
INCAFEX Consultants Ltd (Uganda)  
Industrial Consultancy Unit (ICU) (Somalia)  
Industrial Projects Service (IPS) (Ethiopia)  
Kaburu Okelo & Partners (Kenya)  
Lesotho Consulting Engineers (Lesotho)  
M & E Consulting Engineer (Swaziland)  
Mauritius Chemical Fertilizers Industry Ltd (Mauritius)  
MB Consulting Ltd (Lesotho)  
Mbega-Melvin Consulting Engineers & Town Planners Ltd (Tanzania)  
Merz & McLellan Consulting Engineers (Zambia)  
Munden & Co. Public Accountants (Zambia)  
Mutiso Menezes International (Kenya)  
Mwema & Associates (Uganda)  
National Consultants Pty Ltd Co. (Ethiopia)  
Nei Cochraine (Zimbabwe)  
NZA Associates (Structural and Civil Engineers) (Botswana)  
Regional Cane Sugar Training Centre for Africa (Mauritius)  
SEREFACO Consultants Ltd (Uganda)  
Shawel Consult International (SCI) (Ethiopia)  
Swaziland Consulting Engineers Inc. (Swaziland)  
Tanzania Industrial Studies & Consulting Organization (TISCO)  
Wanjohi Consulting Engineers (Kenya)  
Watkins Gray Morris International (Architects) (Botswana)  
Z.M.C.K. Consulting Engineers (Zambia)  
ZIMCONSULT (Zimbabwe)

#### Industrial entrepreneurship

26. Although priority has been accorded to the development of small- and medium-scale industrial entrepreneurship by the countries of the region, the results achieved so far are not commensurate with the efforts deployed. Even though credit facilities are available to small entrepreneurs in most of the countries, they are not easily accessible because of the security required of the enterprises which the banking sector considers to be high-risk and low-return undertakings. In existing enterprises there has been stagnation and some failures because the policies, incentives and administrative requirements have not always encouraged small entrepreneurs.

27. Manufacturing has never been a tradition in most of the countries in the subregion. Many indigenous industrial entrepreneurs therefore do not have the required management skills to set up manufacturing enterprises, nor the

technological skills to operate them properly. It is also difficult for small- and medium-scale industrial enterprises to penetrate the local markets which, for years, have been dominated by large units. Further, there is no vertical integration between large and small-scale enterprises. Such a linkage could, through subcontracting, build confidence between them, improve the product quality of small units and create a climate favourable to skill development and technology transfer.

28. The main problems affecting the development of the sector in the subregion include limited authorized capital; lack of trained skills and training facilities; shortage of raw materials (both domestic and imported); spare parts; limited domestic market, due to the low purchasing power of the population; fiscal and monetary policies which are highly discriminatory against private entrepreneurs and inadequate credit facilities; and shortcomings in the institutional framework which could otherwise provide encouragement to private entrepreneurs. The measures taken by some of the countries of the subregion to promote the development of small-scale industrial entrepreneurship are presented below.

29. Since independence in 1963, the Government of Kenya has accorded priority to the development of small- and medium-scale indigenous entrepreneurship, and has set up supporting institutions, such as the Kenya Industrial Estates (KIE) and Small Enterprise Finance Company (SEFCO) to provide assistance to local entrepreneurs. KIE was established in 1967 with the objective of assisting in the promotion, establishment and expansion of small-scale industrial enterprises through the provision of soft loans, equity, technical services, industrial buildings and rural industrial development centres. KIE has 30 stations where it organizes one-week training courses for entrepreneurs in production planning, marketing, procurement, finance and accounting, and general management. Since its creation, KIE has assisted and developed over 1,000 small-scale enterprises and 350 informal sector units.

30. There are over 600 non-profit organizations engaged in small enterprises development programmes in Kenya. However, each organization tends to work in isolation and this has led to appreciable duplication in both operations and delivery mechanisms. There is therefore a need to co-ordinate the activities of non-governmental organizations (NGOs) in this field and an impact study needs to be carried out. Such co-ordination is being reviewed, along with the problems faced by small-scale enterprises in Kenya, by a committee set up under the aegis of a UNDP/ILO project on entrepreneurship and employment creation. A strategy paper is also being prepared on ways and means of improving the climate for small-scale entrepreneurship development.

31. In Ethiopia, assistance is provided to small-scale industries by the Handicrafts and Small-scale Industries Development Agency (HASIDA), established in 1977 as an autonomous agency under the Ministry of Industry. The main objectives of HASIDA are to promote, encourage and co-ordinate the development of handicrafts and small-scale industries in the private and co-operative sector. Through its network of 15 regional offices, HASIDA provides the sector with direct services such as project identification and study, training and demonstration, auditing services and industrial infrastructure. It also assists entrepreneurs in obtaining their raw materials both locally and abroad. Since its creation, HASIDA has benefited from UNDP/UNIDO assistance in the form of experts, equipment and training of its staff. HASIDA has a total staff of 70 professionals.

32. At present, there are some 7,700 small-scale industrial enterprises (including 5,460 flour mills) operating in Ethiopia, concentrating on food-processing activities, textiles, wood and metal-processing activities. They mainly produce a narrow range of basic consumer goods and a very limited range of intermediate goods. This is because the law limits the industrial activities in which private industrial organizations can be engaged to the following activities: production and processing of small-scale goods; medium- and small-scale weaving, knitting, spinning and tailoring; production of wood and wood products; fabrication of metal products; and cottage and handicraft industries. About 95 per cent of these enterprises are owned and managed by individual proprietors - the rest being run on a co-operative basis. They provide employment to some 32,800 persons.

33. In Somalia, there is potential for developing small- and medium-scale enterprises (SME), especially those based on domestic livestock and agricultural resources, with considerable employment creation. However, there is no national programme of assistance to the SMEs nor any clear overall development strategy. The Ministry of Industry and Commerce has a small unit of 10 persons to promote SMEs. This Unit provides advice, evaluates projects and assists the SMEs in obtaining foreign exchange for imports of raw materials. About 300 private industrial enterprises exist in Somalia and the Ministry has promoted about 60 of them.

34. The Somali Development Bank (SDB), established in 1968, provides loans to SMEs for all kinds of projects, up to a ceiling of 70 per cent of the total project costs. Borrowers are required to provide fixed assets as guarantees. Loans are repayable in six monthly instalments, over a maximum period of 20 years, including a grace period of one to two years. SDB provides technical assistance only to customers in financial difficulties and who are unable to repay their loans.

35. In Madagascar, past governmental policies which gave priority to public sector enterprises have tended to discourage private entrepreneurs. However, the Government has, during recent years, adopted a policy of privatizing most loss-making public industrial enterprises and encouraging private enterprises. A new investment code was promulgated in June 1985, which gave generous fiscal concessions to approved SMEs.

36. In 1986, a small- and medium-scale industries cell was established in Madagascar within SERDI (Société d'Etudes et de Realisation pour le Developpement Industriel). The objective of the cell is to provide direct assistance to SMEs through project identification and promotion; technical studies; advice on marketing and export promotion, procurement, packaging, management; on-the-job training; quality control; engineering services; training and the development of the spirit of enterprise. A new UNDP/UNIDO project was approved in September 1987, the main objective of which is to strengthen the capacity of the SME cell of SERDI.

37. The Groupement des Entrepreneurs Malgaches also set up in 1987 a new association (Association pour la Promotion des Entreprises à Madagascar (APEM)) whose objective is to assist entrepreneurs in the creation of new enterprises or in the expansion of existing ones in the industrial, agricultural and artisanal sectors. The assistance provided by APEM to SMEs includes project studies, legal and administrative formalities, location of guarantees and additional financing, etc.

38. In Mauritius, the Government has, since independence in 1968, accorded generous concessions to small- and medium-scale enterprises (SMEs), in view of their role in employment generation, income creation and import substitution. Various schemes of financial assistance have been devised by the Government and are being operated through the Development Bank of Mauritius (DBM). One such scheme is designed to encourage unemployed graduates to start small businesses, with unsecured loans from the DBM. Under another scheme, DBM provides loans to small artisans and craftsmen for the purchase of tools and equipment, which then serve as a collateral for the loan.

39. A new organization, called the Small Industries Development Organization (SIDO), was set up in 1984 within the Ministry of Industry of Mauritius to provide assistance to small enterprises. The functions of SIDO include: policy, planning and co-ordination of all activities relating to small enterprises; project identification and consultancy services; institutional finance, including supply of machinery on a hire-purchase basis; marketing support; export promotion; industrial estates; entrepreneurial development; and procurement and supply of raw materials.

40. An extension service cell is being set up within SIDO, with UNDP/UNIDO assistance, in order to provide guidance, business counselling, and advice on all matters relating to the establishment and planning of small industry units.

41. The University of Mauritius has been running, since mid-1987, a ten-week full-time training course for small entrepreneurs, with financial assistance from the European Development Fund. The lecturers are from the University staff, Government officials and private entrepreneurs. The programme envisages the training of 10 batches of 25 entrepreneurs each.

42. In Uganda, adequate attention does not appear to have been paid to the problems and prospects of small-scale industries in the overall development of the industrial sector. The Ministry of Industry and Technology, which is responsible for developing small-scale industries, has neither the manpower nor facilities to plan and promote small enterprises.

43. A survey of 45 small-scale enterprises in Kampala city and its suburbs was carried out in early 1988. The survey identified the following problems: (i) lack of industrial finance; (ii) inadequate supply of standard raw materials; (iii) inadequate trained manpower for technical, managerial and financial operations; and (iv) use of inappropriate technology.

44. The Uganda Development Bank (UDB) has recently obtained a line of credit of \$6 million from the OPEC Fund for on-lending to small-scale entrepreneurs. The details of UDB assistance to small entrepreneurs are still being finalized. Individual loans for industry will be limited to a maximum of \$100,000 and for agriculture to \$60,000.

45. In Zimbabwe, the Small Enterprises Development Corporation provides advice and support to small- and medium-scale industries and, in Zambia, that function is fulfilled by the Village Industries Services.

### III. PROPOSALS FOR THE PROMOTION OF SUBREGIONAL CO-OPERATION IN THE DEVELOPMENT AND UTILIZATION OF INDUSTRIAL SUPPORT SERVICES

46. Proposals outlined in this chapter have been motivated by the fact that the industrial support services need to be improved in order to: (i) execute the projects currently under negotiation or implementation; (ii) create the specialized support services required in some countries; and (iii) improve a selected number of existing institutions (in addition to those agreed upon at the subregional meeting in Addis Ababa in 1983).

47. A review of the projects proposed in the revised programme reveals the need for support services either at the national or subregional level to cater for such activities as:

- Design of processes and products/components as well as production of tools (e. g. dies, jigs, fixtures and common services such as electroplating and heat treatment);
- Identification, planning and development of a series of support and feeder industries to supply products, components and sub-assemblies;
- Laboratory facilities for testing and analysing various industrial products; and
- Plant maintenance and engineering facilities to support the efficient and smooth operation of the existing industrial enterprises.

48. The experience and expertise in the development of human resources and industrial consultancy and engineering services for industrial development acquired by some countries in the subregion could be usefully shared with others. Selected national institutions could become training centres or centres of excellence within the region or subregion. Consideration should be given to the establishment of appropriate machinery, at the subregional level, for initiating and co-ordinating co-operative activities and taking advantage of intergovernmental organizations already established in the fields of industrial and economic development.

49. A review of the state of industrial support services indicates that most countries of the subregion have developed a number of institutions for industrial training, consultancy and engineering services with respect to heavy industries such as food-processing, iron and steel, engineering, metallurgy, metal industry, electric and electronic industries. Those institutions can provide services to the other countries in the subregion and support the development of similar facilities in those countries, if so needed.

50. Ethiopia, Tanzania, Lesotho, Zambia, Mauritius and Kenya appear to have highly developed and advanced institutions for the development and promotion of small- and medium-scale industries. Here again, some of these institutions could provide services to other countries in the subregion in respect of related projects, or in support of the development of similar institutions, if so needed.

51. In the light of the above, it is considered desirable to formulate a programme promoting greater co-operation between the countries of the subregion in the development and utilization of industrial support services. This will contribute significantly to enhancing subregional self-sufficiency and independence in industrial support services. In this connection, it may be deemed desirable to select some outstanding centres/institutions within the subregion and augment their technical capabilities so as to be able to meet the needs of other countries in the subregion.

#### Industrial training

52. The following institutions may be considered and adopted, within the framework of the subregional programme, as regional training centres or centres of excellence in the respective fields. The list could be reviewed from time to time and expanded when new centres emerge.

(a) Agro- and agro-related industries subsector

Kenya Textile Training Institute (KTTI) (Kenya)  
Regional Sugar Cane Training Centre for Africa (RSCTCA) (Mauritius)  
National Textile Corporation (Tanzania)  
Kenya Textile Training Institute (KTTI) (Kenya)

(b) Metallurgical industries subsector

ZISCO Technical Training Centre (Zimbabwe)

(c) Engineering industries subsector

Faculty of Engineering, University of Dar-es-Salaam (Tanzania)  
Industrial Vocational Training Centre (IVTC) (Somalia)  
Tanzania Engineering, Manufacturing & Design Organization (TEMDO)  
(Tanzania)  
Engineering Design Centre (Ethiopia)

(d) Management Training

Centro de Formacao Industrial (Mozambique)  
Eastern and Southern African Management Institute (ESAMI) (Tanzania)  
Ethiopia Management Institute (EMI) (Ethiopia)  
Management Training and Advisory Centre (MTAC) (Uganda)  
Institut National des Sciences Comptables et de l'Administration  
d'Entreprises (INSCAE) (Madagascar)  
Pan African Institute for Development East and Southern Africa (PAID-ESA)  
(Zambia)

53. An information system on training needs and training facilities should be established as an integral part of the centres of excellence programme so as to provide, on a continuous basis, timely and relevant information on training needs and training opportunities in the countries in the subregion. Subregional networks should be developed, inter alia, to provide channels of communication for professional exchanges, and to establish possibilities for mutual assistance between training institutions and research centres in countries in the subregion.

54. The education and training of middle-management and specialized staff can be organized on a co-operative basis. For example, consideration could be given to joint institutions or teaching and training companies, joint production of teaching/learning materials and equipment, and joint research in industrial teaching and learning processes. A most effective form of co-operation lies in the provision of teachers, instructors, facilities or technical opportunities for training trainers. In this regard, directors of the training centres in the subregion should meet at periodic intervals to exchange experience and harmonize their programmes.

55. The training strategy that UNIDO has drawn up for the subregion provides a good basis on which UNIDO, PTA and SADCC can develop specific training programmes. In those programmes, it would be particularly important to provide training in the evaluation of industrial projects and the preparation of feasibility studies; engineering design; standardization, quality control and maintenance. In this connection, if quality control laboratories and product analysis facilities, together with the standardization of specifications, were to be more widely introduced in the subregion, the competitiveness of subregional goods and commodities would be greatly increased.

56. More comprehensive proposals for accelerating the development of industrial and technological capabilities are contained in two UNIDO documents entitled: "Strengthening the scientific and technological capabilities in African countries for industrial development" (document ODG.3(SPEC.)); and "Development of human resources for industrialization in Africa" (document ODG.4(SPEC.)). Those proposals include the need to select a number of national training centres which could be transformed, with the assistance of UNIDO, into subregional centres.

#### Industrial consultancy and engineering services

57. The low level of industrialization in most of the countries in the subregion calls for significant efforts to be made to increase and diversify industrial consultancy and engineering services throughout the subregion. The design of industrial products, the application of production technology, production and quality control, materials management and value engineering are among the many facets of industrial engineering that are needed in any manufacturing industry. Furthermore, technologies acquired from abroad need to be adapted and improved and traditional technologies generated in local laboratories need to be commercialized. The emergence of new technologies (for example, micro-electronics, genetic engineering and biotechnology and remote sensing), and their possible implications for scientific and technological development in the countries in the subregion need to be exploited.

58. A further critical area relates to the extraction, evaluation and transportation of, as well as trade in, industrial raw materials. These activities may not be regarded as major parts of the process of industrialization. They are nevertheless of fundamental importance, since the range of industrial production depends primarily on the variety of local industrial raw materials available for conversion into industrial products and the degree of mutual complementarity. In addition to engineering capabilities, the above activities also call for competence in such areas as

systems analysis, operations research, design and development, socio-economic cost/benefit analysis, feasibility studies and project reporting.

59. As indicated in chapter II of this paper, some countries of the subregion have developed highly competent industrial consultancy and engineering organizations. It is now necessary to enhance their capabilities so as to enable them to extend their services to other countries in the subregion. This could be achieved through the establishment of a network, a subregional arm of the Federation of African Consultants (FECA), in order to promote greater complementarity among the services they provide. The following industrial consultancy and engineering institutions could constitute the nucleus of that subregional network or arm of FECA, if so desired:

Baffoe & Associates Ltd (Botswana)  
NZA Associates (Structural and Civil Engineers) (Botswana)  
Watkins Gray Morris International (Architects) (Botswana)  
Engineering Design Centre (Ethiopia)  
Industrial Projects Service (IPS) (Ethiopia)  
National Consultants Pty Ltd Co. (Ethiopia)  
Shawel Consult International (SCI) (Ethiopia)  
Associated Pan African Consultants (Kenya)  
East African Engineering Consultants (Kenya)  
Kaburu Okelo & Partners (Kenya)  
Mutiso Menezes International (Kenya)  
Wanjohi Consulting Engineers (Kenya)  
Afritek Consulting Ltd (Lesotho)  
Lesotho Consulting Engineers (Lesotho)  
MB Consulting Ltd (Lesotho)  
Entreprise d'Etude de Genie Civil DINIKA (Madagascar)  
B. Tennet Consulting Engineer (Malawi)  
Mauritius Chemical Fertilizers Industry Ltd (Mauritius)  
M & E Consulting Engineer (Swaziland)  
Regional Cane Sugar Training Centre for Africa (Mauritius)  
Swaziland Consulting Engineers Inc. (Swaziland)  
A & E Consult (Somalia)  
Dahrer Training and Consulting Co. (DATCO) (Somalia)  
Industrial Consultancy Unit (ICU) (Somalia)  
Mbeza-Melvin Consulting Engineers & Town Planners Ltd (Tanzania)  
Tanzania Industrial Studies & Consulting Organization (TISCO)  
Consulting Engineers (Abraham P. Wali, ) (Uganda)  
INCAFEX Consultants Ltd (Uganda)  
Mwema & Associates (Uganda)  
SEREFACO Consultants Ltd (Uganda)  
Arup Zambia Ltd (Zambia)  
Deloitte, Haskins & Sells (Zambia)  
Merz & McLellan Consulting Engineers (Zambia)  
Munden & Co. Public Accountants (Zambia)  
Z.M.C.K. Consulting Engineers (Zambia)  
All Metal Founders (Zimbabwe)  
Conolly (Zimbabwe)  
Nei Cochraine (Zimbabwe)  
ZIMCONSULT (Zimbabwe)



60. In order to support the engineering and consultancy services of the subregion, the agencies in the United Nations system as well as subregional organizations and financial institutions are urged to make greater use of those local services. The potential of such services in the subregion could be further enhanced by supporting subregional organizations such as PTA and SADCC. The work being carried out by UNIDO in linking national data banks should be expanded, and steps need to be taken to set up subcontracting arrangements in the subregion. Furthermore, there is a need for more support in the development of managerial consultancy capabilities of some of the institutions listed in the preceding paragraph. The type of projects currently proposed for inclusion in the revised programme for Eastern and Southern Africa will certainly require an integrated and interdisciplinary approach to industrial consultancy. Therefore, assistance will be needed to increase the awareness of modern management methods which in turn would bring about the output and productivity required in each project. Besides establishing a network, efforts should also be made to encourage co-operation in specific subject areas such as training, research and joint ventures.

#### Industrial entrepreneurship

61. Governments in the subregion need to take action to strengthen existing institutions or establish new institutions for the accelerated development of and support to small- and medium-scale industrial entrepreneurs. The existing institutions include the following:

- Small Enterprises Development Corporation (Zimbabwe)
- Kenya Industrial Estates (KIE)
- Small Enterprise Finance Company (SEFCO) (Kenya)
- Handicrafts and Small-Scale Industries Development Agency (HASIDA) (Ethiopia)
- Société d'Etudes et de Réalisation pour le Développement Industriel (Madagascar)
- Small Enterprises Development Organization (SIDO) (Mauritius)
- Small Enterprises Development Organization (SIDO) (Tanzania)
- Village Industries Services (Zambia)

62. The functions and activities of these institutions could include training, extension services, information, repair and maintenance, production and marketing, consultancy services, project identification and preparation, product and engineering design, technological acquisition and procurement.

63. Strengthening or establishing support institutions to local small- and medium-scale industrial entrepreneurs is an area that lends itself to international co-operation. A most pertinent approach is "institutional linkage" or "twinning arrangements". International organizations such as the UNDP and UNIDO, as well as bilateral programmes, could provide valuable assistance to countries in the subregion, within the framework of Technical Co-operation among Developing Countries (TCDC) and Industrial Co-operation among Developing Countries (ICDC), by identifying reputable institutions within the subregion that could be twinned with institutions in other interested countries.

64. In order to enhance the subregional efforts to develop and promote local small- and medium-scale industrial entrepreneurship, those efforts should be consolidated both at the national and subregional levels. Detailed proposals in this regard are contained in the UNIDO document entitled "Accelerated development of indigenous entrepreneurial capabilities for small- and medium-scale industries in Africa" (document ODG.5(SPEC.)). In addition to the proposals outlined above, benefit could be gained by following up the support projects retained in the revised integrated industrial promotion programme for the subregion (document ID/WG.477/3(SPEC.)) some of which have a direct bearing on industrial entrepreneurship.

65. The area of industrial support services is one in which UNIDO could be of useful assistance to the countries of the subregion. Such assistance might focus on the following priority activities:

- (a) Review of training needs, programmes and facilities;
- (b) Developing comprehensive and fully integrated programmes directed towards the training of technological capabilities, local entrepreneurial capacities and industrial trainers;
- (c) Strengthening and/or establishing multi-purpose training institutions, specialized institutions or centres of excellence, to provide training in specific core industrial subsectors and branches;
- (d) Strengthening training links between universities and industry;
- (e) Establishing "teaching companies", as well as facilities for the local production of textbooks, educational and training videos, kits and manuals;
- (f) Introducing special training programmes for industrial maintenance and rehabilitation, the integration of women in industrialization, and the development and promotion of small-scale industries, especially in rural areas;
- (g) Mobilizing financial resources for industrial training;
- (h) Promoting intra-African co-operation, TCDC and international co-operation in industrial training.

#### IV. CONCLUSION

66. The most important factor input for industrialization in Africa is industrial manpower. The achievement of self-reliant and self-sustaining industrial development as outlined in the programme for the Decade as well as in the various programmes adopted by the United Nations and the OAU depends, to a large extent, on the development of the requisite local industrial capabilities. This, in turn, is contingent upon the pattern of industrial production which determines the number and type of industrial skills required.

67. In view of the present situation in which Governments in the subregion are already allocating large proportions of their budgets to education and training, it is necessary to explore better ways of utilizing those resources so as to produce the right types of skilled personnel needed for the countries' industrialization. Industry also needs to be involved more actively in all forms of training and steps taken to resolve the problems of manpower shortages and imbalances.

68. The analysis undertaken in this paper reveals a firm basis for co-operation that is essential to achieving mutual self-sufficiency and sustainment of growth. This is particularly important, given the complementarity of resources, industrial capacities and capabilities available in the subregion.

69. The basis for co-operation appears to extend beyond this resource and capacity complementarity. It also pertains to the contiguity of the subregion which permits full access to goods and services. Other factors, such as linguistic and cultural similarities, also contribute to a fundamental basis for strengthening and enhancing industrial co-operation, while establishing an independent and autonomous economic subregion.

70. The establishment of special institutions such as centres of excellence, on a multi- or mono-sectoral basis, might be considered in some countries in the subregion. Such institutions could be developed to provide services to other countries in the subregion, and to Africa as a whole.

71. In view of the paramount importance of mobilizing indigenous industrial entrepreneurs, concerted efforts must be made to institutionalize in each country systematic programmes for entrepreneurship development. These should focus on the entrepreneur, the person who catalyses resources and manages risk in the course of establishing a viable, sustainable and employment-generating industrial enterprise.

72. The previous chapters identified specific areas of co-operation that could optimize the utilization of the existing industrial services and promote the development of new institutions where needed. Due account was also taken of the state of industrial support services in the subregion and the thrust required to sustain the dynamics of development. It is expected that the meeting will consider and discuss these ideas at length, whereafter it will put forward recommendations for follow-up action to be taken by the subregional, regional and international organizations/institutions concerned, as well as by the countries themselves.