## OCCASION

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


## DISCLAIMER



## FAIR USE POLICY



## CONTACT

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

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

20831

RESTRICTED

../RAF/93/..
December 1993
ORIGINAL: ENGLISH

INTIB/AFRICA INDUSTRIAL AND TECHNOLOGICAL INFORMATION NETWORK, PHASE I, PREPARATORY WORK

# Assessment report of the national industrial and technological information scene in ten African countries, Egypt Sudan, Kenya, Tanzania, Senegal, Ghana, Nigeria Cameroon, Zambia and Zimbabwe

Prepared by the United Nations Industrial Development Organization

Based on the work of Danielle Wilson
Industrial Information Consultant

Backstopping Officer: S. Y. Bakhait,
Industrial and Technological Information Section

United Nations Industrial Development Organization
Vienna

---

* This document has not been edited

TABLE OF CONTENTS

## EXPLANATORY NOTES

### CURRENCY EXCHANGE RATES

US$ 1 = 3,33 EL (Egyptian Pound)

US$ 1 = 136 SL (Sudanese Pound)

US$ 1 = 73 KSH (Kenyan Shilling)

US$ 1 = 180 TZS (Tanzanian Shilling)

1 FF = 50 FCFA

US$ 1 = 700 C (Ghanaian Cedi)

US$ 1 = 42 N (Nigerian Naira)

US$ 1 = K 392 (Zambian Kwacha)

US$ 1 = Z$ 6.8 (Zimbabwe Dollar)

### ABBREVIATIONS

| | |
|---|---|
| ABS | Agricultural Bank of Sudan |
| ARCEDEM | African Regional Centre for Engineering Design & Manufacturing |
| ARCT | African Regional Centre for Technology |
| ARIPO | African Regional Industrial Property Organization |
| ARSO | African Regional Organization for Standardization |
| ASRT | Academy of Scientific Research and Technology |
| BAD | Banque Africaine de Developpement |
| BSI | British Standards Institute |
| CD-ROM | Compact Disk - Read Only Memory |
| CABI | Commonwealth Agricultural Bureaux International |
| CAEE | Cellule d'Appui a l'Environnement des Entreprises |
| CCID | Chambre de Commerce et d'Industrie de Dakar |
| CEDEAO | Communaute Economique des Etats d'Afrique de l'Ouest |
| CEHA | Centre for Environmental Health Activities |
| CICES | Centre International du Commerce Exterieur du Sénégal |
| CNDT | Comité National de Développement des Technologies |
| CNDST | Centre National de Documentation Scientifique |

| | |
|---|---|
| | et Technique |
| COSTECH | Tanzania Commission for Science and Technology |
| CPE | Centre de Promotion Economique |
| CRAT | Centre Régional Africain de Technologie |
| CSIR | Council of Scientific and Industrial Research |
| CSO | Central Statistical Office |
| CZI | Confederation of Zimbabwe Industries |
| DAPIT | Development and Application of Intermediate Technology |
| DBMS | Data Base Management System |
| DDS | Direction de la Prévision et de la Statistique |
| DIPP | Databank on Investment Promotion Programme |
| ECOWAS | Economic Community of West African States |
| ENSP | Ecole National Supérieure Polytechnique |
| EOS | Egyptian Organization for Standardization and Quality Control |
| EPO | European Patent Office |
| ESAMI | Eastern and Southern Africa Management Institute |
| FIIRO | Federal Institute of Industrial Research Oshodi |
| FRC | Food Research Centre |
| FRI | Food Research Institute |
| GEPC | Ghana Export Promotion Council |
| GIC | Ghana Investment Centre |
| GRATIS | Ghana Regional Appropriate Technology Industrial Service |
| IBDC | Indigenous Business Development Centre |
| ICC | Industrial Information Centre |
| ICDC | Industrial and Commercial Development Corporation |
| ICRAF | International Centre for Research in Agroforestry |
| IDA | Industrial Development Abstracts |
| IDBS | Industrial Development Bank of Sudan |
| IDRC | International Development Research Centre |
| IITA | International Institute of Tropical Agriculture |
| IMS | Information Management System |
| INFOTERRA | International Environmental Information System |
| INTELCAM | Cameroon Telecommunications |
| IPC | Investment Public Corporation |
| IRA | Institut de la Recherche Agronomique |
| IRCC | Industrial Research & Consultancy Centre |
| IRI | Industrial Research Institute |
| IRZV | Institut de la Recherche Zootechnique et Vétérinaire |
| ISN | Institut Sénégalais de Normalisation |
| ISONET | International Standards Organization Network |
| ITA | Institut de Téchnologie Alimentaire |
| ITC | International Trade Centre |
| JKUCAT | Jomo Kenyatta University College of Agriculture and Technology |
| KARI | Kenya Agricultural Research Institute |
| KEBS | Kenya Bureau of Standards |
| KEFRI | Kenya Forestry Research Institute |

| | |
|---|---|
| KEMFRI | Kenya Marine and Fisheries Research Institute |
| KEMRI | Kenya Medical Research Institute |
| KENSIDOC | Kenya National Scientific Information and Documentation Centre |
| KENSTINET | Kenya National Scientific and Technological Information Network |
| KIA | Kenya Institute of Administration |
| KIBMT | Kenya Institute of Business and Management Training |
| KIE | Kenya Industrial Estates Limited |
| KIRDI | Kenya Industrial Research and Development Institute |
| KNLS | Kenya National Library Services |
| KP&TC | Kenya Posts & Telecommunications Corporation |
| LAN | Local Area Network |
| MEMI | Ministère de l'Energie, des Mines et de l'Industrie |
| MEPI | Ministry of Economic Planning and Investment |
| MIEC | Mécanisme d'Information des Entreprises du Cameroun |
| MINDI | Ministère du Développement Industriel et Commercial |
| MODEM | Modulator Demodulator |
| NASENI | National Agency for Science and Engineering Infrastructure |
| NBSSI | National Board for Small-Scale Industries |
| NCSR | National Council for Scientific Research |
| NCST | National Council for Science and Technology |
| NFP | National Focal Point |
| NIDB | Nigerian Industrial Development Bank Limited |
| NIIC | National Industrial Information Centre |
| NITEL | Nigerian Telecommunications PLC |
| OAPI | Organisation Africaine de la Propriété Intellectuelle |
| ODA | Overseas Development Agency |
| OEB | Office Europeen des Brevets |
| ONPI | Office National de la Propriéte Intellectuelle |
| ORSTOM | Organisation pour la Recherche Scientifique et Technique Outre-Mer |
| PADIS | Pan-African Documentation and Information System |
| PORSPI | Policy Research and Strategic Planning Institute |
| PTA | Preferential Trade Area for Eastern and Southern African States |
| RAMSES | Research Access Data Management System for Engineers and Scientists |
| R&D | Research and Development |
| RECIT | Reseau Commerce, Industrie et Technologie |
| RFP | Regional Focal Point |
| RITA | Recherche Internationale sur les Technologies de l'Alimentation |
| RMRDC | Raw Materials Research and Development Council |
| RNIST | Réseau National d'Information Scientifique et |

| | |
|---|---|
| | Technique |
| SADC | Southern Africa Development Corporation |
| SAZ | Standards Association of Zimbabwe |
| SDC | Sudan Development Corporation |
| SDI | Selective Dissemination of Information |
| SIA | Sudanese Chambers of Industries Association |
| SIDO | Small Industries Development Organization |
| SIRDC | Scientific and Industrial Research and Development Centre |
| SITTDEC | South Investment, Trade and Technology Data Exchange Centre |
| SMI | Small and Medium Scale Industry |
| SON | Standards Organization of Nigeria |
| SONATEL | Société Nationale des Télécommunications |
| SONEPI | Société Nationale d'Etudes et de Promotion Industrielle |
| SPIT | Service de la Propriéte Industrielle et de la Technologie |
| STIN | Scientific and Technological Information Network |
| TBS | Tanzania Bureau of Standards |
| TIPS | Technology Information Promotion System |
| TCCIA | Tanzania Chamber of Commerce, Industry and Agriculture |
| TDAU | Technological Development Advisory Unit |
| TIB | Tanzania Investment Bank |
| TIES | Technological Information Exchange System |
| TIMS | Tabbin Institute for Metallurgical Studies |
| TIRDO | Tanzania Industrial Research and Development Organization |
| TISCO | Tanzania Industrial Studies and Consulting Organization |
| TFNC | Tanzania Food and Nutrition Centre |
| TP&TC | Tanzania Post & Telecommunications |
| TSDB | Technology Supply Data Base |
| UNEP | United Nations Environment Programme |
| UTAFITI | Tanzania National Scientific Research Council |
| WAN | Wide Area Network |
| WIPO | World Industrial Intellectual Property Organization |
| ZACCI | Zambia Confederation of Industries and Chambers of Commerce |

## ABSTRACT

Personal author: Danielle Wilson

Corporate author: UNIDO

Title: Assessment report of the national industrial and technological information scene in ten African countries, Egypt, Sudan, Kenya, Tanzania, Senegal, Ghana, Nigeria, Cameroon, Zambia and Zimbabwe

Project title: INTIB/Africa industrial and technological information network, phase I, preparatory work.

This assessment report concerning the industrial and technological information scene in ten African countries, Egypt, Sudan, Kenya, Tanzania, Senegal, Ghana, Nigeria, Cameroon, Zambia and Zimbabwe aims at characterizing the national industrial and technological information panorama in the countries concerned, in order to evaluate the existing situation concerning technological and industrial information facilities, the availability of hardware and software and their compatibility to UNIDO/INTIB systems. The assessment report will provide background information for the preparation of a project document for the second phase of the project INTIB/African Industrial and Technological Information Network.

# INTRODUCTION

This report entitled Assessment report of the national industrial and technological information scene in ten African countries, Egypt, Sudan, Kenya, Tanzania, Senegal, Ghana, Nigeria, Cameroon, Zambia and Zimbabwe has been prepared in the frame of the project INTIB/Africa industrial and technological information network, phase I, preparatory work. It is submitted to the United Nations Industrial Development Organization in compliance with the consultant's terms of reference given as annex 1.

The assessment report is the outcome of a mission in ten African countries which was undertaken by the consultant from 18 June to 5 August and from 15 October to 17 December 1993. It was prepared, in close cooperation with the national consultants, in order to characterize the national industrial and technological scene in the participating countries as well as findings concerning the existing technological and industrial information facilities and availability of hardware/software and their compatibility with UNIDO/INTIB systems and in order to prepare a project document for the possibility of networking among INTIB participants and provide guidance to INTIB National Focal Points for the spread use of industrial and technological information.

# CONCLUSIONS AND RECOMMENDATIONS

## 1. Conclusions and recommendations for Egypt:

Egypt has a good industrial information capacity. It has the potential to develop successfully an integrated national industrial information network, including competent staff, adequate equipment and equipment suppliers and a good telecommunications infrastructure. Although INTIB activities have been reduced these last few years, INTIB National Focal Point, the Industrial Information Centre of the Ministry of Industry, which has been reinforced by a UNDP project, is at present in a position to reactivate and to develop the INTIB system and to manage and coordinate INTIB national network activities. To achieve this, INTIB NFP should develop its capacity as an industrial information service with an efficient enquiry service able to respond to the information needs of the industrial world in Egypt.

## 2. Conclusions and recommendations for Sudan:

Sudan should be given high priority as a Least Developed Country. A number of industrial information services are operational in Sudan. However, they tend to be isolated and there is an urgent need to establish a national industrial network to coordinate the individual efforts. For this purpose, it is essential to reinforce INTIB National Focal Point, the National Industrial Information Centre of the Industrial Research and Consultancy Centre (IRCC), through the provision of more efficient computer equipment but, more urgently still, through training, in particular in the use of INTIB databases, in database design and management using Micro CDS/ISIS and in the management of a dynamic industrial enquiry service. The services offered by NIIC would be more efficient with an extra information specialist.

## 3. Conclusions and recommendations for Kenya:

Kenya has an excellent potential in the way of industrial and technological information. However, although there is a strong support towards resource sharing, the tendency for information services is to operate as single units with little concertation and standardization, which means incompatibility of systems and duplication of efforts. There is a large number of well trained information scientists who have been in the profession for a number of years and who are familiar with computerized systems, in particular with Micro CDS/ISIS, but more need to be trained. Although Kenya has a large computing capacity, there is still an insufficient number of computers made available to information services. Generally speaking, industrial and technological information services should be given a higher priority by

## 6. Conclusions and recommendations for Ghana:

Ghana has a well established national scientific and technical information network GHASTINET coordinated by the Information Centre of the Council of Scientific and Industrial Research (CSIR). A number of computerized industrial and technological information systems are in the process of being established in Ghana. However, in spite of the theoretical existence of GHASTINET sectoral network for industry and technology, little coordination has been established between the institutions involved. Consequently, it is urgent to implement an industrial and technological information network in Ghana in order to overcome the isolation and competition which seem to prevail between some of these institutions and which hamper cooperation and exchange of information. CSIR was designated INTIB NFP in 1986. Although CSIR is the coordinator for multudisciplinary scientific information activities in Ghana, it is still at present the most suited institution to host INTIB NFP and to coordinate INTIB industrial and technological network, in view of the absence of other adequately organized industrial information services. However, CSIR, should play a more active role in the promotion of INTIB activities. Computer training should also be reinforced. However, although advanced techniques such as data exchange and information repackaging are required in Ghana, one should not neglect basic training requirements for industrial information specialists, in particular data processing and database development.

## 7. Conclusions and recommendations for Nigeria:

Nigeria has a great potential for industrial and technological information. However, results have been disappointing and a number of institutions which generate or use valuable information have not yet developed coherent computerized information systems. Those who have reached a high level, including staff training, have a tendency to mistrust each other and, in spite of meetings and agreements in principle, little cooperation has been established. This applies particularly to industrial and technological information for which there is an urgent need to establish a national network as a sound basis to industrial and technological information activities. However, a cooperative effort can only be sustained if managerial and Government commitments are real. Therefore, INTIB National Focal Point, the industrial information centre of the Federal Institute of Industrial Research Oshodi (FIIRO/INDICES) should be encouraged to re-establish the strong industrial information service it used to be with adequate means.

## 8. Conclusions and recommendations for Cameroon:

The overall information infrastructure is not very satisfactory in Cameroon with no national policy and no national

resources and equipment. However, a number of computerized industrial and technological information systems are being established. Although the concept of commercializing information services and products is fully accepted in Zimbabwe, that of resource sharing has not yet been debated. Consequently, future efforts should encourage the improvement of the skills of the information professionals, the development of databases specializing in indigenous materials and technologies and the establishment of a cooperative effort through networking. The Department of Technology located at the Office of the President and Cabinet is INTIB NFP. However, the Department of Technology acts as an advisory body and is not directly involved with the industrial world. Therefore, it may be advisable to transfer INTIB NFP to the newly created Scientific Industrial Research and Development Centre which will be more suited for industrial and technological information activities.

**11. General conclusions and recommendations:**

. Information infrastructure is a key element in strengthening and accelerating the process of industrialization, since information is now recognized as a valuable national resource in any development effort and that the quintessence of technology is information. Information requirements concern technology alternatives and their sources as well as guidelines for appropriate choices. The need for providing appropriate industrial and technological information to end users from the public as well as from the private sector, in particular SMIs, and therefore the need to establish and reinforce systems for data collection and processing through networking, is highly observed. However, a cooperative effort can only be sustained if managerial and Government commitments are real. The importance of industrial and technological information should be enhanced by the formulation of a national policy on industrial and technological information in the participating countries.

. INTIB National Focal Points were established during a series of projects which took place in the frame of project RP/RAF/85/621 aiming at establishing and/or strenghtening linkages between national, sub-regional and regional industrial and technological services in selected African countries. Hardware, software and some INTIB databases were provided by the projects as well as training through regional seminars and UNIDO/INTIB ad-hoc training. However, the results have been somewhat disappointing in the 10 countries under consideration: although INTIB databases have been used by some INTIB NFPs, they seem to have been neglected by the majority and to-day they are seldom used anywhere. This is due to a number of factors: apart from Nigeria who benefitted from UNIDO technical assistance during several months, insufficient support was given to each individual country; the training was mostly provided during regional seminars without follow up at

national level and an insufficient number of staff from INTIB NFPs was trained; the importance of the INTIB system has not been sufficiently emphasized among the participating countries; insufficient encouragement and support were given to NFPs to develop their own information system and few guidelines were provided to them; the data from INTIB databases distributed to INTIB NFPs was not updated and expanded; project resources were spread out too thinly; the situation has changed considerably in some countries where institutions have been reorganized and the staff who had been trained left. Therefore, future efforts should concentrate on reinforcing INTIB NFPs through the provision of adequate training, equipment and guidelines.

. There is a chronic shortage of sufficiently trained staff for the implementation and use of computerized information systems in the majority of the 10 participating countries. This is particular true for INTIB NFPs and nodes. This situation is due to two major factors: firstly, the lack of adequate training in some countries, hence the frequent necessity to send staff abroad for training, and secondly the high turnover of staff. Therefore, there is an urgent need to upgrade INTIB staff skills, particularly in a field which involves the use of advanced technologies. Basic training, such as database development, should not be however underestimated.

. There is a general shortage of computers for the processing and dissemination of industrial and technological information: consequently, the acquisition of up-to-date equipment is necessary to develop performant systems. This applies particularly to INTIB National Focal Points and nodes who need to upgrade their computer facilities and acquire communications equipment and appropriate software in order to host the full range of INTIB databases and of local databases which grew rapidly these last five years and to facilitate data exchange and sharing.

. There is a lack of cooperation between industrial and technological information services. Although most information services belong to Government institutions, they operate as separate entities with no or little coordination, no common standards, no common planning, no common guidelines. Therefore, there is an urgent need to create a cooperation spirit among information officers so that resource sharing is applied to industrial and technological information systems covering all industrial sectors, in particular priority sectors such as agro-industries, and to coordinate industrial information activities at national and sub-regional levels by creating efficient industrial and technological information networks based on modern data transfer technologies in order to share resources available, use them to their full potential, facilitate information exchange, establish common standards, avoid overlap and duplication of work and valorize indigenous data. Although priority should be given to the establishment of a sound national industrial and technological

information network coordinated by INTIB NFPs, the establishment of INTIB sub-regional network should allow to set up a referral system in Africa with exchanges between African countries thus encouraging South-South cooperation. Links with international systems should also be established.

. To achieve the goal of networking, a full consideration of the existing communication infrastructures is needed so as to decide on the appropriate methodological informatics infrastructure to be used in each country. Most of the internationally operating networks are store and forward type employing mainframe computers, requiring dedicated telephone lines or x.25 networks. The cost of mainframe computers and dedicated lines is prohibitive for most African countries. Among the countries covered by the project, only Egypt, Kenya, Senegal and Zimbabwe have adopted the international standard x.25 protocol. Even in these countries, running costs can make network use exceed public telephone services. Other networks have been operating on micro-satellite (e.g. Nairobi Medical School), radio links (Lagos British Council) or both (Dar es Salaam Medical College). The acceptance of these alternate technologies has been hampered by Government sensitivity to them as well as their inability to amass a large user base. As a result, direct dialling using public switched telephone networks is the most viable option for most of the African countries. One network technology which has been used successful over noisy telephone lines is the FIDO communication system which is simple to use, economical and based on dial-up telephone systems and can be recommended.

. Attempts to organize industrial and industrial information networks have been made, in particular in Kenya, Tanzania, Senegal and Cameroon. However, none of them has really taken off and achieved substantial goals. One of the main reasons is the lack of network management skills, in particular, the absence of guidelines from the National Focal Point in order to define clearly the methodology, the standards, the workload of each network member and the procedures for data exchange.

. Although industrial and technological information systems have developed fairly recently with a growing awareness of users' needs, a lot of attention has been given to the supply of services and too little on mobilizing demand. Government institutions have been the great beneficiaries of these services. At present, the tendency in the participating countries, is to privatize public entreprises. The target is therefore to find ways of getting closer to the private sector (manufacturing companies, R&D institutions, banks), in particular to small and medium enterprises, in order to make full use of existing information resources which have been so far grossly under-used. This can be achieved by marketing and promoting INTIB information products and services among potential and existing information users.

. Information generated, published and processed in African countries has always been neglected to the detriment of foreign information, local products being generally distrusted. As a consequence, not only scientists have a tendency to publish abroad, which is a considerable loss for the country itself, but foreign databases and sources of information are favoured. Consequently, promoting industrial information services should start with local products, in order to utilize local resources to their full potential and to value the systems developed in African countries.

. Due to economic contingencies, there is a general problem of funding industrial and technological information activities. This problem concerns mainly purchase and maintenance of equipment, acquisition of new material and renewal of journal subscriptions, production and dissemination of information products, publication of information products, scientific papers and newsletters and telecommunications costs. INTIB industrial and technological information network should therefore identify means of financing information activities, besides the funds allocated to them, by commercializing information products and services.

. Financial contingencies in the public sector due to restructuration has led to drastic cuts in the number of staff and sometimes to reductions of salaries. Consequently, staff motivation has become a major problem, particularly for young staff who are attracted by more lucrative activities. Incentives are necessary to mobilize them. One could imagine a financial incentive scheme, based on the resources generated by information activities.

# I. ACTIVITIES AND OUTPUTS

## A. Characterization of the national industrial and technological information scene in Egypt

National policy on scientific and technological information:

No national policy on scientific information/informatics exists in Egypt. However, Egypt has presented a draft information/informatics policy to the Government for consideration. The creation of the National Informatics Centre may accelerate the issue.

Telecommunications facilities:

Advanced telecommunications facilities are available in Egypt, in particular EGYPTNET and GE-NET (General Electric Network), using private leased telephone lines and the x-25 telecommunications protocol for national and international online telecommunications.

Equipment suppliers:

A large number of computer equipment suppliers, able to supply, install and maintain equipment are available in Cairo at competitive prices and are fairly reliable.

Background to industrial and technological information in Egypt:

The industrial scene in Egypt has been recently modified by the introduction of a new law on the privatization of public companies. Institutions which once belonged to the government now belong to holding companies. This change will have a tremendous impact on services provided by both public and private institutions, in particular on industrial information services: efficiency and viability will become key elements in the way they are managed. Generally speaking, the information infrastructure is Egypt is good: a multidisciplinary National Information Network was created a few years ago to coordinate the activities of major information services in the country. So far, the Industrial Information Centre (IIC) has not been included in the network, although this may be envisaged later.

As far as industrial information is concerned, a number of well established information services are available. Most of these are attached to R&D institutions which belong to the Ministry of Industry. They all have computer facilities and trained staff.

They include:

- Tabbin Institute for Metallurgical Studies*
- The Academy of Scientific Research and Technology*
- The Egyptian Organization for Standardization and Quality Control*
- The Fashion and Design Centre*
- The General Organization for Industry
- KAHA, R&D Centre for the Food Industry
- The Information and Decision Support Centre
- Industrial Unions

Institutions marked with * were visited during the mission

**Tabbin Institute for Metallurgical Studies (TIMS):**

Created in 1968, TIMS is a scientific establishment for continuous engineering education, training, research and industrial consultations. TIMS belongs to the Ministry of Industry. Its has a total of 350 staff. Its main objectives are to prepare specialists from engineering and university graduates to meet requirements of metallurgical, mining, coke and refractory industries as well as energy conservation and industrial pollution; take part in industrial development; carry scientific research; offer technical services and consultations to industrial companies; organize technical meetings; publish scientific works; organize training programmes; implement research conservation projects; carry out surveys and measurements for industrial pollution monitoring and control.

TIMS has an information service, a huge library and a printing unit, with well trained staff. TIMS has a total of 20 computers, some of which are used for the setting up of an information system. A number of databases have been implemented under DBASE, in particular a database for Masters theses and a bibliographic database with 542 entries. A new bibliographic database recording research papers published in TIMS Bulletin is in the process of being implemented.

**Academy of Scientific Research and Technology (ASRT):**

ASRT is a well established research institution which includes the Egyptian Patent Office. The Technical Information Department has a computer section with 10 staff and many computers including a mainframe computer. The Patent Office has a collection of 11 million international patents from 13 countries which includes

18,000 Egyptian patents. The bibliographic record of these patents is stored in a computerized database using STAIRS. A collection of databases on CD-ROM is available. Online searches using international databases are currently performed by the information staff. The Technical Information Department has also a microfilming unit. Small fees are charged to users, mainly manufacturing industries and the university.

**Egyptian Organization for Standardization and Quality Control (EOS):**

The role of EOS is to establish Egyptian standards, based on international standards (products, calibration, system standards). It establishes quality control and conformity marks. It has an information centre, limited to internal users, which is equipped with 3 PCs and an Apple computer with a laser printer. A number of computerized databases cover records of ISO 9000 standards, profiles of Egyptian companies inspected for quality control and conformity, products with quality and conformity marks, a guide for exports, product codes, Egyptian standards, auditing. The database PERINORM is also available on CD-ROM.

**The Fashion and Design Centre:**

The Fashion and Design Centre is a holding company. It has been functioning for two years under government control but is now facing the privatization scheme aiming at profit making. It was set up by a joint UNDP-government project. Its objective is to provide information to the textile industry on latest fashion trends from all over the world to encourage the transfer of fashion trends to the local production; to provide training programmes; to give a direct support to industry through technical assistance, such as consultancy for factory planning, patents, collections. The centre requires information on specifications, regulations and patents in view of exporting textiles. It has several PCs, one for word processing applications and miscellaneous uses and other for design training.

A UNDP project, which was mentioned above, has been initiated in 1990 at IIC with the purpose of creating an industrial information network.

Review of the situation concerning INTIB Industrial and Technological Information Network:

INTIB National Focal Point:

The Industrial Information Centre (IIC), Ministry of Industry, is INTIB National Focal Point. So far, IIC activities have centered on the implementation of a computerized information system and the establishment of ICC as a national focal point. INTIB operations have been reduced these last two years and have finally come to a standstill at the resignation of Dr. Mazhar from the Ministry of Industry.

Staff:

IIC has a total of 17 staff which includes 12 professional staff and 5 support staff. The professional staff includes computer engineers, computer programmers and computer technicians. It does not include industrial information specialists.

Computing equipment:

IIC computing capacity is very large. The operational computer equipment includes:

- 9 PCs (3 ICLs & 3 IBMs with 486 processor and 3 ICLs with 386 processor)
- 1 Minicomputer (HP 3000)
- 1 main frame computer
- 2 HP laser printers, 3 EPSON printers and 3 STAR printers
- 1 scanner

The mini-computer and the scanner are not working satisfactorily.

Software and computer applications:

In-house programmes in COBOL and databases developed under CLIPPER, FOXBASE and DBASE are currently used for statistical and commercial data both on PCs and main frame computers, in particular information on gases companies and commercial applications of their products. Databases under MINISIS (RAMSES) are in the process of being implemented on the minicomputer (in the frame of the UNDP project). However, some problems have occurred and RAMSES is not yet operational.

INTIB databases have not been installed at IIC and the staff has not been genuinely trained to its use and to the use of databases implemented under Micro CDS/ISIS. No database on CD-ROM is available.

Other equipment:

A photocopier is available at IIC.

Information users and information needs:

IIC is not fully established yet as an information supplier. The objective is to serve the private as well as the public sector via INTIB nodes. The information required covers all industrial sectors, particularly food processing, textiles, oils, leather, metals, building materials, which are the major industrial sectors in Egypt. It includes technology, equipment, investment, legislation, standards, patents, trade names, copyright regulations.

Networking:

A LAN has been implemented within IIC using NOVEL to allow data to be downloaded from PCs to the mainframe computer and vice versa.

A UNDP project "Integrated Information Network for Effective Management of R&D Institutional Activities" (DP/EGY/88/031) has been initiated in 1990 at IIC. This project has not yet been fully implemented because of delays due to the introduction of new laws on the privatization of industry. The purpose of the project is to design and establish a nucleus for the integrated information network in order to provide facilities for the management and coordination of R&D Institutes which belong to the Ministry of Industry. The project activities include:

- collection of data from R&D institutes and foreign organizations
- upgrading the main computer unit, storage capacity and memory
- acquiring new equipment and communications software for R&D institutes (partially at the expense of R&D institutes which are now subordinated to holding companies).

By the end of the project, IIC will be reinforced and fully established as a national focal point. The long term plan is to create a national industrial information network to serve activities and objectives of R&D institutions from the public as well as the private industrial sectors serving in priority SMIs and medium size enterprises.

**Proposed development for INTIB network**

At present, IIC, Ministry of Industry, id best suited to remain INTIB NFP in Egypt. However, IIC should fulfill its role of National Focal Point with more conviction and develop an efficient industrial enquiry service aiming at providing information to a wide range of users. Several institutions have been identified as potential INTIB nodes and expressed their desire to cooperate. They

are directly linked to the Ministry of Industry and represent key industrial sectors in Egypt. They have a well established information service and/or computer facilities compatible with INTIB databank. These are: Tabbin Institute for Metallurgical Studies (TIMS), the Academy of Scientific Research and Technology (ASRT), the Egyptian Organization for Standardization and Quality Control (EOS), the Fashion and Design Centre. Although the Fashion and Design Centre has no information facility as such, it has computer facilities and is ready to cooperate. Other institutions, such as the General Organization for Industry (GOFI) and the R&D Centre for the Food Industry (KAHA) may also have the basic requirements to become INTIB nodes. When the UNDP project is fully implemented, it will be necessary to integrate the industrial information network created by the UNDP project to INTIB Industrial and Technological Information Network.

## B. Characterization of the national industrial and technological information scene in Sudan

National policy on scientific and technological information:

Sudan has no national policy on scientific and technological information/informatics.

Telecommunications facilities:

Telecommunications facilities are in the pipeline in view of the privatization plan. However, it may take several years before an efficient telecommunications system is operational. International connections via Egypt may be possible. Dedicated lines are available for national communications.

Equipment suppliers:

There are some equipment suppliers in Khartoum although expensive. However, they may be used for maintenance and technical assistance.

Background to industrial and technological information in Sudan:

A number of information services are available in the public and private sectors. In view of the privatizing programme, public institutions have become or may become private. An informal multidisciplinary information network has been set up by the National Documentation and Information Centre at the National Centre for Research. A National Information Network, coordinated by the recently created National Information Centre at the National Strategic Institute, has been scheduled. It will include information centres from all sectors, in particular IRCC as a National Focal Point for industrial information. The National Information Centre has planned a national information network conference in the near future to discuss networking issues. The role of the National Information Centre is to coordinate network activities and establish policies and standards. It is to provide technical support and training to network members. It is also to set up the National Library whose tasks have been unofficially carried out so far by the National Documentation and Information Centre. As a consequence, the latter will concentrate its activities on academic research and higher education.

An Industrial Information Network has been set up in Sudan by UNIDO, with the Sudanese Industries Association (SIA) as a focal point. NTIC is not part of the network.

Industrial information is available in a number of public and private institutions. However few have an information service as such. Computing facilities vary from one institution to another, but, generally speaking, there is an insufficient number of computers for information purposes and an insufficient number of trained staff to operate them. These institutions include:

- Ministry of Industry and Commerce*
- Sudanese Chambers of Industries Association*
- Food Research Centre*
- National Documentation and Information Centre, National Centre for Research*
- Ministry of Economic Planning and Investment*
- Industrial Development Bank*
- Investment Public Corporation*
- Agricultural Bank of Sudan*
- Bank of Sudan
- Sudan Development Corporation
- Economic and Statistical Department of the Ministry of Agriculture
- Department of Statistics*
- University
- National Energy Administration*
- Geological Research Department
- National Information Centre, Institute of Strategic Studies*

Institutions marked with * were visited during the mission.

**Ministry of Industry and Commerce:**

The Ministry of Industry has no information centre. However, two divisions, the Computer Division and the Statistical Department, have developed computerized statistical systems under LOTUS and EXCEL which include statistics on industrial production and industrial capacity, imports and exports, labor, company profiles. COMFAR is used for industrial project analysis. Statistical data is published every three months. Data on industrial investment is published regularly by the Industrial Planning Division. This information is available to the public and private sectors.

In the frame of the Government restructuration which was announced during the consultant's visit, the Ministry of Commerce, Cooperation and Supply merged with the Ministry of Industry to become the Ministry of Industry and Commerce. Therefore, the Trade Information Centre, which belonged to the Ministry of Commerce, Cooperation and Supply, may be taken over by the Ministry of Industry and develop into an industrial information centre.

**Sudanese Chambers of Industries Associations (SIA):**

SIA is a private institution. It includes the 9 chambers associated to it, i.e. the chambers for the food, chemical, oil & soap, textile, leather, wood processing, iron & steel, engineering and miscellaneous industries. As mentioned earlier, SIA is the focal point of an industrial information network which includes the 9 chambers as nodes. The network became fully operational in 1990. Unfortunately, the two senior staff trained to the use and exploitation of the information system left SIA. Therefore, all information activities have stopped. They include a number of databases under Micro CDS/ISIS, in particular a bibliographic database recording 938 documents and reports from the library (SILIB), a database on SIA members (MEMBER), a survey of the consumption of fuel in the private sector (SIENT), profiles of leading figures in the industrial world in Sudan (VIP), a registry of newsletters received by SIA (SISER) and a database on chemical references (CHEMREF). Although SIA Information Centre is temporarily out of action, it is hoped that new staff will soon be appointed and trained to revive its activities.

**Food Research Centre (FRC):**

The purpose of FRC is to provide research (applied research) and development, extension services and to support food industry, training and advisory services in the field of food science and technology. It has a library which has recently acquired a computer for data collection and processing. It has published a large number of publications and pamphlets. Unfortunately, the yearly publication Sudan Journal of Food Science and Technology has been discontinued for lack of funds. FRC information and documentation services are available to researchers as well as to industrial firms.

**National Documentation and Information Centre, National Centre for Research:**

The National Centre for Research was reorganized in 1991, replacing the National Council for Research. It carries out research specializing in specific fields such as renewable energy, tropical medicine, medicinal plants, environment and radioactivity (agricultural applications). It has a well established and well managed information centre and a library, the National Documentation and Information Centre, which was set up

with the assistance of IDRC in 1988. It has 6 PCs equipped with printers (including 1 laser printer) and a CD-ROM reader. It also has a complete microfilming unit. Four trained professional staff maintain the computer system and carry out information searches using internal databases and databases on CD-ROM. The internal databases include 3 bibliographic databases and 1 full text database implemented under Micro CDS/ISIS: LIBRI databases (1 version in English for literature in the English language and 1 version in Arabic for literature in the Arabic language) which contain the records of scientific documents and papers published in Sudan and papers published abroad on Sudan; a retrospective database for documents published before 1985; NDC database which describes current research in Sudan. LIBRI and NDC databases are used for the publication of two serial publications: Sudan Science Abstracts and the National Register of Current Research. Databases on CD-ROM include INFOTERRA, KIT, AGRICOLA, CIMMYT, CAB, POPLINE, AGRIS, MEDLINE. The National Documentation and Information Centre is the National Focal Point for Infoterra, PADIS, CEHA and INIS.

**Ministry of Economic Planning and Investment (MEPI):**

MEPI has an excellent computer centre with statistical databases implemented under LOTUS 123 and DBASEIV. They include files on Gross Domestic Product (1981-1993), Gross National Product, Strategic 3 year and 10 year plans, development budget for all economic activities (1988-1992), Salvation 4 year programme and project projections (confidential, up to 1996). They publish an annual report. Non-confidential information is available to public and private institutions.

**Industrial Development Bank of Sudan (IDBS):**

IDBS major role is to provide banking and funding services as well as technical services for the establishment of private and public enterprises, in particularly small scale industries, artisans and rural industries. In order to back-up its activities, IDBS has established a comprehensive computerized information system which includes an integrated relational database for industrial information which covers the major industrial sectors in Sudan. They also have a library which is in the process of being computerized.

**Investment Public Corporation (IPC):**

IPC is a public institution involved in investment matters in all economic activities of the country. It is currently assisted by a UNIDO project on industrial investment services. It has a small information service which has started implementing a computerized information system under DBASE using 3 PCs. This includes information on investment projects in Sudan and licenses granted by the government for investment projects.

**Agricultural Bank of Sudan (ABS):**

ABS is part of the Ministry of Agriculture. Its major role is to provide assistance for the financing of the agricultural sector, including agro-industries. It has an important IMS implemented under HARWARD GRAPHICS and LOTUS which includes databases on credit for agricultural projects, ABS banking and training activities and COMFAR for project evaluation. This information is available to the public and the private sectors.

**Department of Statistics:**

Attached to the Prime Minister Office, it is responsible for all national statistics including national accounts, population census, industrial census, trade statistics, national agricultural census, health and development. All statistics are computerized and published.

**National Energy Administration:**

The National Energy Administration is part of the Ministry of Energy and Mining. It has a computerized information system which processes information on energy production and consumption in Sudan, including the industrial sector. Unfortunately, trained computer staff have left and few databases have been updated since 1991.

**National Information Centre, Institute of Strategic Studies:**

The role of the National Information Centre has been described earlier on. It will become the centre of information policies and standards in Sudan.

the frame of a research project.

Software and computer applications:

Samples from INTIB databases are available on 5 1/4" diskettes (IDA, TSDB). COMFAR, ARABWORD and SYMPHONY have been installed on the computer hard disk. A full text database on environmental issues is available under SYMPHONY. Small full text files under ARABWORD were compiled for the investment conference which took place in Khartoum in 1990 and are in the process of being updated. They include data on manufacturing companies in the textile, mining, building materials, food, chemical and services sectors and data on excise duty, on Arab investments in Sudan and on population surveys.

Other equipment:

Binding equipment, photocopying machines, microfilming equipment (not operational: microfilm processor missing), printing equipment including an offset machine, and audiovisual equipment including an automatic translation machine (not operational), are available.

Information users and information needs:

Although NIIC is not utilized to its full potential, it has a fairly large number of users from the public and private sectors, particularly food processing, textiles and leather which are the major industrial sectors in Sudan. They include researchers from IRCC and from other institutions, investors, industrialists, university professors and students. The information required covers major industrial activities, i.e. bibliographic, full text and/or statistical data on technologies, equipment and equipment suppliers, specifications, regulations, licensing, investment opportunities, industrial output, international trade and government policies. There is an urgent need to organize and implement a regular and systematic collection of information locally available from government institutions, banks, trade associations, bi-lateral and international institutions (such as statistical data, annual reports, research papers, conference papers, technical papers, newsletters). IRCC scientific publication Industry and Development was stopped a few years ago due to lack of funds. It is essential to reactivate this publication and to encourage scientific writing and publishing in Sudan.

**Proposed development for INTIB network**

In spite of the difficulties encountered by NIIC (IRCC), it is the most appropriate infrastructure in Sudan to host INTIB NFP. However, an extra staff, specializing in industrial and technological information, is required. NIIC should also play a more active role as INTIB NFP. Several institutions, selected from the list given above, have been identified as possible INTIB nodes and expressed their desire to cooperate. Most of them have the pre-requisites for the successful implementation of INTIB national network, in particular an information centre with a computerized information system compatible with INTIB databank. These are: the Sudanese Chamber of Industries Association, the Food Research Centre, the Industrial Development Bank and the National Documentation and Information Centre and possibly the Ministry of Industry and Commerce. INTIB National Network will be a node of the future National Information Network.

## C. Characterization of the national industrial and technological information scene in Kenya

National policy on scientific and technological information:

Although the document on National Information Policy stresses the absence of a comprehensive information policy in Kenya, it notes that the country "does have several legislations, regulations and guidelines that influence information acquisition, accessibility and dissemination". However, a committee for national informatics policy has recently been set up to make recommendations to the Government.

Telecommunications facilities:

Kenya Post & Telecommunications Cooperation have set up a packet switching system KENPAC using the x.25 protocol. The system is accessible via a MODEM connected to a dedicated telephone line at speeds up to 9600 Baud. Charges are based on a monthly subscription depending on speed, volume of data and time of connection (for international connections). A network focal point is charged the full monthly fee although its nodes can be charged a minimal fee when communicating with focal point via KENPAC. E-mail systems are also available using MODEM communications. The most commonly used in Kenya are GREENET (via the UK) and EASILINK (via the US).

Equipment suppliers:

A large number of computer equipment suppliers, able to supply, install and maintain equipment are available in Nairobi at fairly competitive prices. Maintenance is also available.

Background to industrial and technological information in Kenya:

Kenya has a very good information infrastructure. A number of scientific and technological information services are available mostly in public institutions and universities. Although the Kenya Library Association has set up a Sharing Committee and attempts have been made in the past to organize information networks, no tangible results have been reached so far in the way of resource sharing. However, a multidisciplinary information network, KENSINET, the National Scientific and Technological Information Network, is in the process of being set up by the National Council for Science and Technology, which is the central coordinating information body in Kenya. It will have a number of sectoral networks which will include research institutes, public universities, public libraries and documentation centres, NGO and commercial nets, Government information centres, other tertiary

education colleges.

Although there is still a shortage of adequate computers in information services, most of them are computerized or in the process of being computerized, with some trained staff, in particular to the use of Micro CDS/ISIS. An active ISIS users's group meets regularly to upgrade the members' knowledge of the software. They have organized training seminars with the participation of a UNESCO consultant. An advanced Micro CDS/ISIS training workshop has been planned.

Many scientific and technological information services available in Kenya are relevant to industrial development. In his report Establishment of Industrial and Technological Information Bank (INTIB) National Focal Point in Kenya, published in 1985, Paul Imende, KIRDI Chief Librarian, surveyed existing and potential industrial and technological information services in Kenya. Taking Mr. Imende's survey into account, the information centres most relevant to industrial development were visited by the national and international consultants during the mission. They were as follows:

- Kenya Bureau of Standards
- Jomo Kenyatta University College of Agriculture and Technology
- Utalii College
- Investment Promotion Centre
- United Nations Environment Programme
- College of Agriculture and Veterinary Science, Nairobi University
- Faculty of Commerce, Nairobi University
- Kenya Institute of Administration
- Central Bank
- Industrial and Commercial Development Corporation
- Kenya Polytechnic
- Kenya Agricultural Research Institute
- Kenya Forestry Research Institute
- Kenya Commercial Bank
- Ministry of Commerce and Industry
- Kenya Industrial Estates Limited
- Kenya National Library Services
- National Council for Science and Technology

**Kenya Bureau of Standards (KEBS):**

KEBS Documentation and Information Centre has been developed on the basis of the International Organization for Standardization Information Network (ISONET) which is designed to promote the flow of information on standards and related documentation. They are a node for the African Regional Organization for Standardization (ARSO). The Centre's library collection consists of 1,500 printed

Kenya Standards and 150,000 foreign standards. It is computerized, using a PC, with a database on Kenya standards under Micro CDS/ISIS. Modem communications allow to communicate with ISONET and an E-mail system allows data exchange with ARSO. The centre runs a members subscription scheme which gives access to information services at a discount. Information services are also available to external users, in particular private companies.

**Jomo Kenyatta University College of Agriculture and Technology (JKUCAT):**

JKUCAT Library is an academic library designed to support research in agriculture, science and engineering in the country. It has a large collection of about 27,000 books, 3000 reports/papers and 60 current journals. Computerization of library records has just started using a PC (which is not very reliable) and Micro CDS/ISIS, sponsored by Japanese Cooperation. More computers are expected soon and library staff will undergo further computer training. Library services are available to university staff and students and to external users at the librarian's discretion.

**Kenya Utalii College:**

Kenya Utalii College is a training college for the hotel and tourism industry. It has a library which will expand and will be computerized when it moves to new premises. The chief librarian is computer literate but his staff requires further computer training. Library services are available to college staff and students and are based on a membership basis for external users.

**Investment Promotion Centre (IPC):**

IPC was established to promote investment and render support to investors in the country. IPC library provides information on investment opportunities in the country and all relevant facts related to successful investment in Kenya. The library has a PC where bibliographic databases on library records and consultants reports on the potentialities of the chemical sector in Kenya have been implemented under Micro CDS/ISIS and full text databases on the status of investment projects and investors' profiles have been implemented under DBase. Although the Librarian is well trained and computer literate, she has no qualified staff to assist her.

Information services users are mostly investors and researchers in economics from the public and the private sectors.

**United Nations Environment Programme (UNEP):**

INFOTERRA, the global environment information network, was developed by the United Nations Environment Programme in Nairobi. It collects data from 158 countries on all aspects of environmental issues, including industrial pollution, waste disposal, recycling, water, renewable energy, toxic chemicals. The database is available on CD-ROM.

**College of Agriculture and Veterinary Science, Nairobi University:**

The College library is one of the twelve sub-libraries of the Nairobi University Central Library. It has a large collection of documents on all aspects of agriculture and veterinary science, in particular a collection of FAO documents. The college library has a small capacity computer which is used mostly for word processing. Large capacity PCs are expected soon to computerize the library. The Food Technology and Nutrition Departments have their own libraries with computerized databases using Micro CDS/ISIS. The college library participates in the production of the National Union List of Journals and is a focal point for ICRAF. Library users are mostly university professors and colleges but also outside users, mainly researchers and consultants, who can use the library at the librarian's discretion.

**Faculty of Commerce, Nairobi University:**

The Faculty of Commerce Library has a large number of documents, on commerce, auditing, marketing, accounting, insurance, some of which have been inherited from Kenya Institute of Administration who recently moved to new premises. However, it is not computerized and has few computer literate staff. Some computers are expected from the World Bank. Library users are University staff and students and ex-graduates employed in the public and private sectors.

**Kenya Institute of Administration (KIA):**

KIA trains government personnel mainly in public administration, accounting and management. KIA library is housed in temporary premises. After giving a large part of its collection to the Faculty of Commerce when KIA moved, it is left with a small collection of documents. The library may be reorganized and computerized later this year.

**Kenya Central Bank:**

Kenya Central Bank has a large library which covers information on banking and economics. It holds a collection of government reports, World Bank and IMF reports and subscribes to about 100 journals. The library is not computerized although the purchase of a computer for the library and staff training have been scheduled in this year's budget.

**Industrial and Commercial Development Corporation (ICDC):**

ICDC is a Government institution which was established to organize loan programmes in order to promote the participation of the indigenous Kenyans in the economic development of the country. It has a library specializing in law, accounting and engineering which is available to staff members only. The library has no computer.

**Kenya Polytechnic:**

Kenya Polytechnic trains students at middle management level for the public and the private sectors. It has a well established library with a book stock of 14,000 volumes, a collection of documents on microfilm, a special collection of BSI standards, of official Government publications and publications from international organizations. The library subscribes to 120 journals, some of which are currently indexed. A computer is used for bibliographic data using Micro CDS/ISIS. Library services - loans, inter-library lending, enquiry service, training referral service - are available to the Polytechnic staff and students but also to external users at the Librarian's discretion. The librarian has 2 experienced professional staff and 4 support staff who have been trained to the use of Micro CDS/ISIS. A proposal for setting up an information network for technical training between the national polytechnics, institutes of technology and technical

training institutes has been submitted by the Polytechnic Library to the Ministry of Research, Technical Training and Technology.

**Kenya Agricultural Research Institute (KARI):**

KARI is a parastatal institution which comes under the Ministry of Research, Technical Training and Technology and aims at strengthening the agricultural research system in Kenya. It comprises 15 national research centres, 6 regional centres and 11 subcentres scattered all over the country. KARI Central Library was created 1948. It covers comprehensively all aspects of agriculture including agro-processing. It is the depository centre for CABI Abstracting Journals. It holds a collection of 25,000 books, a collection of thesis and dissertations and a collection of reprints of journal articles from KARI scientists. It currently receives 200 journals acquired by donation or exchange. Although the Librarian attended computer training at ICRAF, the central library has no computer yet, although a project proposal has been submitted to ODA. However, a computerized information centre was recently set up at KARI Headquarters in town. It has started implementing a bibliographic database under Micro CDS/ISIS, KARD, using material available at the central library.

**Kenya Forestry Research Institute (KEFRI):**

KEFRI used to be part of KARI. The are now autonomous and have their own library which is not computerized. The construction of a new information and documentation centre project, sponsored by the Japanese Government, is due to start in September 93.

**Kenya Commercial Bank:**

Kenya Commercial Bank is a Government institution. The Head Office Library is an internal library available to the bank staff. A branch library is available at Kenya Commercial Bank Training Institute. The main library, which is not computerized, has a small collection of monographs on banking, government publications, Intelligence Economic Unit country reports, World Bank and IMF publications. It currently subscribes to 18 foreign journals and to local daily newspapers.

**Ministry of Commerce and Industry:**

The Ministry of Commerce and the Ministry of Industry used to be two separate ministries. They have now merged and, as a consequence, have two major libraries: a library on commerce at the Department of External Trade and a library on industry at the Department of Industry. Hopefully, the two libraries will merge and become one single information centre.

The trade library was set up in 1976 with ITC assistance. It collects and processes data from trade development bodies in Kenya and abroad and disseminates information to businessmen. It has implemented a database on products and equipment available in the PTA region covering 19 countries from Eastern and Southern Africa, and a database set up by a UNDP project on procurement sources of goods and services in Kenya. It currently publishes Kenya Export Directory (annual publication), TELEX KETA (a weekly publication on opportunities on external trade in Kenya). They published Kenya Export News until 1992 but have stopped it due to lack of funds.

The industrial library is a well established library with a unique collection of documents covering all aspects of industry which includes textbooks, documents from UNIDO and other UN bodies (the library is UNIDO official depository), Government department and corporation publications, research reports and feasibility studies from the Department of Industry, press cuttings on subjects relating to industrial development, some Kenya industrial standards and (donated) journals. No publications are produced due to lack of funds. The library has no computer and its 2 professional staff need to be trained to the use of computers. However, a project to set up a computerized information service is being examined by the Government for submission to UNIDO.

**Kenya Industrial Estates Limited (KIE):**

KIE is a government institution with a widespread network of regional offices, rural development centres and industrial promotion areas. KIE's objective is to promote and develop small scale and informal sector entreprises through the provision of credits to small scale industrial projects, the provision of business and technical services, the development of physical infrastructure including industrial sheds for sale and letting. It has a library, which was set up two years ago, with a small collection of documents related to small scale industries.

**Kenya National Library Services (KNLS):**

KNLS was created by an act of Parliament with the assistance of a UNESCO project. It is the legal depository library in Kenya and is in charge of allocating ISBN numbers. It is the major reference library in the country. It is the legal depository of World Bank documents. It has a network of 17 public libraries in the country and 7 mobile libraries for the rural areas. It also offers a school library advisory service. It has 1 computer and was the first library to use ISIS. As a consequence, the Director coordinates ISIS activities in Kenya, including users training. The National Library is the main advising body to the Government on information and documentation issues. It is a member of the national commission for UNESCO.

**National Council for Science and Technology (NCST):**

NCST is responsible, among other things, for information policies, as per the priorities of the National Development Plan. Up to now, information policies have applied to sub-sectors of science and technology in Kenya. A global approach has recently been adopted and a team is currently working on a draft proposal for a national informatics policy, in order to set up standards and establish a coordinating mechanism.

Review of the situation concerning INTIB Industrial and Technological Information Network:

**INTIB National Focal Point:**

Kenya Industrial Research and Development Centre (KIRDI) Information Centre is INTIB National Focal Point. KIRDI is a body corporate under the Ministry of Research, Science and Technology established in 1979 as a multidisciplinary institution to conduct research and development in industrial and allied technologies, including engineering, commodity technologies, mining and power resources development.

KIRDI has two libraries: the main library is situated in the administration building on the old premises; the branch library is on the new premises and contains material on engineering. The Information Centre is located in the new premises where the administration and main library will be transferred later. The Information Centre has been operational for the last 2 years.

KIRDI Information Centre has started implementing a number of activities, in particular computerized databases and training.

Earlier this year, they organized a training seminar for information centres in Kenya on BASIC programming, sponsored by the Japanese Government, which was attended by 40 computer specialists, with the participation of 7 international trainers. A training workshop on data exchange among small scale industries took place in Mombasa in 1992.

KIRDI Information Centre currently benefits from an IDRC project aiming at upgrading KIRDI industrial information services, in particular collecting and processing data from small and medium enterprises and disseminating industrial information to the industrial world. KIRDI is also the national focal point for RITA, or Reseau Regional d'Information en Technologies Alimentaires sponsored by ARCT, with telecommunications links between the 5 participating countries, i.e. Senegal, Kenya, Morocco, Cameroon, Nigeria.

KIRDI became INTIB National Focal Point in 1988. At present INTIB activities are reduced from the fact that the Information Centre does not have any INTIB databases and that the member of staff who was trained to their use have left. Apart from this short training, no specific assistance was given from UNIDO, in spite of a project proposal prepared by Mr. Imende in 1985 (op cit.). Mr. Imende attended INTIB regional meeting in Dakar but since 1990, little communication has been established between Nairobi and Dakar.

Staff:

KIRDI Information Centre and libraries have well trained staff which includes 2 professional staff, 4 computer operators and 6 library assistants. The Chief Librarian and the Information Officer are very experienced and have a university degree in Information Science, the latter from Leeds University (UK). They have recently benefitted from training programmes abroad, financed by the IDRC project: the Chief Librarian underwent training for project leaders in Denmark, the Information Specialist followed a 3 month course in Bangkok on networking and telecommunications. One operator was sent to Botswana for a course on Micro CDS/ISIS and desktop publishing, 2 operators were sent to ESAMI in Tanzania for DBMS and ISIS and 1 operator was locally trained. In spite of the high level of its staff, KIRDI Information Centre still needs 1 extra librarian for abstracting.

Computing equipment:

A micro-computer, (486 processor, 100 Mb hard disk and 2 disk drives) donated by ARCT for both the RITA project and INTIB, is available in the administration building with a MODEM which gives access to the E-Mail system, GREENET. The Information Centre has 4 operational

computers, although only 1 of them has a large capacity hard disk and memory. The computer given by the INTIB project has no hard disk. A laser printer and 2 standard printers are available. A number of small computers were donated by the Japanese Government for the BASIC programming training seminar. Unfortunately, they cannot be used for DBMS purposes.

Software and computer applications:

DBase, Micro CDS/ISIS 2.3, Pagemaker and Word Perfect 5.1 are available. Two databases have been implemented under Micro CDS/ISIS: KIDOS, a bibliographic database with 1523 library records, including books and research papers, and KEIN, a company profile database with 2589 records of manufacturing companies in Kenya from the public and the private sectors, searchable on the industrial sectors, geographic areas and products. A directory of machinery supplied in Kenya is being prepared. A database on tools produced by KIRDI have been implemented under DBase. Also, DIPP, the UNIDO databank on investment promotion programme, includes Kenya projects from 14 industrial centres to be promoted outside the country. Further bibliographic databases on seminar papers, consultant reports and indexed journal articles have been planned.

Other equipment:

No other equipment is available. However, a car was purchased by the IDRC project.

Information users and information needs:

KIRDI information existing and potential users are primarily KIRDI research staff. They also include staff from other research institutes, government decision makers, small and medium sale industries, consulting engineering companies, development banks, and private individuals (as identified in P. Imende's report). Information needs include technical data on: raw materials, finished products and inputs/outputs; know-how; production; raw materials; equipment; skills (experts and training); prices and costs; marketing, storage, transportation and distribution; standards; quality control and evaluation; current research.

**Proposed development for INTIB Network**

Although KIRDI has not ben sufficiently active at using and promoting INTIB databases, it has a good infrastructure to fully implement INTIB network and coordinate INTIB activities as INTIB NFP. Several institutions, selected from the institutions visited during the mission, have been identified as possible INTIB nodes and expressed their desire to cooperate. Apart from the Ministry of Commerce and Industry who are not computerized, they all have the pre-requisites for the successful implementation of INTIB national network, in particular an information centre with a computerized information system compatible with INTIB databank. These are: Ministry of Commerce and Industry, Kenya Bureau of Standards, Jomo Kenyatta University College of Agriculture and Technology, Investment Promotion Centre, Nairobi University College of Agriculture and Veterinary Science, Kenya Agricultural Research Institute, and possibly Utalii College and Kenya Polytechnic. INTIB network will be a sectoral network of KENSTINET.

## D. Characterization of the national industrial and technological information scene in Tanzania

National policy on scientific and technological information:

There is no national policy on scientific and technological information/informatics although the Government's National Science and Technology Policy stated in 1985 that "the provision of up-to-date and efficient scientific and technological information systems including libraries, documentation centres and computer systems shall be recognized as vital tools and components in strengthening the nation's scientific and technological capacity". A task Force has recently been established in order to make recommendations to the Government for the establishment of a global informatics policy in Tanzania.

Telecommunications facilities:

Tanzania Post and Telecommunications Corporation does not operate a data Packet Switching System. There are some plans to implement a system, possibly through the private company INMARSAT via the Indian Ocean Satellite. International communications are more feasible at present than national communications in view of the absence of PSS and the poor quality of internal lines. However, for international communications, it is possible either to use leased lines to Europe or to access the Kenyan Packet Switching System (KENPAC) or the South African Packet Switching System using call-up telephone lines up to Nairobi or to Johannesburg. The private telecommunications company SITA (Societe Internationale de Telecommunications Aeronautiques), which interconnects airline offices in and outside the country, also hires some of its lines to external users. The Medical College is experimenting the use of SATELIFE, a private local satellite system which allows it to access the private satellite POLAR ORBITING which they reach using VHF radio frequency. E-mail systems are accessible via the international gateway.

Equipment suppliers:

Computers dealers have recently flourished on the Dar es Salaam market place. However, although they sell computers at competitive prices, which they import directly from Europe or via Nairobi or Zanzibar, computer dealers do not seem to have adequate technical staff to provide satisfactory technical assistance and maintenance.

Background to industrial and technological information in Tanzania:

A number of libraries and/or information services are available in Tanzania, mostly in the public sector. Their size, up-to-dateness and computer capacity vary considerably from one institution to the other. Generally speaking, the computer capacity of libraries and information services and the computer literacy of their staff is insufficient and, apart from selected institutions, little priority has been given to the establishment of reliable information systems, although there is a growing awareness of the needs. Furthermore, there is no centralized scientific and technological information system in the country. Efforts are, however, underway to establish a National Scientific and Technological Information Network (STIN) between national R&D institutions under the supervision of Tanzania Commission for Science and Technology (COSTECH). Other networking projects are also in the pipeline such as TINET and TANZANET, the regional trade information networks by the Board of External Trade, the Business Information Network by Tanzania Chamber of Commerce, Industry and Agriculture, the regional medical information network by the Medical College.

Industrial information is scattered among government departments, research, financial, trade institutions and university colleges. They cover information on Tanzania main industrial sectors, which include mining, textiles, leather, wood processing, metal and non-metal products and food processing. A Directory of Technical Information Resources in Tanzania was published jointly by TIRDO, SIDO, UTAFITI (now COSTECH) and TISCO in 1983. Although some of the data is out of date, it gives some background information on scientific and industrial information in Tanzania. Among the institutions identified as potential industrial information sources and/or potential nodes to the national industrial information network, the following were visited during the mission:

- Information and Documentation, Tanzania Commission for Science and Technology
- Institute of Production Innovation, University of Dar es Salaam
- University Library, University of Dar es Salaam
- Board of External Trade
- Tanzania Investment Bank
- Tanzania Chamber of Commerce, Industry and Agriculture
- Investment Promotion Centre
- Small Industries Development Organization
- Ministry of Industries and Trade
- Bureau of Statistics, Industrial Section
- Tanzania Industrial Studies and Consulting Organization
- Tanzania Bureau of Standards
- Tanzania Food and Nutrition Centre

**Information and Documentation, Tanzania Commission for Science and Technology (COSTECH):**

COSTECH's mission is to promote science and technology in Tanzania and advise the Government on matters relating to science and technology. COSTECH Information and Documentation division have started establishing a computerized information system which includes databases on research projects in Tanzania (researchers' profiles, research institutions and project profiles) and a bibliographic database under Micro CDS/ISIS which includes 4000 library references. Other databases such as local and imported technologies and availability of scientific equipment have been planned. COSTECH have recently taken a number of initiatives concerning information exchange: not only are they currently seeking to establish a national information network for science and technology but they are also experimenting a new E-mail system which aims at allowing R&D institutions and individual researchers in Tanzania to communicate between themselves, using dial-up telephone lines.

**Institute of Production Innovation (IPI), University of Dar es Salaam:**

IPI is an applied engineering research and development organization whose objectives are to contribute to the development of a viable industrial sector through the improvement and utilization of existent know-how and adapted technologies, with main emphasis on agro-processing, transport and energy, and to help coordinate the education offered by the University of Dar es Salaam Faculty of Engineering with the needs of industry. IPI has a library and documentation centre which they are planning to computerize when the computer project is approved by international donors.

**University Library, University of Dar es Salaam:**

The University Library is the only reference and research library in Tanzania. It has large collection of documents going back to 1960s which includes a collection of 500 current journals and the Africana Collection, a collection of papers by Tanzanians. Although the bulk of users are university professors and students, the library is also used by industrialists, economists and consultants from the public and the private sectors. The library is computerized with 4 PCs using Micro CDS/ISIS.

**Board of External Trade:**

The Board of External Trade is a member of TINET, the trade information network, set up by the Regional Trade Information Centre within the PTA region. In view of the absence of a data Packet Switching System in Tanzania, data exchange is currently based on the exchange of diskettes between network members. A current ITC project is planning to establish international data exchange, possibly via KENPAC, the Kenya Packet Switching System. At present, TINET has implemented 3 databases on import/export entreprises, import/export statistics and Trade Control Measures. There is some plan to computerize the library using Micro CDS/ISIS. TANZANET network is also planned in order to establish data communications between the offices of Dar es Salaam, Zanzibar and London.

**Tanzania Investment Bank (TIB):**

The objectives of TIB are to make finance available and to provide technical assistance for the development of the industrial sector in Tanzania. It has a library for internal use only which is not computerized.

**Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA):**

A UNDP project is currently aiming at strengthening TCCIA, in particular at setting up a computerized trade information service. An international consultant is in the process of establishing the service which includes a well stocked library and databases implemented under CLIPPERS, in particular a database on business contacts in Tanzania, a trade enquiry database, a database on British importers, a database on country information worldwide and a database on World Bank Tables. Two bibliographic databases, one for library records, another one for journal articles, have been started using Micro CDS/ISIS. TCCIA Newsletter is published every two months. Other publications such as a business directory have been scheduled. A Business Information Network which will include regional chambers of commerce and TCCIA business and government partners is also planned. At present, the international consultant is working alone. It is hoped that a national counterpart will be appointed before the end of the project (end of 1993).

**Investment Promotion Centre:**

The Investment Promotion Centre has no information service/library although they are thinking of establishing one. They are currently implementing a database on investment projects and are hoping to collect UNIDO feasibility studies on Tanzania.

**Small Industries Development Organization (SIDO):**

SIDO is responsible for the promotion, planning and extensions activities of small industries in Tanzania, offering technical, economic and business advisory services to both existing and prospective small industries. Its activities are coordinated by 20 regional offices. SIDO has a small library but no information service although the recent acquisition of a computer will allow to computerize some of the technical data, in particular adapted technologies and small scale equipment. SIDO produces publications including a quarterly newsletter, Small News. However, no staff is available for information collecting and processing and/or library.

**Ministry of Industries and Trade:**

The Ministry of Industries and Trade has a small librarian but no trained librarian. It has no information service and data on industrial production and infrastructure is collected and processed manually by a senior economist and his team, from which a quarterly report is issued and submitted to policy makers.

**Bureau of Statistics, Industrial Section:**

The industrial Section of the Bureau of Statistics is part of the national statistical programme. It is responsible for the collection, processing and dissemination of statistics on the performance of the industrial sector in order to publish the annual and the quarterly surveys of industrial production and the industrial census. These publications are available for sale and distributed to regular users such as the Bank of Tanzania, the Ministry of Industries and Trade and various public institutions. The industrial section of the Statistics Bureau is at present fully computerized.

**Tanzania Industrial Studies and Consulting Organization (TISCO):**

TISCO, a parastatal institution under the Ministry of Industries and Trade, is a multi-disciplinary consulting organization specializing in the development of industries, the promotion of modern technologies and management. It has a library, for internal use, which has been unable to acquire new materials since 1989 due to lack of funds. Computers are available at TISCO for consulting activities but the library has been excluded from computer use although the information officer has attended a training course on DBMS. TISCO published a directory on manufacturing industries years ago but has not been able to update it.

**Tanzania Bureau of Standards (TBS):**

TBS is a member of ISO. A Swedish project, which has just come to an end, has allowed TBS to establish a well stocked library with a collection of ISO standards and standards from many English speaking countries. It is the depository of Tanzanian standards. The library is not computerized. It receives newsletters and catalogues of standards from ISO members. TBS Mechanical Engineering Section has access to PACKDATA database, an ITC database on packaging, and has developed a Field Station Packaging Information database, in which they process information locally available on packaging. TBS information services are used by industries, researchers and various government institutions. They are planning to introduce subscription fees.

**Tanzania Food and Nutrition Centre (TFNC):**

TFNC is a Government institution under the Ministry of Health charged with the responsibility of spearheading food and nutrition activities in Tanzania. The Food Science Technology Department in Mikocheni is involved in the development of nutritional products in the country. TFNC library has a well established library with a collection of documents which includes TFNC reports, technical and reference documents and 10 current journal titles. The library has acquired a PC and is using Micro CDS/ISIS for bibliographic entries. It is used mostly by TFNC staff and by Government institutions.

Review of the situation concerning INTIB Industrial and Technological Information Network:

**INTIB National Focal Point:**

The Industrial Information Centre of Tanzania Industrial Research and Development Organization (TIRDO) is INTIB National Focal Point. TIRDO is a parastatal organization which was created in 1979. It is mainly involved in carrying out industrial research for the purpose of developing products and processes suitable for the Tanzanian industrial environment. TIRDO Industrial Information Centre has been running for years by competent staff. It enjoys a library with technical and reference books, reports, journals, machinery and equipment catalogues and suppliers directory. It has established an industrial enquiry service related to industrial and technical matters. It is responsible for publications, in particular the two-monthly publication of TIRDO Newsletter.

TIRDO became INTIB National Focal Point in 1986. INTIB activities have been restricted to non computerized activities. This is due to the fact that the computer scheduled by INTIB project never reached TIRDO. However, TIRDO Industrial Information Centre acquired a PC in March 1993 through another project. As a consequence, the computer training received during the regional seminars in Vienna, Dakar, Nairobi and Rabat by the Head of the Industrial Information Centre never came to fruition since she did not have computer facilities in her centre at that time and none of INTIB databases could be installed and used. However, information material provided by UNIDO and UNIDO Industrial Information Services have been used successfully. Furthermore, TIRDO participates actively to TECHMART activities.

TIRDO Industrial Information Centre currently benefits from a 3 year IDRC project aiming at computerizing and strengthening the industrial information and extensions service.

Staff:

TIRDO Industrial Information Centre has a total of 8 staff: 4 professional and 4 support staff who have had some training in the use of computers. One of the senior staff is a computer programmer. Training on Micro CDS/ISIS is to be provided by a national computer expert. One staff member has been trained to the use of PAGEMAKER. The IDRC project has financed training on IMS at ESAMI in Arusha and UNDP financed some training at ARCT in Dakar for two professional staff.? and is planning to have another member of staff trained on information repackaging.

Computing equipment:

TIRDO Industrial Information Centre have just acquired a 486 processor IBM PC with an Epson LQ 2550 printer and a CD ROM reader which has not been installed yet.

Software and computer applications:

The Centre has just started computerization. Micro CDS/ISIS 2.3, DBASE, WORDPERFECT and PAGEMAKER are available. They have not yet started implementing databases although they intend starting a bibliographic database, a database on Tanzanian technologies and a database on equipment available in Tanzania under Micro CDS/ISIS when the training is completed.

Other equipment:

The Centre has two photocopiers, a microfiche reader, an electronic stencil scanner, a telex and a FAX machine.

Information users and information needs:

The users of TIRDO Industrial Information Centre include mainly researchers from TIRDO and from outside and industrial clients reached through industrial extensions services.

Jointly with the Institute of Production Innovation, TIRDO Industrial Information Centre used to run the Professional Club on Information Services for and within Industries which was co-sponsored by the manufacturing sector, industrial associations and technical institutions of Tanzania. It was an informal club aiming at solving practical problems in industry and exploitation of feasible technologies through exchange of technological information and experience.

Two training seminars for industrial information users were organized by IDRC in 1992.

**Proposed development for INTIB network**

TIRDO has a sound information basis to develop and coordinate INTIB activities. However further training in the use and utilization of INTIB databases is required. Several institutions, selected from the institutions visited during the mission, have been identified as potential INTIB nodes and expressed their desire to cooperate. Although they do not necessarily have the pre-requisites for the successful implementation of a computerized information network, in particular a computerized information system and computer literate staff, their information activities are already well established and are strongly linked to industrial development in Tanzania.

These are: the Institute of Production Innovation, the Board of External Trade, Tanzania Chamber of Commerce, Industry and Agriculture, Small Industries Development Organization, Tanzania Industrial Studies, Consulting Organization and Tanzania Bureau of Standards and eventually Tanzania Food and Nutrition Centre. The National Industrial Information Network would be a sectoral node to the National Scientific and Technological Information Network (STIN).

## E. Characterization of the national industrial and technological information scene in Senegal

National policy on scientific and technological information:

Senegal has no national policy on scientific and technological information.

Telecommunications facilities:

Senegal has adopted two packet switching protocols, the x.25 protocol for direct access and the x.28 ptotocol for indirect access, operated by SENPAC, the national packet switching network, with a transit point in Paris (NTI).

Equipment suppliers:

A large number of computer suppliers, who usually provide technical support and maintenance, are available in Dakar but they are expensive and not totally reliable.

Background to industrial and technological information in Senegal:

The information infrastructure in Senegal is satisfactory: generally speaking, a large number of information professionals have received basic training in computer and/or information science and most information services, mainly in the public sector, have developed computerized systems which are mostly PC based. The Centre National de Documentation Scientifique et Technique (CNDST) has embarked on an ambitious programme which aims at establishing a national information network, Réseau National d'Information Scientifique et Technique (RNIST), which includes six sectoral networks, i.e. a network for commerce, industry and technology (RECIT), a network for agriculture, a network for research, a network for further education, a network for public authorities and for transport and a network for equipment and urbanization.

RECIT was created as a national sectoral network for industry, commerce and technology in 1992, following the third summit of the G15 Group which took place in Dakar when Senegal became a member of the SITTDEC network which was set up by the South Investment, Trade and Technology Data Exchange Centre based in Kuala Lampur, Malaysia. During the summit, RECIT, the national focal point for SITTDEC, made a presentation of six databases to the Heads of State who attended the summit. The presentation included a database on legislation for external trade, a statistical database for external trade, a database on exporting companies, a statistical database on Senegal companies, a database on foreign investment in Senegal and

a database on economic trends. SONEPI was nominated National Focal Point for SITTDEC and, as a consequence, for RECIT. In spite of a tremendous effort deployed for the G15 summit, including setting up commissions for the implementation of the network, very little has happened since and individual members have pursued their work separately without standardization. However, the next G15 summit, scheduled in New Delhi in December 1993, may boost network activities in Senegal.

At present, SONEPI's responsibility as SITTDEC/RECIT national focal point is being questioned: the preparation of the presentation of databases at the next summit, hence the responsibility to monitor SITTDEC/RECIT network, has been taken away from SONEPI by a ministerial decision, in view of SONEPI poor performance, and relocated temporarily at CNDST.

RECIT network includes the following members:

- Centre National de Documentation Scientifique et Technique*
- Ministère de l'Energie, des Mines et de l'Industrie*
- Institut Sénégalais de Normalisation*
- Chambre de Commerce pour l'Industrie et l'Agriculture de Dakar*
- Direction du Commerce Extérieur*
- Institut de Technologie Alimentaire*
- Service de la Propriété Industrielle et de la Technologie*
- Centre International du Commerce Extérieur du Sénégal
- Direction de la Prévision et de la Statistique*
- Guichet Unique*
- Cellule d'Appui a l'Environnement des Entreprises*
- Fonds de la Promotion Economique*
- Zone Franche Industrielle
- Cellule de Restructuration Industrielle*
- Centre Régional Africain pour la Technologie / African Regional Centre for Technology*

Institutions marked with * were visited during the mission.

**Centre National de Documentation Scientifique et Technique (CNDST):**

CNDST was created in 1977 to promote and coordinate scientific and technological information activities in Senegal. It also advises the Government for national policies regarding information. CNDST coordinates the national information network, Réseau National d'Information Scientifique et Technique (RNIST) of which RECIT is a sectoral network. CNDST has implemented three databases under Micro CDS/ISIS: BIBLIO, a bibliographic database with 9000 references, CDARBI, an inventory of libraries, information services and archives in Senegal, and CATCOPER, a union list of periodicals. CNDST is the Regional Centre for INFOTERRA, and the national focal point for CARIS, the FAO database on current agricultural

research, PADIS and ENERGIES-CEAO. A large staff, which includes 9 documentalists and a computer programmer, allows to process and disseminate information using a fleet of computers.

Ministère de l'Energie, des Mines et de l'Industrie (MEMI):

MEMI Direction of Industry shelters a computerized information system called SYMPA, which was set up in 1987, following the implementation of the new national industrial policy (or NPI, Nouvelle Politique Industrielle) by the Government. The purpose of the system is to analyze the industrial situation in order to evaluate the impact of the new policy on the economy of the country. Five databases allow economic analysis on external trade, government regulations in connection with NPI, retail prices, general economic environment and sample company accounts. This information is available to government institutions as well as public and private entreprises.

Institut Sénégalais de Normalisation (INS):

ISN is the legal depository of industrial standards in Sénégal. It also sets up standards for quality control and certification. Although ISN information service was set up two years ago and has only one professional staff, it has achieved significant results: a library with a large collection of AFNOR 4500 and ISO standards covering major industrial sectors (agro-industry, electricity, construction, basic sciences, chemistry, packaging) and two bibliographic databases, one on technology and one on standards which have been implemented on the institute's PC using Micro CDS/ISIS. PERINORM database on CD-ROM is also available. The information service produces an information bulletin, Pari Qualité, using desktop publishing techniques and VENTURA software. Its users come both from the public and from the private sectors. Through their ISO membership, INS had a cheap access to international standards. However, due to financial contingencies, the membership has not been renewed this year.

**Chambre de Commerce pour l'Industrie et l'Agriculture de Dakar (CCIA):**

CCIA has a well established library with a comprehensive collection of documents and of current journals. A two year ITC project allowed CCIA to establish a computerized information centre which includes 2 PC computers and 3 Minitels. Three databases have been implemented, a bibliographic

database covering library holdings under Micro CDS/ISIS, a bibliographic database on decrees published in the Journal Officiel under CLIPPERS, and an inventory of Senegal entreprises also under CLIPPERS. A publication, Inventory of Enterprises, has been produced from the latter database and is sold at a minimal fee. Access to international databases is available via SENPAC through the Minitel equipment. Further databases are available on CD-ROM. In spite of a reduced staff composed of 2 documentalists, CCIA information service is used successfully by public and private entreprises and by the general public.

**Direction du Commerce Extérieur:**

The Direction du Commerce Extérieur has a computerized information service manned with one documentalist. The information service has one PC computer with 250 Mb RAM and 3 Mb hard disk, equipped with a laser printer, which was financed by an IDRC project. They are the national focal point for TRAIN, UNCTAD trade analysis and information system, and for CEDEAO data exchange system (Bourse des Echanges). A MINITEL gives direct access to European databases. They also have online access to CCIA databases via a MODEM. The EUROSTAT database is available on CD-ROM. Five databases have been developed under CLIPPERS: a bibliographic database for library holdings, a database for library loans, a bibliographic database for administrative archives, a full text database on the laws on external trade in Senegal and a full text database on export certificates. Their users are institutions, entreprises, exporters, investors from both the private and the public sectors from Senegal and from abroad. At present, information services are free of charge but fees may be charged in the future.

**Institut de Technologie Alimentaire (ITA):**

ITA is a research institute for food technology which was created in 1963. It specializes in food processing, conservation and storage, in the development of new products derived from local agriculture and in quality control. It also organizes training for food technologists. ITA library was set up in 1968. After a number of successful years, the library declined. At present, it has insufficient funds to renew journal subscriptions and to acquire new documents and insufficient funds and staff to produce information products which it used to disseminate to users, mostly from the public sector, such as a newsletter, a periodic list of new acquisitions and SDI profiles. Fortunately, its activities were recently boosted by the RITA project

(Réseau Régional d'Information en Technologies Alimentaires), coordinated by ARCT, which provided funds for the acquisition of a PC computer and a MODEM connection for access to RITA members via SENPAC. ITA is also a member of RESAGRIS, the national agricultural information network.

**Service de la Propriété Industrielle et de la Technologie (SPIT):**

SPIT is the depository of patents produced in Senegal which are forwarded to OAPI in Yacunde for examination and approval. SPIT has a small information service with one professional staff. It has a collection of about 10,000 OAPI patents and is planning to acquire OAPI database under Micro CDS/ISIS. It has recently benefitted from WIPO assistance to purchase a PC computer and EPO and WIPO databases on CD ROM. SPIT information services are available to the general public.

**Direction de la Prévision et de la Statistique (DPS):**

DPS is responsible for the collection, processing and dissemination of national statistics in view of establishing the national accounts. Five major databases have been implemented: Senegal companies annual accounts, import/export statistics, company identification and registration, population census, statistics on employment. In spite of the slow processing of data, data analysis is carried out in order to produce sectoral statistical tables, a directory of companies, external trade statistics and national economic trends. Officially published information products are available to Government institutions and to the public at a minimal fee.

**Guichet Unique:**

Guichet Unique, or one-stop window, is part of the Ministry of Economy, Finance and Planning. Guichet Unique plays two major roles: it coordinates administrative activities related to the incorporation of new companies and promotes financial incentives for promotors. Although an information service was scheduled a few years back, it did not come to existence for financial reasons. However, Guichet Unique needs industrial and technological information and is hoping to develop its own information system.

**Cellule d'Appui a l'Environnement des Entreprises (CAEE):**

CAEE is a French sponsored project which aims at establishing a link between the Senegal administration and the entreprises, in order to advise on the general industrial environment regarding government procedures, regulations, taxation, sources of finance, training, as a tool to the entreprises' decision making process. CAEE also aims at providing information on the industrial and economic environment in Senegal.

**Fonds de la Promotion Economique (FPE):**

FPE is a BAD project which was initiated in 1991 with the purpose of financing viable projects, in particular projects which aim at developing the national production in all economic sectors and local trade. It benefits from three lines of credit: BAD funds, a promotion fund and a guaranty fund. Although no information system has been set up, FPE is in great need of technological and industrial information and has expressed the desire to join the RECIT network.

**Cellule de Restructuration Industrielle (CRI):**

CRI, which is part of the Ministry of Industry, was set up with the purpose of assisting companies in diversifying and converting their activities. CRI benefits from a line of credit from the World Bank which allows to finance technical training, to promote export goods and services and to provide technical assistance. Consequently, a large amount of information is required, in particular on national and regional markets, on the national industrial environment, on technology and on companies themselves. A database on the industrial environment in Senegal called CRI has been initiated recently using DBASE. It allows economic analysis by industrial sectors.

**African Regional Centre for Technology (ARCT):**

ARCT is a regional organization sponsored by the Organization of African Unity (OUA) and the United Nations Economic Commission for Africa (UNECA). It was established in 1980 and has currently 31 member states. Its activities focus mainly on food, energy and capital goods. It is also an instrument for the promotion, co-ordination and integration of technological policies and capacities at the regional level.

ARCT's information service, which has 8 well trained professional staff, has established a technological information system, ARCTIS, with the support of UNDP and IDRC. ARCTIS provides information to private and public institutions at national and regional levels. It also provides back-up services, in particular training on industrial and technological information, covering information systems management, database management systems, software upgrading and development, management and marketing of information services and products, computer-mediated communication and network systems, management of information and documentation services and desktop publishing. ARCTIS is currently developing its capacity as a technical centre support. Regional and sub-regional networks have also been established on a pilot basis, in particular RITA, INTIB and TIES (UNIDO's Technological Information Exchange System). ARCT is the Regional Focal Point (RFP) for INTIB and has direct online access to INTIB databases in Vienna. Linkages with African focal points and E-mail connections (QUICK-COMM, GREENET and COSY) are made through dedicated telephone lines or through the national packet switching system of network members. ARCTIS has also online access to international databases, in particular DIALOG, ESA/IRS and QUESTEL. The equipment includes 47 386 PCs and several 486 PCs with 2 servers. The software available allows a large range of applications in particular DBMS, desktop publishing and telecommunications data exchange. A number of local databases have been developed under Micro CDS/ISIS: a multidisciplinary bibliographic database, a bibliographic database on energy, an inventory of institutions and experts in S&T in Africa, an inventory of scientific and engineering societies in Sub-Saharan Africa and an inventory of technician training institutions in Africa. A database on country profiles has been developed under DBASE IV. Directories derived from the databases have been published as well as a technical bulletin, African Technodevelopment, a newsletter, Alert Africa, and a bulletin on networking activities, INFONET.

ARCT has been extremely active as INTIB RFP. Not only has it given a lot of support to INTIB Senegal NFP and to NFPs in the region, but it has also boosted the INTIB sub-regional network by organizing several INTIB training seminars sponsored by UNIDO. INTIB NFPs were also invited to participate to other ARCT regional training seminars, sponsored by various donors, in particular a seminar on industrial and technological information which took place in Rabat and a seminar on micro-computers which took place in Nairobi, in 1990 and 1991 respectively.

Review of the situation concerning INTIB Industrial and Technological Information Network:

INTIB National Focal Point:

The Société Nationale d'Etudes et de Promotion Industrielle, SONEPI, was nominated INTIB National Focal Point in 1986. SONEPI is a parastatal institution which aims at encouraging the growth of the Small and Medium Scale Industries (SMIs) in Senegal. SONEPI is presently undergoing a drastic restructuration with UNIDO assistance, which may modify the institution's profile in the near future.

SONEPI has an industrial information division and a network division which are part of the Industrial Information and Training Service. The network division was set up when SONEPI joined the SITTDEC network. It shelters network activities, i.e. SITTDEC, RECIT and OCIS-NET, a global information network set up by the Islamic Development Bank based in Saudi Arabia. However, as specified earlier on, CNDST has temporarily taken over networking activities.

SONEPI has remained INTIB NFP up to now. However, no tangible results have been achieved from INTIB activities either. This is largely due to SONEPI inner problems. As a result, INTIB has been completely neglected. Mr. Gaye, who was INTIB coordinator until he left in 1989, attended several INTIB regional training seminars. Unfortunately, he left without transmitting his knowledge to Mr. Bah, who then joined the information division as a documentalist. At present, none of INTIB databases are available at SONEPI. Furthermore, INTIB appears to be unknown to the members of the RECIT network as well as to bona fide users.

In spite of problems encountered with network activities, SONEPI industrial information service has achieved some positive results, in particular the establishment of an enquiry service, the implementation of two databases under Micro CDS/ISIS, the publication of an inventory of Senegal entreprises and services, the establishment of a referral service and the establishment of an awareness service (SDI profiles and dissemination of lists of the latest acquisitions).

SONEPI has recently benefitted from a three year IDRC project aiming at upgrading its industrial information service and at promoting information products and services among SMIs. Consequently, a promoting campaign was successfully carried out in 1992. However, the demand for information increased considerably but could not be handled satisfactorily by the documentalist alone.

Staff:

SONEPI industrial information service has one professional documentalist who was first trained at the Ecole de Bibliothecaires, Archivistes et Documentalistes (EBAD) of Dakar, then in Canada where he acquired a Master's degree in information science.

He also benefitted from various training programmes, particularly on CDS/ISIS, patents, E-mail systems, online searching and attended training seminars on INTIB and on DBMS organized by ARCT.

Computing equipment:

The industrial information service has two 386 PCs, one PS2 with 2 Mb RAM and 60 Mb hard disk which was financed by IDRC and one PC with 12 Mb RAM and 120 Mb hard disk which was financed by ARCT for both RITA and INTIB networks. Telecommunications links and an E-mail connection via SENPAC are also available. In the network division, a 486 33 MHz PC acts as WAN server, with 12 Mb RAM and 600 Mb hard disk and a smaller capacity PC which acts as LAN server. Two laser printers are also available.

Software and computer applications:

CDS/ISIS 3.05, DBASE, PAGEMAKER, WORD PERFECT 5.0, KORTEX 1200 (telecommunications software) and FRONT DOOR (E-mail software) are available at the industrial information service. Two databases have been implemented using Micro CDS/ISIS: EPIS, a database on Senegal entreprises and services, and BISON, a bibliographic database. Trials to search TELESYSTEMES and DIALOG databases were satisfactorily carried out by IDRC. WORD for WINDOWS, TOPIC (DBMS), BANYAN VINES (Telecommunications/E-mail software) are available at the network division.

Other equipment:

A photocopier and a scanner are available.

Information users and information needs:

Internal and external users, mainly project promotors, decision-makers, engineers, technicians, SMIs and students, require primarily local and regional information on the industrial environment such as data on entreprises, markets, product analysis, availability and cost of raw materials, legislation. They also require information on technology, legislation, standards, source of finance, administrative procedures, training.

**Proposed development for INTIB network:**

SONEPI is in the process of being reorganized. However, it will take some time before SONEPI achieves positive results. At the moment, CNDST is SITTDEC/RECIT National Focal Point. INTIB NFP should be closely associated to RECIT activities and should therefore be also transferred to CNDST. However, CNDST is the national coordinator for scientific information activities. Its role is not to monitor sectoral information networks activities such as RECIT and INTIB. Therefore, after the G15 summit, two

solutions may be envisaged: either CNDST remains RECIT/INTIB NFP until SONEPI is able to assume fully its responsibilities or an adequate institution, whose activities are directly linked to trade and industry, is identified. The Service de la Propriété Industrielle et de la Technologie (SPIT) may be suitable.

The nodes identified as RECIT nodes may also become INTIB nodes. A number of the institutions visited during the mission expressed their interest in INTIB, in particular Institut Sénégalais de Normalisation, Chambre de Commerce pour l'Industrie et l'Agriculture de Dakar, Direction du Commerce Extérieur, Institut de Technologie Alimentaire, Service de la Propriété Industrielle et de la Technologie, Centre International du Commerce Extérieur du Sénégal, Cellule d'Appui à l'Environnement des Entreprises and Cellule de Restructuration Industrielle. The African Regional Centre for Technology is INTIB Regional Focal Point.

## F. Characterization of the national industrial and technological information scene in Ghana

National policy on scientific and technological information:

There is no national policy on scientific and technological information in Ghana. However, a bill on national science and technology, which aims at strengthening science and technology in Ghana and which makes provisions for the development of information, has been submitted to the Government for approval. Various commissions have been set up to liaise with Government departments and to study the impact of science and technology in the country. Scientific and technological information activities come under the social sciences committee.

Telecommunications facilities:

There is no packet switching system in Ghana. However, dedicated lines are available for point to point data links. Networks have been established for banking, airlines and for a Ghanaian shipping line. E-mail systems are available using direct telephone lines. Generally speaking, the Ghanaian telephone system is saturated: it is not only impossible to obtain a new line but the quality of existing lines is poor. The P&T Corporation have a project to expand the national system and transfer junction lines to digital links. International connections should also improve by increasing the capacity of switches. This should be achieved within two years.

Equipment suppliers:

Computer equipment can be purchased in Accra although prices are high. Maintenance is available but also expensive.

Background to industrial and technological information in Ghana:

Industrial and technological information is available but it is dispersed and not readily accessible. A number of libraries are available although the collections are often out of date and little new material has been acquired these last few years. Few libraries are computerized and librarians are only starting to be exposed to computer technology. Although the emergence of computerized information systems has transformed the industrial and technological information scene and some databases are in the process of being compiled, an insufficient number of industrial and technological information specialists have reached a satisfactory level of achievement in developing computerized systems and training requirements are still considerable.

In order to coordinate scientific and technological information activities in the country, CSIR currently benefits from an IDRC

project which started in 1989 aiming at establishing a multidisciplinary information network called GHASTINET, Ghana National Scientific and Technological Information Network, of which CSIR is the national focal point. The mandate of GHASTINET is to establish a national capacity for the provision and dissemination of the results of indigenous scientific research and other relevant scientific information. Although the basis of GHASTINET has been set, few concrete results, in the way of resource sharing, have been achieved so far, apart from agricultural information. GHASTINET comprises nine sectoral networks: networking activities have taken off the ground in only one of them, the network for agriculture, forestry and fisheries. A series of training seminars for agricultural information scientists have been initiated at CSIR.

GHASTINET sectoral network for industry and technology, whose nodal point is the library of the Industrial Research Institute, exists only on paper at this stage. Two major factors, which have a direct implication on industrial and technological information in Ghana, explain the absence of achievements: firstly, the fact that, up to now, agriculture has been given greater priority than industry; secondly, the proliferation of institutions involved in industrial development whose activities seem to overlap and who seem to be reluctant to cooperate with each other and exchange data.

The future restructuration of the Ministry of Trade and Industry may contribute to the establishment of a sound cooperation between institutions which have been identified as members of the industrial and technological network as follows:

- Association of Ghana Industries
- Association of Small-Scale Industries
- Building and Road Research Institute
- Bureau of Integrated Rural Development
- Centre for Scientific Research into Plant Medicine
- Department of Rural Housing and Cottage Industries
- Development and Application of Intermediate Technology*
- Food Research Institute*
- Forestry Research Institute of Ghana
- Ghana Export Promotion Council*
- Ghana Investment Centre*
- Ghana National Chamber of Commerce*
- Ghana Regional Appropriate Technology Industrial Service*
- Ghana Standards Board
- Industrial Research Institute*
- Management Development and Productivity Institute
- Ministry of Energy, National Energy Board
- Ministry of Science and Technology
- Ministry of Trade and Industry*
- National Board for Small Scale Industries*
- National Investment Bank
- Policy Research and Strategic Planning Institute*
- Technology Consultancy Service

- Technoserve
- University of Science and Technology
- Women in Development
- Women World Banking Ghana
- Statistical Service of Ghana

Institutions marked with * were visited during the mission.

**Food Research Institute (FRI):**

FRI is currently administered by the CSIR. It was established in 1963 in order to carry out a co-ordinated programme of applied research in the storage, processing, preservation, marketing and utilization of foods and to advise the Government in planning and implementing its food policy. Results of FRI research activities are disseminated to the public by the Scientific Information Division which caters for documentation, library services, scientific information, publications and public relations. FRI library has a book stock of about 3000 on food technology and a small collection of current journals. The main outlets for releasing information from the Institute includes the FRI Newsletter, Annual and Technical Reports, internal seminars and radio and television programmes. The library serves as reference centre for students, chemists, lecturers, farmers, industrialists and housewives. FRI has no computerized information system, although they expressed the desire to be trained to information processing technology and to establish a computer system.

**Industrial Research Institute (IRI):**

IRI was set up as the Institute of Standards and Industrial Research (ISIR) under the aegis of the former Ghana Academy of Sciences. Out of the ISIR emerged the Industrial Research Institute and Ghana Standards Board. IRI is one of the twelve institutions under CSIR. IRI undertakes research into all aspects of industrial problems to enhance efficiency of local industries. This is achieved through the development of new products and processes, improving existing ones and providing solutions to technical problems encountered by industrial establishments. It also organizes training seminars. An information unit is in the process of being established by an IDRC 3 year project. The project is to provide computer equipment, a MODEM and telecommunications software as well as manpower training.

IRI and the Ghana Investors' and Industrial Property Protection Association have established a Patent Information Unit at IRI in collaboration with the World Industrial Property Organization (WIPO).

**Ghana Export Promotion Council (GEPC):**

GEPC is a point of contacts between Ghanaian exporters and exporting markets. It has a library which disseminates information on export trade, using information available in the library as well as external sources such as ITC Market News Service, the Commonwealth Secretariat Export Trade Division and DECTA (UK). GEPC publishes a newsletter **The Exporter** which is disseminated to their members. The library has no computer and its staff (2 professional staff) has had very little computer training.

**Ghana Investment Centre (GIC):**

GIC is a government agency which coordinates investment in Ghanaian economy, in particular investment promotion, identification of sources of finance in priority areas which are agriculture, manufacturing, building and construction, tourism and general services. GIC deals with joint venture and technology transfer agreements. GIC has a library which supplies information to investors on the areas in which to invest, on law on investment and on priority areas. GIC publishes a newsletter, The Investor, and the Investor's Guide to Ghana. The library has recently acquired a PC computer where a bibliographic database is being developed using Micro CDS/ISIS. A computer department has just been created: it includes a LAN with 16 terminals and stand alone PCs. A database on investment in Ghana by sector is being implemented under LOTUS. The information which has been published is available to the general public.

**Ghana National Chamber of Commerce:**

Ghana National Chamber of Commerce has a well established information service. The Chamber recently benefitted from a UNDP/ITC regional project which focused on the establishment of TINET, a trade information network in the English speaking countries of ECOWAS, of which it is the national focal point. As a result of the project, a computerized information system was set up using a PC computer. Two databases were developed: a full text database under CLIPPERS on Ghanaian companies, which currently includes 2000 companies and from which a directory has been published, and a bibliographic database under DBASE. HARVARD GRAPHICS and VENTURA are also used for graphics and desktop publishing activities. A CD-ROM drive and databases on CD-ROM are available. Although the above mentioned project aimed at establishing a regional trade information network, network activities have been very slow: data on diskettes is exchanged

only with Nigeria, in an attempt to create a regional company directory.

The information service users are members from the public and from the private sectors. They require primarily information on import licensing, identification of services offered, equipment suppliers, export information and information on prices.

**Ghana Regional Appropriate Technology Industrial Service (GRATIS):**

GRATIS was set up in 1987 to set up Intermediate Technology Transfer Units (ITTU) in support of small scale and medium industries in Ghana, the main emphasis being on the transfer of technology from ITTUs to the end users. As a result, eight ITTUs have been created with the purpose of developing new products, adapting products to the local environment, developing support for the acquisition of machine tools and training, including the training of technicians and apprentices.

GRATIS has a library which is used by students and users from the public and from the private sectors. They publish ITTU Monthly Reports, manuals on technology transfer, practical handbooks and maintenance manuals. Unfortunately, no computerized record of this valuable indigenous literature is kept, although a fleet of PC computers is used for design and graphics purposes.

**Ministry of Trade and Industry:**

The Ministry of Trade and Industry emerged after the split of the Ministry of Industry, Science and Technology into two ministries. It is about to set up a computerized information service with UNIDO assistance.

**National Board for Small Scale Industries (NBSSI):**

NBSSI aims at providing expertise to individuals or institutions who wish to establish small- and medium-scale enterprises. Although no computerized information system is available at NBSSI, there is a plan to establish a regional system which will include NBSSI regional offices in order to collect and process data on the characteristics of the small-scale industrial sector, on indigenous technologies and on sources of capital goods in Ghana.

**Development and Application of Intermediate Technology (DAPIT):**

DAPIT's major role is to promote technology and in particular to identify, develop, test, produce, demonstrate and deliver small -scale appropriate technology to the rural sector. DAPIT is currently undergoing restructuration. When adequate staff is available, DAPIT wishes to develop the computerized system it has initiated (with the assistance of CSIR) on local technologies.

**Policy Research and Strategic Planning Institute (PORSPI):**

PORSPI, formerly the Technology Transfer Centre, was established as a multidisciplinary unit of CSIR to engage in policy research, education and documentation on issues mainly related to technology policy. It now serves a wider function including provision of direct technological support to the Ministry of Trade and Industry through policy research, analysis, data collection and processing, information management and strategic planning of industry, science and technology. PORSPI has recently published a document entitled Survey on information technology in Ghana which surveys information systems and the availability and use of computer equipment. This publication may have an impact on the implementation of a national policy on scientific and technological information.

Review of the situation concerning INTIB Industrial and Technological Information Network:

**INTIB National Focal Point:**

The Council for Scientific and Industrial Research (CSIR) is INTIB National Focal Point. CSIR hosts the National Science and Technology Library and Information Centre (NASTLIC). NASTLIC includes a multidisciplinary library and an information service which is the national focal point for GHASTINET.

NASTLIC acts as an advisory body and as a leader for developing scientific information systems in Ghana. It also plays an important role in information policy and planning, human resources development and sensitizing decision makers and end users. Its major achievements consist in the building of new premises, the GHASTINET project, training activities, the development of a computerized information system and a number of publications.

CSIR became INTIB NFP in 1986. Mr. Villars attended INTIB regional seminars, in particular in Moscow, Lagos and Dakar. However, at present, INTIB activities are extremely reduced: INTIB databases are scarcely used. The only valuable service to

CSIR is UNIDO industrial information service. As a consequence, INTIB has not been presented to potential users and no promotion has been done.

Staff:

NASTLIC has 7 senior librarians, 2 computer scientists and 1 marketing officer.

Computing equipment:

NASTLIC has 4 PC computers, one for E-mail and desktop publishing, one for word processing and CD-ROM and two for databases. NASTLIC computing capacity is saturated. One PC was financed by the INTIB project. A CD-ROM reader and a TELVIT T100 MODEM and a FAX card are also available.

Software and computer applications:

DBMS (Micro CDS/ISIS 2.3), Word Processing (WP51), desktop publishing (VENTURA) and telecommunications (FRONTDOOR) software is available. An E-mail system allows access to Greenet (UK). AGRIS and Science Citation Index databases are available on CD-ROM.

Five databases have been developed by the GHASTINET project under Micro CDS/ISIS: CAT, a bibliographic database with material from GHASTINET members from which GHASTINET Science Abstracts are published, GHASAB, a bibliographic database on indigenous scientific and technical literature from which Ghana Science Abstracts are published; HILMAN, a full text database on high level manpower in Ghana, RESPRO, a full text database on current research projects in Ghana, from which a directory was published in 1990 and ULIST, a union list of journals.

Other equipment:

A photocopier is available.

Information users and information needs:

IDRC carried out a comprehensive survey on the needs for scientific information in Ghana on behalf of CSIR.

**Proposed development for INTIB network**

In the absence of a sound industrial and technological service among institutions involved with industry and technology, CSIR was selected as INTIB NFP and should remain so at the time being. However, CSIR being the coordinator for the national information network, GHASTINET, the sectoral network for trade and industry, and therefore INTIB NFP, should be relocated in a more appropriate institution when one of them is ready to take over, which is not the case now. The following institutions have shown an interest for INTIB network: Food Research Institute, Ghana Export Promotion Council, Ghana Investment Centre, Ghana National

Chamber of Commerce, Ghana Regional Appropriate Technology Industrial Service, Ghana Standards Board, Industrial Research Institute, Ministry of Trade and Industry, National Board for Small Scale Industries.

## G. Characterization of the national industrial and technological information scene in Nigeria

National policy on scientific and technological information:

There no national policy on scientific and technological information in Nigeria. S&T information is only briefly mentioned in the national policy for science and technology. However, a conference on a national policy for S&T information was held recently and recommendations were made to the Government.

Telecommunications facilities:

Online access to the host computers of online centres via telecommunication network was attempted by the international experts during FIIRO UNIDO project without success. There is no packet switching system in Nigeria although Nigerian Telecommunications PLC (NITEL) have agreed to adopt the X.25 protocol agreement. Four alternatives are available for online communications: dial-up lines, dedicated/leased lines, digital lines and radio links. However, the telecommunications lines in Nigeria still need qualitative improvement, including leased and digital lines for national and international communications. Furthermore, the cost of connection to the lines is extremely high. It seems that it will take a minimum of two years to see real improvements in the telecommunications situation in Nigeria. Experiments have been done using either radio links (i.e. British Council in Lagos) or satellite communications via INMARSAT (IITA in Ibada) which is an efficient but expensive experiment.

Equipment suppliers:

Computer equipment suppliers proliferate in Nigeria but their prices are high.

Background to industrial and technological information in Nigeria:

The National Information and Documentation Centre which includes the National Library has not been very active at sponsoring and promoting information systems in the country. The lack of coordination is emphasized by the large size of the Federation and its geographic diversity. Also the individualistic nature of information producers seems to result in a poor dissemination of information. As a result, no national information network has been organized and computerized information systems lag behind in spite of some isolated initiatives.

However, the National Planning Commission, which comes under the Federal Ministry of Economic Development, has initiated a pilot project with the assistance of UNDP which aims at establishing the National Databank, as a backbone to analysis for national

planning at Federal and Regional levels. Statistical and factual data is being collected and processed from the Planning Research and Statistics departments of Government institutions for this purpose. The National Databank has been designated as SITTDEC national focal point for Nigeria. Its role will be to monitor and coordinate the future national information network and to advise on national policy.

In spite of the numerous sources of industrial and technological information in Nigeria, there are few specialized information centres at Federal level and little cooperation has been established between the existing ones. However, an agreement in principle of cooperation between institutions from ministries, universities and research centres has been reached, including a Memorandum of Understanding between FIIRO, the Raw Materials Research and Development Council and the National Office for Technology Transfer and Promotion. However, so far few significant practical results have been achieved. This has however set the basis for the industrial and technological information network.

The following institutions have been identified as industrial and information sources in Nigeria:

- Raw Materials Research and Development Council*
- National Office for Technology Transfer and Promotion*
- Standards Organization of Nigeria*
- Manufacturers Association of Nigeria
- Lagos Chamber of Commerce and Industry*
- Chambers of Commerce (in each state of the Federation)
- Nigerian Industrial Development Bank*
- Nigerian Institute of Food Science and Technology
- Nigerian Bank for Commerce and Industry
- Central Bank of Nigeria
- National Agency for Science and Engineering Infrastructure*
- Federal Ministry of Science and Technology
- Federal Ministry of Industry
- Industrial Development Centres (in each state of the Federation)
- Ministry of Commerce and Industry
- Industrial [illegible]tes (in each state of the Federation)
- Yaba Col[illegible] Technology
- Obafemi [illegible]ity, Food Technology Department
- Nation[illegible] Institute for Oceanographic and Marine Researc[illegible]
- Product[illegible]elopment Agency
- Nigerian Society of Engineers
- National Directorate of Employment
- Directorate of Food, Roads and Rural Infrastructure
- National Library, National Information and Documentation Centre
- Industrial Training Fund
- Centre for Management Development
- Opportunities Industrialization Centre
- African Regional Centre for Engineering Design and

Manufacture*
- International Institute for Tropical Agriculture*

Institutions marked with * were visited during the mission.

**Raw Materials Research and Development Council (RMRDC):**

RMRDC is an autonomous government body aiming at promoting the utilization of indigenous raw materials in industry and at helping industry source raw materials. It sponsors R&D and information on raw materials. It has a library and a computer department which has set up RMRDC-NET, the Raw Materials Research and Development Council Network. This is a complex LAN which links all the computing resources within the Council's Headquarters. The LAN includes the Raw Material Information System. A number of databases, based on data on raw materials collected from the Council's partners, have been initiated using ORACLE relational database management software.

**National Office for Technology Transfer and Promotion (NOTAP):**

Formerly called the National office of Industrial Property, NOTAP is involved in investment promotion and technology transfer agreements. It is particularly active in the provision of advisory services on patented and non-patented technology information to end users, assistance in linking research institutions with investors for commercialization of research results, stimulation of foreign technology flows to priority areas, improvement of the process of adapting foreign technologies and development of local technological capabilities.

NOTAP established a Patent Information and Documentation Centre in 1991 with the assistance of UNIDO and WIPO, in collaboration with the Patent and Trade Marks Registry of the Federal Ministry of Commerce and Tourism. A computerized information system based on CORIS which includes a fleet of 8 PC computers allowed the establishment of a computerized registry for technology acquisition. The full collection of WIPO and EPO databases on CD-ROM is available.

NOTAP is TIES national focal point. It has also acquired a large collection of technology profiles from the Small Industries Research Institute, located in New Delhi, with the purpose of adapting them to local requirements and making them available to SMIs.

**Standards Organization of Nigeria (SON):**

SON is empowered among other things to prepare standards for products and services and to ensure compliance with the Federal Government policies on standardization and quality assurance for both manufactured goods and imported products throughout the country. SON currently benefits from a UNDP/UNIDO project which includes the establishment of a computerized information system. PC computers are used as stand alone workstations to avoid problems occurring when working in a LAN. Databases have been implemented, in particular a database on Nigerian standards and a database on SON clients and contacts, using FOXBASE, EXCEL and DBASE in a Windows environment. Desktop publishing software and equipment (including a scanner and a colour photocopier) are used to prepare training material. PERINORM database and ISO standards database are available on CD-ROM. The library operates an enquiry service and a SDI service. Services are available to institutions and bona fide users at a charge. An E-mail system is available although attempts to communicate with the external world have so far failed in spite of the allocation of a digital telephone line for this purpose.

**Lagos Chamber of Commerce and Industry:**

The Lagos Chamber of Commerce and Industry establishes business contacts for its 2000 members and business partnership with foreign entrepreneurs. It has also an interest in domestic economic policy formulation. The information department which includes the library and computer facilities have set up a LAN connecting 6 PCs, but only a database on Lagos Trade Fair exhibitors has been developed so far. The library, which is well stocked, operates a trade and investment enquiry service which provides information on markets, labour, income per capita etc. to local businessmen and to foreign investors.

**Nigerian Industrial Development Bank (NIDB):**

NIDB is a development finance company which provides medium- and long-term finance and sometimes makes equity investments to limited liable companies registered in Nigeria. NIDB has a library which is not computerized, although the librarian was sent to a computer course in Brussels. Information on banking, finance, engineering, law, administration and economy is available to the Bank's staff and to external users at the manager's discretion.

**National Agency for Science and Engineering Infrastructure (NASENI):**

NASENI is a parastatal institution which comes under the Ministry of Science and Technology. NASENI supervises other parastatal research institutions called the Science and Engineering Infrastructure Development Complexes. Its major role is to establish an adequate infrastructure for the development of science and technology in the country. Information will be part of the software infrastructure.

**African Regional Centre for Engineering Design and Manufacture (ARCEDEM):**

ARCEDEM is a regional organization located in Ibadan which was established in 1980 with the main objective of developing the capability of member states for engineering design, by promoting national centres for engineering design and engineering, by training engineers and technicians, and by manufacturing industrial and agricultural machines and equipment. ARCEDEM has developed a sophisticated CAD/CAM system for engineering design with UNIDO assistance. The library, whose librarian was trained to the use of Micro CDS/ISIS by FIIRO, is computerized. A bibliographic database has been developed under Micro CDS/ISIS. The library currently benefits from a 3 year IDRC project ainimg at sensitizing engineers to the use of information. Information on engineering, standards and patents rights is available to engineers, researchers, industrialists, trainers and students from member states.

**Internaticnal Institute for Tropical Agriculture (IITA):**

Located in Ibadan, IITA was established in 1967 to increase the productivity of key food crops and to develop sustainable agricultural systems in Africa. IITA was the first major African link in an integrated network of international research centres located throughout the developing world. It is an autonomous non-profit organization. IITA Library and Documentation Centre is to provide access to the information that researchers need to work productively and to provide educational and reference materials. The library has a computer unit. A bibliographic database has been developed using BASIS, a modular information system developed by Battelle Memorial Institute. Terminals throughout the Institute allow access to the library database. A number of databases on agriculture are available on CD-ROM. IITA feeds information into international systems such as AGRIS and GCIR, the Consultative Group on International

Agricultural Research. IITA information services are available to the Institute's staff and to researchers and lecturers at the librarian's discretion.

Review of the situation concerning INTIB Industrial and Technological Information Network

**INTIB National Focal Point:**

FIIRO, the Federal Institute of Industrial Research Oshodi (FIIRO), is INTIB National Focal Point. FIIRO is a semi-autonomous institute under the aegis of the Federal Ministry of Industry and Technology. FIIRO's objectives are to assist in accelerating the industrialization of Nigeria through finding industrial utilization for Nigerian raw materials and upgrading of indigenous production techniques. The Institute Information Section has over the years collected and accumulated various sources of information covering different areas of technological and economic activities. The information sources include books, journals, standards, patents, trade literature and can be made available to any member of the public on request.

The Industrial Information Centre and Extension Services (FIIRO INDICES) was established in 1988 with UNIDO assistance in order to provide industries, entrepreneurs and researchers in Nigeria with the appropriate information in their various areas of interest. INDICES includes four sections - Technical Enquiry Service, Library, Industrial Extension Service and Computer Services - which provide the following services to end users: Current Awareness Service on the Economy (CASE), Selective Dissemination of Information (SDI), technical enquiry service, Industrial Abstracts (INDAB), document procurement services and industrial extension service. Some services are rendered free of charge, others are charged at discounted rates to members.

Information is updated through regular collections from industrial sources. Updates from the Science Citation Index are received on diskettes. Unfortunately, no foreign currency is available for journal subscriptions and new library materials and consequently the SDI service have been interrupted. British Council coupons are still available for document procurement.

FIIRO/INDICES have made full use of INTIB databases. INTIB databases have been presented to potential users, mostly during trade fairs and through advertising. Consequently, a large number of requests from industrialists were related to REQT, VENT and OFFR databases. UNIDO Industrial Information Service has also been used intensely. However, a decline of the use of INTIB databases has been observed these last two years. At present, INTIB databases have not been reinstalled on hard disk after the LAN crashed. Some diskettes are missing, in particular those containing Micro CDS/ISIS and IDA.

Staff:

FIIRO/INDICES has five professional staff, including a computer specialist. A comprehensive training programme, which included training courses abroad and on-the-job training, was carried out during the UNIDO project. Since, FIIRO/INDICES staff training programme has stopped due to lack of funds. However, FIIRO/INDICES have carried out training sessions for national information scientists.

Computing equipment:

The UNIDO project provided 5 PC/XT and 3 PC/AT compatible computers, 2 Toshiba 1200 laptops, 5 Epson LQ 850 printers, 3 Epson GQ 3500 laser printers, 2 CD-ROM players, 4 AT MODEMs, 2 Wangtek tape recorders, 4 converters and spare parts. Two computers were allocated to the library. Computers were inter-connected by a LAN. Unfortunately, the LAN broke down, resulting in hard disk crashes on several computers. A lot of data was lost although some had been backed up on tape. At present, the unavailability of spare parts and the corrupted backup software make it very difficult to re-establish the system. None of the printers work and only one CD-ROM drive is operational. Furthermore, the two library computers are saturated and searches on CD-ROM hang. However, FIIRO will shortly benefit from UNIDO/SAS assistance aiming at maintaining and repairing existing computers and it is hoped that the system will be fully operational within a few months.

Software and computer applications:

A large number of software packages are available: the library uses mostly Micro CDS/ISIS 2.3, PAGEMAKER and VENTURA, SYTOS (for back-ups). The following databases were developed under Micro CDS/ISIS: bibliographic databases including STEP (scientific, technical and economic publications), CASE (current awareness service on the economy), PIPE (product and industry profiles extracts), full text databases including DANTE (data on available Nigerian technologies), RADIO (research and development information online), COMPRESS (company profiles for extension and similar services) and databases for the management of INDICES including AID (answered inquiries data) and THESAURUS. All databases were recovered after the crash. However, many of them need to be updated.

Other equipment:

Audiovisual equipment and a car are available.

Information users and information needs:

FIIRO/INDICES serve the Institute's staff as well as industrialists. The Technical Enquiry Service has been used very successfully by entrepreneurs from SMIs. The AID database allows to keep a record of industrial

enquiries and to analyze the use of FIIRO/INDICES.

**Proposed development for INTIB Network**

FIIRO/INDICES have been an active INTIB NFP. However, the recent years have been disappointing; not only has the use of INTIB databases declined considerably but the LAN breakdown has grossly damaged the information system. It is hoped that FIIRO/INDICES will soon be able to rehabilitate its services and boost its activities as a major industrial information supplier in Nigeria. To achieve this, FIIRO/INDICES need not only adequate resources but also support and commitment both from management and staff.

Among the institutions which were visited during the mission, some have shown positive interest for INTIB network and have been identified as potential INTIB nodes. They include RMRDC and NOTAP, who have already agreed in principle to cooperate with FIIRO, NOTAP, SON, NASENI and NIDB. Although ARCEDEM is a regional organization, its contribution to INTIB network may be valuable.

## II. Characterization of the national industrial and technological information scene in Cameroon

National policy on scientific and technological information:

There is no national policy on scientific and technological information in Cameroon. CNDT have been asked to advise the Government on this matter.

Telecommunications facilities:

Telecommunications are well developed in Cameroon. INTELCAM Packet Switching System CAMPAC gives access to international gateways via INTELSAT. Cameroon has adopted the x.25 protocol. Dedicated lines are also available. However, only a few networks are operational in the banking sectors and in private firms. A programme aiming at digitalizing national lines should be completed by mid-1994.

Equipment suppliers:

Computer equipment suppliers are available but expensive. Deficient equipment is usually sent to Europe for maintenance.

Background to industrial and technological information in Cameroon:

The general information panorama in Cameroon is not very satisfatory: information is a low priority and there is no general structure such as a national information network. However, a seminar entitled Scientific and Technical Information and Development, sponsored by UNIDO, was recently organized by the National Committee for the Development of Technologies (CNDT). The seminar stressed the urgent need to organize a national information network which would coordinate all sectoral information activities in the country.

Industrial and Technological information is not readily available in Cameroon. Although a UNIDO project aiming at establishing a mechanism for the supply of information to enterprises, investors and SMIs (MIEC), was completed in 1991, industrial and technological information remains scarce, disorganized and is not disseminated satisfactorily. The UNIDO project established an industrial information service at the Direction of Industry of the Ministry Industrial and Trade Development (MINDIC) which is the focal point of MIEC - or Mécanisme d'Information des Enterprises du Cameroun. This mechanism is based on "pillar institutions" able to collect, process and disseminate information to the industrial sector which includes:

- Société Nationale d'Investissement*
- Chambre de Commerce, d'Industries et des Mines du

Cameroun*
- Fonds d'Aide et de Garanties aux PME*
- Groupement Interprofessionnel pour l'Etude et la Coordination des Intérêts Economiques au Cameroun
- Syndicat des Industriels du Cameroun*
- Conseil National des Chargeurs du Cameroun
- Direction des PME et de l'Artisanat*

The institutions marked with * were visited during the mission.

Although a common methodology, common objectives and common products (a bibliographic database and a register of companies) have been defined and initiated, MIEC, is not fully operational to-day: work has been disrupted by a complete restructuration of public institutions in Cameroon, resulting in loss of staff and resources. However, MIEC could be used as the basis for a national industrial and technological information network.

However, few of them being directly involved with technological processes and technology transfer, an attempt was made to identify other institutions more geared towards technologies. Consequently, the following institutions were included in the consultant's programme of visits:

- Institut de la Recherche Agronomique*
- Centre de Création des Enterprises*
- AGRO-PME*
- Ecole Nationale Supérieure Polytechnique*
- Direction des Statistiques*
- Comité National de Développement des Technologies*
- Organisation Africaine de la Propriété Intellectuelle*

**Société Nationale d'Investissement (SNI):**

SNI is a parastatal institution aiming at encouraging investment in Cameroon, in view of developing trade, industry and agriculture. SNI acts as a private investor, in compliance with Government policies. SNI is a member of MIEC. However, recently, its contribution has been minimal due to a complete re-organization and to the appointment of new staff.

**Chambre de Commerce, d'Industries et des Mines du Cameroun (CCIM):**

CCIM is located in Douala. It was a key institution when MIEC was established. It coordinated FINATEC, a comprehensive file on Cameroon companies for which a large amount of data was collected and processed on manual input sheets. However, CCIM had no computer and could not computerize the file. At present, the file needs updating and computerizing. CCIM information service is available but not very active: it benefitted from an ITC project aiming at organizing a

trade information service connected to the regional system TINET. However, the project was stopped before the end, in view of CCIM bad performance. It is to be hoped that CCIM will be reorganized and will regain the confidence of SMIs in Cameroon.

**Fonds d'Aide et de Garanties aux PME (FOGAPE):**

FOGAPE is a parastatal financial institution. It aims at promoting SMIs and at providing financial and technical support for the establishment and the rehabilitation of enterprises. FOGAPE has an industrial information unit, which is part of the statistical division, manned by 3 members of staff (2 specialists in industrial studies and in communication and a documentalist). However, a fire which occurred earlier this year destroyed most of the documents held by the library as well as the computers and databases. Also, the current reorganization and the pending relocation of FOGAPE have disrupted its activities. Little information is currently being disseminated to users and the various newsletters and journals the unit used to publish have been canceled.

**Syndicat des Industriels du Cameroun (SYNDUSTRICAM):**

SYNDUSTRICAM is a trade association of private entrepreneurs. It has currently 60 members coming mainly from medium and large industries from various industrial sectors. It aims at encouraging industrial development in Cameroon through its contacts with Government institutions, Chambers of Commerce and foreign representations in Cameroon. SYNDUSTRICAM gives also direct support to its members through technical and financial advice and through the provision of information. It also advises the Government on industrial matters and is a member of various national advisory committees. Computerized data on members allows the regular publication and dissemination of industrial sectoral analysis to members.

**Direction des PME et de l'Artisanat (DPMEA):**

DPMEA is part of MINDIC. A small documentation service is available at the Division of Industrial Studies and Promotion of SMIs. A bibliographic database has been implemented on a PC computer using Micro CDS/ISIS and an industrial enquiry service provides information to SMIs.

**Institut de la Recherche Agronomique (IRA):**

IRA is a research institute specializing in agriculture which comes under the Ministry of Higher Education, Informatics and Scientific Research. Its library, which is common to IRA and Institut de la Recherche Zoologique et Vétérinaire (IRZV), currently benefits from assistance from the World Bank, ORSTOM, ACCT, CTA, which has allowed to refurbish the building and to upgrade library services. Computer training and a large collection of documents and of databases on CD-ROM have also been provided by international funds. Four PCs are available on which bibliographic databases have been developed under Micro CDS/ISIS and TEXTO. IRA is part of REDOCAM, the national agricultural information network. IRA and IRZ are currently developing pilot projects on the utilization and processing of local products such as cocoa, grain, dairy products and meat.

**Centre de Création des Enterprises (CCEY):**

CCCEY is a project financed by the Canadian International Development Agency which was initiated in 1989 with the purpose of encouraging the creation of SMIs in Cameroon and, consequently, stimulating employment. It serves as a "business incubator" in all industrial sectors, mostly in the Yaounde region. CCEY provides financial, technical and managerial assistance to SMIs during their establishment phase. The project aims at establishing an autonomous institution able to develop the informal industrial sector. A joint UNIDO project has allowed the development of industrial units using local materials such as laterite bricks. CCEY has a small library which is not computerized although plans to create a database on the profile of enterprises created by the project is in the pipeline.

**AGRO-PME:**

AGRO-PME is an NGO which was created in 1987 by a group of young engineers. Its objective is to support public and private initiatives aiming at developing SMIs in the Central African region in the agro-industrial sector, thus contributing to food security in the region. Its activities include research and development, industrial studies, consultancy, training and dissemination of information. A close cooperation has been established with international institutions such as UNDP/UNIDO, USAID, Programme d'Appui aux PME (PAME). An efficient enquiry service was created following the numerous information enquiries which reached AGRO-PME as a consequence of their activities.

A computerized information system has allowed to develop several databases under DBASE, in particular a database on companies created by the project, including company accounts, a database on equipment suppliers for the transformation of local materials with the assistance of GRET and Ecole Nationale Supérieure Polytechnique, and a bibliographic database. AGRO-PME is part of several regional and international information networks, in particular, LIO (ORSTOM network) and a regional university network. An active promotional campaign of their activities will be initiated through various publications and using the media, the final objective being to commercialize information products and services.

**Ecole Nationale Supérieure Polytechnique (ENSP):**

ENSP is a leading engineering college in Cameroon. A well stocked library is available to the college professors and students as well as to engineers and entrepreneurs. A computerized system has been established and there is a project to link the college and the University calculation centre through an ETHERNET LAN link, with the assistance of the French Cooperation. The following databases have been developed under Micro CDS/ISIS and TEXTO: a database on metal allies, a database on tropical woods and related processing technologies, a database on local construction materials, a database on the collection and treatment of domestic wastes, a database on the functioning and manufacturing of satellite dishes and a database on local enterprises which have trained college students. The college is also developing a technical consultancy unit in order to assist existing SMIs and encourage the development of new ones in Cameroon.

**Direction des Statistiques:**

The Direction of Statistics comes under the Ministry of Planning. One of its departments, the Direction of Statistical Studies, carries out quarterly and annual economic surveys in the country through questionnaires distributed to samples of enterprises. It also carries out studies on the potentiality of sample manufacturing enterprises. Publications issued from the surveys are sold to the public.

Comité National de Développement des Technologies (CNDT):

CNDT is an inter-ministerial committee which aims at coordinating research and information on technologies and technology transfer in Cameroon. It works in close cooperation with ten research institutions with whom

it is in the process of implementing a computerized network. Unfortunately, all computers but one held by CNDT were stolen and one of the research institutes, which hosted RITA database, was completely burnt down. The rehabilitation of the information network is underway.

**Organisation Africaine de la Propriété Intellectuelle (OAPI):**

OAPI is a regional organization which has 14 members from French speaking African countries. It is the official depository of patents and trade marks from the 14 member countries as well as from foreign countries wishing to extend their coverage. OAPI has a well established library which includes a comprehensive collection of technical documents and patents on paper as well as microfilm and databases on CD-ROM, including OAPI, INPI, EPO and WIPO patents. The OAPI patent Collection is in the process of being computerized using MINISIS. OAPI is currently preparing a project aiming at promoting the technologies described in patents which are no longer protected among industrialists for potential industrial use.

Review of the situation concerning INTIB Industrial and Technological Information Network

**INTIB National Focal Point:**

At present, the Direction of Industry of the Ministry of Industry and Trade Development (MINDIC) is INTIB National Focal Point. CAPME used to be INTIB NFP. However, when CAPME was closed due to bad performance, INTIB NFP was relocated to MINDIC/DI.

MINDIC was reorganized two years ago and, consequently, the Statistical Department, which included the industrial information service, was canceled. Consequently, information services were created in the various divisions. At present, the industrial information service comes under the Direction of Industry. It has a small library with a collection of technical documents, including documents from international institutions. No current scientific journal is available. The publications which the industrial information service used to publish and disseminate are no longer available due to lack of funds. Information enquiries and contacts are recorded in a manual file. The future of the industrial information service is uncertain due to a pending restructuration of the MINDIC.

Staff:

MINDIC/DI industrial information service is manned by an economist who is in charge of the service and two statisticians but no trained information specialist.

Computing equipment:
The information service has a PC computer.

Software and computer applications:
A bibliographic database has been developed under Micro CDS/ISIS, following the format of MIEC bibliographic database.

Other equipment:
A photocopier is available.

Information users and information needs:
Information users come mainly from public institutions. However, various users, including individuals who wish to start a small business, consult the information service.

**Proposed development for INTIB network**

INTIB NFP was transferred from CAPME to MINDIC/DI in 1992. However, MINDIC industrial information service, which is also the focal point for MIEC, has not been very active in developing neither MIEC nor INTIB systems. Getting through to the public sector has not really materialized. Consequently, it would be advisable to relocate INTIB NFP to a more commercially minded institution such as the Chamber of Commerce. However, it will take two years before the Chamber is rehabilitated. In the meantime, INTIB NFP could be taken over by a current UNDP/ILO project in Douala, AFREDI RAF/87/145, aiming at encouraging the creation of SMIs in Cameroon. The project includes the establishment of an information system manned by an information specialist. This could be an opportunity to establish an autonomous industrial and technological information service able to commercialize information products and services and to make the service viable.

INTIB network can be based on the structure and the work initialized by MIEC. INTIB nodes could be selected among MIEC most pro-active institutions and among institutions more geared towards technological development and SMIs, in particular SNI, FOGAPE, SYNDUSTRICAM, IRA/IRZV, CCEY, AGRO-PME, ENSP, CNDT, OAPI.

## I. Characterization of the national industrial and technological information scene in Zambia

National policy on scientific and technological information:

There is no national policy on scientific and technological information in Zambia. However, a document on policy implementation prepared by the Zambia Library Association and revised by UNESCO was submitted to the Government, in which UNESCO recommended the creation of a national library. As a result, the Zambia Library Service Bill was drafted and recently submitted to Parliament. Unfortunately, the bill concerns only public libraries but not scientific information services.

Telecommunications facilities:

At present, the quality of telephone lines is inadequate for data communications. However, the Post and Telecommunications Corporation (PTC) is currently installing digital telephone lines in the Lusaka area. The international telephone exchange is also in the process of being digitalized. No packet switching system is available yet.

Background to industrial and technological information in Zambia:

In Zambia, scientific and technological information is scattered and lacks coordination. Zambia has no national library therefore no coordinating body for scientific information activities. Networking has only started to take off the ground with the information network for agricultural research which is coordinated by the Agricultural Research Library.

Few libraries and information centres provide industrial and technological information in Zambia. Fewer still are computerized. Furthermore, there is a shortage of computer literate staff among information specialists. Basic training, particularly training in database management systems and in the use of Micro CDS/ISIS, is urgently required. The following institutions were identified as industrial and technological information providers:

- Small Industries Development Organization*
- Central Statistical Office*
- Zambia Confederation of Industries and Chambers of Commerce*
- Ministry of Commerce and Industry*
- Technological Development Advisory Unit*
- Companies, Trademarks, Patents and Registered Design Office*
- Preferential Trade Area for Eastern and Southern African States*
- Development Bank of Zambia
- Bank of Zambia*

- Small Enterprises Promotions

Institutions marked with * were visited during the mission.

**Small Industries Development Organization (SIDO):**

SIDO, which was created in 1981, is charged with the responsibility of formulating, coordinating and implementing national policies and programmes related to the promotion and development of SMIs in the country. SIDO is in the process of establishing an industrial information service with the assistance of IDRC. Project oriented data, in particular project profiles, technological information and marketing information, is collected and processed on the PC which was donated by the IDRC project. Several databases have been developed under Micro CDS/ISIS, such as a database on project profiles, a database on industrial information sources, a database on appropriate technology sources, and a database on industrial enterprises. SIDO is also the national focal point for the UNIDO Energy and Environment Information System (EEIS) database. Information is disseminated to public institutions but also to SIDO's partners, in particular to SMIs from the private sector. SIDO is aiming at running its industrial information service on a commercial basis.

**Central Statistical Office (CSO):**

CSO has three branches: the social branch, the economic branch and the agriculture & environment branch aiming at producing national statistics, in particular the national accounts, external trade figures, balance of payment statistics, public finance, industrial and agricultural production figures, the national and the agricultural census. A number of these activities are computerized. However, the industrial statistical division has not been computerized and little industrial data is available. Data on large companies has been collected since 1990 but not processed. The publications produced by CSO are available to public free of charge and to private institutions at a minimal fee.

**Zambia Confederation of Industries and Chambers of Commerce (ZACCI):**

ZACCI exists to promote the national interest in the areas of commerce and industry. Its role has become crucial since Zambia has switched to a free market economy. ZACCI represents the business community on the following national bodies: Commercial Farmers'

Bureau, Export Board of Zambia, Prices and Income Commission, SIDO, Zambia Agricultural and Commercial Show, Zambia Bureau of Standards, Zambia International Trade Fair, Zambia Iron and Steel Authority and Zambia National Trades Facilitation Committee. ZACCI has started an information service with the financial support of UNDP which includes a computerized database on Zambian company profiles using FOXBASE software, the publication of a newsletter where business opportunities are publicized and a small library.

**Ministry of Commerce and Industry:**

The Ministry of Commerce and Industry has a weak information base. It has no library. A UNIDO project aiming at establishing an industrial database did not materialize due to lack of staff. However, the Ministry is being reorganized and the new organigramme should include a statistical and data processing unit.

**Technological Development Advisory Unit (TDAU):**

TDAU is located at the University. It acts as partner to Government and Non-Governmental Organizations, international organizations and private entrepreneurs who want to introduce new technologies in Zambia. The unit gives technical assistance in the testing and redesigning of equipment to suit the Zambian conditions. TDAU also assists in doing market and feasibility studies and in the dissemination of technologies. It is part of the SATIS network. It has a well stocked and well organized library specializing in adapted technologies. Publications which include products leaflets, research reports, a newsletter and technological surveys are disseminated widely, exchanged at international level and sold to the private sector. The library and enquiry service, manned by one staff, is not yet computerized, although this has been planned. TDAU publications are scanned and indexed by The National Council for Scientific Research Information Service.

**Companies, Trademarks, Patents and Registered Design Office:**

The Office is the legal registry of companies and the depository of trade marks, patents and design. It has no library and no computerized system.

**Bank of Zambia:**

The Bank of Zambia has a comprehensive library with a collection of documents on banking and economics, documents from CSO and Bank of Zambia publications. It is the official depository of IMF/WORLD Bank publications. The library is not computerized. It is used mainly by Bank staff but also by students and external users at the librarian's discretion.

**Preferential Trade Area for Eastern and Southern African States (PTA):**

The PTA General Secretariat is located in Lusaka. Although its main activities concern trade, the PTA Secretariat is also concerned with technologies. PTA General Secretariat coordinate the TINET network. A UNDP/UNIDO project allowed to initiate an industrial information database. It is hoped that the second phase of the project will allow to collect and process further data from PTA member countries in order to implement regional databases, in particular an expert database, an investors database, a project database and a database on industrial standards.

Review of the situation concerning INTIB Industrial and Technological Information Network

**INTIB National Focal Point:**

The National Council for Scientific Research has been INTIB NFP since 1988. NCSR is a Government body whose objective is to coordinate science and technology related to research in Zambia. NCSR advises the Ministry of Science and Technology and Vocational Training on policies for science and technology. NCSR Information Services Unit was established to back up research activities. It includes four sections: the library section, the documentation section, the publishing section, and the cartographic analysis section. The documentation section offers a number of services, in particular an enquiry service and a document procurement service. Reviews or state of the art reports are produced at request. An SDI service used to supply regular updates to 44 clients. However, this service was stopped earlier this year when the section lost several members of staff. The following publications are regularly produced and disseminated: the library catalogue, Zambia Scientific Abstracts, a bibliographic record of publications on Zambia and by Zambians available in Zambian, Zambia Journal of Science and Technology, where scientific articles are published. These publications are very valuable for three major reasons: they create awareness among scientists, they allow the acquisition of 40 foreign journals on an exchange basis and they are a source of income.

INTIB databases were used successfully until the INTIB computer broke down due to a power problem in the absence of a UPS. Consequently, INTIB files were lost. When the computer was repaired, INTIB files were not reinstalled. At present, only UNIDO industrial enquiry service is still used occasionally.

Staff:

NCSR Information Services have 3 professional staff. They have recently lost several members of staff due to an early retirement schedule. The Head of the Information Services is a scientist. His assistant is a graduate in information science from Sheffield University. She is familiar with computer technology, which is not the case of her colleagues who have not received any formal computer training.

Computer equipment:

NCSR Information Services Unit has 5 PC computers. One was acquired by the INTIB project, one has recently been donated by UNEP for the INFOTERRA databases and the others were purchased by the Council. An E-mail system is in process of being installed. A CD-ROM is also available although it is not operational due to a problem with the interface card.

Software and computer applications:

Micro CDS/ISIS and Q & A are available for DBMS purposes. WP is used for most publications. The above mentioned publications are compiled from corresponding databases implemented under Micro CDS/ISIS. Furthermore, a database on local journal clippings, a union list of scientific and technical journals available in 10 Zambian research institutions and a file on scientists in the country are available. NCSR being the national focal point for INFOTERRA, it has acquired the INFOTERRA database under Micro CDS/ISIS and the Irish environmental database under Q & A.

Other equipment:

A photocopier is available at the library.

Information users and information needs:

The majority of information users are researchers and academics. However, members of Government institutions and of the private sector also use the enquiry service. NCSR publications give it a certain amount of publicity resulting in frequent requests for foreign literature. The distant location of NCSR from the city centre is perhaps a drawback.

**Proposed development for INTIB Network**

NCSR has a well established information and enquiry service and, in spite of the recent loss of staff, has performed satisfactorily. NCSR is well suited to coordinate INTIB network activities in close cooperation with the following institutions which have been identified as potential nodes: Small Industries Development Organization (SIDO), Technological Development Advisory Unit (TDAU), Zambia Confederation of Industries and Chambers of Commerce (ZACCI), Ministry of Commerce and Industry, and Preferential Trade Area for Eastern and Southern African States (PTA).

## J. Characterization of the national industrial and technological information scene in Zimbabwe

National policy on scientific and technological information:

Zimbabwe has no national industrial and technological information policy.

Telecommunications facilities:

A packet switching system is available in Zimbabwe using the x.25 telecommunications protocol.

Equipment suppliers:

Zimbabwe has a host of computer dealers which are reliable and which can provide satisfactory technical assistance.

Background to industrial and technological information in Zimbabwe:

Zimbabwe has a number of scientific libraries which are located both in public and autonomous institutions. However, few have a fully developed computerized system. A Micro CDS/ISIS users' group has been set up. A national network, SCINET, coordinated by the National Library, exists only on paper at this stage. An agricultural information network is coordinated by the Ministry of Lands, Agriculture and Water Development. A private information dealer, Greymatter, has embarked on a commercial venture to provide information to the general public.

Industrial and technological information is located mainly in parastatal and autonomous institutions. Privatization and competition are strong in Zimbabwe and the result is that information is dispersed, uncoordinated. Furthermore, trade information seems to prevail over technological information. The following institutions have been identified as key industrial and technological information sources:

- Scientific Industrial Research and Development Centre*
- Technology Information Promotion System*
- Confederation of Zimbabwe Industries*
- Zimtrade*
- Indigenous Business Development Centre*
- Standards Association of Zimbabwe*
- Patent Office of Zimbabwe*
- African Regional Industrial Property Organization*
- Zimbabwe Investment Centre
- Research Council Library

Institutions marked with * were visited during the mission.

Scientific Industrial Research and Development Centre (SIRDC):

SIRDC is a newly established research and development institution whose role is to advise industry on technological matters. SIRDC has published the first issue of a newsletter which will be distributed widely among Government institutions and Zimbabwe industries. Information is one of SIRDC basic requirements: an industrial information unit will start in January 1994 with 1 staff and will expand when the institution moves to new premises. The TIPS programme, described below, may be transferred to SIRDC. SIRDC is planning to use the x.25 telecommunication link to have access to international databases.

**Technology Information Promotion System (TIPS)**

TIPS is an information network aiming at collecting, processing and dissemination technological and trade information among developing countries. The system is operated by DEVNET, an NGO created by the newsagency Inter Press Service based in Rome, under supervision of UNDP. The network operates in 16 developing countries in Africa, Asia and Latin America. The system collects daily data on trade, business opportunities, technology, products, equipment and services and disseminates 14 sectoral bulletins and newsletters to its subscribers. In Zimbabwe, 200 companies currently subscribe to TIPS. TIPS is planning to diversify the services of the system into query services, indices and catalogues.

**The Confederation of Zimbabwe Industries (CZI)**

CZI is a voluntary organization funded by members on a sliding scale based on turnover and number of employees. CZI advises their members on all trade and development issues in the country. CZI's partners are politicians, policy makers, business communities, trade organizations, commercial and industrial agencies. CZI publishes the Trade Bulletin, The Industrialist and the Industrial Review Magazine in which business opportunities are promoted. CZI has a library and is planning to implement a computerized information system in 1994.

Zimtrade

Zimtrade is the national trade development organisation responsible for promoting and expanding Zimbabwe's international trade. It has a dynamic trade and marketing information service which is the national focal point for TINET and a node for SITTDEC.

Computerized databases include a company register using a home-made programme. A bibliographic file has been planned but, unfortunately, Micro CDS/ISIS, which is not considered to be user friendly, will not be used. Databases on CD-ROM are available, in particular ABI Inform, Predicasts and Trade Fair database. The trade information service handles trade enquiries, disseminates trade opportunities and publishes an annual export directory and sectoral export directories, a monthly newsletter and new exporters guides. An E-mail system is used for international information enquiries.

**Indigenous Business Development Centre (IBDC)**

IBDC is an NGO aiming at developing and promoting small and medium scale businesses. It was created by a group of indigenous businessmen who faced problems of sourcing finances and who lacked managerial skills to start up their projects. It is mainly financed by its members. The inaccessibility to technological and market information is one of the major problems encountered by SMIs. For this purpose, IBDC is planning to set up a library and computerized information system with, initially, a database on member profiles and a statistical database concerning the creation of enterprises which would provide background information for the preparation of a national strategic programme aiming at developing Zimbabwe SMI building capacity.

**Standards Association of Zimbabwe (SAZ)**

SAZ is a member of ISONET. SAZ produces Zimbabwe standards which can be new standards or foreign standards adapted to Zimbabwe requirements. SAZ has a well established library with a collection of 400 Zimbabwe standards and British, South African, American and ISO standards. The library has acquired a PC equipped with a CD-ROM reader which is used mostly for CD-ROM applications (Perinorm and Worldwide STD Service). A bibliographic database is planned and a LAN will soon interconnect SAZ computers.

**Patent Office of Zimbabwe**

The Patent Office of Zimbabwe is the national depository for patents, trade marks and industrial designs. The majority of patents are foreign and only 50 patent applications per year are from Zimbabwe. Manual index cards and manual registers are still used to keep a record of the patents. A PC is available and is used for searching EPO database on CD-ROM.

**African Regional Industrial Property Organization (ARIPO)**

ARIPO was set up in 1976 by the Lusaka Agreement whose objectives are to promote, harmonize and develop the industrial property system in the region. The 1982 Harare Agreement gave ARIPO the right to grant patents and register industrial designs on behalf of the member States. ARIPO has currently 14 members from African English speaking countries. ARIPO has concentrated on international cooperation through which mutual exchange of information and documentation can be achieved, in particular within the SADC region, with WIPO, EPO, ARCT and OAPI. WIPO donated a work station comprising a 40 Mb PC, a CD-ROM reader, a laser printer and a monochrome high resolution screen as well as the complete collection of WIPO/EPO databases on CD/ROM, to the Patent Documentation and Information Centre. Three more PCs are available on which AFPAT, a bibliographic database recording African patents since 1976, and SEARCH, a database on patent enquiries, have been developed using Micro CDS/ISIS. Documents and journals are received from various countries on an exchange basis. The number of information enquiries has grown considerably since 1990. The enquiry service provides general information on patents and does state-of-the art searches, novelty searches and bibliographic data searches. Searches on the use of expired patents have also been carried out on specific subjects.

Review of the situation concerning INTIB Industrial and Technological Information Network:

**INTIB National Focal Point:**

The Department of Technology, located at the Office of the President and Cabinet, is INTIB National Focal Point. The Department of Technology used to be part of the Ministry of Industry. It is an advisory body which facilitates research and development in Zimbabwe. It provides, inter alia, direct services and supervision to the Research Council which coordinates research activities in Zimbabwe. When the Department of Technology was transferred to the Office of the Cabinet, INTIB NFP followed. It is also the national focal point for TIES and for SITTDEC.

Staff:

The Department of Technology has no information specialist. The Deputy Secretary supervises the information system.

Computing equipment:

The Department of Technology has a high capacity computer donated by the SITTDEC project with an E-mail access to SITTDEC nodes.

Software and computer applications:

INTIB databases have not been used much: the INTIB data available at the Department of Technology is considered to be obsolete and out of context and does not correspond to Zimbabwe requirements. However, Harare hosted Techmart in 1992 which was a great success. For this occasion, they prepared a comprehensive database on technology offers and technology requests from which they have published an inventory.

Information users and information needs:

Information users are mostly researchers and, indirectly industrialists.

**Proposed development for INTIB network:**

The Department of Technology is part of the Office of the President and Cabinet. At present, part of the research and development activities which it used to carry out when it belonged to the Ministry of Industry are being progressively transferred to the newly created Scientific Industrial Research and Development Centre. Consequently, when SIRDC information service is established in 1994, it would be advisable to transfer INTIB NFP to SIDRC which is most suited for industrial and technological information activities in Zimbabwe. The institutions visited during the mission have shown interest for INTIB network. Therefore, the industrial and technological network may include the Scientific Industrial Research and Development Centre (SIRDC), the Technology Information Promotion System (TIPS), the Confederation of Zimbabwe Industries (CZI), Zimtrade, the Indigenous Business Development Centre (IBDC), Standards Association of Zimbabwe (SAZ), Patent Office of Zimbabwe, the African Regional Industrial Property Organization (ARIPO) and eventually Zimbabwe Investment Centre and the Research council Library.

## II. UTILIZATION OF PROJECT RESULTS

The purpose of the report, prepared by the international consultant in close cooperation with national consultants who were nominated to assist in the preparation of the report, is to assess the national industrial and technological information scene in ten African countries, Egypt, Sudan, Kenya, Tanzania, Senegal, Ghana, Nigeria, Cameroon, Zambia and Zimbabwe in the frame of the project INTIB/Africa industrial and technological information network, phase I, preparatory work, in order to provide background information for the preparation of a project document for the possibility of networking among INTIB participants and provide guidance to INTIB National Focal Points for the spread use of industrial and technological information. The assessment report includes characterization of the national industrial and technological scene in the participating countries as well as findings concerning the existing technological and industrial information facilities, the availability of hardware/software and their compatibility with UNIDO/INTIB systems.

# ANNEX 1

## TERMS OF REFERENCE

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

# JOB DESCRIPTION

Post title. Documentation and Information Systems Consultant

Duration: 4 Months

Date Required: May 1993

Duty Station: RAF (INTIB National Focal Points At Egypt, Sudan, Kenya, Tanzania, Sénégal, Ghana, Nigeria, Cameroon, Zambia and Zimbabwe)

Purpose of the Project: The project is intended to establish basis for industrial and technological information systems covering communication hardware and software, in order to enhance the information flow within, to and from the African countries including possibilities for the establishment of national and sub-regional INTIB networks with appropriate linkages to the international information systems.

Duties: To prepare assessment report including characterization of the national industrial and technological information scene in 10 African countries as well as findings concerning the existing technological and industrial information facilities and availability of software and hardware and their compatibility to UNIDO/INTIB systems.

To prepare project document for possibilities of networking and cooperation among participants and to provide guidance to INTIB National Focal Points (NFPs) for the spread use of industrial and technological information.

Qualifications: University degree in industrial and technological information.

English and French

Responding to the highly globalized and competitive market, manufacturing has undergone rapid changes and due to Africa's exposure to this market, many firms in the African continent are awaken up to the need to upgrade and standardize their products. The exposure of many African countries to personal computers and telecommunications networking is also making them know that an industrial service is not only feasible but is also a necessity.

Industrial Information is useful to different people: manufacturers, investors, traders, government policy makers, students, academicians and researchers. The information service will have to focus primarily on people engaged directly in industry decision making, namely the manufacturers, investors and traders. In addition, it will also try to reach government policy makers and regulators, industrial information agencies, and industry, technology and trade associations. The number of existing users and the frequency of demand for information seem to be closely linked to the level of industrial development achieved in the country.

Those countries at the early stages of industrial development - and this is very much the case in Africa - are the least sensitive o the role that industrial and technological information plays in supporting their decisions. The need for industrial and technological information is then transformed into active demand with clear priorities as to the type of information expected from the information services and centers.

## ANNEX 2

## LIST OF PERSONS MET DURING THE MISSION

**Egypt:**

INTIB National Focal Point:
Eng. Nagwa Zayed, National Consultant, Head of Industrial Information Centre

Dr. Mahmoud Y. Saada, Vice-President, Academy of Scientific Research and Technology
Ms. Tahany M. Osman, General Director of Technical Information Department, ASRT
Eng. Esam Niazy, Chief R&D section, Textile Industries Holding Co., Director General, Fashion & Design Centre
Prof. Dr. Adel S. Abdel-Khalik, Professor of Mining Engineering and Rector, Tabbin Institute for Metallurgical Studies
Prof. Dr. Mohamed Hilal, President, Egyptian Organization for Standardization and Quality Control
Eng. Samia El Azazy, Managing Director, R&D Department, EOS

**Sudan:**

Dr. Tag El Sir Mustapha, Minister of Industry

INTIB National Focal Point:
Dr. M. El Amin A. Rahman, Director General, Industrial Research & Consultancy Centre (IRCC)
Dr. El Hag A. El Hag, National Consultant, Director of National Industrial Information Centre, IRCC
Ms. Amal M. Rabbah, National Consultant, Senior Researcher, National Industrial Information Centre, IRCC
Mr. Siddig A. Rahaman, National Consultant, Researcher, National Industrial Information Centre, IRCC

Prof. Faysal T. Abushama, Director, National Centre for Research
Dr. Cecile Wesley, Director of National Documentation and Information Centre, National Centre for Research
Mr. A. Izzel Arab Yousif, Director General, Sudanese Chambers of Industries Association
Dr. Mohamed K. Jageer, Director General, Investment Public Corporation
Mr. Mirgani Dafullah Ahmed, Director of Research Information Department, Investment Public Corporation
Mr. Mohamed Abed El Hamed, Deputy Director of Technical Assistance Department, Ministry of Economic Planning and Investment
Ms. Aalam Siddig, Assistant Director of Computer Section, Ministry of Economic Planning and Investment
Mr. Mohmed Salih Fadl, Deputy Managing Director, Agricultural Bank of Sudan
Mr. Mohamed Osman Malhki Arabi, Director of Computer Division,

Agricultural Bank of Sudan
Mr. Abdel Moneim A. Ali, Director of Trade Information Centre, Ministry of Commerce, Cooperation and Supply
Mr. Ismagl Ibrahim, Ag. General Manager, Industrial Development Bank of Sudan
Mr. Omer M. Mgkki, Manager of Data Processing Department, Industrial Development Bank of Sudan
Mr. Mohd Elmahi, Director of Research Department, Industrial Development Bank of Sudan
Dr. Siddig Naser, Director, Statistical Department
Prof. Abdulla F. M. Ali, Deputy Director, Food Research Centre
Eng. M. R. El Hakim, Director, National Energy Administration, Ministry of Energy and Mining
Dr. Omar A. Fadlalah, Director of National Information Centre, Institute of Strategic Studies

**Kenya:**

INTIB National Focal Point:
Mr. J.M. Mong'oni, Ag. Director, Kenya Industrial Research and Development Institute
Mr. H.I. Lumala, Principal Administrative Officer, KIRDI
Mr. Paul B. Imende, Chief Librarian, KIRDI
Mr. Clement W. Kabiru, National Consultant, Information Specialist, KIRDI

Mr. Andanje, Engineer, Kenya Posts & Telecommunications Corporation
Eng. J.E. Owino-Okwero, Assistant Director, Kenya Bureau of Standards
Mr. Francis W.M. Ochola, Principal Documentation Officer, Kenya Bureau of Standards
Mr. Patrick O. Ombori, Ag. Librarian, Jomo Kenyatta University College of Agriculture and Technology
Mr. Wilfred J. Mkoji, Librarian, Kenya Utalii College
Ms. Nellie Mwawaka, Librarian/Documentalist, Investment Promotion Centre (IPC)
Ms. Linda Spencer, Deputy to the Director & Chief of Network Development, Infoterra Programme Activity Centre, United Nations Environment Programme (UNEP)
Ms. J. Were, Librarian, University of Nairobi, College of Agriculture and Veterinary Science, Nairobi University
Mr. Peter Matanji, Librarian, Faculty of Commerce, Nairobi University
Mr. Charles Kimani, Librarian, Central Bank
Ms. I.N. Wanyaga, Librarian, Industrial and Commercial Development Corporation (ICDC)
Ms. Lucy W. Kinyangui, Principal Librarian, Kenya Polytechnic
Ms. N. Kaman, Librarian, Kenya Polytechnic
Mr. E.M. Kamumbu, Librarian, Kenya Agricultural Research Institute (KIRDI)
Mr. Solomom K. Kuria, Department of External Trade, Ministry of Commerce and Industry
Ms. Penninah Warjiru Muturi, Librarian, Department of Industry, Ministry of Commerce and Industry

Ms. Rose Ondego, Librarian, Kenya Commercial Bank
Mr. Julius Shimanyula, Librarian, Kenya Industrial Estates Limited
Ms. Edith K. Muthigani, Chief Science Secretary, National Council for Science and Technology
Mr. S. K. Ng'ang'a, Director, Kenya National Library Services (KNLS)

Tanzania:

INTIB National Focal Point:
Mr. Paul K. Haule, Director General, Tanzania Industrial Research and Development Organization (TIRDO)
Mr. Anthony Y. Kiyanga, Director of Administration and Finance, TIRDO
Prof. R. Claussnitzer, Director of Research and Development, TIRDO
Ms. W. Nyonyi, Head of Industrial Information Centre, TIRDO

Dr. Sheya, Director, Centre of Technology, Development and Transfer Tanzania Commission for Science and Technology (COSTECH)
Mr. Theophilus E. Mlaki, Director Information and Documentation, Tanzania Commission for Science and Technology
Mr. Emrod Elisante, Development Engineer, Institute of Production Innovation (IPI), University of Dar es Salaam
Dr. J. M. Newa, Chief Librarian, University Library, University of Dar es Salaam
Mr. Adam K. Msilaji, Senior Trade Information Officer, Board of External Trade
Mr. Hermemegild Haule, Librarian, Tanzania Investment Bank (TIB)
Mr. S.M.S. Mkumba, Principle Executive Engineer, Tanzania Post & Telecommunications (TP&TC)
Mr. Alfred Sagoe, Trade Information Officer, UNDP Project, Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA)
Mr. Emmanuel D. Ole Naiko, Investment Services Division, Investment Promotion Centre
Mr. C.M.N. Ntabajana, Manager Planning and Strategy, Small Industries Development Organization (SIDO)
Mr. A.J. Chillumanga, Senior Industrial Economist, Ministry of Industries and Trade
Mr. Sange Mbaruku, Head of Industrial Section, Bureau of Statistics
Mr. Charles A. Mandara, Section Head, Information Centre, Tanzania Industrial Studies and Consulting Organization (TISCO)
Mr. Nashon. N. Maingu, Chief Public Relations Officer, Tanzania bureau of Standards (TBS)
Ms. Edna Msumba, Chief Librarian, TBS
Mr. S.S. Kabogota, Head of Mechanical Engineering Section, TBS
Mr. William Sangiwa, Computer Expert, Muhimbili Computer Centre, Muhimbili Medical College
Ms. S. Shao, Librarian, Tanzania Food and Nutrition Centre (TFNC)

Senegal:

INTIB National Focal Point:
Mr. H.M. Ly, President, SONEPI
Mr. Cisse, Head of Industrial Information and Training Service
Mr. M. Bah, Documentalist, Industrial Information Division
Mr. M. Diakhate, Engineer, Technical Studies Division

Mr. M. Nageri, Director of Scientific and Technological Information Division, African Regional Centre for Technology (ARCT)
Mr. M. F. Diagne, Director, CNDST
Ms. D. Dieng, Head of Documentation Service, Chambre de Commerce, d'Industrie et d' Agriculture de Dakar
Mr. M. Wilane, Manager of Communication and External Relations Division, Institut Senegalais de Normalisation
Mr. A. M. Dieng, Manager of Industrial Propriety and Technology Division, Ministère de l'Energie, des Mines et de l'Industrie
Mr, Cheikh Dioum, Director of Studies, Fonds de Promotion Economique
Mr. B. Fall, Head of Centre Unique de Collecte d'Information, Direction de la Prevision et de la Statistique
Mr. M. Ndiaye, Documentalist, Institut de Technologie Alimentaire
Mr. M. Guey, Manager of SYMPA Information System, Direction de l'Industrie, Ministère de l'Energie, des Mines et de l'Industrie
Mr. T. Cisse, Director of Polyconsult Engineering
Mr. Dieng, Manager of SENPAC Centre, SONATEL
Mr. N. Kane, Head of Public Relations Division, Guichet Unique, Ministere de l'Economie, des Finances et du Plan
Mr. M. Faye, Director, Cellule de Restructuration Industrielle, Direction de l'Industrie, Ministère de l'Energie, des Mines et de l'Industrie
Mr. Thomas, Directeur du projet Cellule d'Appui a l'Environnement des Enterprises
Mr. Ndiaye, Directeur du projet Appui au Développement du Secteur Privé, Primature
Mr. Diop, Documentalist, Direction du Commerce Extérieur

Ghana:

INTIB National Focal Point:
Prof. Alhassan, Director General, Council of Scientific and Industrial Research
Mr. J.A. Villars, Acting Director, National Science and Technology Library and Information Centre, Council of Scientific and Industrial Research

Ms. A. Andah, Ag. Director, Food Research Institute
Ms. A. Amoaka-Mensah, Director, Industrial Research Institute
Mr. S.K. Dotse, Project Engineer, Development and Application of Intermediate Technology
Ms. H. G. Woanyah, Director Industry, Ministry of Trade and Industry
Mr. Brown, Librarian, Ghana Investment Centre
Ms. Ansah, Librarian, Ghana Export Promotion Council

Mr. J.B. Amanfu, Executive Secretary, Ghana National Chamber of Commerce
Mr. Adjebu, P&T Corporation
Mr. R. Buatsi, Head Socio-Economic and Communication Division, Ghana Regional Appropriate Technology Industrial Service
Dr. E.K. Abaka, Executive Director, National Board for Small-Scale Industries
Mr. G. Esegbey, Scientific Secretary, Policy Research and Strategic Planning Institute

**Nigeria:**

INTIB National Focal Point:
Prof. S.A. Odunfa, Director/Chief Executive, Federal Institute of Industrial Research Oshodi (FIIRO)
Mr. Sodipe, Assistant Director, Federal Institute of Industrial Research Oshodi

Mr. A.O. Teriba, Principal Research Officer, Lagos Chamber of Commerce and Industry
Mr. D. Abiola, Assistant Controller, Nigeria Industrial Development Bank Limited
Eng. T.A. Adebanjo, Head, Customers Service, Nigeria Telecommunications
Mr. G. Chikwendu, Consultant Computer System Management, National Databank, National Planning Commission
Mr. Thompson, Head of Computer Unit, Raw Materials Research and Development Council
Prof. J.A. Abalaka, Director General, Standards Organization of Nigeria
Dr. T.I. Obiaga, Coordinating Director for Engineering, National Agency for Science and Engineering Infrastructure (NASENI)
Mr. Olayinka, Assistant Chief Analyst, National Office for Technology Acquisition and Promotion (NOTAP)
Mr. Y. Ade Adedigba, Head, Library and Documentation Centre, International Institute of Tropical Agriculture (IITA)
Ms. P.O. Idahosa, Library/Documentation Officer, African Regional Centre for Engineering Design & Manufacturing (ARCEDEM)

**Cameroon:**

INTIB National Focal Point:
Mr. C. N'Donga, Directeur de l'Industrie, Direction de l'Industrie, Ministère du Développement Industriel et Commercial (MINDIC)
Ms. E. Liegue, National Consultant, Head of Industrial Information Service, MINDIC/DI

Mr. Belinga Betchem, Chef de la Division des Etudes, Direction des PME et de l'Artisanat, MINDIC/DPMEA
Mr. Ambassa Olinga François, Chef de la Division de la Formation et de la Communication, Société Nationale d'Investissement du Cameroun
Mr. N. Ghangueu, Chargé d'Etudes, Fonds d'Aide et de Garanties

aux PME (FOGAPE)
Ms. Jaillard, Representative, Syndicat des Industriels du Cameroun (SYNDUSTRICAM)
Ms. R. Kindi, Head of Documentation Service, Institut de la Recherche Agronomique (IRA)
Mr. Paul-André Desrosiers, Directeur Général, Centre de Création des Enterprises (CCEY)
Mr. N. Monkam, Directeur Général, AGRO-PME
M. Vermande, Directeur, Ecole Nationale Supérieure Polytechnique (ENSP)
Mr. J.M. Dzouali, Directeur des Etudes Statistiques, Direction de la Statistique
M. Sabou J. Traore, Patent Officer, Organisation Africaine de la Propriété Intellectuelle (OAPI)
Mr. Efa Fouda, General Secretary, Comité National de Développement des Technologies (CNDT)
Ms. Abenkou, Manager, Division des Etudes et de la Planification, Intelcam
Mr. Enombei, National Coordinator for Trade Information Network Project, Chambre de Commerce, d'Industries et des Mines du Cameroun (CCIM)
Mr. Hakim Hossenmamode, CTA, Project RAF/87/145, AFREDI

Zambia:

INTIB National Focal Point:
Prof. M.N. Siamwiza, Ag. Secretary General, National Council for Scientific Research
Mr. Mushipi, Head of Documentation and Scientific Information Centre, National Council for Scientific Research
Ms. N. Mweemba, Documentalist, Documentation and Scientific Information Centre, National Council for Scientific Research

Mr. M. C. Kaumba, Director of Projects, Small Industries Development Organization (SIDO)
Mr. C. Sapele, Head of Data Processing Division, Central Statistical Office
Mr. G.C. Chingwe, Computer Programmer, Zambia Confederation of Industries and Chambers of Commerce (ZACCI)
Mr. L.E.C. Banda, Ag. Director for Industry Department, Ministry of Commerce and Industry
Mr. R.E. Jere, Librarian, Technological Development Advisory Unit
Mr. G. Lipimile, Assistant Registrar, Companies, Trademarks, Patents and Registered Design Office
Mr. M. Sichilima, Statistician, Preferential Trade Area for Eastern and Southern African States
Mr. V. Mukuka, Librarian, Bank of Zambia

Zimbabwe:

INTIB National Focal Point:
Mr. I.C. Chiri, Deputy Secretary, Department of Technology, Office of the President and Cabinet
Ms. Kaganda, Senior Administrative Officer, Department of

Technology, Office of the President and Cabinet

Prof. C.J. Chetsanga, Director General, Scientific and Industrial Research and Development Centre (SIRDC)
Mr. C.M. Chokwenda, Director, Technology Information Promotion System (TIPS)
Ms. Ma-Lord T. Makaya, Manager of Trade Information Services, Zimtrade
Ms. S. Lupalila, Marketing Manager, Confederation of Zimbabwe Industries (CZI)
Ms. M. Zinyama, Executive Director, Indigenous Business Development Centre (IBDC)
Ms. Simpson, Divisional Director, Information Services, Standards Association of Zimbabwe
Mr. Manyonga, Senior Patent Examinor, Patents Office of Zimbabwe
Mr. Delaet, Technical Advisor, African Regional Industrial Property Organization (ARIPO)
Mr. G.H Sibanda, Senior Industrial Property Officer, ARIPO
Mr. Kiige, Information and Documentation Officer, ARIPO

## ANNEX 3

## MISSION SCHEDULE

18 - 28 June

Zurich - Cairo
Meeting with UNIDO country officer at UNDP Office
Meetings with Head of Industrial Information Centre, INTIB National Focal Point, and her staff
Meeting with Director General of the Fashion & Design Centre
Meeting with General Director of the Technical Information Department of the Academy of Scientific Research and Technology and her staff
Meeting with Rector of the Tabbin Institute for Metallurgical Studies and information service staff
Meeting with Managing Director of R Ş D Department of the Egyptian Organization for Standardization and Quality Control

28 June - 10 July

Cairo - Khartoum
Meeting with UNIDO Secretary and UNDP Deputy Resident Representative at UNDP Office
Meetings with Director General, Industrial Research & Consultancy Centre
Meetings with Head of National Industrial Information Centre, INTIB Focal National Point, and his staff
Meeting with Minister of Industry
Meeting with Director of the National Centre for Research and staff of the National Information and Documentation Centre
Meeting with Director General of Sudanese Chambers of Industries Association
Meeting with Director of Investment Public Corporation and Information centre staff
Meeting with Ag. General Manager of Industrial Development Bank
Meeting with Deputy Director of Technical Assistance Department, Ministry of Economic Planning and Investment
Meeting with Assistant Director of Computer Section, Ministry of Economic Planning and Investment
Meeting with Deputy Managing Director, Agricultural Bank of Sudan and with Director of Computer Division
Meeting with Director of Trade Information Centre, Ministry of Commerce, Cooperation and Supply
Meeting with Director of Food Research Centre (FRC)
Meeting with Director of National Energy Administration
Meeting with Ag. General Manager, Manager of Data Processing Department and Director of Research Department, Industrial Development Bank of Sudan

10 - 22 July

Khartoum - Nairobi
Meeting with Ag. Director, Kenya Industrial Research and Development Institute (KIRDI)
Meeting with Principal Administrative Officer, KIRDI
Meetings with Chief Librarian and with National Consultant, Information Specialist, KIRDI
Meeting with UNIDO Programme Officer
Meeting with Kenya Posts & Telecommunications Corporation Engineer
Meeting with Assistant Director and Principal Documentation Officer, Kenya Bureau of Standards
Meeting with Ag. Librarian, Jomo Kenyatta University College of Agriculture and Technology
Meeting with Librarian, Kenya Utalii College
Meeting with Librarian/Documentalist, Investment Promotion Centre
Meeting with Librarian of College of Agriculture and Veterinary Science, Nairobi University
Meeting with Librarian of Faculty of Commerce, Nairobi University

Meeting with Librarian of Kenya Institute of Administration
Meeting with Chief of Network Development, Infoterra Programme Activity Centre, United Nations Environment Programme
Meeting with Librarian, Central Bank
Meeting with Librarian, Industrial and Commercial Development Corporation
Meeting with Principal Librarian and Librarian, Kenya Polytechnic
Meeting with Librarian of Kenya Agricultural Research Institute
Meeting with Librarian of Kenya Forestry Research Institute
Meeting with Librarian of Department of Industry, Ministry of Commerce and Industry
Meeting with Librarian, Kenya Commercial Bank
Meeting with Librarian, Kenya Industrial Estates Limited
Meeting with Chief Science Secretary, National Council for Science and Technology
Meeting with Director, Kenya National Library Services

22 July - 5 August

Nairobi - Dar es Salaam
Meeting with UNIDO Country Director Assistant
Meeting with Director of Administration and Finance and Director of ResearchHead, Tanzania Industrial Research and Development Organization (TIRDO)
Meeting with Head of Industrial Information Centre, TIRDO
Meeting with Director of Centre of Technology and with Director of Information and Documentation, Tanzania Commission for Science and Technology
Meeting with Development Engineer, Institute of Production Innovation, University of Dar es Salaam
Meeting with Chief Librarian, University Library, University of Dar es Salaam
Meeting with Senior Trade Information Officer, Board of External Trade

Meeting with Librarian, Tanzania Investment Bank
Meeting with Principle Executive Engineer, Tanzania Post & Telecommunications
Meeting with Trade Information Officer, UNDP Project, Tanzania Chamber of Commerce, Industry and Agriculture
Meeting with Investment Services Officer, Investment Promotion Centre
Meeting with Manager Planning and Strategy, Small Industries Development Organization (SIDO)
Meeting with Senior Industrial Economist, Ministry of Industries and Trade
Meeting with Head of Industrial Section, Bureau of Statistics
Meeting with Head of Information Centre, Tanzania Industrial Studies and Consulting Organization (TISCO)
Meeting with Chief Public Relations Officer, Chief Librarian and Head of Mechanical Engineering Section, Tanzania Bureau of Standards (TBS)
Meeting with Computer Specialist, Muhimbili Computer Centre, Muhimbili Medical College
Meeting with Librarian, Tanzania Food and Nutrition Centre (TFNC)
Meeting with Director, TIRDO
Dar es Salaam - Zurich

15 - 30 October

Zurich - Dakar
Meetings with UNIDO Country Officer in Senegal
Meetings with Head of Industrial Information and Training Service, SONEPI
Meeting with SONEPI Director
Meeting with SONEPI Documentalist and Engineer responsible for information networks
Meetings with Head of Scientific and Technological Information Division, African Regional Centre for Technology (ARCT)
Meetings with Director of CNDST
Meeting with Head of Documentation Service, Chambre de Commerce, d'Industrie et d'Agriculture de Dakar
Meeting with Manager of Communication and External Relations Division, Institut Sénégalais de Normalisation
Meeting with Manager of Industrial Propriety and Technology Division, Ministry of Industry and Commerce
Meeting with Director of Studies, Fonds de Promotion Economique
Meeting with Head of Centre Unique de Collecte d'Information, Direction de la Prévision et de la Statistique
Meeting with Documentalist, Institut de Technologie Alimentaire
Meeting with Manager of SYMPA Information System, Direction de l'Industrie, Ministre de l'Energie, des Mines et de l'Industrie
Meeting with Director of Polyconsult Engineering
Meeting with Manager of SENPAC Centre, SONATEL
Meeting with Head of Public Relations Division, Guichet Unique, Ministere de l'Economie, des Finances et du Plan
Meeting with Director, Cellule de Restructuration Industrielle, Direction de l'Industrie, Ministère de l'Energie, des Mines et de l'Industrie
Meeting with Directeur, Cellule d'Appui a l'Environnement des

Enterprises
Meeting with Directeur, Appui au Développement du Secteur Privé, Primature
Meeting with Documentalist, Direction du Commerce Extérieur
Dakar-Accra journey delayed due to strikes in Senegal

**31 October - 6 November**

Dakar - Accra
Meeting with UNIDO UCD and JPO
Meeting with Acting Director, National Science and Technology Library and Information Centre, Council of Scientific and Industrial Research
Meeting with Director General, Council of Scientific and Industrial Research
Meeting with Ag. Director, Food Research Institute
Meeting with Director, Industrial Research Institute
Meeting with Project Engineer, Development and Application of Intermediate Technology
Meeting with Director Industry, Ministry of Trade and Industry
Meeting with Librarian, Ghana Investment Centre
Meeting with Librarian, Ghana Export Promotion Council
Meeting with Executive Secretary, Ghana National Chamber of Commerce
Meeting with Communications Director, P&T Corporation
Meeting with Head Socio-Economic and Communication Division, Ghana Regional Appropriate Technology Industrial Service
Meeting with Executive Director, National Board for Small-Scale Industries
Meeting with Scientific Secretary, Policy Research and Strategic Planning Institute

**7 - 17 November**

Accra - Lagos
Meeting with UNIDO Ag UDC and JPO
Meeting with Director/Chief Executive, Federal Institute of Industrial Research Oshodi (FIIRO)
Meeting with Assistant Director, Federal Institute of Industrial Research Oshodi
Meeting with Principal Research Officer, Lagos Chamber of Commerce and Industry
Meeting with Assistant Controller, Nigeria Industrial Development Bank Limited
Meeting with Head, Customers Service, Nigeria Telecommunications
Meeting with Consultant Computer System Management, National Databank, Federal Bureau of Statistics
Meeting with Head of Computer Unit, Raw Materials Research and Development Council
Meeting with Director General, Standards Organization of Nigeria
Meeting with Coordinating Director for Engineering, National Agency for Science and Engineering Infrastructure (NASENI)
Meeting with Assistant Chief Analyst, National Office for Technology Acquisition and Promotion (NOTAP)

Meeting with Head, Library and Documentation Centre, International Institute of Tropical Agriculture (IITA)
Meeting with Library/Documentation Officer, African Regional Centre for Engineering Design & Manufacturing (ARCEDEM)

17 - 29 November

Lagos - Yaounde
Meeting with Director of Industry, Direction de l'Industrie, MINDIC Meeting with National Consultant, Direction de l'Industrie, MINDIC
Meeting with Head of Studies and Promotion of Craft, MINDIC
Meeting with Head of Training and Communication Division, Société Nationale d'Investissement du Cameroun

Meeting with Chargé d'Etudes, Fonds d'Aide et de Garanties aux PME (FOGAPE)
Meeting with Representative, Union of Cameroon Industrialists (SYNDUSTRICAM)
Meeting with Head of Documentation Service, Institut of Research in Agronomy (IRA)
Meeting with Director, Centre for the Creation of Enterprises in Yaounde (CCEY)
Meeting with Director, AGRO-PME
Meeting with Director, Ecole Nationale Supérieure Polytechnique (ENSP)
Meeting with General Secretary, Comité National de Développement des Technologies (CNDT)
Meeting with Director of Statistical Studies, Direction of Statistics
Meeting with Patent Officer, African Organization for Intellectual Propriety (OAPI)
Meeting with Manager, Studies and Planning Division, Intelcam

Yaounde - Douala
Meeting with Trade Information Network Coordinator, Chambre of Commerce (CCIM)
Meeting with CTA, Project RAF/87/145, AFREDI

30 November - 2 December

Douala - Nairobi - Lusaka
Meeting with UNIDO UCD
Meeting with Ag. Secretary General, National Council for Scientific Research
Meeting with Head of Documentation and Scientific Information Centre, National Council for Scientific Research
Meeting with Documentalist, Documentation and Scientific Information Centre, National Council for Scientific Research
Meeting with Director of Projects, Small Industries Development Organization
Meeting with Head of Data Processing Division, Central Statistical Office
Meeting with Computer Programmer, Zambia Confederation of

Industries and Chambers of Commerce
Meeting with Ag. Director for Industry Department, Ministry of Commerce and Industry
Meeting with Librarian, Technological Development Advisory Unit
Meeting with Assistant Registrar, Companies, Trademarks, Patents and Registered Design Office
Meeting with Statistician, Preferential Trade Area for Eastern and Southern African States
Meeting with Librarian, Bank of Zambia

3 - 14 December

Lusaka - Harare
Meeting with UNDP Deputy Resident Representative in Zimbabwe
Meeting with Deputy Secretary, Senior Administrative Officer and Technical Officer, Department of Technology, Office of the President and Cabinet
Meeting with Director General, Scientific and Industrial Research and Development Centre
Meeting with Director, Technology Information Promotion System
Meeting with Manager of Trade Information Services, Zimtrade
Meeting with Marketing Manager, Confederation of Zimbabwe Industries
Meeting with Executive Director, Indigenous Business Development Centre
Meeting with Divisional Director Information Services, Standards Association of Zimbabwe
Meeting with Senior Patent Examinor, Patents Office of Zimbabwe
Meeting with Technical Advisor, Senior Industrial Property Officer, and Information and Documentation Officer, African Regional Industrial Property Organization

15 - 17 December

Harare - Vienna
De-briefing in Vienna
Vienna - Zurich.

## ANNEX 4

## BIBLIOGRAPHY

Technical report: Integrated Information Network (Egypt), by Mieczyslaw Muraszkiewicz, UNIDO, October 1991.

UNIDO project proposal: Strengthening the Department for Documentation and Industrial Information of the Industrial Research and Consultancy Centre (Sudan), UNIDO, September 1988.

Establishment of Industrial and Technological Information Bank (INTIB) National Focal Point in Kenya: Report prepared for UNIDO consideration under project RP/RAF/85/621/17-04/62.6Z, by Paul B. Imende, Nairobi, 1985.

The National Science and Technology Policy for Tanzania, United Republic of Tanzania, Ministry of Planning and Economic Affairs, 1985.

National Information and Informatics Policies in Africa: report and proceedings of a regional seminar held in Addis Ababa, Ethiopia, 28 November - 1 December 1988, IDRC, PADIS.

Federal Institute of Industrial Research, Industrial Information Centre, Phase II, Federal Republic of Nigeria: terminal report, based on the work of Erik I. Vadja, Industrial Information Advisor, UNIDO, May 1989.

Conception et mise en route d'un mécanisme pour l'information des enterprises de la Republique du Cameroun. Rapport technique: fin de la troisième et dernière phase, d'après l'étude de Mme A. David, CTA. et de M. N. Chuangueu, Responsable National du Projet, ONUDI, Septembre 1991.