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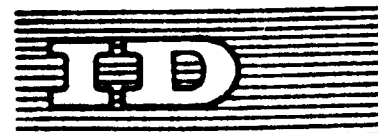
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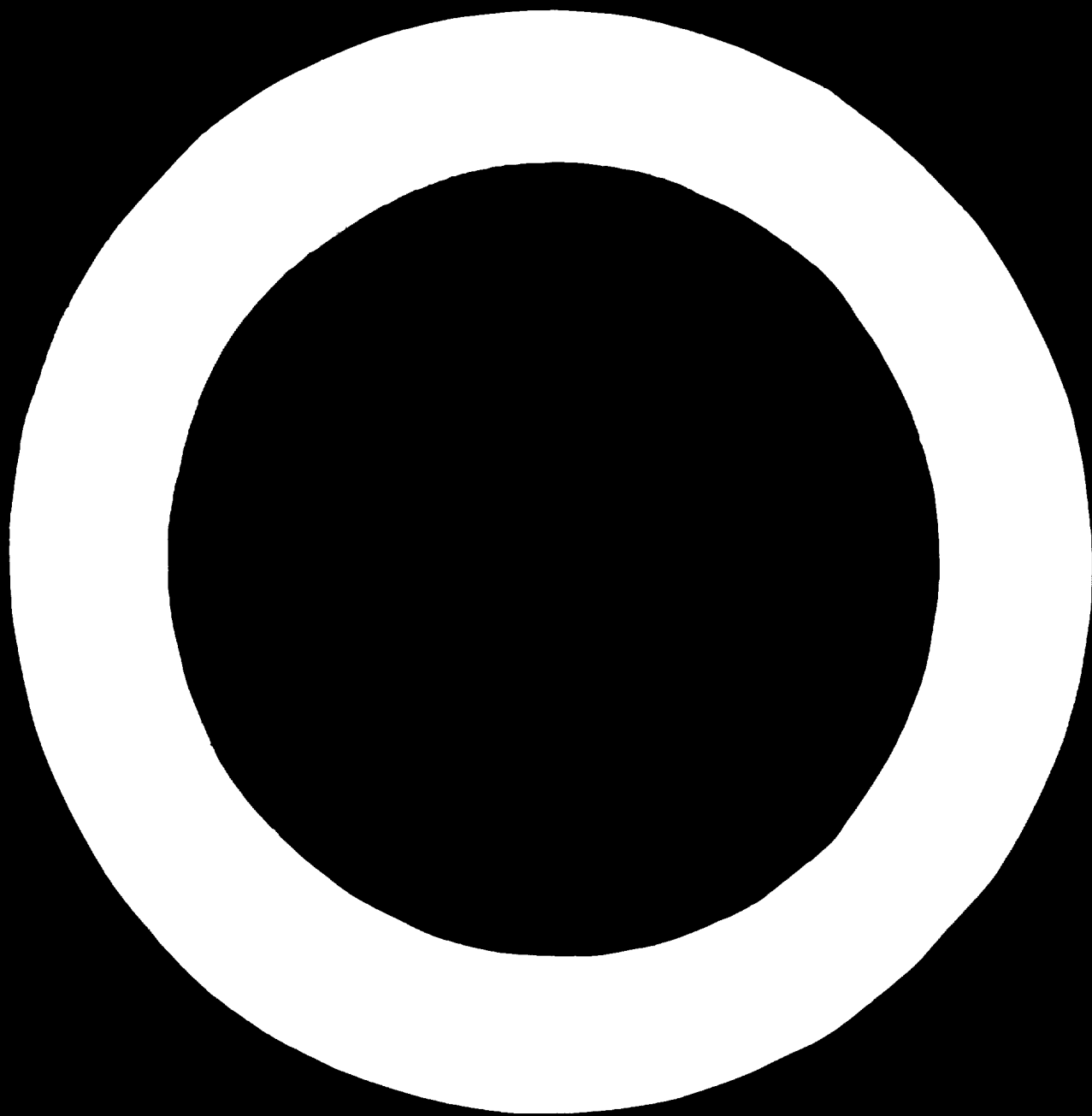
10th Session of the Advisory Committee on the
Application of the Science and Technology to Development

Vienna, Austria, 25 November - 6 December 1968

The Role of Science and Technology
in the Operational Approach and
other Work Programme Projects of UNIDO

Id. 68-3639

We regret that some of the pages in the microfiche copy of this report may not be up to the proper legibility standards, even though the best possible copy was used for preparing the master fiche.



The purpose of UNIDO, as formulated in General Assembly resolution 2152 of 17 November 1966 which established the Organization as an autonomous body within the United Nations, is to promote industrial development and assist in accelerating the industrialization of the developing countries with particular emphasis on the manufacturing sector. The functions of UNIDO, as set forth in the resolution of the Assembly, are to:

1. Encourage, promote and recommend national, regional and international action to achieve more rapid industrialization of developing countries;
2. Contribute to the most effective application in the developing countries of modern industrial methods of production, programming and planning, taking into account the experience of countries with different social and economic systems;
3. Build and strengthen institutions and the administration in the developing countries of industrial technology, production, programming and planning;
4. Disseminate information on technological innovations originating in various countries and assist the developing countries in the practical application of such information;
5. Assist, at the request of developing countries, in the formulation of industrial development programmes and in the preparation of specific industrial projects;
6. Aid in the regional planning of the industrialization of developing countries within their regional and sub-regional groupings;

7. Offer advice and guidance on problems relating to the exploitation and efficient use of natural resources, industrial raw materials, by-products and new products of developing countries;
8. Assist the developing countries "in the training of technical and other appropriate categories of personnel needed for their accelerated industrial development, in co-operation with the specialized agencies concerned";
9. Propose "measures for the improvement of the international system of industrial property, with a view to accelerating the transfer of technical know-how to developing countries";
10. Assist, at the request of developing countries, in obtaining financing for specific industrial projects.

As can be seen, science and technology impinge to some extent on almost all of these functions, and for a comprehensive review of the work programmes of UNIDO it would be necessary to go over the whole programme of work as described in the pertinent documents, e.g. those for 1968 and 1969 (ID/B/20, Rev.1 and ID/B/26) which were submitted to the 9th Session of the Committee. It may, however, best serve the purpose of the Committee to select a few areas of the work programmes of UNIDO, both current and for the near future, which are likely to be of interest to the Committee and in which close co-operation between the two bodies seems to be most warranted.

At the 9th Session of the Committee (STD/9/IB/Ann.2 of 8 April 1968), UNIDO referred to activities which fell within the framework of the World Plan of Action, i.e.

- a. transfer of technology and industrial property;
- b. intensification of industrial research;
- c. promotion and dissemination of industrial information;
- d. in-plant training of engineers;

for the period up to 1968/1969. Thus, in the present document, with respect to the above subjects, reference will be made only to programmes and projects planned for the years 1970 and 1971. Past and future activities in other areas likely to be of interest to the Committee will be presented according to the structure of the Organization. It has to be emphasized, however, that

these programmes and projects have not yet been approved by the governing body of the Organization, the Industrial Development Board, nor have definite agreements been made with other UN agencies or international organizations for projects where joint actions are envisaged. Thus the programmes and projects for 1970 and 1971 should be considered rather as general outlines of activity than as definite commitments.

In addition to the Office of the Executive Director and the Division of Administration, Conference and General Services, UNIDO is divided into four substantive divisions: Industrial Policies and Programming, Technical Co-operation, Industrial Technology and Industrial Services and Institutions. The Technical Co-operation Division is concerned mainly with the practical implementation of the various programmes of technical and other assistance of the UN family in the field of industrialization. A list of the current field activities under the UNDP/TA, the Special Industrial Services (SIS), and the UNDP/Special Fund Programmes is given in the annex. Under these programmes UNIDO is assigning to developing countries in 1968 a total of 316 experts for about 2700 man-months. Envisaged for 1969 are 732 experts and 6,000 man-months. As this type of activity depends on requests from developing countries in addition to the availability of mainly external funds, no estimates can be made of the size of such assistance beyond 1969. In view of the obvious upward trend and the steadily growing interest of the developing countries in the services of UNIDO, however, a reasonable expansion is to be expected.

Industrial Technology Division

The core of activities of interest to the Committee will be found in the programmes of work of this Division, which is organized in sections according to one or more groups of key industries. It deals with such important fields as product engineering and manufacturing; development of product design and capabilities, industrial plant construction, repair and maintenance and quality improvement, testing and cost reduction. On the basis of the recommendations of the governing body of UNIDO, the Industrial Development Board, as well as of the recommendations of the Athens International Symposium on Industrial Development, the Division is giving special attention to: agricultural machinery and implements; construction and related building materials and equipment; pulp and paper production; repair and maintenance of industrial machinery and mobile equipment; and the use and adaptation of locally produced materials.

As to the great urgency to increase the output of food and feedstuffs in the developing countries, UNIDO has agreed with The Food and Agricultural Organization (FAO) to intensify the work on production planning and the execution of plans leading to the establishment of production facilities for fertilizers and pesticides, as well as on the development of modern food processing. The Committee is aware of the contribution of UNIDO to its action programmes to avert the impending protein crisis (cf. ECOSOC Dec.4343 of 25 May 1967), and its attention is drawn to the two meetings on Fish Protein Concentrates and on Soya Bean Protein Processing to be held in 1969 (cf. ID/E/26, 1.71 and 79 par.93). The recommendations of these two meetings will be distributed in late 1969 and in 1970 to all countries that have the possibility of developing such protein products. Information on the impact follow-up actions will be analysed in a seminar on proteins in 1971.

There is a similar need to improve local rice processing methods to enhance the quality of the rice and to make use of by-products. A working group will be held in Bangkok in 1970 in close co-operation with other UN bodies. It will be attended by rice experts from developing and developed countries and will serve as a preparation for a seminar scheduled for 1971, also in Bangkok, with the aim of providing guidelines for a general systematic approach to the solution of national and regional rice processing problems such as:

- a. selection of technology and processing equipment
- b. economy of scale in rice processing;
- c. extraction and use of rice bran oil;
- d. extraction and use of rice bran protein;
- e. use of rice bran wax.

An expert meeting in Vienna in 1970 will discuss similar problems in the processing of another staple from developing countries, cassava, although very little progress has been made in developing up-to-date processing facilities for such a crop.

The developing countries are anxious to establish their own processing facilities for locally grown vegetable oil-bearing materials in order to increase their protein supply, and to augment their foreign exchange revenues by replacing the exports of raw materials with the higher-priced refined products. In 1970, in close co-operation with FAO, a working group meeting will be convened in London at which the main aspects of industrial vegetable oil production in developing countries will be discussed and a policy of development proposed.

In the food industry a great variety of machines for different levels of technology are available. The selection of the most appropriate equipment is a difficult problem for the developing countries, as they neither have the necessary information nor the past experience upon which to draw. For this reason a series of working group meetings will be begun in 1969 in Moscow and are expected to continue in 1970 and 1971.

A number of food processing problems in developing countries are still waiting to be solved. UNIDO, in co-operation with other international organizations, will try to establish a mechanism for permanent co-operation in research with a well known food processing research centre in Europe, that will devote part of its research activities to the particular problems and prospects of developing countries. It will also provide research facilities to experts from UNIDO and organize in-plant training.

As to agricultural machinery and equipment, an expert group is scheduled to meet in 1969 in Vienna in order to programme the activities of UNIDO in this field in the coming years. Subsequently a team of staff members and consultants will investigate such common problems in the production of agricultural machinery and equipment in developing countries as: redesigning traditional equipment for local use; assessing equipment changes made necessary by the introduction of power equipment, and repair and maintenance facilities. In all these activities UNIDO will co-operate closely, where appropriate, with FAO and other UN agencies or international organizations.

In support of the programmes for the increase of food supplies, the possibilities of manufacturing industrial refrigeration equipment will be considered at a joint meeting in Vienna of representatives of the industry, experts in food processing and representatives from the developing countries. The engineering aspects will be discussed at the meeting on refrigeration that is to be organized in Vienna in 1969.

Activities of UNIDO in the construction and building materials group will be reinforced in the future. Following up the 1968 paper on "Small-scale Manufacture of Portland Cement", a second study on the manufacture of Portland Cement from gypsum with sulphuric acid as a by-product will be published in 1969.

Work on plastics as building materials has already appeared in both the 1968 and 1969 Work Programmes. The information thus provided on methods of using plastics to reduce the cost and simplify the manufacture of building materials will be supplemented by a number of studies designed to show how plastics can be modified and adapted to the conditions of construction industries in the developing countries. These studies will be commissioned in 1970.

In the series of seminars on prefabrication in the building industries (the first being for the Latin American countries in 1967 and the second for the ECAFE region in 1968), a third seminar is planned in 1969 for African countries. It will be held in co-operation with ECA and the UN Centre for Housing, Building and Planning.

Developing clay building materials plants was the subject of an inter-regional seminar in 1968. As recommended by the seminar, UNIDO, in co-operation with the UN Centre and the ECA, will organize in Africa the first and second of three Clay Building Materials Industries Workshops; the third will be held in the ECAFE region.

A working group is scheduled to discuss a related area, the technology and production methods for the construction of wooden houses, in 1969. In order to assist developing countries in finding substitutes for wood, UNIDO proposes to hold, in co-operation with FAO, a working group to discuss the economic and technical problems of production of particle board from agricultural wastes, such as bagasse, flax and hemp. UNIDO also plans to convene a working group to investigate the manufacture of particle board and fibre board from coco-nut fibres, palm fronds and other waste products of crops grown in tropical climates. The experts will assess the processes already developed, recommend the most suitable technology and suggest further research work.

A great deal of information on pulp and paper has been obtained. In 1969 UNIDO, in close co-operation with FAO will set up a method for facilitating the most appropriate use of this information and will investigate the possibility of establishing a pilot plant for the manufacture of newsprint from bagasse.

An Interregional Symposium on Repair and Maintenance in Developing Countries will assemble in Vienna in 1970. It will deal, inter alia, with:

- (i) Promotion of preventive maintenance concepts in the industries of developing countries and the introduction into existing plants of maintenance schemes for equipment and buildings;
- (ii) Practicability of domestic production of spare parts and components of equipment;

- (iii) Feasibility of upgrading existing maintenance and repair facilities to handle more complex equipment;
- (iv) Technological feasibility and merits of establishing centres for production and storage of spare parts and equipment for different industries; and
- (v) Co-ordination of assistance in the field of maintenance and repair by international organizations and other interested institutions.

The findings and recommendations of the various seminars and work shops will be widely distributed, so that industry and technicians in the developing countries can apply them. These findings and recommendations should also stimulate scientists and research workers to turn their attention to problems for which satisfactory solutions have not yet been found.

Industrial Policies and Programming Division

The activities of this Division include the programming of the manufacturing sector as a whole and of individual industries, aspects of project planning and project implementation, development of industrial programming data, development of industrial policies, promotion of industrial investment and industrial financing, identification and promotion of viable export industries, preparation of periodic and special surveys, collaboration with developing countries in conducting national and industrial surveys.

Though science and technology enter into many of the issues with which this Division is dealing, it is primarily concerned with the role of the social sciences in the industrialization of the developing countries, particularly economics in general and such special branches of economics as foreign trade, finance, investment and the like.

Only two of the particular projects listed in the 1970 Work Programme of the Division are of direct interest to the Committee. The first is in the field of Industrial Programming, the other in the Survey Section. These two projects are:

1) Project planning and implementation bureaux in developing countries

UNIDO proposes to work towards developing new kinds of industrial project planning and implementation activities, preferably conceived as Special Fund projects, which would be capable of developing a project through its entire course from identification to full operation.

2) Survey of the impact of manufacturing technology on the growth of manufacturing productivity and the expansion of employment

Although this is an economic research project, the Division also proposes to examine employment and productivity problems in selected developing countries which in their industrialization effort hope to maximize employment through a specific choice of manufacturing technique in the promoted industries. The survey will attempt primarily to develop systematically the evidence bearing upon these issues, but will, at the same time, reveal alternative manufacturing techniques and employment practices which may have a greater direct effect on alleviating unemployment.

In May 1967 the Role of Advanced Skills and Technology in Industrial Development was the topic of an ad hoc meeting of experts. The proceedings of this meeting will be published in 1968.

Industrial Services and Institutions Division

Effective industrialization of countries still predominantly agricultural requires a host of supporting services which individual plants or firms normally cannot supply, in addition to the organizations or institutions which provide them. These services and organizations make up the institutional infrastructure of industrial development with which the Division is concerned.

This institutional infrastructure covers:

- (a) General industrial services and their administration;
- (b) Industrial legislation, patents, licensing and standardization;
- (c) Industrial information, including extension services and promotion;
- (d) Industrial training;
- (e) Small-scale industries, including industrial estates.

All these play a vital role in the application of science and technology to development; thus the endeavours of UNIDO in this field should be of particular interest to the Committee. It is, however, impossible to present within the framework of a single paper a comprehensive account of all of the past, present and future work of UNIDO with respect to the activities listed above. It is hoped that it will be sufficient for the purposes of Committee to learn about the most important of these activities with emphasis on those that are operational.

General industrial services and their administration

This group covers a number of activities, of which only a few are briefly discussed below as of particular interest to the Committee. The scope of activities includes:

- (a) The general pattern of such services and organizational arrangements for providing them;
- (b) The administration and management aspects of service institutions generally;
- (c) Assistance to organizations covering a number of industrial services, such as comprehensive Industrial Development Centres;
- (d) Assistance to the ministries of industry;
- (e) Industrial research services;
- (f) Special industrial repair and maintenance organizations;
- (g) Industrial Co-operative organizations;
- (h) Professional organizations.

Past activities have included on-the-spot country surveys, seminars, workshops and studies of specific types of organizations. Comprehensive surveys were carried out on the Organization and Administration of Industrial Services in 25 countries in various regions. As an extension of these survey missions, in 1969 and 1970 other missions will be sent to interested developing countries to assess the status of present industrial services and to help in making plans for their future development and improvement.

A regional seminar on the organization and administration of industrial services was held in Tangier for African countries, and another one is scheduled for 1969 in the Soviet Union for the countries of Asia and the Middle East. To help improve the management of these services an interregional workshop for senior industrial administrators will be organized in 1970 in collaboration with the UN Regional Economic Commissions. The participation of non-governmental organizations will be sought.

So far the commitment of UNIDO in industrial research has consisted largely in providing assistance to industrial research institutions in developing countries, organizing workshops and seminars and publishing periodicals and manuals. Industrial research institutes established with the assistance of UNIDO in Thailand, the Sudan, Colombia, Guatemala (for the five Central American republics), and Israel have already been reported on to the Committee at its 9th Session (cf. STD/9/1B/Add.2, p.4). Under consideration or in the early stages of examination are projects for establishing similar research institutes in the Congo (Brazzaville), Guinea, the Ivory Coast, Malaysia, Mali and Peru. In 1971 and 1972 regional meetings on the evaluation of industrial research institutions and their impact on industrial development will be organized. UNIDO also will assist in the development of the International Association of Industrial Research Institutes, to be launched in 1969. Such an association could act as a consultative body to UNIDO and member governments for further identification of requirements in industrial research on a regional basis. For senior personnel of industrial research institutes an interregional training programme will be organized in Denmark with emphasis on visits to plants and field work.

On the basis of feasibility studies and other preparatory work in 1968 and 1969, UNIDO will assist in the establishment and initial operation of pilot industrial equipment repair and maintenance centres in Africa, Asia and the Middle East. In addition, an interregional workshop for managers of such centres is planned for 1970.

2) Industrial legislation, patents, licensing and standardization

The objectives of UNIDO in these interrelated fields are set out in the Programme of Work for 1969 (ID/B/26, p.74, para.99). Throughout 1968, activities in this area were largely concerned with the establishment of closer co-operation with other international organizations and the UN Regional Economic Commissions. In 1969 the emphasis is being shifted to feasibility studies, identification of problems and establishment of all other prerequisites for action in the coming years. Such action consists of direct assistance to developing countries through the assignment of experts, training of personnel and the organization of expert group meetings. Experts in one meeting in 1970 will deal with problems of patent office organization and administration in developing countries, and those attending a second will examine and make recommendations on the cost of transfer of proprietary technology from the developed to the developing countries. A manual on patent office organization and administration will be submitted to the first expert group meeting. Short term courses will be organized for prospective licensees in developing countries. In 1971 it is hoped to be able to begin publishing the long planned Series on Patents and Licenses in collaboration with United International Bureau for the Protection of Intellectual Property (BIRPI), to convene a meeting on the cost of licensing proprietary technology to developing countries and to continue the short-term courses for prospective licensees.

In the field of standardization the main activities of UNIDO through 1968 have involved the supervision of technical assistance to developing countries in establishing modern and efficient standards programmes. In the near future such technical assistance programmes will be accelerated and a number of promotional and training projects are envisaged to introduce and/or improve industrial standards in developing countries. In order to assess the work of UNIDO and other international organizations and to update information concerning the needs of developing countries, UNIDO plans to send out a series of assessment missions in 1970 and later years. A Testing and Standards Centre in the Philippines has been under examination and the Paraguay Technical Standards National Institute, approved in 1962, has been expanded to function as a national bureau of standards.

3) Industrial information and promotion

Most of the developing countries depend on the industrial and technical knowledge available in the developed countries. If the flow of such knowledge from the developed to the developing countries is to be systematic, industrial information has to be collected and organized within the originating countries; adapted so it can be easily applied under the conditions of the developing

countries; received by an appropriate organ in these countries and disseminated as widely as possible among the potential users, whose practical application is to be evaluated and controlled. In recent years UNIDO has laid the foundation for the organization of such a systematic flow through an international industrial information service.

UNIDO began building up an international industrial information transfer network in 1968 by appointing the first industrial information correspondents. Their number will be increased gradually, with the hope of having correspondents in all large industrialized and in all developing countries by 1970. Correspondents in the advanced countries, may be qualified individuals or institutions and are together with Industrial Documentation and Data Centre of UNIDO (see below) the main source for answering the increasing flow of inquiries from the developing countries to the Industrial Inquiry Service of UNIDO. About 100 inquiries a month are foreseen during 1970. Building up a network of information correspondents in the developing countries is much more difficult because many of them lack experienced information personnel and, therefore, have no suitable organization for handling technical information. Thus, UNIDO will have to create such information services in some countries and up-grade existing ones in others. If an industrial information network in the developing countries is to work efficiently, its correspondents will have to be thoroughly trained. Such training is planned through fellowship programme, regional seminars and interregional workshops, and a mobile task-force of from three to five information experts who will spend short periods in different developing countries.

An interregional seminar on industrial information for participants from developing countries will be held in 1969. A similar seminar for African industrial information officers is scheduled for 1970 in Addis Ababa in conjunction with the Economic Commission for Africa (ECA). These seminars ought to be followed in 1971 by two area meetings of industrial information officers from the Latin American and the Arab countries. Workshops on methods of collection and dissemination for industrial information are planned for 1970 in Uganda and Venezuela.

For collecting and distributing industrial information, UNIDO will try to arrange for the collection and distribution centres for agricultural and food processing information being established by FAO at the national ministries of planning to be extended to cover subject areas of UNIDO. The use of industrial consultants is another method of facilitating the transfer of technology to developing countries. UNIDO has been building up a Roster of Industrial Consultants

that will be operational by 1970. It will be available to internal and external users.

For the promotion of industry in developing countries, an industrial advisory service similar to the well-known agricultural extension services is badly needed. UNIDO is trying to promote such industrial information field officer services through regional meetings, exhibitions, missions to individual countries and publications.

The application of science and technology to the process of industrialization in the developing countries also requires the Supply of Industrial Equipment. UNIDO, in response to Economic and Social Council (ECOSOC) resolution 1183 (XLI), has begun an Advisory Service on the Supply of Industrial Equipment. Up to now the Service has been limited to providing lists of suppliers to prospective buyers in developing countries. This Service will be extended to the field and will provide guidance on price trends and evaluation of tenders, if requested by buyers in developing countries.

The main vehicles for the systematic dissemination of industrial information remain publications. The "UNIDO Newsletter" will continue to be published in English, French and Spanish, and Russian, Arabic and German editions will be added in 1970. Each issue will contain brief reports on field projects, meetings, missions, publications and other UNIDO activities. Industrial Research and Development News serves as a liaison journal for those engaged in industrial research and development activities, particularly in the developing countries. In 1970 each issue will contain a special feature on a vital problem, such as the repair and maintenance of industrial equipment or establishing a balance between adaptive and basic research in developing countries. A monthly compilation of 'Industrial Development Abstracts' from technical reports and documents issued by the UN agencies will be published in one multilingual edition. UNIDO also will publish information pamphlets and directories, including summaries of answers to technical inquiries and bibliographies on topics of major importance.

As a means of distributing industrial and technological information in the developing countries, UNIDO intends to put an effective audio-visual aids programme into operation. In 1970, UNIDO will establish a comprehensive register of industrial film material available to developing countries. In the developing countries a survey of locally available audio-visual material will be undertaken and attempts will be made to improve the circulation of such material within the country and, if appropriate, in neighbouring countries. There is a need to

investigate the possibilities for promoting the use of visual media for the communication of technical know-how to industries in the developing countries, for augmenting the available supply of such material and for assessing the potential impact of the use of such media on the speed and scope of industrialization. A survey project to this effect is envisaged for 1970.

Industrial Documentation and Data Centre

To meet the growing needs of the technical staff of UNIDO at headquarters and in the field, UNIDO is building up an Industrial Documentation and Data Centre which, it is hoped, will become one of the most authoritative collections of reference works and data related to industrialization in developing countries in the world. By 1970 the Centre will contain more than 4,000 selected volumes on industrial economics and technology in addition to a comprehensive collection of directories. About 1,000 periodicals will be scanned, and the specialized collections of relevant technical assistance reports, feasibility studies, pamphlets and the like will be further extended.

4) Industrial training

In previous years the work of UNIDO in industrial training has been done largely on an ad hoc basis. During 1968, however, UNIDO has been working towards a systematic approach and this work will be accelerated in the years to come. Yet, because of the limited means available, the work will continue to be primarily of a promotional and co-ordinating nature and will be carried out in close contact with ILO, UNESCO, UNESOB, and UN Regional Economic Commissions in Latin America, Africa and the ECAFE region. As a further means of helping developing countries to assess their industry training needs, UNIDO, in co-operation with ILO, plans the organization of 'Training Assessment Missions' in selected countries in 1970. The in-plant training programme for newly graduated, middle- and top level engineers, already reported to the Committee at its last session (cf. loc. cit. pp. 6 and 7), will be continued and will be supplemented by a series of studies on methods of training to be applied in such training programmes. Furthermore, a meeting of Directors of Group In-Plant Training Programmes from the industrialized countries and of prospective ones from developing countries will be convened in Vienna in 1970. It is also expected to establish a number of local Industrial Training Organizations in selected developing countries or, if feasible, in a region serving a number of such countries. Under active consideration at the moment are in-plant training programmes for newly graduated engineers in Brazil, Ghana, Indonesia and the Philippines. An in-plant training centre for engineers has already been established in Turkey.

Training of industrial administrators is being organized on a regional basis. A group training programme for such administrators is scheduled for 1970 in the ECAFE region in co-operation with the Institute for Economic Development and Planning in Bangkok.

5) Small-scale Industries

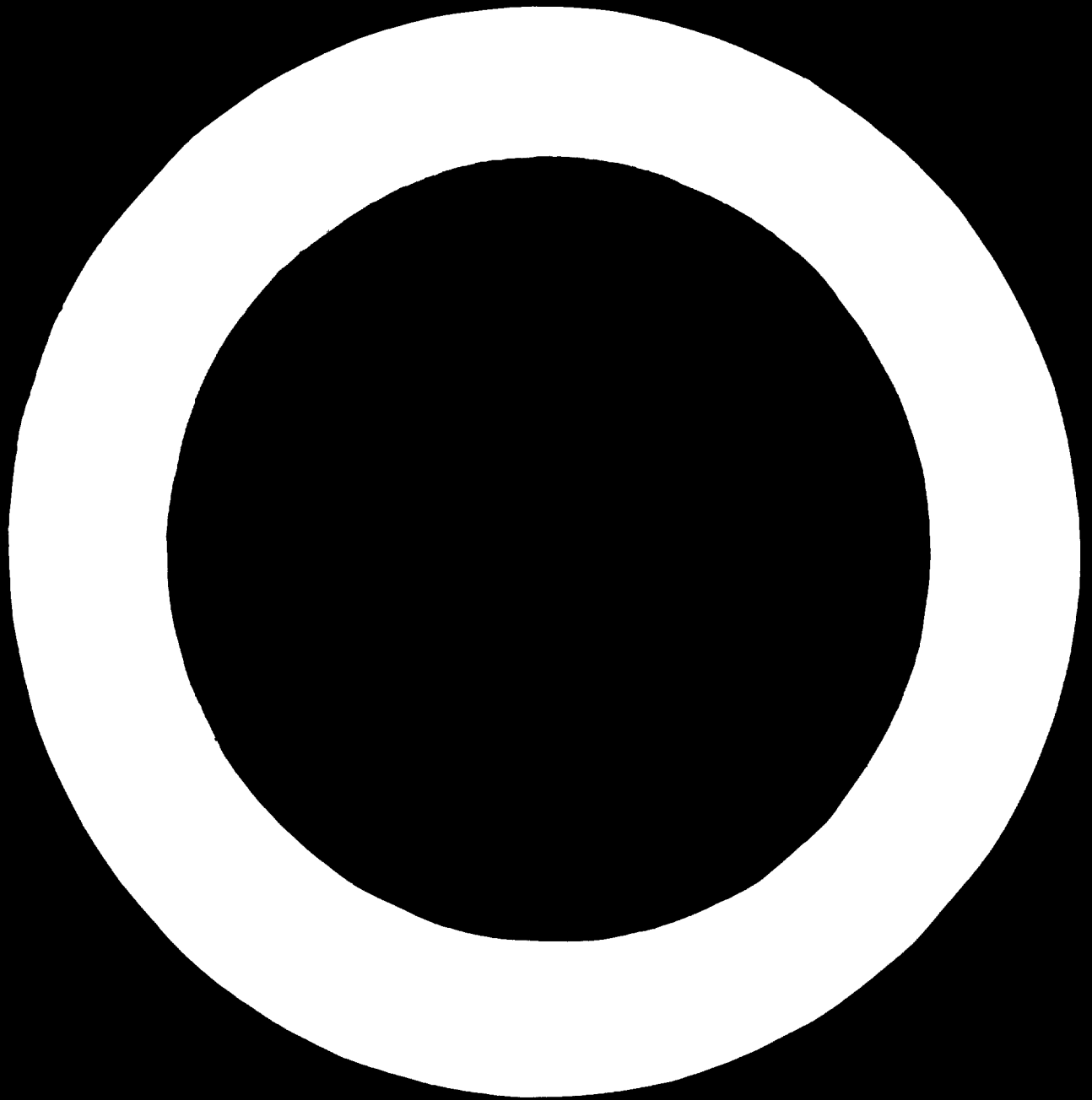
Small-scale industries in the developing countries need integrated development programmes covering a broad range of measures of protection and assistance such as extension services in technique and management, standard factories, common service facilities, appropriate technology, training programmes and various other incentives and measures. Therefore, UNIDO is undertaking a wide range of projects, many of which cut vertically across certain areas of study and activity of the Organization as a whole, while others complement work done by other organizations, such as the UN Regional Commissions, the ILO and other agencies of the UN family. Co-operation within the UN is ensured through working parties set up under agreements, as for instance, with the ILO, and through consultations between officials at the working level.

Two regional meetings in the West African and the East African sub-regions will focus attention on industrial extension services and on financing of small-scale industries. The joint UNIDO-ILO missions to four or five countries for the establishment or strengthening of industrial extension services, scheduled for 1970, will be of particular benefit to small-scale industries. Equally beneficial should be a floating exhibition combined with promotional services on a ship which will be in its voyage, calling in first at African ports, in 1970-1971. Demonstration plants will be promoted in these African countries not visited by the ship, but such plants require the participation of governments and of private manufacturers. A study on mobile demonstration workshops for different types of small-scale industry will be prepared for use by the industrial extension services, once they are operating in developing countries.

Co-operation with the Committee

UNIDO is conscious of the valuable contribution the Committee has made and is continuously making to the application of science and technology to industrial development in the developing countries. UNIDO will collaborate with the Committee in the action programme and will be cognizant of the priorities established by the Committee. In particular, UNIDO will survey research and development activities oriented towards the more extensive and rapid transfer of industrial technology to developing countries and will, specifically, locate and examine examples of the successful application of industrial technology to,

and plants designed for, the needs of developing countries. It will, furthermore, take responsibility for initiating and implementing the chapter on 'Accelerating Industrial Development' in the World Plan of Action of the Committee. These activities are, or will be included in 1969 and 1970 in the Programme Work of the Industrial Services and Institutions Division.



ANNEX I

Current field activities under the UNDP/TA Programme

Mechanical and electrical engineering industries

- Bulgaria - A team of six highly specialized experts for assisting the Research Institute of Industrial Design
- India - Expert for the introduction of more advanced methods in the production of machine tools
- Indonesia - Expert to assist the Government in the field of production engineering and maintenance of engineering plants
- Iran - Expert on electronics to assist in over-all industrial development in the industrial research and development centres
- Israel - Team of experts in selected fields of specialization in the metal working industries
- Korea - Expert on metal forming and finishing for technical problem analysis and corrective action to improve various phases of metal production
- Singapore - Expert in light engineering industries attached to the Economic Development Board
- ECAFE Region - Regional adviser to assist countries in the field of industrial engineering

Metallurgical Industries

- India - Expert to advise the Government of Mysore at the Mysore Iron and Steel Works on all matters concerned with foundry operations
- Iran - Adviser on the development of non-ferrous metals to prepare i.e. studies on processes, equipment and production costs
- Philippines - Expert to make analysis of the non-ferrous metals and other important industries
- Uruguay - Industrial engineer to make analysis of the non-ferrous metals and other important industries
- Venezuela - Expert to assist in the technological development of the metals industry and to advise on technical and economic criteria for productivity investigations
- ECAFE Region - Regional adviser to assist countries of the region in aspects of the metallurgical industry

ANNEX I

Construction and Building Materials

- Ceylon - Ceramics expert to assist in the initial operation of the ceramics factory at Filigandala
- Malta - Expert on improvements in factory buildings methods and materials
- Papua and New Guinea - Expert on building and construction materials
- Romania - Expert on the application of modern technology in the construction industry and the production of steel and aluminium control of laminated products, tabular material etc.

Chemicals, Pharmaceuticals and Other Related Industries

- Brazil - Expert to help SUDENE (Superintendency for Development of Northwest) in solving problems related to the chemical industry
- Guinea - Industrial chemist/engineer to be attached to the Ministry of Development as adviser on various aspects of chemical industry
- India - Expert to assist in the development of polymers (incl. acrylics, polyimides, urethanes and systems), organic pigments and dyes
- Israel - Expert on pharmacological research
- Mexico - Study of the technical and economic possibilities of specific industrial projects in the pharmaceutical industry
- Nigeria - Chemical engineer to assist the Director of the Federal Institute of Industrial Research
- Peru - Industrial adviser on appropriate technologies, use of raw materials etc. for the production of petrochemicals
- The Americas - Regional adviser in pulp and paper and in the chemical industry
- Trinidad & Tobago - Assistance to chemical industry
- Turkey - Chemical engineer to assist the Government in the development of chemical and petrochemical engineering
- ECAFE Region - Regional adviser to assist the countries in the region in the field of chemical and petrochemical industries (incl. pulp and paper)

Light Industries

- Argentina - Wool technologist to advise on research conducted by the "Instituto Nacional de Tecnologia Industrial"
- Ceylon - Textile expert on planning, erection of machinery and other technical matters
- Malaysia - Expert in leather products or processes for flaying, preservation and tanning of leather and auxiliary industries
- Morocco - Expert to make an extensive survey of the technological and economic aspects of the textile industry
- Nigeria - Food technologist to assist in the elaboration of a research programme
- Switzerland - Vegetable oil processing specialist to assist in the formulation of a uniform system of grading and standardization of oil seeds.
- African Region - Regional adviser to assist the countries of the region in the field of engineering textiles

Industrial Research, standardization and quality control

- Argentina - Engineer for components testing to assist in technological research
- Barbados - Industrial Standards Adviser to assist in the administration of an official system of standards as well as of testing methods
- Indonesia - Industrial Research Adviser to integrate and co-ordinate the various existing research institutions, to extend laboratory studies to the phase of pilot plant construction and to make techno-economic feasibility studies towards large-scale industrial production
- Iran - Adviser to the Institute of Standards and Industrial Research
- Libya - Senior research chemist to advise in the planning and organization of applied chemical research programmes
- Nigeria - Director, Federal Institute of Industrial Research, to establish the policy of the institute, to plan and execute research programmes
- Singapore - Senior industrial research adviser to assist the Industrial Research Unit of the Economic Development Board particularly in the expansion of its testing and other technical services and the research programmes of its Chemical Section
- Thailand - Expert to the Applied Scientific Research Corporation
- ECAF Region - Regional Adviser on standardization

Field activities under the Special Industrial Services (SIS) Programme

<u>Argentina</u>	Assistance for the establishment of an aluminium industry
<u>Bolivia</u>	Development of ceramics industry Petrochemical fertilizer and explosives complex
<u>Brazil</u>	Organization and improvement of industrial research (State of Bahia) Assistance to the Commission for Industrial Development Fish protein concentrate industry (exploratory mission) Tetraethyl lead project Assistance to Petropolis Textile Mills
<u>Bulgaria</u>	Research Institute for Instrument Design Packing media: scientific research and experimentation centre
<u>Central African Republic</u>	Plywood mill in the Lobaye region Medicinal plants and essential oils Cotton textile industry
<u>Ceylon</u>	Textile industry Assistance to Mineral Sands Corporation Vegetable oil industrial development
<u>Chad</u>	Société des Industries de la Viande du Chad
<u>Chile</u>	Assistance to the textile industry
<u>China, Republic of</u>	Union of Industrial Research Institutes
<u>Colombia</u>	Assistance to Forjas de Colombia
<u>Congo (Brazzaville)</u>	Study of industrial development of the Pointe Noire District Pineapple canning project
<u>Cyprus</u>	Industrial standards and quality control
<u>Dominican Republic</u>	Bagasse building boards factory rehabilitation Assistance to the Public Enterprises Corporation (CORDES)
<u>Ecuador</u>	Fertilizer industry Reorganization of the textile industry
<u>Ethiopia</u>	Industrial trial projects Hides and skins Ethiopian Drug Manufacturing Company Leather and shoe industry National Meat Corporation
<u>Ghana</u>	Fibre Bag Manufacturing Corporation Reorganization of state enterprises
<u>Greece</u>	Establishment of industrial estates at Volos
<u>Haiti</u>	Industrial development programme

<u>Iceland</u>	Sodium sulphate by freezing sea-water
<u>India</u>	Development of chrome tanning processes for village tanneries Titanium products industry
<u>Indonesia</u>	Spinning mills Metal working industry Paper mills Steelmills Fertilizer industry
<u>Iran</u>	Manufacture of chlorine based and phosph. pesticides Industrial development programme and regional co-operation
<u>Jamaica</u>	Things Jamaican Assistance to furniture industry Assistance to Jamaican Ceramics Ltd. Management Service, Public Works Department: Maintenance Workshop
<u>Jordan</u>	Steel rolling mill
<u>Kenya</u>	Caustic soda, sulphuric acid Textile study Preparation and promotion of specific industrial projects
<u>Laos</u>	Small- and medium-scale industries Match factory
<u>Liberia</u>	Adviser to steel project co-ordinating unit
<u>Libya</u>	Demonstration plant for fodder yeast production from petroleum Consolidated programme, industrial field
<u>Malagasy Republic</u>	Tulear Vegetable Oil Company Nitrogen fertilizer project
<u>Malawi</u>	Pottery industry
<u>Malaysia</u>	Federal Industrial Development Authority (FIDA)
<u>Mali</u>	Elaboration of industrial development Meat processing industrial development Organization of state enterprises
<u>Mauretania</u>	Development of small-scale industries
<u>Mauritius</u>	Utilization of by-products in sugar-cane industry Glass industry
<u>Mexico</u>	Reconstruction of marine protein concentrate plant Fish concentrate plant (exploratory mission)
<u>Nicaragua</u>	Petrochemical complex (low-density polyethylene and polyvinyl chloride)
<u>Pakistan</u>	Steel industry

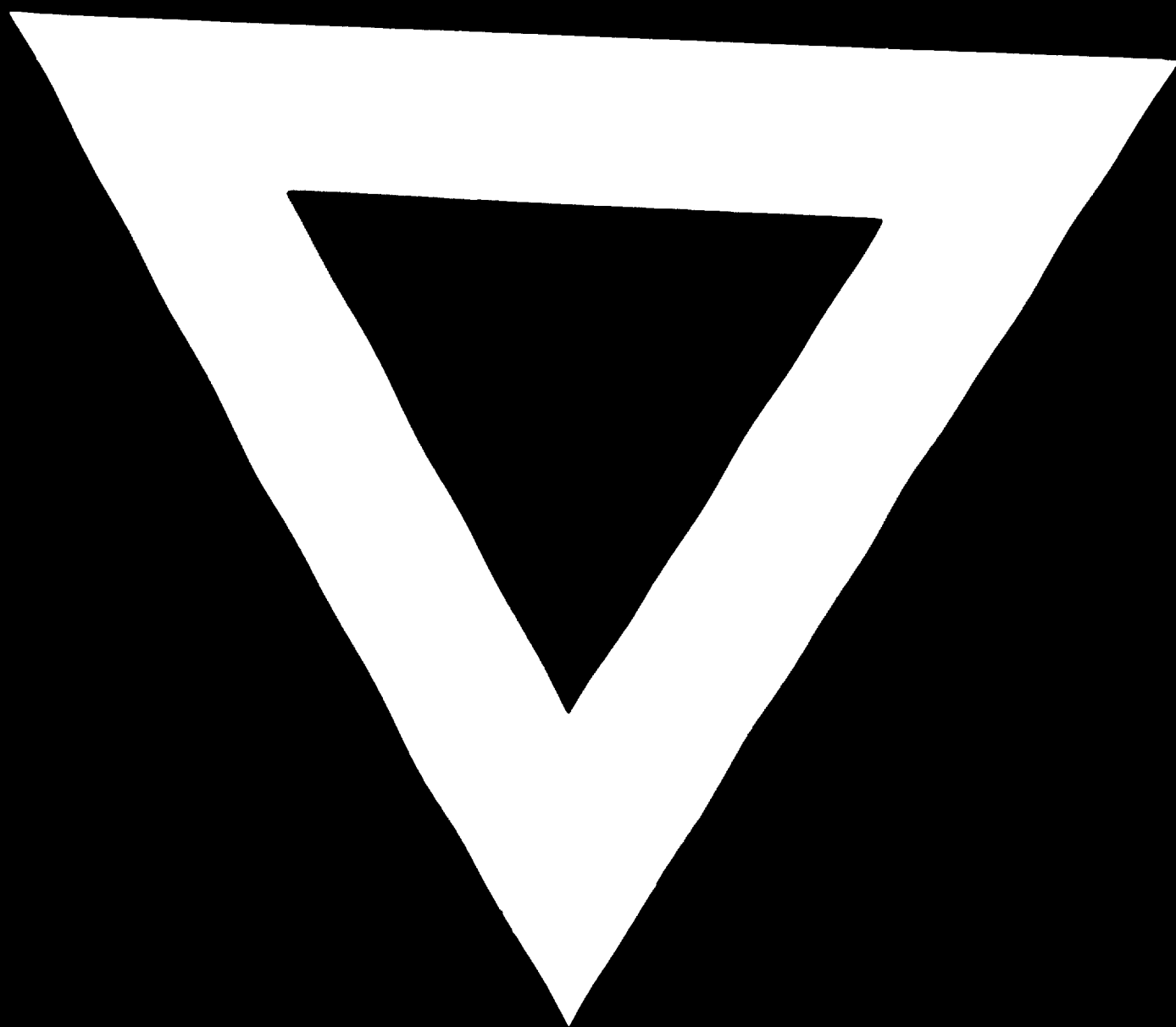
ANNEX 2

<u>Peru</u>	Bagasse pulp and paper project (possibility study) Textile industry Fishing industry
<u>Romania</u>	Welding of light weight alloys
<u>Rwanda</u>	Cement plant Tea processing Malt production Food processing industries
<u>Senegal</u>	Aluminium foundry shop
<u>Singapore</u>	Fire safety Building hardware industry Industrial product design Woodworking industries Printing industry Leather products industry
<u>Somalia</u>	Gypsum and sepiolite Mogadiscio power supply
<u>Sudan</u>	Textile production Fertilizer project, ammonia & urea Khartoum tannery Nile Cement Company Training in food processing Small-scale industry
<u>Syria</u>	Nitrogen fertilizer project Triple phosphate project (tender evaluation) Steel rolling mill
<u>Thailand</u>	Sugar industry Standard national industrial classification system
<u>Togo</u>	Cassava agro-industrial complex
<u>Trinidad & Tobago</u>	Paper industry
<u>Tunisia</u>	Ateliers mécaniques du Sahel Gypsum production of sulphuric acid and cement clinker Vegetable oil processing Mechanical Construction & Naval Co., Menzel Bourgiba
<u>Turkey</u>	Cement factories Paper industry Iron and steel industry Barite ore grinding mill Briquette utilization Aluminium industry
<u>Uganda</u>	Pulp and paper industry Industrial survey mission

<u>United Arab Republic</u>	Edfu bagasse pulp and paper mill Cotton textiles laboratories Organic chemical industries Production of raw and natural silks Design of insulation of high voltage transmission lines Heavy mineral black sands Aswan steel project (exploratory) Central Textile Research & Development Institute Quality control development programme Textile finishing industry
<u>Venezuela</u>	Venezuelan Petro-chemical Institute
<u>Zambia</u>	Metal working and engineering industries
<u>ECAF Region</u>	Industrial development feasibilities in Lower Mekong

Field Activities under UNDP/Special Fund Programmes

<u>Algeria</u>	Centre for Industrial & Technological Studies Industrial and marketing surveys on petroleum derivatives and natural gas
<u>Bolivia</u>	Pilot plant for experimental production of asbestos
<u>Central America</u>	Central America Research Institute for Industry
<u>Colombia</u>	Colombia Institute for Technological Research
<u>India</u>	Design Centre for Electrical Measuring Instruments
<u>Iran</u>	Establishment of industrial estates Research Centre for Industrial and Trade Development
<u>Israel</u>	Israel Industrial Research Centre
<u>Jordan</u>	Centre for Industrial Development
<u>Maghreb Countries</u>	Centre for Industrial Studies
<u>Pakistan</u>	Promotion of fertilizer and petrochemical industries
<u>Paraguay</u>	Paraguay Technical Standards National Institute
<u>Rwanda</u>	Pilot plant for industrialization and pyrethrum production
<u>Saudi Arabia</u>	Industrial Studies and Development Centre
<u>Singapore</u>	Metal Industries Development Centre
<u>Sudan</u>	Sudan Industrial Development Institute
<u>Tanzania</u>	Industrial Studies & Development Centre
<u>Thailand</u>	Thailand Technological Research Institute
<u>Tunisia</u>	National Centre for Industrial Studies
<u>Turkey</u>	In-plant training centre for engineers Small industries development programme
<u>United Arab Republic</u>	Engineering & Industrial Development Centre Institute of Small Industries



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