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Vienna, 23 May - 2 June

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**PROGRAMME OF WORK FOR 1978,  
REPORT OF ACTIVITIES IN 1971 AND UPDATING  
OF 1972 PROGRAMME**

**PART TWO**

**Industrial Technology Division**

*(Groups 1 to 6 and 17)*



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### PROGRAMME OF WORK FOR 1973, REPORT OF ACTIVITIES IN 1971 AND UPDATING OF 1972 PROGRAMME

#### PART TWO

#### Industrial Technology Division

(Groups 1 to 6 and 17)

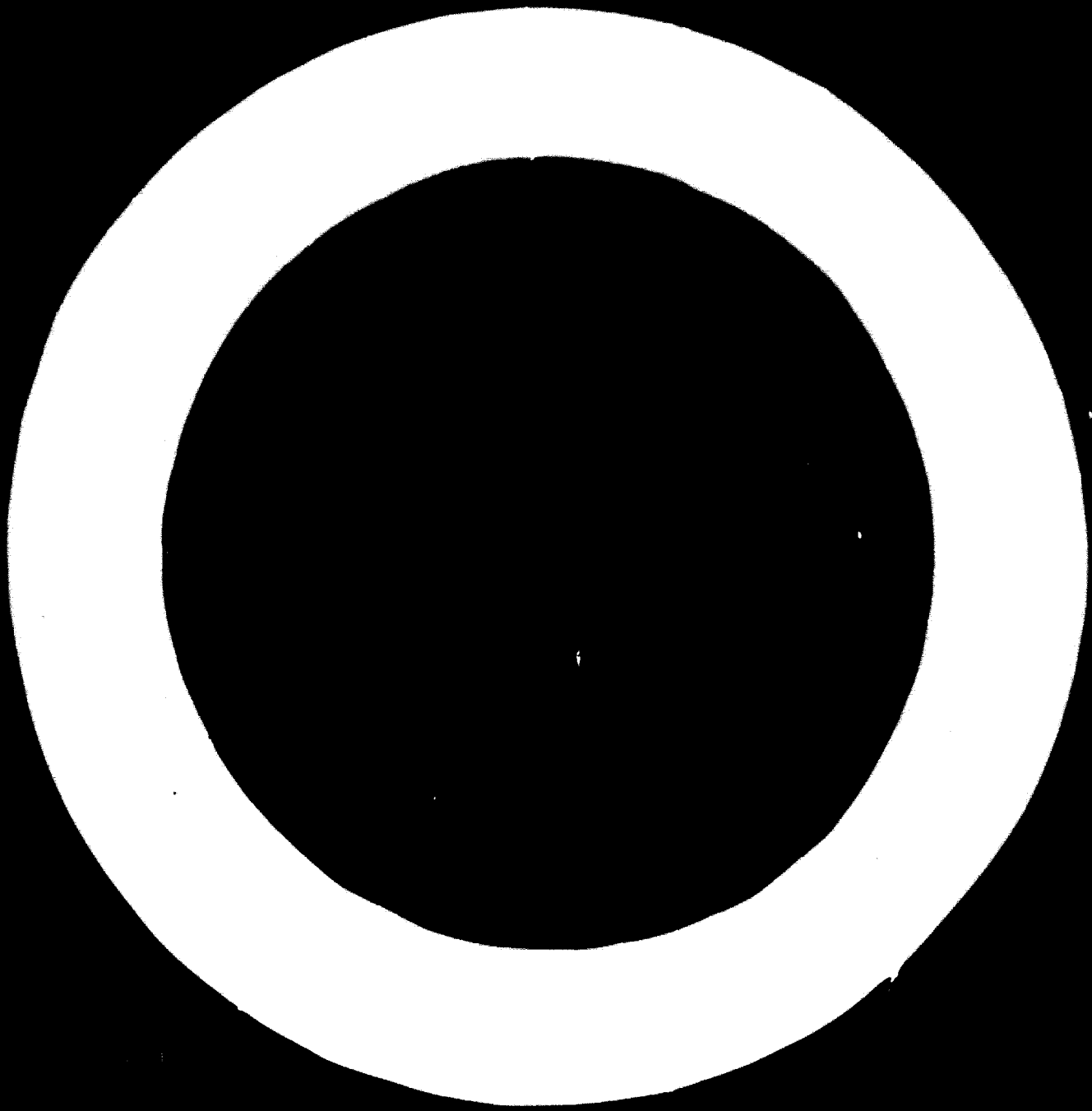
#### Corrigendum

##### Page 64, para.182, last line

Change to read as follows: "studies are scheduled for internal reproduction in 1973".

##### Page 78, para.227, line 11

Change the title of project component 5.03.03 "Workshop on pesticides" to read as follows: "Expert group meeting on pesticides"



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\*For administrative purposes the number of this group of activities has been changed from 15b to 17; the title, competence and responsibilities of the group remain the same.

Editorial Note: The material contained in the present document was formulated largely during the second half of 1971, with 30 September 1971 as the general out-off date for most facts and figures. All project components under supporting and other activities are Priority A unless otherwise indicated.

## INTRODUCTION

1. The activities of UNIDO undertaken through the Industrial Technology Division are oriented towards assisting the developing countries to accelerate their industrialization process. More specifically, assistance is given in the improvement and expansion of industrial facilities and in the establishment of new ones through the transfer of technology. Special emphasis is given to the utilization of mineral and agricultural resources and to the upgrading of engineering and technical skills in developing countries as well as to the mobilization of technical support from industrially developed countries. Such technical assistance is carried out through direct operational activities and "catalytic" supporting activities.

2. Within the Industrial Technology Division, there are seven technical groups of activities: Engineering Industries (Group 1); Metallurgical Industries (Group 2); Construction and Building Materials Industries (Group 3); Chemical, Pharmaceutical and Pulp and Paper Industries (Group 4); Fertilizer, Pesticide and Petrochemical Industries (Group 5); Light Industries (Group 6); and Industrial Branch Reports and Across-the-Board Techniques (Group 7; formerly Group 15b). The activities of these groups are described in detail under their relevant headings in this document. The technical activities of these groups are co-ordinated to provide a unified approach to the development of industry. The integrated programmes of activities are oriented towards a specific industrial sector such as industry related to agriculture, industry based on the utilization of natural resources, or industry for specific engineering product development and manufacture (e.g. the automobile industry). The programmes are also directed towards intersectoral activities such as the transfer of technology, global industrial problems and maintenance and repair. The salient features of these integrated programmes of activities are detailed below.

### SPECIFIC INDUSTRIAL SECTOR ACTIVITIES

3. The "green revolution" has highlighted the complex interrelationship between agriculture and industry. A significant portion of the current and proposed activities of UNIDO in the Industrial Technology Division is directed towards the development of industries related to agriculture. UNIDO's assistance in the agricultural machinery and implements, fertilizer and pesticide and agro-chemical industries contributes to the modernization and productivity of agriculture. Technical assistance given to industries that process agricultural and natural products (such as fruits and vegetables, fish, wool, fibres, leather and wood) or extract animal and vegetable oils develops the agricultural sector and creates opportunities for industrial growth. Of particular significance is the assistance of UNIDO in the industrial production of protein-rich food for human consumption. The activities of UNIDO in this field are in keeping with the efforts being made by the United Nations family to solve the world protein problem.

4. Within that part of its programme of work being carried out in the Industrial Technology Division, UNIDO has given emphasis to assisting developing countries in the exploitation of their natural and other industrial resources with a view to developing local industry. A few

examples of materials and products from natural resources are: chemicals from coal, petroleum and natural gas; salt from the sea; lime and sand (for cement); clay (for building materials); and black sand and ores (for metallurgical industries).

5. In respect of industries for engineering product development and manufacture, UNIDO attempts to assist developing countries in achieving greater independence in the production of quality equipment and consumer goods. To realize this objective, engineering design capabilities have to be improved, local manufacturing facilities planned and expanded, quality improvements and maintenance introduced, and testing facilities supplied. UNIDO provides technical assistance in all of these areas.

### INTERSECTORAL ACTIVITIES

6. The activities of UNIDO, including the establishment of facilities for the improvement of design capabilities, are oriented towards the creation and transfer of technology. Of special interest are the centres for metallurgical technology, mechanical engineering design centres, institutes for electrical and electronic component development, packaging institutes, and research and development centres for specialized branches, all of which receive support and assistance from UNIDO. Both operational and supporting activities further the choice of appropriate technology, including the economic size of plants, suitable product development and process planning methods.

7. UNIDO undertakes industrial branch studies and across-the-board activities to assist industry to overcome the global industrial problems that are technologically and economically related to various industrial sectors. Among the subjects included in the across-the-board activities are: packaging, environmental planning, management and control, industrial design, and product improvement. In connexion with the Second United Nations Development Decade, UNIDO is preparing global studies on trends and projections of the major industrial sectors in the developing countries.

8. The problem of maintenance and repair is common to almost all developing countries and constitutes one of the most serious problems to their industrialization process. The lack of appropriate physical facilities, under-utilization of capacities, lack of necessary technical manpower and skills and, most of all, the inadequacy of organizational and management techniques are major problems related to maintenance and repair. Considerable effort is being made by UNIDO to draw the attention of Governments and other authorities to the need for a planned approach to these shortcomings. UNIDO is assisting in the provision of mobile workshops and of equipment for stationary workshops for the maintenance and repair of agricultural machinery and implements, road-making and earth-moving equipment, transport machinery etc. In addition, UNIDO is assisting at the factory level and at the national planning level in the strengthening of facilities and in the introduction of modern maintenance and repair management techniques.

9. In the developing countries, industrial design is another common and serious problem area, which calls for UNIDO assistance. While specific problems of industrial design receive the attention of individual groups of activities within UNIDO, additional emphasis is being placed upon an integrated approach to the over-all problems of industrial design, including



the design of the final product. Assistance will be provided through operational and supporting activities in industrial design, with a view to increasing the range of processes and products available to developing countries.

### ACTIVITIES IN 197.

10. Although there is great diversity among the developing countries with regard to their technological and industrial development and resources, they nonetheless share common goals and problems. The activities of UNIDO have therefore been selective in order to meet the specific needs of the developing countries. At the same time, emphasis has been placed on mobilizing the available technological resources in all of the groups of activities in order to provide maximum assistance. The following examples show how the supporting activities of UNIDO have been designed to disseminate technological information, establish new mechanisms for co-operation, provide contacts between the developing and the developed countries, and lead to field projects that increase industrial productivity.

#### Specific industrial sector activities

11. The Second Interregional Fertilizer Symposium, held by UNIDO in Kiev and New Delhi, was directly related to the development of one of the industries based on agriculture. The Symposium, which was attended by some 130 experts, brought together not only technical personnel for the exchange of technological information, but also officials empowered to discuss investment opportunities in the developing countries. Representatives from FAO, the World Bank and from a number of multinational companies actively participated in the Symposium. The World Bank had estimated that \$25 billion would be needed to establish fertilizer plants in the developing countries in the next few years, and as a result of this Symposium, the World Bank has shown great interest in the establishment of such plants in the developing countries. Consequently, the World Bank and UNIDO have held consultations to formulate investment-oriented integrated projects. The Symposium also made recommendations concerning the establishment of integrated fertilizer plants in selected countries and the introduction of co-operative ventures by several small countries which, by pooling their resources, could set up plants for producing intermediate materials for fertilizers.

12. The Seminar on the Development of the Leather and Leather Products Industry in Developing Countries, held in Vienna, was attended by 25 participants from African countries and 53 observers from the industrialized countries. UNCTAD, FAO and IDCAS also participated and co-operated in the Seminar. Various aspects of the manufacture, marketing and export of leather products, including by-products, were discussed. The participants toured six Austrian leather and footwear factories. Through the integrated approach, which incorporates the effective participation of other relevant groups of activities of UNIDO, investment opportunities and subcontracting problems were also discussed. Participants from developing countries and representatives of industrial firms from the developed countries also made use of this opportunity to establish potentially productive contacts.

13. The Interregional Seminar on the Industrial Processing of Rice, which was held jointly by UNIDO, ECAFE and FAO in co-operation with the Government of India, highlighted inter-agency co-operation and effective participation by manufacturers. The Seminar was attended by 200 participants from 25 countries who examined the technological problems of rice processing and

laid down effective guidelines for the future development of the industry. Local and foreign participants took advantage of this unique opportunity to discuss matters concerning the import and export of machinery and industrial investment promotion.

14. As a direct outcome of the Expert Group Meeting on the Production of Fish Protein Concentrate, held jointly by UNIDO and FAO in 1969, UNIDO assisted the Government of Morocco in preparing a request for a UNDP/SF project aimed at establishing a plant for the industrial processing of fish protein concentrate. The project became operational in March 1971.

15. The above examples illustrate clearly the manner in which supporting activities lead to operational activities. In the development of agricultural and allied industries, UNIDO has maintained close co-operation with FAO; 6 of the 37 approved projects for the development of agricultural machinery and implements were joint UNIDO/FAO projects, and the full co-operation of FAO was secured in the remaining projects. The 37 projects involved primarily the local manufacture of hand tools, animal-drawn implements and suitable power equipment. For example, a UNIDO/FAO mission to Ceylon assisted in an analysis of tractor and power tiller manufacturing proposals and recommended measures to be taken for setting up a local manufacturing programme. In Chad, a UNIDO mission analysed the potential for manufacturing animal-drawn implements and recommended a comprehensive programme for local manufacture.

16. The following examples illustrate operational activities that led to increased productivity in the processing of agricultural products: the extraction facilities of a fish-meal plant in Agadir are now being used on a daily three-shift basis after having lain idle for several years; an analysis and evaluation of the activities of the Ghana Industrial Holding Corporation in the vegetable oil industry have resulted in a projected increase in the productive capacity, within the next five years, of about 40 per cent; and expert assistance to the Bahr Dahr Textile Mill resulted in a threefold increase in production during the first six months of operation.

17. A Workshop on the Creation and Transfer of Metallurgical Know-how was held by UNIDO in India to examine problems and recommend action related to the development, in industrializing countries, of capabilities for planning, engineering, design and construction of metallurgical plants and equipment, with a view to utilizing to the maximum local natural resources and manpower. Metallurgical specialists from the developing and the developed countries attended the Workshop and examined jointly the practical problems of establishing and strengthening organizations, enterprises, groups or centres for such purposes.

18. The operational activities in the metallurgical, chemical and building materials industry sectors have been directed primarily towards the utilization of locally available raw materials. In the metallurgical sector, for example, many projects were related to the utilization of metal ores, which included bauxite, ilmenite, copper, lead, zinc and iron ores. In the construction and building materials sector, a large number of projects dealt with the utilization of local sands, clays and volcanic materials to produce cement and cement products, fine ceramics, asbestos etc. In the chemical sector, there were nearly 100 projects for the manufacture of new products or for increasing the productivity of existing facilities for products such as solar salt, soda ash, fertilizers, cosmetics and pharmaceuticals.

19. With regard to industries for engineering development and manufacture, UNIDO has in Bulgaria a Regional Seminar on Machine Tools in the Developing Countries of Europe and the Middle East to examine the role of machine tools in the expansion of world industrial production, for nearly all engineering industries depend on a stock of machine tools and their application and utilization. The Seminar highlighted the co-operation of UNIDO with ECN and the European Committee for Co-operation of Machine Tool Industries (CECIMO), which represents 1,500 manufacturers in thirteen European countries whose output constitute 10 per cent of the world machine tool production. During the Seminar, contacts that could lead to mutually beneficial commercial and technical arrangements were established between representatives from the developing countries and manufacturers from developed countries. In addition, 21 projects were identified for possible UNIDO technical assistance in eleven developing countries.

20. The Expert Group Meeting on the Manufacture of Electronic Components in Developing Countries, held in the United States of America, was directed towards the promotion of national electronic industries in six selected developing countries that had already made some progress in this field. The structure of the industries in these countries and the technical problems of establishing new industries were discussed. A number of proposals for UNIDO technical assistance are now under consideration. The Meeting, which was held in collaboration with the Institute of Electrical and Electronics Engineers (IEEE), is illustrative of the co-operation of UNIDO with engineering professional societies of industrialized countries.

21. The operational activities of UNIDO in the engineering sector have been directed towards products that require a significant amount of engineering expertise in their development and manufacture. Thus UNIDO has rendered assistance in: manufacture of electronic components, instruments and radio receivers; development of design capabilities in the metalworking and machine tool industries; development of transport equipment, including ancillary components; manufacture of ferro-cement fishing boats; and development of agricultural machinery and implements.

**Intersectoral activities**

22. The supporting and operational activities of all groups of activities have been designed and implemented with the primary objective of introducing modern and appropriate technology to the industries of the developing countries. Of special significance for the transfer of technology are such UNIDO projects as: assistance to selected national institutes in the field of integrated wood processing; assistance in establishing leather training centres; support of existing research institutions in applied polymer research, plastics fabrication technology and quality control; and studies on the implications of technological innovations for the planning of iron and steel industries. Preliminary activities have been carried out to obtain information on product specifications for small low-cost tractors and power tillers and to establish criteria for the transfer of technology appropriate to low-volume batch production techniques.

23. In its efforts to assist the developing countries in solving global industrial problems, UNIDO carried out a number of different activities. An Expert Group Meeting on Packaging, held in Vienna, was attended by experts and observers from thirteen countries. UNCTAD, IDCA, the World Packaging Organization and the Asian Packaging Federation participated in the Meeting, at

which various aspects of the development of the packaging industry were examined, including the establishment of appropriate promotional, training and applied research activities. The Expert Group formulated guidelines for the future activities of UNIDO in this field and helped to stimulate the interest of developing countries. The major operational activities related to packaging were: modernization of packaging for furniture, improvement of food packaging and development of the manufacture and design of corrugated fibreboard containers. In addition, a number of projects for the establishment of national packaging centres have been outlined and feasibility studies to examine the need for such centres were carried out.

24. With regard to environmental engineering, UNIDO participated in the Seminar on Air and Water Pollution in the Iron and Steel Industries, organized by ECE in Leningrad. At the Seminar, seven participants from developing countries formed a special group and discussed specific pollution problems in the developing countries. This group has submitted country reports identifying possible areas of technical assistance in dealing with major industrial pollution problems.

25. In the field of maintenance and repair, UNIDO conducted a Maintenance Week in Turkey, which brought together government officials, industrial managerial personnel and technical experts. After discussing the techno-managerial problems of maintenance and repair, the participants formulated guidelines for action. UNIDO also carried out a number of operational activities in this field, including exploratory missions, organization of management, special plant-level trouble-shooting and establishment of maintenance and repair centres.

#### **OUTLINE OF ACTIVITIES: 1972 TO 1973**

26. In keeping with the trend towards greater integration of technical assistance programmes, primarily at the country level, UNIDO will continue to concentrate its resources on areas that are of particular benefit to the developing countries, with special regard to assistance to the least developed among the developing countries. Emphasis will be given to diversification of products for local manufacture, import substitution, ancillary industrial development and labour-intensive diversified production programmes.

27. In view of the complexity of industrialization and the need for integrated solution-oriented technical assistance, UNIDO has established close co-operation with organizations within the United Nations family and with a number of external organizations and institutions. Emphasis is placed on co-operation and technical liaison with the regional economic commissions, UNESOB, ILO, FAO, UNESCO and WHO. Direct contacts have been established with manufacturers, manufacturers' associations, financial institutions, research and development agencies and professional societies. Consequently, the future projects of the relevant groups of activities are aimed at bringing together persons, organizations and institutions to formulate a solution-oriented programme for the promotion of industry. The activities are designed to disseminate technical information and to act as technological catalysts for investment promotion. Several examples of the integrated promotion-oriented activities planned by UNIDO for 1972 and 1973 are mentioned below.

**Specific industrial sector activities**

28. In its efforts to promote industry for agricultural development and the processing of agricultural products, UNIDO proposes to hold in 1973, in co-operation with ICAR, ICRRI and the International Rice Research Institute, a meeting on the design and manufacture of rice machinery. Among the activities planned for 1973 and designed to assist the developing countries in the selection of suitable product lines, in the expansion of manufacturing capacities and in the establishment of prototype facilities are: a clinic for the promotion and manufacture of animal-drawn implements, in co-operation with the Indian Society of Agricultural Engineers; a workshop on pesticides; an expert group meeting on the manufacture of proteins from hydrocarbons; a symposium on industrial meat processing; and a regional seminar on the development of footwear and leather goods.

29. In contributing to the efforts in solving the world protein problem in terms of General Assembly resolutions 2416 (XXIII) and 2684 (XXV), UNIDO intends to participate in the work of the Protein Advisory Group of the United Nations, in accordance with ECOSOC resolution 1640 (LII) and General Assembly resolution 2848 (XXVI). The industrial production of animal and vegetable protein from traditional and non-traditional sources (biosynthesis etc.) falls within the terms of reference of UNIDO. UNIDO will therefore ask the Secretary-General to request a provision in the budget estimates for 1973 so that UNIDO will be able to participate in the work of the Group. The activities of the Protein Advisory Group would be followed closely by UNIDO, which hopes to avail itself of the competence, experience and services of the Group with regard to edible protein for direct human consumption. The Protein Advisory Group has also developed quality guidelines for the production and distribution of protein products for human consumption, and UNIDO intends to follow the guidelines and specifications proposed by the Group. Further, UNIDO proposes to make use of the institutions designated by the Protein Advisory Group and take advantage of other services provided by the Group within the terms of reference and the financial means of the projects for which UNIDO has executive responsibilities.

30. Participation with the Protein Advisory Group would be carried out by UNIDO within its work programme and in co-operation with interested organizations of the United Nations family, particularly FAO, under the terms of existing agreements relating to co-operation and coordination of activities in fields of common interest. The co-operation with FAO would take place within the framework of the FAO-UNIDO agreement of July 1969, which set out guidelines for co-operation between the two organizations. The agreement stipulated that while FAO "has responsibility for the development and promotion of protein concentrates, research and experimentation with respect to the acceptability for human consumption, and development of food habits," UNIDO "has responsibility for the production of protein as a branch of the manufacturing industry."<sup>1/</sup>

31. Most of the activities of UNIDO related to edible protein are carried out by Group 6. A detailed description of the past and proposed activities in this area is to be found in the relevant part of the report of that Group.

<sup>1/</sup> Document ID/B/65, Annex I, para.21.

One of the major activities related to the development of industry based on the utilization of natural resources will be the third interregional iron and steel symposium, which UNIDO proposes to hold in 1973. At the symposium, high-level discussions will be held on the techno-economic aspects of establishing plants and of rationally expanding existing ones. At the workshop on refractories production, proposed for 1973, UNIDO plans to bring together technologists, equipment manufacturers and potential investors to discuss ways and means of establishing suitable plants. An expert group meeting on the development of the synthetic rubber industry, to be held in 1973 in co-operation with the Government of Romania, will bring together a number of manufacturers, representatives from manufacturers' associations, the International Rubber Study Group and participants from the developing countries to discuss the establishment of small-scale plants in the developing countries, especially in those countries that are in the process of setting up petrochemical complexes to produce the necessary basic materials.

#### **Intersectoral activities**

33. In 1972 and 1973, a number of additional co-ordinated steps are to be taken towards the creation and transfer of technology. In 1972, UNIDO will hold a meeting through which it can promote the transfer of metallurgical technology to metals transforming industries in Latin America. Contacts will be arranged between donors and recipients of technological know-how for an exchange of information and for subsequent negotiations on actual transfers of technologies. Additional examples of this type of activity are the proposed meeting on new techniques of yarn and fabric production, to be held in co-operation with the International Institute for Cotton; an expert group meeting on the construction industry, at which various aspects of the transfer of technology in the construction industry will be discussed (this meeting will be held in co-operation with the United Nations Centre for Housing, Building and Planning (UNCHBP) and the relevant regional economic commissions); and an expert group meeting on the transfer of technology in the production and use of catalysts, to be held in co-operation with the Government of Romania. In addition, studies will be commissioned for use in field activities, in-plant training courses will be conducted and contacts will be strengthened with research, development, manufacturing and professional organizations. All of these various activities have been designed to aid in the transfer of technology to the developing countries.

34. With regard to global industrial problems, UNIDO intends to carry out branch reports on the construction industry and on the inorganic basic chemicals industry. In the field of packaging, examples of integrated activities are a regional symposium on packaging research and development centres, a seminar on food processing and packaging, and a seminar on the application of plastics. Activities related to environmental engineering will include a workshop on industrial waste utilization and pollution abatement technology. Other global industrial problems such as investment, employment and trade will also be investigated by UNIDO.

35. As an essential element in continuing industrialization, maintenance and repair activities are stressed throughout the programme of the Industrial Technology Division. A workshop on the selection of stationary and mobile maintenance and repair shops for agricultural machinery and implements, to be held in co-operation with the Soviet authorities, and a number of maintenance weeks are examples of activities planned in this area.

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## GROUP 1: ENGINEERING INDUSTRIES

### Introduction

36. The programme of UNIDO in the field of engineering industries is concentrated on the transfer of technology in the areas of agricultural engineering, mechanical engineering, electrical and electronic engineering and transportation equipment. In practical terms, the major objective of Group 1 is to assist in the establishment and effective utilization of manufacturing facilities and engineering services. In an effort to achieve this objective, a wide range of technical assistance projects has been executed by UNIDO staff and experts.

37. An analysis of the work carried out by UNIDO through Group 1 points to priorities in the promotion of the manufacture of particular types of equipment and products. Agricultural machinery and implements are of special importance owing to their close connexion with the "green revolution". In mechanical engineering, emphasis is on the crucial role of tools in the production of metal products, and activities have been concentrated on dies, jigs and fixtures as well as machine tools. In the electrical and electronic industries, the production of consumer products and electrical distribution equipment has led to a rise in the standard of living in developing countries. Attention is being given to the development and manufacture of instruments as they control virtually all industrial processes. High in the interest of Governments is the promotion of the manufacture of road vehicles and ships. In the more advanced of the developing countries, a start has been made on the manufacture of special equipment for the mining and construction industries; this activity will be extended to equipment in other industrial branches in the near future.

38. In addition to promoting the manufacture of capital equipment and other engineering products, most Governments accord priority to services such as maintenance and repair, and UNIDO is making an effort to promote such services in all fields of engineering. Another important activity is the promotion of local design capabilities, for a good design is fundamental to the proper execution of engineering work. Over a long term, local design capabilities are vital to the process of industrialization.

39. UNIDO has been emphasizing the need for proper selection and design of products to suit local conditions, utilization of local raw materials and adaptation of production techniques to conditions in developing countries. In achieving rapid and orderly industrialization, the surveys and feasibility studies on the manufacture of specific engineering products, currently being carried out by UNIDO in a number of countries, are also of importance. Direct assistance is given to enterprises in plant layout, process planning, production control, in-plant inspection, proper application and better utilization of machinery and testing of export products to ensure that they meet internationally accepted standards. Physical facilities have been established in the form of development centres for metalworking industries, specialized design centres,

construction workshops and mobile workshops for maintenance and repair. The creation of such centres and workshops is a particularly effective form of technical assistance, for not only do these have a long-term effect on industrial development, but through them, UNIDO can undertake a co-ordinated programme of work in the field involving a large number of local personnel. In all of these activities, UNIDO seeks to provide on-the-job training for local staff.

40. UNIDO staff have gone on mission to a number of countries to identify opportunities and formulate projects in nearly all areas of engineering. Seminars and symposia have been organized by UNIDO on various aspects of engineering industries; at these meetings the participants can share experiences and discuss common problems in the establishment of such industries. During the seminars and symposia, many interested parties from industrialized and developing countries are brought together with a view to promoting bilateral contacts, both public and private. Activities of this type often result in practical and direct commercial contacts and on-the-spot formulation of projects. At a recent seminar, over 20 projects were thus identified. A large number of enterprises, associations of manufacturers and professional institutions are now working in close collaboration with UNIDO in joint efforts to expand contacts with and in the developing world.

#### OPERATIONAL ACTIVITIES

41. A number of developing countries have requested technical assistance for the establishment and development of manufacturing and service facilities for agricultural machinery and implements, with special reference to their linkage to the metalworking sector. The requests touch on several areas including: (a) the preparation of feasibility studies for the establishment of manufacturing facilities; (b) the reinforcement or establishment of facilities for the development of product lines, prototype fabrication and testing facilities; (c) the establishment, organization and operation of services for maintenance and repair and replacement parts manufacture, including stationary and mobile workshops; and (d) the evaluation of manufacturing proposals, rationalization of manufacturing programmes, investigation for the establishment of manufacturing plants for hand tools, animal-drawn implements, crop protection equipment, engines, power tillers and tractors.

42. Such requests reflect the growing awareness of the developing countries of the need to manufacture equipment suitable for local soil conditions and crop patterns and to make full use of the locally available resources. The developing countries are also interested in enhancing local engineering capabilities in design and adaptation and in establishing testing facilities for product performance evaluation. Emphasis is also put on national maintenance and repair programmes.

43. On the basis of the technical assistance requests received by UNIDO and in view of the emphasis placed by the developing countries on the rational development of the agricultural machinery and implements industry, certain trends in the nature and scope of UNIDO's technical assistance in this field can be ascertained. Up to 1971, the technical assistance requests, which were in the areas of manufacturing feasibility, design and adaptation, and maintenance and repair, indicated that the primary wish of the Governments was to obtain preliminary information and guidelines for future development. The least developed of the developing



countries placed emphasis on local manufacture of hand tools, animal-drawn implements. In 1970, the trend in development was towards identification, specification and financial analysis of the manufacturing plants. From 1973 onwards, the emphasis is likely to be placed on the establishment of pilot manufacturing plants and on the expansion of selected small-scale units. Among intermediate developing countries, the emphasis is on local manufacture of animal- and tractor-drawn implements, threshers, and assembly of pumps and engines. Among the more industrialized of the developing countries, the trend seems to be towards the manufacture of pumps, equipment, crop protection equipment, trailers, power tillers, and assembly of tractors and combines. The future trend of technical assistance will be towards institutional assistance in design, development and testing, maintenance and repair, establishment and strengthening of manufacturing and professional institutions, licensing for the establishment of new units, development of ancillary industries, and in exploring possibilities of regional co-operation.

44. In the field of electrical and electronic industries, the activities of UNIDO fall into three categories: (a) planning; (b) promotion of design capabilities; and (c) provision of testing and production facilities. The planning activities are designed primarily to assess demand and identify manufacturing possibilities leading to the promotion of investment and the development of complementary specialization in the electrical industries. Given the extremely high rate of innovation in the electronics field, the development of local design capabilities is vital for the rapid adoption of new techniques and components. Special emphasis is therefore placed on assistance given by UNIDO in design capabilities, covering all aspects of work from the preparation of performance specifications to actual physical and electrical design of products, components and process control systems. UNIDO is also promoting the manufacture of high quality equipment by assisting in the establishment of testing facilities that are essential for checking performance specifications and safety requirements of electrical equipment.

45. In response to the considerable interest in radio receivers, UNIDO has been engaged in promoting the design and production of low-cost receivers, based on performance specifications prepared by the International Telecommunication Union (ITU). In 1971, UNIDO completed several projects in this area, all aimed at improving the production of receivers and strengthening the design capabilities needed to keep abreast of the development of new circuits and components. A number of Asian countries have considerable experience in the production of electronic components, and UNIDO has promoted this type of science-based industry in order to increase local employment opportunities.

46. A second area of growing importance is that of instrumentation for measurement, control and regulation purposes not only for the electronic industry but for all processing industries. UNIDO is executing several major projects concerned with the design and production of instruments for industry; the three surveys that are to be made in this area are expected to lead to further major projects.

47. Considerable interest has been expressed by industrializing countries in the development of electrical power. UNIDO has carried out a number of projects on the design and production of electrical distribution equipment, particularly transformers, cables and insulators, all of which

are essential for the expansion of national electrical networks. Recognising the importance of the electrical and electronic industries to national economies, UNIDO has implemented projects concerned with the general planning of these industries. A major project is being carried out under which complete laboratory facilities are being designed for the testing of high-power and high-voltage electrical equipment.

48. In the coming years, the developing countries are expected to increase their efforts to establish and expand their electrical and electronic industries; an increase in the number of requests for technical assistance to that industry is, therefore, to be expected. The less developed of the developing countries will require assistance primarily for the establishment of plants and production facilities for consumer equipment (radios) and for electric power switching and distribution equipment. Countries in the intermediate stage of industrial development are expected to submit requests for the manufacture of telecommunication and professional electronic equipment, production planning and market studies. Relatively advanced countries will seek assistance for equipment design, research and testing facilities, quality control, and production rationalization.

49. UNIDO is making a concerted effort to help the developing countries to solve the manifold problems of maintenance and repair through field projects that fall into four categories: (a) exploratory missions to survey and determine requirements for the improvement of maintenance and repair facilities; (b) development and strengthening of maintenance and repair services at enterprise and country levels; (c) establishment of stationary or mobile maintenance and repair centres together with extension services; and (d) organization and management of maintenance and repair facilities. These projects are continuing activities, which will grow with the expansion of industry. The demand for jobbing and central workshops will undoubtedly increase in proportion to the needs of enterprises for specialized work, and UNIDO is promoting the establishment of these types of workshops. UNIDO is also providing assistance to improve the reliability of materials and equipment design.

50. The operational activities of UNIDO related to the metalworking industries are divided into four main categories: (a) identification, through feasibility studies, of manufacturing opportunities for metal products and equipment; (b) assistance in the selection, application and utilization of machinery and tools; (c) introduction of better production techniques; and (d) promotion of design capabilities.

51. UNIDO has promoted the development of the metalworking industries through assistance in the production of a wide range of metal products, structural parts and associated tools, dies, jigs and fixtures. In view of the particular importance of machine tools to these industries, UNIDO has concentrated on assistance in the use, design and production of machine tools in developing countries. UNIDO has also encouraged the establishment of manufacturers' associations to promote co-operation and the exchange of ideas between manufacturers from developed and developing countries.

52. The activities undertaken by UNIDO in this field in 1971 included assistance in design of metal products, solving of production problems, organizing material testing and in-plant inspection and advising on allied problems of marketing and cost accounting. The assistance covered

such items as steel structures, metal containers, wire products, chains, padlocks and similar household items and hardware essential to daily life. UNIDO has been engaged in the implementation of several major projects such as metalworking industries development centres and demonstration workshops, which will become the nuclei of the development of the metalworking industries in the given developing countries.

53. UNIDO has rendered assistance in promoting better design and proper use of tools, dies, jigs and fixtures as these are determining factors in productivity and the quality of the end product. The selection, proper utilization and maintenance and repair of machine tools have also been promoted by UNIDO as a step towards upgrading production. Many of the more industrialized developing countries have embarked on the production of machine tools, and UNIDO has been providing assistance in the development of local designs, in the solution of production problems and in the testing of various types of machine tools. UNIDO will also be promoting the use of numerically controlled machine tools through the establishment of demonstration centres.

54. In addition to its assistance in specialized technical fields, UNIDO is implementing several projects in general fields including assistance in the carrying out of regional surveys. Projects of this type have arisen from governmental awareness of the need of a basis for sound policy making in the development of the metalworking industries. In 1971, emphasis was placed on feasibility studies and the improvement of production techniques. It is expected that these activities will continue in the future in the less developed countries, with respect to metal products; in the more developed countries, the emphasis is likely to shift to the production of capital equipment such as machine tools. Activities concerned with the selection and utilization of machine tools and the promotion of design capabilities, both of which are fundamental to the engineering industry, will continue to increase.

55. With regard to transportation equipment, UNIDO has carried out projects involving over-all planning, feasibility studies, design and research, production, testing, quality control, standardization, maintenance and operation. Through such projects, UNIDO has been promoting the manufacture in developing countries of ships and boats, commercial road vehicles, passenger cars, railway equipment, diesel engines and bicycles.

56. In view of the growing interest in shipbuilding and repair services, UNIDO has prepared plans and feasibility studies in this field. Considerable success has been achieved in the production of small boats, using ferro-cement techniques. The technical assistance provided by UNIDO in shipbuilding and repair is being increasingly oriented towards the planning and upgrading of repair facilities and the building of ferro-cement boats. A number of new projects are expected in such fields as manufacture of deck equipment and maintenance of harbour equipment. In its shipbuilding and repair projects, UNIDO intends to maintain closer co-operation with UNCTAD, FAO and the Inter-Governmental Maritime Consultative Organization (IMCO).

57. The activities of UNIDO in the automotive industry have been concentrated on the over-all planning of the industry through the preparation of feasibility studies on the establishment and development of automotive assembly plants and ancillary industries. Other activities are concerned with providing assistance in solving production problems in the automotive industry,

drafting appropriate industrial legislation and planning regional co-operation. UNIDO expects that in the future its technical assistance projects related to the automotive industry will be directed more towards the planning of subregional agreements and the preparation of feasibility studies on the establishment and development of this industry, including the preparation of production programmes at national levels.

58. UNIDO is also active in other areas of transport, and work is currently being carried out on design and restoration of railway equipment, on diesel engine design and on the manufacture of mopeds and bicycles.

59. In addition to UNIDO activities, for which Group 1 has primary responsibility, assistance has been provided on technical aspects of operational activities being carried out by other groups of activities within UNIDO. In particular, assistance has been given in the preparation of projects for industrial promotion meetings, in the preparation of industrial training programmes, in evaluation of industrial services, in the organization of information services on engineering products and in the carrying out of sectoral surveys.

Value of approved field projects and forecast of requirements, 1971 to 1973  
(in thousands of US dollars)

Source of funds	1971 estimated expenditure	1972			1973		
		Approved projects	Requirements for new projects	Total	Approved projects	Requirements for new projects	Total
UNDP/SF	935.6	} 2,457.9	1,627.8	4,085.7	1,353.0	4,027.0	5,380.0
UNDP/TA	280.0		(396.5) <sup>a/</sup>			(1,360.0) <sup>a/</sup>	
RP	107.3	138.2	-	138.2	120.0	-	120.0
SIS	524.0	886.0	600.0	1,486.0	-	1,750.0	1,750.0
GTF	95.4	417.1	280.0	697.1	-	940.0	940.0
FIT	<u>30.0</u>	<u>4.0</u>	<u>30.0</u>	<u>34.0</u>	-	<u>30.0</u>	<u>30.0</u>
Total	1,972.3	3,903.2	2,537.8	6,441.0	1,473.0	6,747.0	8,220.0

Note: UNDP/TA and UNDP/SF are to be merged, effective 1 January 1972.

<sup>a/</sup> Annual estimated costs of projects included in the UNDP Country Programmes or projects officially submitted to UNDP for approval.

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**List of Approved Projects and Projects  
under Active Consideration**

Projects over US\$100,000

Projects under US\$100,000

Agricultural machinery and implements:

VC/00/1-Algeria - Repair shops and mobile repair units for agricultural equipment

CHD (IPF)\* - Establishment of workshops for production and repair of agricultural tools and implements

GAM (IPF)\* - Assistance to assembly plant for ox-drawn agricultural equipment

VC/00/1-Pakistan - Repair shops and mobile repair units for agricultural machinery

UAR-68/373  
BDI-70/795  
CHD-71/1137  
GAM-71/1389  
MAG-70/1039  
MAG-71/1382  
MAR-70/924  
MOR-71/1137  
SUD-70/1128

TAN-71/1141  
ZAR-70/1110  
LAV-71/1148  
GUY-70/810  
LAO-70/814  
NEP-71/1304  
NEP-71/1305  
THA-71/1167  
WES-70/888

IRQ-70/983  
LEB-70/1113  
LEB-71/1114  
SAU-70/932  
SYR-71/1181  
SYR-71/1182  
SOY-71/1293  
INT/01/1/9  
INT-VC/1/21

(4 projects)

(27 projects)

Electrical and electronic industries

SPA-12 (SF) - Industry testing and experimentation centre (electrical industries)

UAR/01/2/1\*\*  
GAM/01/2/1\*\*  
MAR/01/2/1\*\*  
MOR-71/1365  
NIR-70/858  
NIR/01/1/3\*\*  
RWA-71/1397  
SEN/01/2/1\*\*  
SUD/71/10  
IND-69/484

IND/01/1/4\*\*  
INS-70/1200  
KOR-69/673  
THA-70/840  
THA/01/1/2\*\*  
ALB/01/2/1\*\*  
CZE/70/6\*\*  
IRQ-69/634  
IRQ-70/981  
ISR/01/1/1\*\*

POL/01/2/1\*\*  
POL/70/2  
ROM/71/1435  
ROM/70/2  
ROM-69/452  
ROM-70/1057  
ROM/69/3  
SYR-68/441  
SYR-69/536  
YUG-71/1308

(1 project)

(30 projects)

Maintenance and repair

CMR-19 (SF)\* - Pilot programme in maintenance and repair

CON(K)-34 (SF) - Central service for maintenance and repair of industrial equipment

DAH-12\* - Maintenance and repair of boats

GUI-22\* - Maintenance and repair organization

SEN-18\* - Establishment of central pilot workshop for general maintenance and repair

COL (IPF)\* - Maintenance and repair of transport equipment

JAM-14 (SF) - Maintenance and repair training and demonstration unit

ALG/69/12  
ALG-69/528  
ALG-70/883  
UAR/69/10  
UAR/71/2\*\*  
CAF-70/930  
GAB-69/629  
GAM-VC/1/27  
GUI-70/1126  
SEN-71/1331  
SEN-VC/1/18  
UPV-70/786  
COS-71/1188  
DOM-69/632  
DOM/01/2/1\*\*

ELS-71/1189  
GUA/01/1/1\*\*  
GUA-71/1190  
HON/01/2/1\*\*  
PAN-71/1191  
AFG-70/836  
INS-70/1124  
KOR-69/565  
MON-69/597  
MON/01/2/1  
NEP-71/1253  
PAK/69/8  
IRQ-70/706  
ISR/01/2/1\*\*

JOR/01/1/2  
JOR/01/2/1\*\*  
JOR-71/1231  
SAU-70/728  
SYR/01/1/1\*\*  
SYR/01/2/3\*\*  
TUR-71/1434  
YEM-71/1143  
SOY/01/1/2\*\*  
SOY/01/2/1\*\*  
SOY-70/945  
YUG-70/880  
YUG-70/893  
INT-VC/1/25

(7 projects)

(43 projects)

\* Projects not yet approved but included in the Country Programmes and projects officially requested.

\*\* Fellowship posts.

Projects over US\$100,000

Projects under US\$100,000

Metalworking industries

TUN-27 (SF) - Centre for development of proto- type tools, Sousse	ALG/01/1/1**	VEN/01/1/2**	KMR/01/1/1**
	NOR-71/1429	VEN/01/2/2**	PAK/01/2/3**
CHI-39 (SF) - Metalworking industry testing centre	NER-70/377	VEN-70/779	SYR-69/60
	NIG/01/2/1**	VEN/68/5	TUR-71/1434
PHI-30 (SF) - Metal industries development centre	TUN/70/1	LAT/01/1/1	TUR/01/1/1**
	CUB/01/2/1**	LAT/01/2/1	YUG/01/2/1**
SIN-7 (SF) - Metal industries development centre	PER/01/2/1**	FIJ/69/531	INT-VC/1/15
	VEN/71/16		
(4 projects)			(22 projects)

Transport equipment

UAR-VC/00/2 - Machinery for repair of road transport equipment and mobile units	UAR/71/33	NIR-70/1108	FIJ/70/3
	UAR-71/1295	RWA-71/1392	INS-70/889
	UAR-68/394	COS-71/1306	THA-71/1163
	UAR-9033-71	PER/69/2	ICE-70/938
	UAR-69/558	VEN-70/780	ROM/70/39
	UAR-71/1298	VEN-71/1347	INT-VC/1/20
	UAR-VC/1/13		
(1 project)			(19 projects)

Design capabilities

UAR-55 (SF) - Engineering and industrial design development centre	UAR-69/680	ELS/01/2/1**	IRA/70/10
	UAR-70/1140	IND/71/21**	POL/71/2
IND-67 (SF) - Design centre for electrical measuring instruments	UAR-VC/1/22	IND/01/2/1**	ROM-70/770
	BRA/69/19	IRA-9026-71	
BIL-3 (SF) (IPF)* - Research institute for instrument design (Phase I and Phase II)			
(3 projects)			(11 projects)

Processing industry machinery

TUN-70/1084	CEY-70/897	ALB/02/1/1**
UPV-70/828	CEY-70/771	HUN/69/7**
COL/71/5	IRA-70/714	ROM-70/1002
COL/01/1/1**	KOR/69/16	ROM/69/5
PER-70/1051	PHI/01/2/1**	YUG-71/1243
		(15 projects)

Multisectoral projects

UAR-85 (IPF)* - Quality control centre for engineering industries	UAR-70/1112	SIN-70/724	YUG-70/880
	JAM-69/562	ISR-69/670	YUG-71/1221
ARG/68/6 (TA) - Assistance to the National Institute of Industrial Technology (INTI)	LAT-70/984	POL/70/23**	YUG-70/829
	INS-70/902	ROM/71/3**	INT/01/2/1
	IRA-71/1160	YUG-70/816	
(2 projects)			(14 projects)

\* Projects not yet approved but included in the Country Programmes and projects officially requested.

\*\* Fellowship posts.

## SUPPORTING AND OTHER ACTIVITIES

60. The supporting and other activities of Group I are classified under the following projects:

Agricultural machinery and implements	1.01
Electrical and electronic industries	1.02
Maintenance and repair	1.03
Metalworking industries	1.04
Transportation equipment	1.05
Design capabilities	1.06
Construction machinery	1.08

### **Agricultural machinery and implements (1.01)**

61. The Industrial Development Board at its fifth session, the Special International Conference of UNIDO and ECOSOC at its fifty-first session all stressed the importance of promoting activities related to: the "green revolution"; the advancement of the least developed among the developing countries; the local manufacture of industrial inputs for agriculture such as agricultural machinery and implements; and the manufacture of agricultural machinery especially designed for use in developing countries and within the purchasing power of their rural population. Accordingly, UNIDO has formulated its activities in the field of agricultural machinery and implements in line with these recommendations. Emphasis has been put on the direct linkage of supporting activities to field activities.

62. In the agricultural machinery sector, UNIDO followed up the recommendations of the 1969 Expert Group Meeting on Agricultural Machinery Industry in the Developing Countries (1.01.01) by sponsoring missions to various regions to formulate relevant technical assistance programmes. As a result of these missions, 34 technical assistance requests from 29 countries and two regions have been received. In this connexion, it is interesting to note that five projects related to the agricultural machinery industry were discussed at the UNIDO meetings on promotion of industrial projects in Asia and the Far East (cf.13.09.02).

63. As a result of the 1970 joint UNIDO/UNESOB Mission on Agricultural Machinery Industry (1.01.02), UNIDO received seven requests for expert assistance from four of the Middle East countries. In 1971, UNIDO assisted UNESOB in the preparation and review of a document entitled "Some aspects of the manufacture of agricultural machinery and implements and of the engineering industries in selected countries of the Middle East", which includes country study reports on the six countries visited by the mission. The analysis of the findings of the mission, originally scheduled for publication in 1971 (ID/B/EO/Add.1, para.36), will be published jointly with the report of the UNIDO/IDCAS mission (cf.1.01.03) in 1972.

64. In 1971, UNIDO, in co-operation with the Industrial Development Centre for Arab States (IDCAS), extended the survey in the Middle East to countries in the North African region. The

UNIDO/IDCAS Agricultural Machinery Mission (1.01.02) analyzed the problems of these countries with special reference to regional co-operation. As a result of this mission, twelve technical assistance projects in these countries have been identified. In addition, UNIDO has already received five requests for technical assistance from four North African countries.

25. During 1971, UNIDO assisted IDCAS in the preparation of Industrial branch studies on tractors, tractors and prime movers (1.01.04). UNIDO was also responsible for a paper on the agricultural machinery and implements industry in the Arab countries, which was discussed at the Second Industrial Development Symposium for Arab States in October 1971. At the same meeting a common technical approach and the assistance of UNIDO in the proposed IDCAS expert group meeting on tractors, tractors and prime movers, to be held in 1972, were formulated. A UNIDO staff member is expected to participate in this IDCAS meeting.

26. UNIDO continued to encourage regional development of the agricultural machinery industry in 1971 by organizing, in co-operation with ECLA and the Acuerdo de Cartagena, an Agricultural Machinery and Implements mission (1.01.05) to the countries of the Andean Group. The mission began its work in December 1971 and will complete it in early 1972. Individual country studies are being undertaken and a techno-economic analysis is being made of the problems of the subregion. The studies and the analysis will be combined in a report on the development of the agricultural machinery industry in countries of the Andean Group. The report is scheduled for publication in 1972.

27. A joint UNIDO-ECA agricultural machinery and implements mission (1.01.06; Priority B) to five selected countries of West Africa was to have been carried out in 1971 (ID/B/80/Add.1, para.41). Owing to lack of resources, this mission has been postponed to 1972, subject to the availability of funds.

28. In 1971, UNIDO commissioned five studies (ID/B/80, Add.1, para.43), to assess the Agricultural machinery and implements requirements, including storage and transport, in the ECAFE region (1.01.07), as an industrial input contributing to the "green revolution". The studies cover the following subjects: design and development; maintenance and repair; storage and transport; professional agricultural engineering societies; and the activities of manufacturers' associations in promoting the agricultural machinery industry. In addition, a paper was prepared in 1971 for publication by the Farm Machinery Industrial Research Corporation of Japan on the agricultural machinery and implements industry in South East Asia and on related activities of UNIDO. In 1971, UNIDO prepared a paper on the role of UNIDO in promoting the manufacture of rice mechanization machinery in the developing countries. This paper is to be presented at the 1972 International Conference on Tropical and Sub-Tropical Agriculture to be held in Hawaii by the American Society of Agricultural Engineers. All these studies will serve as background papers for the proposed expert group meeting (cf.1.01.08) to be held in 1973. The co-operation of ECAFE in the implementation of these studies was secured, and suggestions have been invited on additional topics for studies.

29. In 1972, UNIDO will carry out, in co-operation with the International Rice Research Institute (IRRI), a regional study on the Design and manufacture of wet-land (rice) harvesting and threshing machinery in the developing countries (1.01.08). In this study, which was



supported by the Industrial Development Board at its fifth session (A/ID/B/50/1, para. 10). An analysis will be made of the specific problems of development of local manufacturers of agricultural machinery and implements, including storage, transport and materials handling equipment in relation to the needs generated by the "green revolution". The study will also identify local manufacturers who might be interested in participating in product diversification and in the expansion of their manufacturing facilities.

70. The expert group meeting, originally scheduled for 1972 (ID/B/50/Add.1, para. 44), has been postponed to early 1973 in order to take into account the findings of the 1972 regional study and the deliberations and recommendations of the 1972 session of the International Rice Commission. The expert group meeting, in which ECAFE and FAO will co-operate, will be held at the Agricultural Machinery Division of the International Rice Research Institute (IRRI) in Manila, Philippines, as a joint UNIDO/IRRI project. Participating in the meeting will be small- and medium-scale entrepreneurs from developing countries, representatives of manufacturing organizations from industrialized countries and representatives of financial institutions. The meeting will also take into account the recommendations relevant to rice machinery development as presented by the 1968 UNIDO/ECAFE Fact Finding Mission on Agricultural Machinery Industry, the 1971 Expert Group Meeting on the Mechanization of Rice Production and Processing held jointly by FAO and the Governments of the Netherlands and Surinam, and the 1971 joint UNIDO/FAO/ECAFE Interregional Seminar on the Industrial Processing of Rice (cf. 5.02.06). The expert group will also study the development and prototype fabrication programme of appropriate machinery and equipment undertaken by IRRI. On the basis of its findings, the expert group will formulate a programme for the development, adaptation and manufacture of suitable machinery and equipment in selected developing countries. The report of the expert group meeting is scheduled for publication in 1973.

71. As a follow-up of this meeting, UNIDO proposes to explore the possibilities of supplying suitable machinery and implements, developed by IRRI, to developing countries and of assisting further in prototype fabrication and adaptation with the objective of eventual local manufacture in developing countries.

72. As a new development in this area UNIDO proposes to organize in 1973 a Manufacturing development clinic for animal-drawn implements and hand-operated agricultural machines (1.01.09). A number of the least developed countries have shown interest in the establishment of small- and medium-scale units for the manufacture of simple tools and implements. The objective of the clinic is to bring potential entrepreneurs and government officials from the less developed countries into contact with medium-scale manufacturers from the more advanced of the developing countries to select, with the assistance of UNIDO experts, product lines which may be appropriate to their country. It is planned to hold the meeting in India during the Agricultural Fair and the Special Meeting of the Indian National Agricultural Engineering Society. In addition, the report on plant requirements for the production of specific animal-drawn agricultural implements, which was finalized in 1970 (ID/B/50/Add.1, para. 33), will be reviewed at the manufacturing development clinic.

73. As a follow-up on this meeting, UNIDO proposes to supply participating countries with selected equipment and components needed for setting up prototype fabrication. UNIDO also proposes to assist in product performance analysis and in the fabrication of a number of

prototype. UNIDO anticipates that these operational activities may result in the establishment of demonstration manufacturing units. If approved, these activities will be carried out in co-operation with Groups 9, 11 and 13. The co-operation of FAO will also be sought through the appropriate channels.

74. As a new activity UNIDO proposes to conduct in 1973 a workshop on Selection of stationary and mobile maintenance and repair workshops for agricultural machinery and implements (1.01.10). The project, as proposed, consists of a workshop, which would probably be held in Moscow on the occasion of an international exhibition on the organization of technical services and repair of automotive equipment. Exhibition authorities would be requested by UNIDO to include special maintenance and repair equipment for tractors, agricultural machinery and implements.

75. Participants would be from those developing countries that had expressed a desire to establish national maintenance and repair programmes. During the workshop, the representatives from the developing countries would discuss with UNIDO experts and Soviet technical personnel various aspects of organization and operation of maintenance and repair programmes. With the assistance of the experts, the participants could select equipment and machinery suitable for their needs and formulate preliminary programmes for the establishment of stationary maintenance and repair workshops, mobile units and technical training. The co-operation and participation of FAO in this workshop will be sought through the appropriate channels. The activity would be carried out in co-operation with Group 8.

76. During 1971, UNIDO contacted a number of developing countries to ascertain their interest in small low-cost tractors, and requested the countries to forward details of their concept of such a type of tractor. In 1972, UNIDO proposes to analyse the reactions and the interest of the Governments and to investigate the feasibility of presenting a regional or global project for UNDP financing. If the reactions are positive, UNIDO would seek the assistance of WAITRO and the co-operation of FAO and OECD in this undertaking. UNIDO proposes to organize in 1973, subject to the availability of resources, a manufacturing promotion meeting on Small low-cost agricultural tractors and power tillers (1.01.11; Priority B). It is envisaged that the meeting would be held in co-operation with the International Commission of Agricultural Engineering, during the Eighth International Congress of Agricultural Engineering. During the proposed meeting, discussions would be held on product specifications, necessary adaptation work and possibilities of further specific manufacturing activities in close co-operation with selected manufacturers in developing countries; and an action-oriented programme would be formulated.

77. The meeting would be organized with the participation of: selected manufacturers who had indicated their interest in exploring the possibilities of developing or adapting their existing products to meet the needs of the developing countries; representatives of selected agricultural machinery research and development institutes, who had been active in developing a small tractor; and representatives of selected developing countries that had indicated interest in exploring the possibilities of local manufacture of such small tractors.

## Electrical and electronic industries (1.02)

The report of the 1969 Meeting on the Manufacture of Telecommunication equipment including Low-Cost Receivers for Sound Broadcasting and Television (1.02.01) was published in 1971. As recommended by this Meeting, UNIDO proposes in 1973 to prepare two studies on telecommunication equipment for rural areas (Priority B), covering low-capacity telecommunication systems comprising radio and carrier equipment together with simple telephone switching equipment. This type of equipment is no longer manufactured in developed countries as its capacity is too low for large networks. In sparsely inhabited regions, however, where the traffic density is low and distances between centres are large, there is a demand for such equipment. The studies would recommend applications for the equipment, set out the performance specifications and identify sources of know-how. UNIDO intends to circulate the studies to interested countries with a view to promoting the local manufacture of such equipment. No further supporting activities in this field are planned for the time being, though UNIDO is promoting the manufacture of low-cost radio receivers through operational projects. Since many developing countries have already successfully set up enterprises for the assembly of receivers, current operational projects are primarily concerned with design modifications for local production, production engineering and quality control in order to reduce the price and improve the reliability of the product.

79. As planned (ID/B/80/Add.1, para.48), UNIDO held in 1971 an Expert Group Meeting on the Manufacture of Electronic Components in Developing Countries (1.02.03) in San Francisco, in collaboration with the American Institute of Electrical and Electronics Engineers (IEEE). The Expert Group examined the structure of the electronic industries in six selected developing countries, together with the technical problems of the establishment of the industry. As a result, proposals are under consideration from two of these countries for the strengthening of institutional organizations for the promotion of electronic industries. Another country is considering the establishment of a marketing trust for the promotion of such industries; a fourth country is undertaking technological research, with UNIDO assistance, on a particular series of semi-conductors; and the two other countries are advertising the facilities they can offer foreign investors for the establishment of a component industry. It is anticipated that, after the dissemination of the report of the Meeting, scheduled for publication in 1972, further interest will be shown in projects related to this area.

80. In 1971, UNIDO carried out a study on the Manufacture of semi-conductors on a sub-regional basis (1.02.05) that is scheduled for publication in 1973. The expert group meeting and the market survey on the same subject, both originally scheduled for 1972 (ID/B/80/Add.1, para.50), have been postponed to 1973 (Priority B) subject to the interest of the Governments of the countries in the Andean Group. UNIDO will be carrying out a number of operational projects related to the manufacture of semi-conductors.

81. In 1972, UNIDO proposes to prepare three studies on Electrical equipment manufacture (1.02.06) for discussion at the proposed seminar for Latin American countries on plans and policies for the development of electrical engineering industries (cf.12.01.02).

### Maintenance and repair (1.03)

82. As a reflection of the importance attached by the Industrial Development Board to the subject of maintenance and repair (A/219, para.44), a maintenance and repair unit has been established within the Industrial Technology Division to improve the co-ordination and correlation of efforts of all divisions in UNIDO's maintenance and repair programme.

83. The supporting activities in this area are based on experience gained from field projects and on discussions with representatives from developing countries who attended UNIDO meetings on the subject. The activities are designed to support existing projects, to create an understanding of the need for work in this area and to deal with specific subjects on which more information is required by the developing countries.

84. The report on the Interregional Symposium on Maintenance and Repair in Developing Countries (1.03.01), held in Duisburg during 1970, was published in 1971. The proceedings are scheduled for publication in 1973.

85. One of the main recommendations of the Interregional Symposium was that it should be followed by a series of Regional symposia on various aspects of maintenance and repair in developing countries (1.03.02). The first of these is the regional symposium on maintenance planning and organization, which was originally scheduled to be held in Japan in 1972 (ID/B/80/Add.1/Corr.3). At the request of the Japanese Government, however, the symposium has been postponed to March 1973. Many techniques have already been developed for production planning and control, and an effort is being made to apply these techniques, with the necessary modifications, to maintenance planning and control. The regional symposium will offer an opportunity to disseminate new developments with particular stress on their applications to developing countries. The report of the regional symposium is scheduled for publication in 1973.

86. The planned participation of UNIDO in the Conference of the Federation of European National Maintenance Associations (1.03.03; Priority B), originally scheduled for 1971 (ID/B/80/Add.1, para.54), has been postponed indefinitely at the request of the Federation.

87. The first National Maintenance Week (1.03.04), which took place in Istanbul, Turkey, from 18 to 23 October 1971, was attended by 273 participants. Many recommendations were formulated, and a group of local industrial experts is being formed to follow up the implementation of these recommendations in collaboration with the Turkish National Productivity Centre and UNIDO. The second week, planned for 1971, had to be cancelled at government request. In 1972 it is planned to hold one or two national maintenance weeks, and two more are planned for 1973.

88. The study on UNIDO sponsored mobile workshops (1.03.05), originally to have been carried out by a team of consultants (ID/B/80/Add.1, para.56), will now be undertaken by headquarters staff in collaboration with field experts during 1972.

19. As a follow-up of one of the recommendations made at the 1968 Interregional Symposium on Maintenance and Repair in Developing Countries (cf. 1.03.01), UNIDO undertook in 1971 a study on the Supply of spare parts to industry (1.03.06). The study is scheduled for publication in 1972.

20. The inability to import spare parts in a short time and the resulting stoppage of important and expensive machinery for long periods is greatly hindering industrial development in developing countries. The improvement of maintenance facilities will alleviate the situation only partially since the lack of hard currency will continue to have a negative effect. Many so-called emergency techniques are being developed to allow equipment to continue running until spare parts are received. UNIDO therefore proposes to carry out in 1972 a study on Emergency techniques in maintenance and repair (1.03.07) in order to make such techniques available to the developing countries.

#### **Metalworking industries (1.04)**

21. At the fifth session of the Industrial Development Board, during the discussion of the work of UNIDO in the metalworking industries, several delegations welcomed the introduction of design and other service centres for these industries (A/8416, para.47). Particular emphasis was given to product design, material testing and quality control and encouragement of local production of consumer goods, machinery and tools and their better utilization. UNIDO has continued its work in this area, providing assistance in the establishment of a number of these centres and aiding in the planning of the development of metalworking industries as a whole, in the developing countries.

22. In 1971, UNIDO held, in Varna, Bulgaria, the first of a series of regional seminars on Machine tools in developing countries (1.04.01)<sup>2/</sup> (ID/B/80/Add.1, para.61). The purpose of this Seminar, which was organized for the benefit of the developing countries of Europe and the Middle East, was to provide an opportunity for a discussion on the problem of selection and utilization of machine tools and to promote co-operation between developed and developing countries in this region. The Seminar was attended by 29 participants and 17 observers from developing and developed countries. Among the participants from industrially advanced countries were representatives from the national associations in the Committee for European Co-operation of the Machine Tool Industries (CECIMO). CECIMO represents 1,500 manufacturers in thirteen European countries whose combined output totals 40 per cent of the world machine-tool production. CECIMO members bore their own participation costs and presented six papers at the Seminar. The Secretary-General of CECIMO attended the Seminar and reaffirmed the willingness of his organization to assist UNIDO. A representative of ECN also attended the Seminar.

<sup>2/</sup> In document ID/B/80/Add.1 (page 22), this series of seminars was listed under two component headings - 1.04.01 and 1.04.03; as the two components are actually parts of a single continuing activity, they have been combined under one heading.

93. As planned, the experience gained in the creation and development of the machine-tool industry in Bulgaria was examined by the participants during the first session of the Seminar. Three working documents, entitled "Development of machine-tool production in Bulgaria", "Modernization and reconstruction of machine tools" and "Maintenance and repair of machine tools in Bulgaria", were presented to the Seminar by Bulgarian specialists. Following the working sessions, films provided by European machine-tool manufacturers' associations were shown on production utilization and selection of machine tools and accessories. In order to observe the production and utilization of machine tools under workshop conditions and to study the experience gained in the creation and development of a machine-tool building industry, the participants paid visits to machine-tool and equipment plants located in Kasanlak, Stara, Zagora, Asenovgrad, Plovdiv and Sofia.

94. At the Seminar, recommendations were adopted that took into account the different levels of development of the metalworking industries of the countries of the region. Individual recommendations were made for the developing countries and for action by UNIDO. Areas for possible UNIDO technical assistance were identified for eleven developing countries and 21 job descriptions were drafted. Official requests are being submitted through the respective UNDP Resident Representatives after approval by the government authorities of the countries concerned.

95. The Seminar was useful both for developing and developed countries, as many direct contacts were established that may lead to mutually beneficial commercial and technical arrangements. At the end of the Seminar, lectures were arranged by UNIDO and delivered by representatives of advanced countries to more than 100 Bulgarian engineers and technicians on the premises of the Machine Tool Research Institute in Sofia. The lectures were followed by a film showing the use of numerically controlled machine tools. The report of the Seminar is scheduled for publication in 1972.

96. Further in 1971, UNIDO published two studies, one on "The selection and acceptance testing of metal-cutting machine tools" and the other on "The effective use of machine tools in developing countries".

97. In 1972, UNIDO plans to hold in Argentina a regional seminar on machine tools in Latin America (ID/B/80/Add.1, para.59). This is the second in the series of regional seminars planned by UNIDO. Discussions will be held on the design and manufacture of machine tools and on the introduction of numerically controlled machine tools into the industry of that region. The problems of selection and utilization, maintenance and repair and rehabilitation of machine tools will also be discussed. The objectives of this seminar are slightly different from those of the meeting in Bulgaria, as in Latin America, the stock of machine tools is greater and a larger number of countries have already embarked on the manufacture of machine tools. The seminar will be held in co-operation with ECLA.

98. UNIDO proposes to invite to the 1972 seminar representatives of machine-tool manufacturing associations and enterprises together with machine-tool users in Latin America who could benefit from such a meeting. The seminar will also be co-ordinated with the investment promotion meeting that is tentatively scheduled to be held in Latin America immediately after this seminar (cf. ID/B/80.02). Through these two co-ordinated activities, UNIDO expects to achieve

two objectives: first, an expansion of the machine-tool industry in the region; and second, an increase in productivity through more rational use of existing machinery. The report of the seminar is scheduled for publication in 1973.

99. UNIDO proposes to undertake in 1973 the third in this series of seminars. The seminar, which would be of a type similar to that undertaken in 1972 in Latin America, would be held on a regional basis for the developing countries of Asia and the Far East. The co-operation of ECAFE will be sought through the appropriate channels.

**Transportation equipment (1.05)**

100. This area of UNIDO's activities covers the automotive and ancillary industries, ship-building and repair, manufacture and repair of rolling stock, and the manufacture of materials handling equipment such as containers and pipelines, as suggested by the Industrial Development Board at its fourth session (A/8016, para.87).

101. The proceedings of the 1969 Seminar on the Establishment and Development of Automotive Industries in Developing Countries (1.05.01), were published in 1971; the report of the Seminar was published in 1970.

102. With regard to work under the heading Assessment of ancillary, automotive and spare parts production industries (1.05.02), UNIDO and ECLA collaborated with the Inter-American Development Bank, as reported to the Industrial Development Board last year (ID/B/80/Add.1, para.64), in the preparation of a study entitled "Prospects and possible forms of regional integration in the Latin American automotive industry". The study will be published by ECLA in 1972.

103. On the subject of Utilization of idle shipbuilding and repair facilities (1.05.03), UNIDO is preparing a study on the utilization of shipbuilding and repair facilities in the Western Pacific; the study, which was originally scheduled for publication in 1971 (ID/B/80/Add.1, para.65), will appear in 1972. Taking into account the recommendations of the Industrial Development Board at its fifth session (A/8416, para.49), UNIDO has also been compiling studies on "Ferro-cement boat building" and "Standard shipyards for ships up to 1,000 tdw", both of which are scheduled for publication in 1972.

104. The Regional survey on container manufacture (1.05.04; Priority B), to be carried out in 1972 (ID/B/80/Add.1, para.66), was cancelled in favour of work of higher priority in other areas.

105. UNIDO proposes to convene in 1973, subject to availability of resources, an expert group meeting on the Manufacture of fibreglass reinforced plastic bodies for road vehicles (1.05.05; Priority B). The purpose of the meeting would be to advise UNIDO on technological, economic and commercial aspects of bodybuilding for road vehicles using fibreglass reinforced plastics. The meeting would draw attention to the particular advantages of this type of construction with a view to promoting its wider acceptance in developing countries. UNIDO would also invite businessmen concerned with the financing and establishment of automotive industries to participate in the discussions with a view to promoting investment in this area.

106. UNIDO also proposes to convene in 1973, subject to availability of resources, a workshop on Ferro-cement boat building (1.05.06; Priority B) at which information and practical experience on this technique could be exchanged. This building technique is of particular importance to developing countries as only a low capital investment is needed and as cheap raw materials can be utilized. UNIDO anticipates that a number of developing countries will be interested in adopting this new type of construction.

#### **Design capabilities (1.06)**

107. The report on the 1970 Expert Group Meeting on Development of Engineering and Industrial Design Capabilities (1.06.01) was published in 1971. Work in this field is now being undertaken in the form of operational activities and under other project components; no further general supporting activities are planned under this heading for the time being.

#### **Construction machinery (1.08)**

108. In 1971, UNIDO completed two studies on the Manufacture of construction machinery (1.08.01) (ID/B/80/Add.1, para.69). The two studies are being incorporated into a single report and a limited number of copies of the report will be circulated in 1972 to interested countries with a view to stimulating interest in this field. It is anticipated that some technical assistance projects will develop from the initial investigation of the possibilities of manufacturing construction machinery for building, roadmaking and earthmoving. A revised edition of the report, with additional information on sources of know-how, will be issued in 1973.



See table overleaf.





**Printed publications**

<u>1971 publications programme</u>		<u>Languages</u>	<u>Cost (US\$)</u>
ID/22	The selection and acceptance testing of metal-cutting machine tools in developing countries (1.04.01)	E F S R	
ID/36	Establishment and development of automotive industries in developing countries (1.05.01) Part I. Report of the seminar Part II. Proceedings of the seminar	S E S	
ID/47	Report of the expert group meeting on agricultural machinery industry in developing countries (1.01.01)	F S	
ID/57	Operation, maintenance, design and manufacturing of chemical plants and equipment in developing countries Report of UNIDO/DECHEMA seminar (1.07.01)	F S	
ID/65	Report of the interregional symposium on maintenance and repair in developing countries (1.03.01)	E F S	
ID/67	Development of engineering design capabilities in developing countries Report of the expert group meeting (1.06.01)	E	
ID/74	The manufacture of telecommunications equipment and low-cost receivers Report of the development meeting (1.07.01)	E	
			<hr/> 27,427

1972 publications programme

ID/36	Establishment and development of automotive industries in developing countries (1.05.01) Part I. Report of the seminar Part II. Proceedings of the seminar	F F	
ID/67	Development of engineering design capabilities in developing countries Report of the expert group meeting (1.06.01)	F S	
ID/74	The manufacture of telecommunications equipment and low-cost receivers Report of the development meeting (1.07.01)	F S	
ID/77	Effective use of machine tools and related aspects of management in developing countries (1.04.01)	E F S	

1973 publications programme (cont'd)

	<u>Language</u>	<u>Cost</u> (US\$)
ID/80		
Proceedings of the interregional symposium on maintenance and repair in developing countries (1.03.01)		
Vol.I - Economic and development aspects	E P S	
Vol.II - Organizational and planning aspects	E	
Vol.III - Technical aspects	E	
-		
Regional analysis of UNIDO/UNESCO/IDCAS mission on agricultural machinery in twelve countries of the Middle East and North Africa (1.01.02; 1.01.03)	E F	
-		
Development of the agricultural machinery industry in countries of the Andean Group (1.01.05)	E S	
-		
Report of the UNIDO/TEEE expert group meeting on the manufacture of electronic components in developing countries (1.02.03)	E P S	
-		
Study on the supply of spare parts to industry (1.03.06)	E	
-		
Machine tools in developing countries of Europe and the Middle East Report of the regional seminar (1.04.01)	E P S R	
-		
Ferro-cement boat building (1.05.03)	E P S	
-		
Design of a standard shipyard for building and repair of ships up to 1,000 tdw (1.05.03)	E	
-		
Utilization of shipbuilding and repair facilities in the Western Pacific (1.05.03)	E	

32,100

Forecast of 1973 publications programme

ID/82		
Proceedings of the interregional symposium on maintenance and repair in developing countries (1.03.01)		
Vol.II - Organizational and planning aspects	F S	
Vol.III - Technical aspects	F S	
-		
Design and manufacture of wet land (rice) harvesting and threshing machinery in developing countries Report of the expert group meeting (1.01.08)	E	
-		
Manufacture of semi-conductors on a subregional basis (1.02.05)	E	

<u>Forecast of 1972 publications Programme (cont'd)</u>		<u>Languages</u>	<u>Cost</u> <u>(US\$)</u>
-	Maintenance, planning and organization for Asia and the Far East Report of the regional symposium (1.03.01)	E	
-	Machine tools in Latin America Report of the regional seminar (1.04.01)	E F S	
			15,600

Note: In the computation of the printing costs a standard formula was applied on an average cost of internal and external printing.

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## GROUP 2: METALLURGICAL INDUSTRIES

### Introduction

109. The pattern of requests received by UNIDO from developing countries for technical assistance to their metallurgical industries reflects three main objectives: (a) the promotion of industrial utilization of promising resources of metallurgical raw materials; (b) the creation and expansion of local production of needed metals; and (c) the establishment of indigenous sources of metallurgical expertise so that problems related to metal production and application can be solved locally.

110. Although the requests cover a variety of problems relating to the production and application of metals, several priority areas have been identified, and to these UNIDO is directing its main efforts and resources: establishment of alumina and/or aluminium production facilities; smelting of ilmenite concentrates with production of pig iron and a slag rich in titanium oxide; copper, lead and zinc production; development of the iron and steel industry; establishment and improvement of foundry facilities; and creation and transfer of metallurgical know-how.

111. The activities of UNIDO in the metallurgical industries are being oriented towards actual and specific conditions of the developing countries; this orientation has given increased significance and a greater practical impact to the technical assistance projects of UNIDO. The activities related to metallurgical industries include: provision of specialized expertise for operation of metallurgical installations; laboratory and pilot scale investigations to ascertain the suitability of specific raw materials or metallurgical processes; pre-feasibility and feasibility studies on the establishment of new plants; assistance in the national planning of metallurgical industries; and assistance in the establishment of centres for metallurgical technology. Increasing emphasis is being placed on the promotional aspects of these activities through efforts to bring together potential donors of metallurgical know-how, usually from developed countries, with recipients from developing countries (industrial organizations and enterprises).

### OPERATIONAL ACTIVITIES

112. The operational activities being undertaken by UNIDO through Group 2 are directed towards the establishment, expansion and improvement of metallurgical industries in developing countries, with particular attention to local resources, conditions and needs.

113. Assistance in the development of alumina or aluminium industries based on locally available raw materials has been requested by a number of countries. Generally, the assistance requested is related to problems or possibilities arising from one or more of the following factors: large deposits of bauxite; potentially cheap and abundant electric power; non-conventional ores needing special treatment; demand for aluminium; export

possibilities; and need for highly specialized expertise. It is expected that assistance to aluminium semi-fabrication will also become the subject of a number of technical assistance requests in the near future.

114. A number of developing countries (including Brazil, Guyana, Egypt, Gambia, India, Madagascar, Senegal) have received or are receiving assistance from UNIDO in the industrial processing of titanium-bearing ores or concentrates. Laboratory tests and preliminary technical studies have been completed with encouraging results and feasibility studies have also been undertaken in several instances. In several of the above-mentioned countries, pilot or prototype plants are under consideration for the production of a  $TiO_2$ -rich slag, which is in demand on the world market, and of pig iron, a basic material for local foundries and steel plants. Some of the prototype plants will probably be established through UNDP/SF type projects, others on a bilateral basis.

115. With regard to heavy non-ferrous metals, UNIDO carried out a study on the demand assessment of copper and its alloys in Iran. Technical assistance for production metallurgy of copper is being provided to Chile, through a UNDP/SF project, and to India, through an SIS project. Expertise was provided to the Government of Iran to assess the possibility of establishing lead and zinc industries.

116. The establishment, expansion and improvement of iron and steel plants continue to be the subjects of numerous requests submitted to UNIDO. These requests document the interest of developing countries in this basic industry. In 1971, UNIDO completed a comprehensive study that is to serve as a basis for planning the long-term development of the Peruvian iron and steel industry; a number of projects are envisaged as a follow-up of the study. UNIDO is also preparing for the Brazilian Government a comprehensive study on the implications of technological innovations for the long-term planning of the country's rapidly expanding iron and steel industry. UNIDO will also prepare an integrated, comprehensive long-term study of the situation and prospective development of the iron and steel industry of another developing country.

117. UNIDO is carrying out, with the co-operation of ECAFE, a regional feasibility study for the ferro-alloy industry in the Mekong countries (the Khmer Republic, Laos, the Republic of Viet-Nam and Thailand). In 1971, preliminary assistance in the long-term planning of the Thai steel industry was provided by UNIDO, and a pre-feasibility study on the establishment of a small-scale re-rolling mill was prepared for the Government of Togo. Similar assistance is being provided to Qatar in assessing the possibilities of setting up a steel rolling mill. Technical assistance has been provided to the Syrian Arab Republic in planning its iron and steel industry, and a pre-feasibility study on iron and steel industry development is being carried out by UNIDO at the request of the Mali Government. UNIDO is providing technical assistance to the Ghana Industrial Holding Corporation, with the aim of increasing the short- and long-term profitability of the existing steel works. Experts were provided to the steel industry of Yugoslavia to assist in increasing productivity and improving quality at the Zenica steel plant.

118. UNIDO has been requested to assist the Government of Egypt in a comprehensive programme of technical assistance in the iron and steel sector: the pilot plant tests with



down iron ores, carried out in 1971, are to be followed by a feasibility study for the establishment of an integrated steel plant; pilot plant tests on Bazarya iron ores may be followed by a feasibility study for a direct reduction plant; assistance is being provided in the establishment and operation of a pilot project for technical data processing; and in the maintenance services at the iron and steel works at Durgam; and in the supply of spare parts and other services for the modernization of their steel shop.

119. As a follow-up of pilot plant investigations of the Indian and Iranian iron ores, UNIDO assistance in making a pre-feasibility study for the establishment of a direct reduction plant is under consideration by the Government of Iran. Assistance was provided to India in connection with projects for iron production by unconventional processes in Andhra Pradesh, Orissa and Maharashtra. As a consequence of the Seminar on Tin Plate Production (2.03.01), held in UNIDO in 1970 in Chile, requests for technical assistance were received for expertise in quality control of hot-dipped tin plate and in the design and layout of an electrolytic tinning line.

120. During the last two years, increasing interest has been shown by developing countries in technical assistance projects for establishing and strengthening their foundry industries. In 1971, projects in this area included the supply of expertise for improving existing foundries in Argentina, Egypt, Haiti, Iran, Iraq, Mali, the People's Democratic Republic of Yemen and Thailand, and for the establishment of demonstration or prototype foundry shops in Senegal and Togo. UNIDO is continuing its assistance in the establishment of prototype foundries, in combination with mechanical workshops, in Somalia and the Sudan and has initiated preparatory work for establishing, in co-operation with ILO, a combined foundry, tool, die and mould-making centre in Malaysia. Projects of this type will help to solve immediate problems in the production of spare parts that are needed for the repair of machinery and equipment and - with their demonstration and training effect - will serve as nuclei for metallurgical and metalworking industries. In addition, such centres will supply local markets with castings needed by other industries.

121. UNIDO is assisting a number of the more industrialized developing countries in the establishment of metallurgical technology centres. Examples of UNIDO activities in this area are: assistance to a central metallurgical research and development institute in Egypt (UNDP/SF); assistance to the National Mining Enterprise (ENAMI) of Chile to establish and develop a centre for experimentation and investigation of copper industry problems (UNDP/SF); and assistance to the National Metallurgical Laboratory in Jamshedpur, India, for the creation of a creep testing laboratory (UNDP/SF). Other technical assistance projects are under consideration for the establishment or strengthening of metallurgical technology centres in Iran, Pakistan, Turkey and Yugoslavia.

Value of approved field projects and forecast of requirements, 1971 to 1973  
(in thousands of US dollars)

Source of funds	1971 estimated expenditure	1972			1973		
		Approved projects	Requirements for new projects	Total	Approved projects	Requirements for new projects	Total
UNDP/SF	46.0	65.0	1,307.6	2,307.2	65.3	4,007.0	4,864.3
UNDP/TA	235.0		(431.0) <sup>a/</sup>			(1,060.0) <sup>a/</sup>	
RP	83.3	139.6	-	139.6	110.0	-	110.0
SIS	551.8	462.3	600.0	1,032.3	-	1,250.0	1,250.0
GTF	344.3	116.6	520.0	636.6	-	850.0	850.0
FIT	<u>37.0</u>	<u>33.7</u>	<u>30.0</u>	<u>63.7</u>	-	<u>65.0</u>	<u>65.0</u>
Total	1,297.4	1,717.8	2,457.6	4,175.4	875.3	6,264.0	7,139.3

Note: UNDP/TA and UNDP/SF are to be merged, effective 1 January 1972.

a/ Annual estimated costs of projects included in the UNDP Country Programmes or projects officially submitted to UNDP for approval.



Projects over US\$100,000

Projects over US\$10,000

Iron and steel (cont'd)

YUG/68/8 (TA) - Iron and steel metallurgy - assistance in development of mathematical models, automation of steel production, iron ore beneficiation, vacuum spectroscopic and X-ray fluorescence analysis and vacuum metallurgy	ROM/02/1/1** SYR/71/3 SYR-69/306 SYR-69/513	SYR/02/1/3** TUR/02/2/1** TUR-70/1032	YUG-6 /456 YUG-69/460 YUG-71/1196
(5 projects)			(4 <sup>1</sup> projects)

Foundries

SEN-20 (IPF)* - Foundry development centre, Thiès	ALG-70/885 UAR-70/778 IVC/02/1/2** MLI-70/1024	MLI-VC/2/14 SOM-VC/2/8 SUD-71/1223 ECU-70/913	HAI-71/1383 LAO-71/1260 IRQ-70/842
SID-VC/2/7-1/7 - Prototype foundry plant	(2 projects)		(11 projects)

Creation and transfer of metallurgical know-how

UAR-63 (SF) - Central metallurgical research and development institute	UAR/69/2** ROM/69/2	YUG-71/1321 INT/70/2	THA-9012-70 ROM/70/3**
COL (IPF)* - Establishment of development centre for metallurgical and engineering sector			
IND-111 (SF) - National metallurgical laboratory, Jamshedpur			
IRA (SF)* - Centre for metallurgical technology	(4 projects)		(6 projects)

\* Projects not yet approved but included in the Country Programmes and projects officially requested.

\*\* Fellowship posts.

## SUPPORTING AND OTHER ACTIVITIES

The supporting and other activities of Group 2 are classified under the following projects:

Light non-ferrous metals	
Heavy non-ferrous metals	2.01
Iron and steel	2.02
Foundries	2.03
Creation and transfer of metallurgical know-how	2.04
	2.05

### Light non-ferrous metals (2.01)

123. Under this heading several activities related to aluminium, magnesium and titanium processing are covered, from ore preparation to metal fabrication. Many developing countries export bauxite, some export alumina and a few produce aluminium, primarily for domestic consumption. Certain developing countries have deposits of titanium-bearing ores that can be smelted to produce pig iron and a slag rich in titanium-oxide. In one or two developing countries, the need for magnesium production is already being felt.

124. Four studies prepared by UNIDO in 1970 on Alumina and aluminium production (2.01.01) (ID/B/80/Add.1, para.86) were finalized in 1971 and are scheduled for publication in a single document in 1972. The expert group meeting on alumina and aluminium production in developing countries (Priority B), originally planned for 1972 (ID/B/80/Add.1, para.87), had to be cancelled owing to lack of resources.

125. The seminar on Complex titanium-iron ore processing (2.01.02), originally planned for 1971 (ID/B/64/Add.2, para.17), was not convened, as it was thought advisable to wait until UNIDO had accumulated more experience from its operational projects in this area before holding such a seminar.

126. As stated to the Industrial Development Board at its fifth session (ID/B/80/Add.1, para.89), UNIDO plans to prepare in 1972 a basic reference document on Prototype plant design and operating standards for smelting of titaniferous ores or concentrates (2.01.03). The scope of this study, which is scheduled for publication in 1973, has been changed in order to emphasize marketing aspects.

### Heavy non-ferrous metals (2.02)

In 1971, UNIDO finalized the report of the 1970 Seminar on copper production (2.02.02), and it is scheduled for publication in 1972. No new supporting activities under this heading are planned for 1973.

**Iron and steel (2.03)**

128. The activities under this heading include the preparation of iron ores, coke making, iron making, steel making, ferro-alloy production, rolling and finishing operations in the production of steel as well as wire drawing, forging, welding, tube production and other steel forming techniques.

129. The report of the Seminar on Tin Plate Production (2.03.04), held in 1970 in Chile, in conjunction with ECLA, was reproduced internally in 1971 as document ID/WG.73/17. In 1972, additional information on the subject of tin plate production will be sought and subsequently distributed to interested developing countries.

130. In 1971, UNIDO made a preliminary proposal to hold a Third interregional iron and steel symposium (2.03.06) in 1973 (ID/B/80/Add.1, para.98-100). At that time, UNIDO included in its 1972 work programme the holding of a preparatory expert group meeting in Vienna to "advise UNIDO on the need, purposes, justification and modus operandi of a proposed third interregional iron and steel symposium and to prepare its eventual agenda".<sup>3/</sup> At the fifth session of the Industrial Development Board, the convening of the preparatory expert group meeting was approved and support was expressed for the holding of the symposium (A/8416, para.63). In 1972, UNIDO therefore plans to hold the expert group meeting, to which six strategists and executives of the iron and steel industry will be invited. The report of this expert group meeting will be prepared and reproduced internally for limited distribution in 1972.

131. In the discussions at the third interregional iron and steel symposium, which UNIDO proposes to hold in 1973, the position and role of developing countries as consumers or suppliers of essential metallurgical raw materials and of steel products will be re-examined in the light of technological innovations and changing world market conditions. Specific issues of discussion will be the macro-economic effects of local iron and steel production; factors affecting the scale of iron and steel units (integrated, semi-integrated or non-integrated) and the role of "mini" steel plants, including those based on unconventional techniques (charcoal blast furnaces, direct reduction etc.); the need for, and significance of, heavy investments in know-how, in addition to investments in hardware; the impact and consequences of new technologies in the world iron and steel industry (new processes, new products); changes in the international iron and steel picture and possibilities open to developing countries as a consequence of shifts in production and trade; development of local capability to plan, design, build and operate plants and equipment; possible solutions to the problems caused by a limited coking coal supply; financial, technical and labour problems related to the establishment of local production to satisfy the growing demand for steel in developing countries; and sources and mechanisms for obtaining financing, know-how, equipment and trained manpower. An effort will also be made to promote special contacts of organizations and individuals capable of supplying know-how, equipment and financing with the decision-making executives and technical managers of the iron and steel industry in developing countries. Group 13 will be co-operating in the presentation and discussion of issues related to financing.

<sup>3/</sup> Document ID/B/80/Add.1, para.100.

### Foundries (2.04)

132. At the fifth session of the Industrial Development Board, a number of delegations emphasized the importance of the establishment of foundry industries and of the assistance of UNIDO in this area, particularly in view of the general interest and of the possibilities such industries afford for international co-operation (A/8416, para.66). The technical assistance projects that UNIDO has been carrying out in this area are related to the production of castings of iron, steel, aluminium alloys, copper alloys and other metals. UNIDO's supporting activities under this heading provide guidance to the developing countries in establishing foundries or in improving operations ranging from small-scale sand-casting installations for simple products to large-scale, automated installations.

133. Owing to lack of resources, the expert group meeting on Foundry technology for developing countries (2.04.02; Priority B), originally scheduled for 1971 (ID/B/64/Add.2, para.31), could not be carried out.

134. In 1971, UNIDO finalized a basic reference document on Prototype design and operating standards of typical grey cast iron foundry installations (2.04.03), a task that was begun in 1970 (ID/B/80/Add.1, para.104). The document contains a description of typical grey cast iron foundry installations suitable for developing countries; layouts; a list of essential equipment; a list of typical products; manpower requirements; and estimates of capital and production costs. It will be of direct use in the planning and operation of foundries in developing countries and will also be useful in planning and implementing the assistance of UNIDO to this branch of industry. The document is scheduled for publication in 1972.

### Creation and transfer of metallurgical know-how (2.05)

135. It is estimated that in the course of the next decade, developing countries will invest in their metallurgical industry about \$20 billion (including investment in associated infrastructure requirements), a sizable portion of which will be utilized for the acquisition of direct and indirect know-how ("indirect know-how", as understood here, means the know-how contained in equipment purchased). Many developing countries feel that they cannot afford to remain totally dependent on the import of the required know-how and equipment. UNIDO plans to assist them so that a substantial amount of the required investment can be directed to domestic sources of know-how and equipment. In other instances, the need for national sources of know-how arises from special conditions or special raw materials, requiring adaptation or development of new processes and products.

136. As planned in the 1971 work programme (ID/B/64/Add.2, para.33), UNIDO held a Workshop in Jamshedpur, India, in 1971 on Creation and Transfer of Metallurgical Know-how (2.05.01). The Workshop was attended by specialists of developing and developed countries, who examined jointly practical questions related to the establishment and operation of groups (Government or private) for engineering, design and development of metallurgical plants, processes and equipment. The report of the Workshop is scheduled for publication in 1972.

21. Support was indicated by the Industrial Development Board at its fifth session for the Promotion of metallurgical technology transfer to the metals transforming industries of developing countries (2.05.02) (A/8416, para.67). Preparatory work was carried out in 1971 and a portfolio of promising technologies, based on contacts with a large number of firms and organizations from developed countries ("donors"), is being prepared for distribution. As UNIDO plans to introduce this activity in the Latin American region, the portfolio will be distributed to interested firms and organizations in Latin America ("recipients"). UNIDO will promote contacts between donors and recipients through various means, including missions and a promotional meeting to be held in August 1972 in one of the Latin American countries. The report of the meeting is scheduled for publication in 1973. The specific goals of UNIDO in promoting the transfer of metallurgical technology in Latin American countries are: application of selected new processes in the developing countries; conclusion of technical assistance agreements leading to new or improved operations; establishment of contacts between firms and organizations in developing countries with consulting firms in developed countries for the solution of specific problems; and establishment of institution-to-institution agreements.



Expenditures and estimated costs for supporting and other activities, 1971 - 1973  
(in m/m and thousands of US dollars)

Project (Priority A)	Regular budget						Extra-budgetary resources (\$)		
	Staff (m/m)		Consultants (\$)			Expert group meetings (\$)		1971	1972
	1971	1972	1973	1971	1972	1973	1971		
<u>2.01 Light non-ferrous metals</u>									
2.01.01	1	1		2.0	-	-	-	-	-
2.01.03	-	1	1	-	1.0	-	-	-	-
<u>2.02 Heavy non-ferrous metals</u>									
2.02.02	1	1	-	-	-	-	-	-	-
<u>2.03 Iron and steel</u>									
2.03.04	2	1	-	-	-	-	-	-	-
2.03.06	1	2	15	-	4.7	27.3	-	6.0	-
<u>2.04 Foundries</u>									
2.04.03	1	1	-	-	-	-	-	-	-
<u>2.05 Creation and transfer of metallurgical know-how</u>									
2.05.01	3	1	-	4.5	2.2	-	-	-	-
2.05.02	1	3	1	3.3	7.0	-	-	-	-
Total	10	11	17	9.8	14.9	27.3	-	6.0	-
<u>Backstopping and servicing of operational activities</u>	38	55	67						
	48	66	84						

10/2/73 (Part 11)  
10/2/73

1/ Operational costs shown above are included in the table on page 36.

Printed publications

<u>1972 publications programme</u>		<u>Languages</u>	<u>Cost (US\$)</u>
ID/80	Copper production in developing countries Report of the seminar (2.02.02)	E	
-	Studies on the aluminium industry in de- veloping countries (2.01.01)	E	
-	Prototype design and operating standards of typical grey cast iron foundry installations (2.04.03)	E	
-	Creation and transfer of metallurgical know-how Report of the workshop (2.05.01)	E	
			<u>4,800</u>
 <u>Forecast for 1973 publications programme</u>			
-	Prototype plant design and operating standards for melting of titaniferous ores or concentrates (2.01.03)	E	
-	Report of the meeting on promotion of metallurgical technology transfer to the metals transforming industries of developing countries (2.05.02)	E	
			<u>3,500</u>

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Note: In the computation of the printing costs a standard formula was applied based on an average cost of internal and external printing.

DO 4267

## GROUP 3: CONSTRUCTION AND BUILDING MATERIALS INDUSTRIES

### Introduction

138. In the construction and building materials industries in developing countries, UNIDO continues to direct its operational and supporting activities towards a maximum utilization of local labour and material resources. The selection of raw materials for the cement and clay products industries is of paramount importance for the successful operation of new plants, but it is a time-consuming task. UNIDO is attempting to speed up the evaluation and selection of raw materials by such means as the use of small, mobile equipment for evaluation of raw materials. Assistance in the choice of production methods and in the initiation and evaluation of feasibility studies for new plants as well as in the improvement of operation of existing plants continues to be the main task being undertaken by UNIDO in this field.

139. Through its supporting and operational activities in the 1972 and 1973 work programmes, UNIDO hopes to achieve a more effective transfer of knowledge and an increase in the number of manufacturing facilities by bringing together representatives of manufacturers and/or investors in developed countries and government authorities and prospective manufacturers in developing countries to study specific projects related to cement production and refractories.

### OPERATIONAL ACTIVITIES

140. UNIDO assistance in the building materials sector continues to grow steadily in volume and scope and covers the range of cement and cement products, glass, fine ceramics, heavy clay building materials, natural stones, gypsum, volcanic materials, asbestos, expanded clays and certain plastic materials.

141. The greatest interest of developing countries has been expressed in: detailed evaluations of available raw materials and implementation of feasibility studies for the establishment or expansion of manufacturing facilities; assistance in improving production efficiency by modernizing or rehabilitating existing plants; examinations of the opportunities for the economical manufacture of products on smaller scales than would be economically viable in developed countries; assistance in the introduction of new locally produced goods for the domestic market and, where economically feasible, for export; and assistance in the establishment of centres for industrial applied research serving specifically the construction and building materials industries.

142. In the cement industry, UNIDO has given technical assistance to a number of countries. The Central African Republic, Dahomey, Mauritius, Niger and Nigeria received assistance in evaluating new projects in cement making, in expanding production and in improving manufacturing methods. Assistance was also given to Turkey in the quarrying of raw materials and in improving maintenance of cement plant machinery.

143. Among the operational activities related to heavy clay building materials was the assistance given to the Government of Fiji in evaluating raw materials and markets for the establishment of a clay-based building materials industry in the Fiji islands.

144. The Government of Uganda is receiving assistance from UNIDO in the production of dinner ware and in the design and erection of a new plant for expanded production of other fine ceramics products for which there is a market in the neighbouring countries. Technical assistance is being given to the Ghanaian Government in improving the efficiency of its bottle-making plant and in carrying out a feasibility study on the manufacture of flat glass products.

145. UNIDO has assisted the Government of Egypt in planning an applied research centre for its growing refractories industry. The feasibility of refractories manufacture and of the industrial exploitation of the graphite industry has also been the subject of an assistance project for the Government of Ceylon.

146. In Bolivia, a major programme on the asbestos industry has now entered the phase of construction of an experimental plant for the beneficiation of asbestos ore. This plant will manufacture a product for both local and export markets. Technical assistance is being given to the asbestos-cement industries of several countries including Bolivia, the Syrian Arab Republic and the Sudan.

147. The number of operational projects under Group 3 increased by more than 50 per cent in 1971 over the number in 1970, with a threefold increase in project expenditure. It is anticipated that there will be a further considerable increase in project activities and expenditure in 1972.

Value of approved field projects and forecast of requirements, 1971 to 1973  
(in thousands of US dollars)

Source of funds	1971 estimated expenditure	1972			1973		
		Approved projects	Requirements for new projects	Total	Approved projects	Requirements for new projects	Total
UNDP/SF	218.7	} 219.2	636.1	855.3	-	1,261.0	1,261.0
UNDP/TA	91.0		(92.0) <sup>a/</sup>			(220.0) <sup>a/</sup>	
RP	25.3	40.4	-	40.4	35.0	-	35.0
SIS	237.5	212.8	250.0	462.8	-	550.0	550.0
GTF	4.4	-	6.0	6.0	-	8.0	8.0
FIT	<u>14.0</u>	<u>12.0</u>	<u>15.0</u>	<u>27.0</u>	-	<u>25.0</u>	<u>25.0</u>
Total	590.9	484.4	907.1	1,391.5	35.0	1,844.0	1,879.0

**Note:** UNDP/TA and UNDP/SF are to be merged, effective 1 January 1972.

<sup>a/</sup> Annual estimated costs of projects included in the UNDP Country Programmes or projects officially submitted to UNDP for approval.

**List of Approved Projects and Projects  
under Active Consideration**

Projects over US\$100,000

Projects under US\$100,000

Multisectoral

ALG/03/1/3**	ECU-9030-71	KOR/69/16**
GHA-69/641	ELS/71/2	THA-9010-70
MLW-68/293	NIC-70/742	MON/68/10
SOM/03/2/1	PAR/03/1/1**	AFE/69/15
UGA-70/1141	CEY/03/1/2**	ICE-70/040
UPV-71/1217	INS/03/1/1**	ROM-70/095
BOL/70/4	IRA-69/608	ROM-71/1431
BOL-VC/4/20	IRA-9034-71	ROM/70/7**
ECU-70/927		

(25 projects)

Cement

CAF (IPF)\* - Feasibility study for the development of cement industry and establishment of small-scale cement plant

CON(K)-71/1462	MAR-70/1067	ARG-70/1093
DAH/03/2/1**	NER-71/1386	BOL/03/2/2**
DAH-71/1226	NER-71/1198	TUR/68/3
ETH-70/754	NIR-70/794	TUR/69/4

(1 project)

(12 projects)

Fibro-cement composites

BOL-20 (SF) - Construction and building materials industry

SUD-71/1362	BOL-71/1167
BOL-70/929	SYR-68/448

(1 project)

(4 projects)

Plastics in building

IRA-71/1282
EME-70/797

(2 projects)

Clay building and allied materials

BOT/03/2/1**	LIB-71/1300	THA/03/1/3**
BDI-71/1147	NER-71/1199	HUN/03/2/1**
CHD/03/2/1**	MAL/03/2/1**	JOR/03/1/1**
CON(B)-71/1349		

(10 projects)

\* Projects not yet approved but included in the Country Programmes and projects officially requested.

\*\* Fellowship posts.

Projects over US\$100,000

Projects under US\$100,000

Building materials industry studies

FIJ-70/887

(1 project)

Construction industry studies

KMR/03/1/2\*\*

(1 project)

Refractory products

UAR-70/878

CEY-70/1028

IRQ/03/2/1\*\*

(3 projects)

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\* Projects not yet approved but included in the Country Programmes and projects officially requested.

\*\* Fellowship posts.

### SUPPORTING AND OTHER ACTIVITIES

148. The supporting and other activities of Group 3 are classified under the following projects:

Cement	
Fibro-cement composites	3.01
Plastics in building	3.02
Clay building and allied materials	3.03
Prefabrication in the building industries	3.04
Building materials industry studies	3.05
Building materials industry research	3.06
Construction industry	3.07
Refractory products	3.08
	3.09

149. The main objective of the supporting activities being carried out by Group 3 is the promotion of the building materials industries in developing countries. The work of UNIDO in this field will continue to include assistance in the widest possible utilization of locally available raw materials. The programme of work for 1972 and 1973 introduces in the construction industry new activities that are designed to assist developing countries in establishing and operating efficient local construction industries. As in the past, UNIDO will continue to co-operate with the United Nations Centre for Housing, Building and Planning (UNCHBP), the regional economic commissions, UNESOB and other United Nations agencies.

#### Cement (3.01)

150. In line with the request of the Industrial Development Board at its fourth session (A/8016, para.127), UNIDO continues to give particular attention to cement production. In 1972, UNIDO plans to hold in Denmark an interregional seminar on the Manufacture of cement (3.01.01). As stated in document ID/B/80/Add.1 (para.122), presented to the Board at its fifth session, the seminar will bring together technologists and potential investors from both developed and developing countries with a view to promoting the manufacture of cement and cement products in those developing countries where it is feasible. The UNCHBP will co-operate with UNIDO in this seminar and invitations will also be extended to the regional economic commissions, UNESOB and ILO. The report and the proceedings of the seminar are scheduled for publication in 1973. The study undertaken by UNIDO in 1969 on "The manufacture of cement and sulphuric acid from calcium sulphate" was published in 1971.

151. The survey on Cement machinery (3.01.02; Priority B), planned for 1972 (ID/B/80/Add.1, para.123), will not be carried out owing to lack of resources.

### Fibro-cement composites (3.02)

152. Following the recommendations of the 1969 Expert Working Group on Fibro-Cement Composites (3.02.01), the report of which was published in 1971, UNIDO has further investigated the subject of fibro-cement composites. The substitution of asbestos by other fibrous materials for the manufacture of fibro-cement building materials is of importance for countries lacking asbestos resources. The problem has been researched by a Hungarian technical institute using mineral wool from basalt rock in partial substitution of asbestos fibre. The use of mineral wool as a substitute for asbestos fibre is technically feasible up to a 50 per cent substitution, as regards the strength of the cured product. There may still be problems, however, in the manufacturing process when using large amounts of mineral wool and this will need to be solved on an individual investigation basis before any final recommendations can be made.

153. UNIDO had proposed to carry out in 1971 a study on the Substitution of asbestos by mineral wool (3.02.02) (ID/B/80/Add.1, para.126). However, in view of the findings of the Hungarian institute (cf. para.151 above) and the preliminary work carried out by UNIDO, such a study would appear to be premature. For this reason, the study has been postponed.

154. The survey on Low-grade asbestos (3.02.03; Priority B), scheduled for 1972 (ID/B/80/Add.1, para.127), will not be carried out owing to lack of resources.

### Plastics in building (3.03)

155. An Expert Group Meeting on the Use of Plastics in the Building Industry (3.03.01) was held in Vienna in 1971 in co-operation with the UNCHBP. The Meeting was attended by architects working in this field and representatives of leading plastics raw material manufacturers, together with a number of observers from developing countries. The Expert Group made several recommendations to UNIDO with regard to further work in this area. The report of the Meeting, originally scheduled for publication in 1971 (ID/B/80/Add.1, para.129), will appear in 1972.

156. The proposed seminar on Production of multi-material houses (3.03.02; Priority B), provisionally scheduled for 1972 (ID/B/80/Add.1, para.130), will not be held owing to lack of resources.

### Clay building and allied materials (3.04)

157. UNIDO has been continuing its efforts to promote improved technologies and the wider use of clay products in developing countries. In 1970, UNIDO held the first of a series of regional Workshops on clay building materials industries (3.04.01) in Tunisia; the report of the Workshop, together with a summary of the lectures presented there, was published in 1971. As a result of this Workshop, there was a marked increase in 1971 in requests from African countries for technical assistance in this field.

158. In 1972, UNIDO plans to hold another such workshop, this time for countries in Latin America (ID/B/80/Add.1, para.132). The co-operation of the UNCHBP and ECLA will be sought in



the organization of this workshop, which will concentrate on the particular needs in Latin America for the development of the clay building materials industry. The report and proceedings of the workshop are scheduled for publication in 1973.

### **Prefabrication in the building industries (3.05)**

159. The importance of prefabrication in the building industry has been stressed on various occasions by the Industrial Development Board and, in particular, its relevance to the manufacture of small, prefabricated elements (A/1617, para.103 and A/2016, para.120). The UNCHBP, in collaboration with ECAFE and ECLA, had earlier held two regional meetings on this subject in 1967 and 1968 in Denmark.

160. The expert group meeting on Prefabrication in Africa and the Middle East (3.05.01), originally scheduled for 1971 (ID/B/80/Add.1, para.134), is now planned to be held in Bucharest in April 1972. The meeting will afford an opportunity for technologists and executives from developing countries in Africa and the UNESOB region to see current developments in this field in Romania and Hungary and to make technical and commercial contacts, which hopefully would lead to investment promotion in this branch of industry. Preliminary work was carried out in 1971, and the report and proceedings of the meeting are scheduled for publication in 1973.

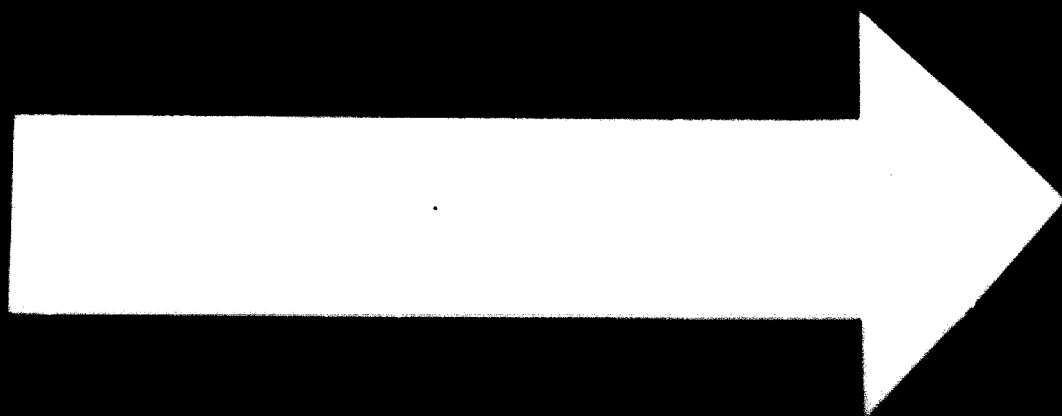
### **Building materials industry studies (3.06)**

161. UNIDO continues to receive requests for technical assistance in establishing production of a great variety of building materials. In 1971, UNIDO undertook five Studies in the building materials industry (3.06.01), but was unable to complete them during the year owing to lack of resources. One of the studies will be completed in 1972, entitled "Manufacture and use of special glasses, glass products and refractories", and will serve as a basis for the proposed workshop on the production of refractories (of.3.09.01) to be held in 1973.

162. The inclusion into the work programme of activities related to calcium silicate building materials was noted with satisfaction by the Industrial Development Board at its fifth session (A/8416, para.74). However, owing to lack of resources, the study on Building components produced from silicious raw material (3.06.02) had to be down graded to Priority B.

### **Building materials industry research (3.07)**

163. In 1971, a Meeting of Directors of Building Research Institutes and Development Organizations in the ECAFE Region (3.07.01) was held in Melbourne, Australia, in March 1971, in co-operation with the UNCHBP and ECAFE, and the report of the Meeting was published by ECAFE in 1971. The Meeting, which was attended by fourteen participants, has resulted in a planned regular exchange of information on up-to-date practical research and on research programmes between the various institutes in the region; this exchange will serve to reduce duplication of efforts. The United Nations agencies concerned will be fully informed, on a regular basis, of the research being planned and carried out by the various institutes, and UNIDO will take account of this in planning its approach to various fields of operational assistance involving building materials.



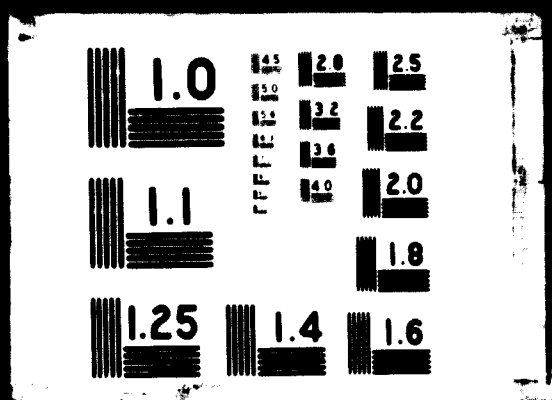
**22.7.74**

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### Construction industry (3.08)

164. At the fifth session of the Industrial Development Board, several delegations spoke on the need for greater emphasis in the work programme on construction (A/8416, para.73). UNIDO has been considering how technical assistance could best be given to the construction industry in view of the high proportion of capital investment that developing countries are making in the end product of the construction industry. UNIDO therefore proposes to carry out in 1972 a study on the Construction industry in developing countries (3.08.01) to determine where technical assistance can be most effectively used to enable the industry to make more efficient use of the equipment, manpower and materials available in developing countries. This study, which will be reproduced internally, is to become the basis for further activities in this area.

165. In 1973, UNIDO proposes to convene an expert group meeting, probably in Vienna, on the same subject. The final form of the meeting will depend on the results of the study to be made in 1972. The UNCHBP, the regional economic commissions and UNESOB will be invited to co-operate in the 1973 meeting.

### Refractory products (3.09)

166. Refractory products are basically ceramics designed for high-temperature use in furnaces and kilns. Without them, modern industry could not make metals, cement, clay products and glass. With the growing industrialization of the developing countries, there is a steady increase in the demand for refractory products. Many of the less specialized products can be made in the developing countries where raw materials exist. In 1971, UNIDO commenced to study the manufacturing opportunities in developing countries for refractory products. This activity will continue during 1972 (cf.3.06.01).

167. In 1973, UNIDO proposes to hold a workshop, probably in Vienna, on the Production of refractories (3.09.01). Technologists, equipment manufacturers and potential investors from developing and developed countries will be invited to examine concrete proposals for industrial investment in this field.

See table overleaf.

Expenditures and estimated costs for supporting and other activities, 1971 - 1973  
(in m/m and thousands of US dollars)

Project (Priority A)	Regular budget						Extra-budgetary resources (\$)		
	Staff (m/m)			Consultants (\$)			Expert group meetings (\$)		
	1971	1972	1973	1971	1972	1973	1971	1972	1973
3.01 <u>Cement</u>									
3.01.01	4	3	-	-	-	-	-	30.0 TA	-
3.02 <u>Fibro-cement composites</u>									
3.02.01	1	-	-	-	-	-	-	-	-
3.02.02	1	-	-	-	-	-	-	-	-
3.03 <u>Plastics in building</u>									
3.03.01	2	1	1	2.6	-	-	6.5	-	-
3.04 <u>Clay building and allied materials</u>									
3.04.01	2	3	-	-	2.0	-	-	40.0 TA	-
3.05 <u>Prefabrication in the building industries</u>									
3.05.01	2	2	-	-	-	-	3.4	-	-
3.06 <u>Building materials industry studies</u>									
3.06.01	1	1	-	1.0	1.0	-	-	-	-
3.07 <u>Building materials industry research</u>									
3.07.01	3	-	-	-	-	-	-	18.7 TA	-



**Printed publications**

<u>1971 publications programme</u>		<u>Languages</u>	<u>Cost</u> <u>(US\$)</u>
ID/39	The manufacture of cement and sulphuric acid from calcium sulphate (3.01.01)	E	
ID/56	Fibro-cement composites Report of the expert group meeting (3.02.01)	E F S	
ID/71	Clay building materials industries in Africa Report of the workshop (3.04.01)	E	
			<hr/> 2,852
<u>1972 publications programme</u>			
ID/71	Clay building materials industries in Africa Report of the workshop (3.04.01)	F	
-	Use of plastics in the building industry Report of the expert group meeting (3.03.01)	E	
			<hr/> 600
<u>Forecast for 1973 publications programme</u>			
-	Manufacture and utilization of Portland cement Report and proceedings of seminar (3.01.01)	E	
-	Use of plastics in the building industry Report of the expert group meeting (3.03.01)	F S	
-	Clay building materials and ceramic industries in Latin America Report and proceedings of workshop (3.04.02)	E S	
-	Prefabrication in Africa and the Middle East Report and proceedings of the expert group meeting (3.05.01)	E F	
			<hr/> 4,500

**Notes:** In the computation of the printing costs a standard formula was applied based on an average cost of internal and external printing.



DE4268

## GROUP 4: CHEMICAL, PHARMACEUTICAL AND PULP AND PAPER INDUSTRIES

### Introduction

166. The programme of UNIDO within Group 4 has as its objectives the promotion of the use and processing of locally available material resources, the development of key industrial branches and, in certain cases (such as the manufacture of pulp from bagasse), the encouragement of new uses of material currently utilized as fuel or simply discarded as waste products.
169. In previous years, UNIDO has placed emphasis in the chemical industry on: the production of salt from brine or seawater by the use of solar energy; the manufacture of pharmaceuticals; the extraction of essential oils from plants; and the manufacture of selected industrial chemicals by fermentation of waste products. UNIDO will continue its work in these areas; additionally, it will examine closely the possibilities of manufacturing on an economically viable basis a number of secondary basic chemicals to strengthen the basic chemical sector in developing countries.
170. UNIDO is continuing to emphasize the possibilities of utilizing available non-timber resources, especially sugar-cane bagasse, in the production of pulp and paper. The possibilities of increasing the operating efficiency of pulp and paper plants in developing countries by providing expert technical assistance in operations and maintenance are being followed up in the operational programme of UNIDO.
171. Another new field of assistance is in the production and distribution of contraceptives; this work is being carried out in association with the United Nations Fund for Population Activities (UNFPA) and other United Nations agencies.

### OPERATIONAL ACTIVITIES

172. The operational programme of UNIDO within Group 4 continues to be aimed at promoting the use of locally available materials and formulating development of key industrial sectors. Developing countries have expressed great interest in:
- Detailed evaluations of available raw materials and the preparation of feasibility studies for establishment or expansion of manufacturing facilities based on these materials;
  - Assistance in improving production efficiency through modernization or rehabilitation of plants;
  - Examinations of the opportunities to manufacture products economically on a smaller scale than is economically feasible in developed countries;
  - Assistance in introducing the manufacture of new products that can be marketed locally and abroad; and
  - Assistance in the establishment of industrial applied research projects or organizations that are related to the activities being carried out under Group 4.

173. Many developing countries have evinced considerable interest in projects related to salt and chlor-alkali, for not only is salt used for human consumption and for the preservation of meat and hides, but - more recently - as a basic chemical industry raw material for export to developed countries. Among the UNIDO projects related to the salt industry were exploratory missions to determine whether the climatological conditions and topography would justify full-scale technical and economic feasibility studies. In one country, examination was made of the possibility of producing salt as a by-product in an existing potash salts extraction process. In Panama and the People's Democratic Republic of Yemen, modernization and expansion of solar salt facilities were the subjects of detailed study. In 1971, UNIDO completed a project involving an evaluation of the expansion plans of the Brazilian national industry for solar salt and soda ash production.

174. With regard to fermentation chemicals, UNIDO initiated in 1971 two projects involving studies of the feasibility of producing furfural from sugar-cane bagasse. Assistance was given by UNIDO to fermentation chemical industries in Cuba, Egypt and the Philippines.

175. UNIDO assistance to the pharmaceutical industry in developing countries was given primarily in the form of feasibility studies on technical and economical aspects of proposed production. In 1971, UNIDO carried out technical assistance projects in this field in Mauritius and Nigeria, and it is planned to undertake further projects in 1972 in Ceylon and Thailand. Under the auspices of UNIDO, a consulting firm is carrying out a major feasibility study on the establishment of pharmaceutical production and marketing, on a regional basis, within the East African Community.

176. In 1971, UNIDO carried out a wide range of projects concerned with the improvement of production techniques for chemicals; among the subjects dealt with were soap production, sulphuric acid, cellophane film and the utilization of peat. Assistance is being provided by UNIDO in the planning of chemical industries in Brazil, Cuba, Jamaica and Morocco.

177. There has been a steady growth in projects being undertaken by UNIDO in the pulp and paper industry. Assistance has been given in solving production problems and in the development of plans for initiation or expansion of industries, especially those that utilize non-traditional raw material sources. Assistance was also given to several countries in establishing the bases for applied research institutes. Early in 1972, UNIDO will begin a four-year programme of research in Cuba, aimed at the setting up of a major research establishment for pilot-scale evaluation of processes for producing newsprint and dissolving pulp from sugar-cane bagasse. FAO will be associated with UNIDO in the execution of this project.

178. The developing countries have shown a continuing interest in solving the specific problems of their industries with regard to eliminating industrial pollution and recovering waste materials. Several technical assistance projects have been carried out by UNIDO and fellowships have been granted to nationals of developing countries specifically for training in this field.

Value of approved field projects and forecast of requirements, 1971 to 1973  
(in thousands of US dollars)

Source of funds	1971 estimated expenditure	1972			1973		
		Approved projects	Requirements for new projects	Total	Approved projects	Requirements for new projects	Total
UNDP/SF	-	102.6	1,182.0	1,285.5	-	1,023.0	1,023.0
UNDP/TA	131.8		(65.0) <sup>a/</sup>			(180.0) <sup>a/</sup>	
RP	86.9	152.0	-	152.0	120.0	-	120.0
SIS	438.5	479.4	480.0	959.4	-	1,150.0	1,150.0
GTF	3.6	-	5.0	5.0	-	8.0	8.0
FIT	<u>42.5</u>	-	<u>40.0</u>	<u>40.0</u>	-	<u>40.0</u>	<u>40.0</u>
Total	703.3	734.0	1,707.9	2,441.9	120.0	3,121.0	3,241.0

Note: UNDP/TA and UNDP/SF are to be merged, effective 1 January 1972.

a/ Annual estimated costs of projects included in the UNDP Country Programmes or projects officially submitted to UNDP for approval.

**List of Approved Projects and Projects  
under Active Consideration**

Projects over US\$100,000

Projects under US\$100,000

Multisectoral

UAR/04/2/2**	ECU-70/820	DOM/04/2/2**
UAR-69/658	THA-70/800	JAM/04/2/1**
RWA-68/383	MON/68/11	LAT/04/2/2
BRA/68/25	PHI-71/1417	BUR/04/2/1**
CUB/70/16	POL/70/25**	IRQ/04/2/2**
CUB/70/13		

(16 projects)

Basic chemicals

CON(B) (SF)* - Assistance towards the utilization of potash processing residues and extraction of rock salt	CON(B)-71/1230	CHI/70/23**	POL/71/7**
	MOR-71/1459	JAM/71/2	ROM/04/2/1**
	AFR/04/1/2	LAT/04/1/2	ROM-71/1194
TUR/68/1 (TA) - Chemical industries planning	AFR/04/2/2	CEY/69/12	ROM-70/997
	AFR-70/1049	THA-70/718	TUR-70/947
	ARG/04/2/1**	POL/70/3**	SYR-70/937
	CHI/04/2/1		

(2 projects)

(19 projects)

Marine salt

DAH-70/826	ECU-70/838	SOY-71/1180
SOM-70/1005	PAN-69/651	SYR-70/936
TOG-70/1026	FIJ-70/1030	SYR-68/445
TUN-69/622	KOR-69/630	BRA-69/684
AFR-71/1285		

(13 projects)

Pharmaceuticals

MAR-70/918	CEY-71/1284
NIR-70/1060	LAO/04/2/1**
AFR-70/784	THA-71/1277
(Phase II)	INT-9035-71**
EAC/04/2/1**	

(8 projects)

Essential oils

RWA-69/574

(1 project)

\* Projects not yet approved but included in the Country Programmes and projects officially requested.

\*\* Fellowship posts.

Projects over US\$100,000

Projects under US\$10,000

Pulp and paper

PHI (IPF)\* - Pulp and paper industry  
YUG-70/852 (SIS) - Assistance to the cellulose and viscose factory in Danja Luka in industrial waste water treatment, pulp and paper production

UAR-71/1228  
GUI-68/418  
GUI/04/2/1\*\*  
RWA-69/572  
SEN-71/1413  
UGA-70/1082  
UGA-69/451  
AFR-70/1048  
ARG-70/1099  
ARG/04/1/4  
CUB-69/479  
ECU/04/2/2\*\*

PER-67/163  
LAT-70/1022  
LAT/04/1/6  
IND/04/1/6  
IND/04/1/8\*\*  
INS-69/580  
INS/04/2/2\*\*  
IRA/04/2/3\*\*  
PAP/69/3  
AFE/70/69  
(FAO/UNIDO)

BUL/01/1/1\*\*  
BUL/71/13\*\*  
CYP-70/2007  
HUN-71/131  
HUN-71/1303  
ROM-70/696  
TUR-70/1107  
YUG-70/800  
YUG-70/1138  
YUG-71/1151  
INT-VC/1/19

(2 projects)

(33 projects)

Industrial fermentation

UAR-69/540  
CUB/71/3

CUB/69/3  
CUB/04/1/5

TRT-68/41

(5 projects)

\* Projects not yet approved but included in the Country Programmes and projects officially requested.

\*\* Fellowship posts.

### SUPPORTING AND OTHER ACTIVITIES

179. The supporting and other activities of Group 4 are classified under the following projects:

Basic chemicals	4.01
Marine salt	4.02
Pharmaceuticals	4.03
Essential oils	4.04
Pulp and paper	4.05
Industrial fermentation	4.06
Chemicals from coal	4.08

#### Basic chemicals (4.01)

180. The Interregional seminar on basic chemicals (4.01.01), originally scheduled for 1970 (ID/B/64/Add.4, para.12), was subsequently rescheduled for 1971 (ID/B/80/Add.1, para.152). Owing to lack of resources, however, the seminar has now been postponed indefinitely. The papers that have been prepared for the seminar will be scanned to ascertain their suitability for later publication.

181. The proposed Regional survey of basic chemicals (4.01.02), originally scheduled as priority A (ID/B/64/Add.4, para.13), is being changed to Priority B. Subject to the availability of resources, the survey will be carried out in 1972 with the assistance of the Romanian Government. The objectives of the survey will be to review, on a regional or subregional basis, the feasibility of manufacturing certain basic chemicals in the African region, taking into account the effects of economy of scale and present and future trends of markets for these products.

182. In 1972, UNIDO proposes to undertake Studies on secondary chemicals (4.01.03) with a view to examining the potential for manufacture of certain secondary chemicals that are in demand in such basic industries as mining, pulp and paper, textiles, printing, toiletries, paints and surface coatings. The studies will be restricted to products with sound marketing prospects and will identify potential problems and examine possible solutions. Among the subjects covered in the studies will be various aspects of import, production and the supply of raw material. The studies are scheduled for publication in 1973.

183. As a logical follow-up of the regional survey (4.01.02) and the studies (4.01.03) to be carried out in 1972, UNIDO proposes to hold in 1973 a workshop on the Manufacture of basic and secondary chemicals in Africa (4.01.04). Among the participants would be representatives of industrial interests in the developing countries of the African region and manufacturers of equipment as well as potential investors from developed countries. The participants would examine the technical and commercial possibilities of manufacturing in Africa specific basic and secondary chemicals, with the over-all aim of establishing such manufacturing where feasible. In this workshop, the co-operation of ECA will be sought through the appropriate channels.

#### Marine salt (4.02)

184. UNIDO is continuing the technical assistance initiated in this field in 1969, and several countries have now received assistance in establishing, modernizing and/or expanding their salt industries. Assistance was also extended during 1971 to include industrial utilization of inland salt deposits and salt lakes.

185. The Study on the marine salt industry (4.02.01), undertaken by UNIDO in 1970, was published in 1971 under the title "Chemicals from seawater, inland brines and rock salt".

186. The proposed expert group meeting on Water-salt chemical complexes (4.02.02; Priority B), to have been held in 1971 (ID/B/80/Add.1, para.156), was cancelled owing to lack of resources. UNIDO has been giving direct technical assistance in this field through a number of operational projects.

#### Pharmaceuticals (4.03)

187. UNIDO continues to receive requests for technical assistance in the establishment of pharmaceutical industries, and these requests are examined in co-operation with FAO and WHO. During 1971, international pharmaceutical concerns and associations co-operated with UNIDO by assisting in the production, distribution and testing of pharmaceuticals and in personnel training.

188. A Team mission on pharmaceuticals (4.03.02) was to have been fielded during 1971 in Latin America as a follow-up of the 1969 Expert Group Meeting in Budapest (ID/B/80/Add.1, para.160). Preparatory work was carried out for this activity in 1971, but the mission did not materialize owing to a change in work plans. There are, however, substantial production possibilities for some traditional pharmaceutical products that still have a significant role to play in the developing countries.

189. During 1971, UNIDO assisted the United Nations Fund for Population Activities (UNFPA), in co-operation with WHO, in the organization of an expert group meeting on the production and distribution of contraceptives in developing countries. The programmes of UNFPA in this field during 1972 and 1973 will require further co-operation from UNIDO. UNIDO therefore proposes to hold in 1973 for the ECAFE region an expert group meeting on the Establishment of pharmaceutical industry sectors, including contraceptive devices (4.03.04). The expert group will formulate guidelines for the possible production of contraceptive devices and for the expansion of the pharmaceutical production industry in the countries of this region. The co-operation of ECAFE in holding this meeting will be sought through the appropriate channels.

#### Essential oils (4.04)

190. The proposed action team on Extraction of essential oils from indigenous plants (4.04.02) was supported by the Industrial Development Board at its fifth session, particularly as this activity represented a positive and action-oriented approach (A/3416, para.7). Thus, in 1972 UNIDO will dispatch to several Latin American countries a demonstration unit team for essential oil manufacture. It is anticipated that, as a result of this and other visits of the team,

commercial extraction plants will be established where a particular process has been shown to be technically feasible and where the product can compete economically with synthetics currently being manufactured in developed countries.

#### **Pulp and paper (4.05)**

191. The programme of UNIDO for assistance to developing countries in the exploitation of non-traditional fibre resources for pulp and paper manufacture is continuing. During 1971, an Expert Group Meeting on Pulp and Paper (4.05.01) was held in Vienna, covering non-traditional fibre resources (ID/B/80/Add.1, para.166). The Expert Group made a number of recommendations to UNIDO for widening the range of its activities in this field. The assistance of UNIDO and FAO in increasing and broadening the use of bagasse and mixed tropical hardwoods through pilot-plant scale testing was particularly stressed. The report and proceedings of the Meeting are scheduled for publication in 1972.

192. At the above-mentioned Expert Group Meeting in Vienna, observers from developing countries and machinery manufacturers and expert consultants from developed countries gave particular emphasis to the problem of increasing the operational efficiency of mills in developing countries. UNIDO therefore propose to upgrade the Workshop on pulp and paper production (4.05.02) - a priority B activity in document ID/B/80/Add.1 (para.167) - to priority A. The workshop, which UNIDO proposes to convene in 1973, would concentrate on how best to overcome problems of efficiency that seriously reduce the output of the mills in which costly capital equipment is involved. Specific problems would be highlighted, case by case, and methods of attacking and solving these problems would be subjects of discussion.

#### **Industrial fermentation (4.06)**

193. UNIDO continues to give technical assistance to developing countries through its operational programme in the field of industrial fermentation for the production of chemicals.

194. The report and proceedings of the 1969 Expert Group Meeting on the Manufacture of Chemicals by Fermentation (4.06.01) was published in 1971. No further supporting activities are planned in this area for the immediate future.

#### **Chemicals from coal (4.08)**

195. The report on carbonization of coal, recovery of by-products and hydrogenation of coal, prepared by UNIDO in 1970 as part of the series of Studies of chemicals from coal (4.08.01), will be published in 1972. The bibliography on hydrogenation of coal and coal tars, compiled in 1970, is also scheduled for publication in 1972.



Expenditures and estimated costs for supporting and other activities, 1971 - 1974  
(in m/m and thousands of US dollars)

Project (Priority A)	Regular budget						Extra-budgetary resources (\$)				
	Staff (m/m)		Consultants (\$)			Expert group meetings (\$)			1971	1972	1973
	1971	1972	1973	1971	1972	1973	1971	1972			
4.01 <u>Basic chemicals</u>											
4.01.01	-	-	-	-	-	-	-	-	-	-	-
4.01.03	-	2	1	-	-	-	-	-	1.0	GTF	-
4.01.04	-	2	4	-	-	1.7	-	-	-	-	-
4.03 <u>Pharmaceuticals</u>											
4.03.02	3	-	-	-	-	-	-	-	-	-	-
4.03.04	1	2	2	-	-	1.5	-	-	-	-	-
4.04 <u>Essential oils</u>											
4.04.02	-	2	2	-	4.5	-	-	-	-	-	13.0 TA
4.05 <u>Pulp and paper</u>											
4.05.01	6	-	-	8.3	-	-	-	9.8	-	-	-
4.05.02	-	2	4	-	2.0	1.1	-	-	-	-	15.0 TA
4.06 <u>Industrial fermentation</u>											
4.06.01	1	-	-	-	-	-	-	-	-	-	-
Total	13	10	13	8.3	9.0	4.3	9.8	-	1.0	GTF	3.3
<u>Backstopping and servicing of operational activities</u>	58	62	59								
	71	72	72								
Project (Priority B)											
4.01 <u>Basic chemicals</u>											
4.01.02	-	3	-	-	-	-	-	-	-	-	-
Total	-	3	-	-	-	-	-	-	-	-	-

Operational costs shown above are included in the table on page 61.

**Printed publications**

1971 publications programme

		<u>Languages</u>	<u>Cost</u> <u>(US\$)</u>
ID/32	Modernization and mechanization of salt industries based on seawater in developing countries Proceedings of expert group meeting (4.07.03)	F S	
ID/59	Manufacture of chemicals by fermentation Report and proceedings of expert group meeting (4.06.01)	E F S	
ID/73	Extraction of chemicals from seawater, inland brines and rock salt deposits (4.02.01)	E	
			<u>5,685</u>

1972 publications programme

ID/35	Establishment of pharmaceutical industries in developing countries Report and proceedings of expert working group meeting (4.03.01)	F	
-	Report and proceedings of the expert group meeting on pulp and paper (4.05.01)	E	
-	Carbonization of coal and recovery of by-products and hydrogenation of coal (4.08.01)	E	
-	Hydrogenation of coal and coal tars Review and annotated bibliography of works published in 1959-1970 (4.08.01)	E	
			<u>4,300</u>

Forecast of 1973 publications programme

-	Report and proceedings of the expert group meeting on pulp and paper (4.05.01)	F S	
			<u>1,000</u>

**Note:** In the computation of the printing costs a standard formula was applied based on an average cost of internal and external printing.

104269

104269 (Part 1)  
104269

## GROUP 5: FERTILIZER, PESTICIDE AND PETROCHEMICAL INDUSTRIES

### Introduction

196. In that part of the work programme of UNIDO being carried out by Group 5, emphasis has continued to be given to assistance to the developing countries in the establishment and strengthening of the fertilizer, pesticide and petrochemical industries with a view to supporting agricultural development. The importance of fertilizers and pesticides in increasing crop yields in seed and crop protection is well known. Plastics and other petrochemical products are playing an increasingly important role in irrigation, water conservation, animal and crop protection, and packaging of agricultural products.
197. A number of UNIDO's current and proposed projects in these branches of industry are designed to provide Governments with advice on investment opportunities, project and product selection, preparation of tenders, evaluation of offers and promotion of joint ventures. There is encouraging evidence that investments in petrochemical and fertilizer plants have resulted from these efforts. In Algeria, for example, a fertilizer plant was constructed along the lines recommended by UNIDO and approval was given in 1971 to the establishment of a petrochemical complex, following a pattern suggested by UNIDO.
198. Foremost among the raw materials for the fertilizer, pesticide and petrochemical industries are petroleum and natural gas, sulphur, phosphate rock and potash - resources that are abundant in several of the developing countries. Projects being undertaken or planned by UNIDO are intended to assist countries in the utilization of these resources through the establishment of industries to supply both export and domestic markets. One form of UNIDO assistance consists of conducting surveys for petrochemical products of the external and domestic markets. The surveys are followed by pre-investment feasibility studies for specific manufacturing facilities.
199. The Second International Fertilizer Symposium, held in Kiev and New Delhi in 1971, brought together not only experts for an exchange of technological information, but also people empowered to discuss investment opportunities in developing countries. A special feature of the Symposium was the examination of responses to a questionnaire on problems facing developing countries in the operation, expansion and financial aspects of fertilizer development. The answers incorporated a wide range of problems that UNIDO may be requested to examine and assist in solving.
200. Since the two seminars and training programmes in plastics technology for developing countries, held in Vienna in 1970 and 1971, UNIDO has received a number of requests for technical assistance in plastics. There is evidence that the participants in these programmes not only established close technical and business contacts with manufacturers of plastics and plastic equipment abroad during their plant visits, but subsequently have also acquired and adopted certain processes and equipment in their own plants and laboratories.

201. Efforts are made to enlist the co-operation of governmental and non-governmental institutions in assisting UNIDO to carry out its various programmes of industrial development. Discussions have been held recently with Romanian authorities on the establishment of a joint UNIDO-Romanian centre to provide assistance in the fertilizer, pesticide and petrochemical fields by: testing new products and processes; conducting process research; developing pilot plants; participating in technical missions to the developing countries; and sponsoring meetings or seminars on subjects of special interest.

### OPERATIONAL ACTIVITIES

202. The operational activities in the fertilizer, pesticide and petrochemical industries are directed towards the establishment, improvement and further development of these industries. Among the types of activities being carried out by UNIDO in these fields are identification of investment opportunities, market and pre-feasibility studies, trouble-shooting, assistance in preparation and evaluation of tenders and assistance in supervision of plant construction and initial operation. Assistance to established industries consists of modernization of facilities; improvement of procedures for procurement, maintenance and quality control; training of operating personnel; and product diversification.

203. The activities of UNIDO in these fields are beginning to show tangible results. In Algeria, the UNDP/SF project on Industrial and Marketing Surveys on Petroleum Derivatives and Natural Gas, completed in 1968, has led to important investment decisions: the recommended fertilizer production facilities have been constructed and the Government has authorized construction of a petrochemical complex along the lines recommended by the project. An agreement to erect a plant for the production of plastics, as well as follow-up assistance by UNIDO in market studies, also resulted from this project.

204. A UNDP/SF project in Pakistan - Pre-investment Studies for the Promotion of the Fertilizer and Petrochemical Industries - was concluded in 1971 and contributed significantly to planning for the development of these industries. During the four-year duration of this project, number of proposed projects for petrochemical manufacture were modified in accordance with UNIDO recommendations, and other projects were either initiated or programmed for initiation as a result of the findings. Fertilizer requirements were also determined, and advice was offered as to the best means of meeting these requirements. Negotiations have been carried out concerning the supply, by UNIDO, of modern equipment for plastics fabrication, equipment that is to form the nucleus of a plastics technology centre.

205. An illustration of the type of assistance requested by the developing countries may be shown in the field of petrochemicals. Requests have been received for surveys of the domestic and export markets, for feasibility studies of specific petrochemical units and for assistance in preparing specifications and evaluating bids. Actual construction of plants and the supervision of initial operations are normally carried out under direct arrangements with the contractors. Frequent requests are also received for assistance in the end use of petrochemicals. For example, with regard to plastics, many requests are concerned with the fabrication of plastic goods,

including mould design, equipment selection, quality control and testing and training of technical personnel, as well as assistance in the development of consumer markets. Market studies are planned or underway for Egypt, Indonesia, Malaysia and Trinidad and Tobago as well as for the Industrial Development Centre for Arab States (IDCAS). UNCTAD has agreed to co-operate in some of these surveys. In Peru, UNIDO completed a market survey, and investment feasibility studies involving several hundred million US dollars are now being carried out.

206. With regard to the work of UNIDO in the fertilizer industry, a project carried out jointly with FAO in Togo has been re-examined in the light of market information obtained by FAO. A new proposal has been formulated for developing in Togo a fertilizer industry that would be more compatible with the market; this proposed project would also provide Togo with valuable experience for the future development of a large export-oriented phosphatic fertilizer industry, based on the utilization of domestic natural resources. A review mission reported that the efforts of FAO in promoting the use of fertilizers have already had a significant impact on farmers of the country, and the products of the proposed fertilizer plant (triple superphosphate and mixed fertilizers) are likely to find ready acceptance.

207. In Ethiopia, a study is being initiated in co-operation with FAO to determine the scope for the establishment of fertilizer bulk blending plants and pesticide formulation plants; such industries would help to bring about improvements in the supply of agricultural inputs to support agricultural development. It is expected that UNIDO will assist in the construction of such plants as may be recommended.

208. In 1971, with the assistance of UNIDO, the construction in Rwanda of a demonstration plant was completed; in the plant pyrethrin is extracted from pyrethrum flowers as the active ingredient for pesticides. It is expected that the plant will contribute significantly to the industrialization of the country. Among the other demonstration plants that are expected to be constructed with UNIDO assistance are a pilot plant for synthetic fibres and a plant for plastic resins.

209. At the request of several developing countries in the ECAFE region, a project designed to co-ordinate the regional production of certain active ingredients for pesticides is to be initiated in 1972 and completed in 1973. The project should be of benefit to those countries of the region whose domestic markets are insufficient to justify development of a basic pesticide industry. The advice and co-operation of WHO and FAO will be solicited in this project.

210. Technical assistance activities designed to establish or strengthen technological institutes in plastics technology are on the increase. These activities include applied polymer research, plastics fabrication technology, quality control and testing, training, advice on processing of plastics for use in agriculture, building and packaging. Countries in which such UNIDO assistance has been given include Argentina, Burma, Chile, India, Israel, Nicaragua, Pakistan and Thailand.

Value of approved field projects and forecast of requirements, 1971 to 1973  
(in thousands of US dollars)

Source of funds	1971 estimated expenditure	1972			1973		
		Approved projects	Requirements for new projects	Total	Approved projects	Requirements for new projects	Total
UNDP/SF	944.9	} 1,172.4	1,172.7	2,352.1	787.7	4,233.0	5,020.7
UNDP/TA	115.4		(565.0) <sup>a/</sup>				
RP	125.2	108.6	-	108.6	120.0	-	120.0
SIS	258.1	354.7	300.0	654.7	-	750.0	750.0
GTF	69.3	-	95.0	95.0	-	130.0	130.0
FIT	<u>50.0</u>	<u>62.0</u>	<u>43.0</u>	<u>105.0</u>	<u>-</u>	<u>105.0</u>	<u>105.0</u>
Total	1,562.9	1,697.7	1,617.7	3,315.4	907.7	5,218.0	6,125.7

Note: UNDP/TA and UNDP/SF are to be merged, effective 1 January 1972.

a/ Annual estimated costs of projects included in the UNDP Country Programmes or projects officially submitted to UNDP for approval.

**List of Approved Projects and Projects  
under Active Consideration**

Projects over US\$100,000

Projects under US\$100,000

Fertilizers

ETH (IPF)\* - Pilot project bulk blending plant for production of complex fertilizers  
 ICG-12 (SF) - Fertilizer use, promotion, demonstration and production scheme, Lomé  
 PAK-26 (SF) - Pre-investment studies for the promotion of the fertilizer and petrochemical industries

UAR-69/471  
 UAR-70/1047  
 MOR-69/692\*\*  
 NIR/05/2/1\*\*  
 RWA/05/1/3  
 CUB/70/17  
 GUY/05/2/1\*\*  
 NIC-69/624

PAN-69/698  
 TRI/05/2/1\*\*  
 CEY-69/646  
 CEY-70/1104  
 VIE/05/1/1\*\*  
 VIE/05/2/2\*\*  
 VIE/05/1/3\*\*

IRQ/05/1/1\*\*  
 ISR/71/16\*\*  
 SYR-71/1204  
 SYR-68/325  
 SOY-70/256  
 INT/70/8  
 INT-VC/5/7

(3 projects)

(22 projects)

Raw materials for the production of  
fertilizers and pesticides

ETH-71/1259

(1 project)

Pesticides

UAR-69 (SF) - Demonstration pesticide production plant based on chlorine and bromine resources  
 RWA-3 (SF) - Pilot plant for industrialization and pyrethrum production  
 RWA (IPF)\* - Supplementary assistance to RWA-3  
 RWA-9029-71 (FIT) - Government's cash counterpart contribution towards cost of subcontracts in SF project RWA-3

MAR-70/1095  
 MOR/05/2/3\*\*  
 BRA-71/1265

LAT/05/1/6  
 BUR-71/1353

GRE-71/1373  
 SYR-69/535

(4 projects)

(7 projects)

Petrochemicals

PER-70/762 (SIS) - Pre-investment survey for the petrochemical industry  
 PER (IPF)\* - Peruvian institute of petrochemical industries

UAR-71/1246  
 UAR-70/1096  
 GAB-70/968  
 MAR-70/1053  
 MOR-71/1216

NIR-71/1471  
 RWA-68/409  
 AFR-70/1054  
 COL/05/2/1\*\*  
 ECU-70/1050

HAI/05/2/2\*\*  
 NIR-70/1045  
 TRI-69/660  
 VEN/05/2/4\*\*  
 LAT-69/438

\* Projects not yet approved but included in the Country Programmes and projects officially requested.

\*\* Fellowship posts.

Projects over US\$100,000

Projects under US\$100,000

Petrochemicals (cont'd)

IND (IPF)\* - Establishment of a demonstration plant for the production of synthetic fibres - Silk and Art Silk Mills' Research Association (SASMIRA)

IND-117 (IPF)\* - Performance, evaluation and utilization of petroleum products

PHI (IPF)\* - Plastic products industry

BUR-71/1195  
BUR-71/1418  
BUR/70/11  
BUR/70/12  
CEY-69/495  
IND/69/1  
IND/05/1/5\*\*  
IND/05/1/6\*\*  
INS-71/1379  
IRA-71/1117  
KOR/69/16\*\*  
MAL-71/1406

PAK/05/2/5\*\*  
THA-71/1335  
AFE/05/1/3  
AFE/05/2/2  
BUL/71/33\*\*  
BUL/71/34\*\*  
BUL/71/32\*\*  
HUN/69/1\*\*  
HUN/69/11\*\*  
POL/71/3\*\*  
POL/69/1\*\*

ROM-70/1056  
ROM/70/6\*\*  
ROM-70/994  
ROM-70/835  
SYR-69/509  
TUR-71/1329  
YUG-70/955  
YUG-68/345  
INT/05/1/10\*\*  
INT/05/1/3  
INT-VC/5/15

(5 projects)

(49 projects)

Multisectoral

ALG/05/21\*\*  
UAR/05/2/3\*\*

INT/05/2/3  
INT-VC/5/1

(4 projects)

\* Projects not yet approved but included in the Country Programmes and projects officially requested.

\*\* Fellowship posts.



### SUPPORTING AND OTHER ACTIVITIES

211. The supporting and other activities of Group 5 are classified under the following projects:

Fertilizers	5.01
Raw materials for the production of fertilizers and pesticides	5.02
Pesticides	5.03
Petrochemicals	5.04

#### Fertilizers (5.01)

212. The supporting activities being carried out by UNIDO in this field are designed to assist in identifying prospects for industrial development, in facilitating transfer of technology, in solving special problems that prevent the full utilization of production facilities and in planning for development of the fertilizer industry.

213. In order to assist in fertilizer development, UNIDO is continuing its surveys on Prospects of fertilizer development possibilities (5.01.01). The surveys are carried out in co-operation with the relevant regional economic commissions and UNESOB. Before publication, the drafts of the surveys are submitted to the regional commissions and to FAO for comments. The results of these surveys form the bases for discussion at the fertilizer and pesticide development meetings planned for each region (cf.5.01.02). In previous years, UNIDO had undertaken surveys in Africa, Asia and Latin America. In 1971, UNIDO completed a survey of the UNESOB region. During 1972, UNIDO proposes to make a survey of the East European region (ID/B/80/Add.1, para.185). Co-operation will be sought with ECE through the appropriate channels.

214. The surveys on prospects of fertilizer development possibilities are being published as a "Directory of fertilizer production facilities". Volume I (Africa) of this Directory was published in 1971. Volume II (Asia) was not completed in 1971 as planned (ID/B/80/Add.1, para.185), but is scheduled for publication in 1972. The surveys on the Latin American and UNESOB regions are scheduled for publication in 1972 as Volumes III and IV of the Directory. When the surveys are completed, a summary balance sheet, with appropriate updating, will be prepared and submitted to FAO, the regional economic commissions and UNESOB for review before publication as a UNIDO document at a later date.

215. The meeting on the Development of the fertilizer and pesticide industries (5.01.02) in the UNESOB region, planned for 1971 (ID/B/64/Add.5, para.18), was merged with the Second Inter-regional Fertilizer Symposium (cf.5.01.05). In 1972, a similar meeting will be held for the East European region (ID/B/80/Add.1, para.186). The ECE will be invited to co-operate in this meeting and FAO, WHO and the International Bank for Reconstruction and Development (IBRD) will be invited to participate. It is expected that the Government of Romania will host the meeting. In 1973, UNIDO proposes to hold a regional meeting for the African region.

216. The purpose of these regional meetings was to bring together UNIDO government officials and industrialists from developing countries with experts and industrial investors from the industrialized countries. UNIDO has evidence that these meetings help to achieve direct transfer of technology and to stimulate investment in the fertilizer and pesticide industries in the developing countries. A number of requests for UNIDO assistance in solving specific development problems appear to have resulted from contacts established at such meetings.

217. In the series of studies being undertaken by UNIDO on the Underutilization of capacities in the fertilizer and pesticide industry (5.01.04), a study on the pesticide industry in the ECAFE region was made in 1971. A similar study of the fertilizer industries was carried out within the framework of the UNDP/IBRD project (PAK-26) in Pakistan. A further study, to have been carried out in the ECA region in 1971 (ID/B/80/Add.1, para.189), has been postponed. It is hoped that at a later date this series of studies can be expanded to include the Latin American region.

218. The Second Interregional Fertilizer Symposium (5.01.05) was held in Kiev and New Delhi in 1971, with approximately 250 persons, including about 130 experts, from some 45 countries participating. Among the topics discussed at the Symposium were appropriate technologies, operation and maintenance of plants, training of personnel, financing, marketing and distribution and the use of fertilizers in agriculture. At the Symposium, a number of recommendations were made including: (a) UNIDO should establish closer linkage with FAO and IBRD in its efforts to encourage the development of the fertilizer industry and the financing of projects; and (b) UNIDO should give specific attention to problems of industrial pollution resulting from fertilizer manufacture. As a result of these recommendations, UNIDO has already initiated specific measures to effect closer collaboration with FAO and IBRD and to involve Group 17 more closely on the broader problem of industrial pollution in the fertilizer industry. As an outcome of the Symposium, meetings have been held with FAO and IBRD on possible joint steps in financing fertilizer projects. The report of the Symposium is scheduled for publication in 1972. As a measure of economy, the proceedings of the Symposium will not be printed, but ten sets of all papers presented at the Symposium will be sent to each participant for distribution to interested institutions and experts in his country.

219. The two Studies (5.01.06) commissioned in 1969 (ID/B/64/Add.5, para.25) will not be published but will be used internally. The FAO was consulted on the study on "Direct use of phosphate rock as fertilizer and cattle food", which UNIDO completed in 1970, and expressed the opinion that the paper did not add significantly to the literature on the subject. Publication was therefore cancelled, but the document will be utilized internally. The study on "Experience of the Union of Soviet Socialist Republics with processes for reducing the use of sulphur in fertilizer manufacture" is not timely now that there is an excess of sulphur production in the world.

220. Aside from other documents related to, and described under, specific project components, two Publications (5.01.07) were scheduled for 1971 (ID/B/80/Add.1, para.192). "Fertilizer demand and supply projections to 1980 for South and Central America" was published in 1971 as Monograph No.6 of the Fertilizer Industries Series. "Techno-economics of nitrophosphate fertilizers", which was originally planned for publication in 1971, was reviewed at the Second Interregional Fertilizer Symposium; it is expected to be reproduced internally in 1972.

21. In order to assist the developing countries to intensify the development of their fertilizer industry with their agricultural development, UNIDO will prepare in 1972 (ID/B/80/Add.1, para.103) an information paper on Models for establishing national fertilizer development centres (5.01.03). The paper will describe the organization and functioning of such well-developed centres as the TVA National Fertilizer Development Center in the United States of America, the Union of Soviet Socialist Republics' Nitrogen Institute and the Fertilizer Association of India. This paper will be included in the revised Fertilizer Manual (cf.5.01.11).

22. The technology of catalyst production and use is vital to the development of the petrochemical and fertilizer industries. In some developing countries, these catalysts could be produced with relatively low costs using domestic raw materials. To examine this problem, UNIDO will hold in 1972, in co-operation with the Government of Romania, an expert group meeting on the Transfer of know-how in production and use of catalysts (5.01.09) (ID/B/80/Add.1, para.104).

23. In some of the smaller developing countries, the market is not large enough to justify the establishment of a fertilizer industry. However, much can be done to reduce fertilizer costs to farmers by improving the efficiency of purchasing, receiving, storing, mixing and distribution of imported fertilizers or intermediate products. UNIDO therefore proposes to make a study in 1972 on Reduction of fertilizer costs (5.01.10) to show how these improvements can be made. The substance of this study, which will be reproduced internally in 1973, will be incorporated in the revised Fertilizer Manual (cf.5.01.11).

24. In 1967, UNIDO produced a Fertilizer Manual that proved to be a successful and useful publication. Since that time, there have been significant changes in both the economics of fertilizer production and the types of products and processes. UNIDO therefore proposes to make in 1973 a Revision of the Fertilizer Manual (5.01.11; Priority B) to bring the original publication into line with the latest developments. It is also felt that the manual could be improved by including more material of direct interest to developing countries and by excluding some of the more technical material available in other publications. In addition, the vital problem of pollutants resulting from fertilizer manufacture would be approached with a view to establishing minimum standards of air and stream pollution. Attempts are being made to interest a commercial firm in the publication of the revised manual.

**Raw materials for the production of fertilizers and pesticides (5.02)**

25. Owing to limited resources, the proposed study on the Transport of molten sulphur (5.02.01; Priority B), planned for 1971 (ID/B/80/Add.1, para.195), could not be carried out. The study on world supply of and demand for sulphur, prepared by the British Sulphur Institute (ID/B/80/Add.1, para.195), is scheduled for publication in 1972. No further activities in this field are presently planned for 1972 or 1973.

**Pesticides (5.03)**

26. Two missions to investigate the Availability of excess chlorine and its potential use for pesticide production (5.03.01) were carried out by UNIDO in 1971, one in the ECLA region and the other in the ECAFE region (ID/B/80/Add.1, para.197). The recommendations of these missions are

being evaluated and will be used in the operational activities that are expected to develop as a result of the missions. A similar mission to the ECA region, originally planned for 1972 (Priority B), was cancelled owing to lack of resources.

227. UNIDO has collected a considerable amount of information on the production and use of pesticides in developing countries and is also in possession of information on the variety of pesticides produced and claims of their effectiveness by manufacturers throughout the world. Many developing countries cannot afford investments in the intricate and expensive facilities required to produce these sophisticated chemicals. For such countries, industrialization in the pesticide branch is restricted largely to setting up formulation and packaging plants. In other developing countries, the production of basic pesticides is feasible, but owing to the complexity and large variety of pesticides, many of which are proprietary products protected by patents, the selection of products and the transfer of the necessary technology are difficult. It is felt that there is scope for assistance to both groups of countries. UNIDO therefore proposes to organize in 1973 a Workshop on pesticides (5.03.03) to provide a forum for the exchange of information, transfer of technology, and strategies that could be adopted for the promotion of the pesticide industries in developing countries. This workshop was originally proposed as a priority B project in the 1971 work programme (ID/B/64/Add.5, para.32) but could not be implemented owing to lack of resources. Given the importance of the subject matter, however, UNIDO has upgraded it to priority A in its 1973 work programme. The FAO would be invited to participate in the workshop and would be asked to assist UNIDO to prepare a preliminary assessment of the possibilities for increased production of selected pesticides in the developing countries and to select suitable participants.

228. In 1971, UNIDO, in co-operation with the Syracuse University Research Corporation, held the third Interregional Training Course for Industrial Production of Pesticides (5.03.04) in Syracuse, New York. The course was organized by the New York Liaison Office and is also included among the operational activities of Group 16. Two volumes of the proceedings of the Second Interregional Training Course for Industrial Production of Pesticides in Developing Countries, held in 1970, are scheduled for publication in 1972 under the titles:

- General principles and formulation of pesticides; and
- Chemistry and production of active ingredients.

229. Since many developing countries do not have markets sufficiently large to sustain pesticide industries, UNIDO proposes to carry out in 1973 a survey on Co-ordination of pesticide production (5.03.05; Priority B) in the ECAFE region. Through this survey, UNIDO would seek to establish the basis for regional co-operation in the manufacture and trade of pesticides in the ECAFE region as preliminary requests have been received from several countries of that region. The Industrial Policies and Programming Division will co-operate in this project and the information obtained from the survey, which is complementary to the UNIDO assisted Asian Industrial Survey for Regional Co-operation at ECAFE,<sup>4/</sup> would be analysed by UNIDO.

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<sup>4/</sup> This survey is reported on under the operational activities of Group 15 (Industrial Surveys and Studies).

**Petrochemicals (5.04)**

230. Owing to the heavy publication programme and budget restrictions, the proceedings of the Interregional Petrochemical Symposium on the Development of Petrochemical Industries in Developing Countries (5.04.01), held in 1969, will not be published as originally scheduled (ID/B/80/Add.1, para.204).
231. UNIDO had planned to hold in Vienna in 1971 an expert group meeting on Future trends in, and competition between, natural and synthetic rubber (5.04.03) (ID/B/80/Add.1, para.206). Owing to delays in receiving nominations for the participants, the meeting has had to be postponed until early 1972. Confirmation of participation has already been received from several developing countries and nominations of additional participants are expected from a number of other countries. In 1971, UNIDO prepared a study on this subject incorporating the available relevant data from other international organizations, and before the meeting this study will be distributed to all participants from developing countries. A number of international organizations including UNCTAD, FAO, the International Rubber Study Group, and other international natural and synthetic rubber associations, as well as rubber goods producing companies, have announced their interest in participating in this meeting. Among the main topics of the meeting will be an analysis of new trends in the competition between the two types of rubber and an identification of problems related to the production and utilization of natural and synthetic rubber in developing countries. The expert group is to provide guidelines for the future work programme of UNIDO in this field.
232. The expert group meeting is also expected to stress the need for the use of synthetic rubber in certain products such as vehicle tires, in the manufacture of which both synthetic and natural rubber are essential. In some developing countries that have the necessary quantities of raw materials such as styrene and butadiene and that are in the process of setting up petrochemical complexes, the production of synthetic rubber has become feasible. UNIDO proposes, therefore, to convene in 1973, in co-operation with the Government of Romania, an expert group meeting on the development of the synthetic rubber industry. The expert group would give particular emphasis to the study of small but economic plants recently developed by some synthetic rubber manufacturers. Participants from developing countries interested in establishing new synthetic rubber plants would be invited as well as persons from developed countries interested in offering licences and know-how on certain well-established processes. In addition, the International Rubber Study Group and the International Synthetic Rubber Manufacturers' Association would be invited to the meeting to evaluate the effects of substituting natural rubber with synthetic rubber as part of its programme.
233. The second UNIDO In-plant Training Programme in Plastics Fabrication and Utilization (5.04.04) (ID/B/80/Add.1, para.207) was held in Vienna from 17 May to 16 July 1971, in co-operation with the Government of Austria, with fourteen participants from developing countries taking part. The programme is reported on under the operational activities of UNIDO being carried out by Group 16 (Industrial Training). In 1971, UNIDO published a document on "Guidelines for the production and marketing of acrylic sheet in developing countries" (ID/SER.J/6); it will be used as background material in possible future courses within this training programme.

234. UNIDO plans to convene in 1972, in association with the Latin American Plastics Institute at Buenos Aires, and the Colombian Plastics Association, a symposium on the Development of the plastic fabrication industry (5.04.05) (TD/B/80/Add.1, para.206). In addition to participants from the Latin American region, a number of participants from developed countries are also expected - people interested in the transfer of technology and in investing in the Latin American countries. Participants will be asked to specify technical assistance requirements and opportunities for investments. A number of organisations, including ECLA, FAO, the International Committee on Plastics in Agriculture and the Inter-American Development Bank, will be invited to participate in the symposium.

235. The study commissioned by UNIDO on Proteins from hydrocarbons (petro-proteins) (5.04.06) was completed in 1971. The study showed that proteins from hydrocarbons can become an important supplement to other kinds of proteins and might help to alleviate the world's protein deficiency. Although their present application is limited to animal feeding, it is expected that in the near future, proteins from hydrocarbons will be used for human consumption. Full-scale production of single cell protein has already been initiated by some companies and the establishment of several large commercial plants has been announced recently. Preliminary discussions with some major companies indicated that they would be interested in co-operating with UNIDO and would assist in the establishment of pilot plants in developing countries.

236. In view of the facts brought to light by the above-mentioned study, UNIDO proposes to hold in 1973 an expert group meeting on the manufacture of proteins from hydrocarbons. UNIDO would invite to the meeting experts from developed countries who would be in a position to offer technical know-how and licences and experts from those developing countries that are fairly advanced in this field. By bringing together these two groups of experts, UNIDO hopes to initiate business and investment discussions with regard to pilot plant utilization, exports, distribution and marketing. The co-operation of FAO, WHO and UNESCO would be requested through the appropriate channels. The preparatory work would begin in 1972. The results of the meeting would be made available to other developing countries to generate their interest in this field. The report of the meeting would be scheduled for publication in 1973.

237. In 1972, UNIDO will prepare an information paper on the Establishment of a plastics technology centre (5.04.08) (ID/B/80/Add.1, para.211) to serve as a guide in the establishment of centres that will provide technical service, testing and quality control, training for technicians and advice on utilization of plastics. This paper, which will be reproduced internally, will be presented for discussion at the seminar on the application of plastics scheduled for 1973 in London (5.04.11).

238. The report on the Universal process training unit (5.04.09), which UNIDO had originally planned for 1971 (ID/B/80/Add.1, para.212), will be carried out in 1972. The report is scheduled for publication in 1973.

239. The preparatory work for establishing a visiting and consulting Team for petrochemical and plastics industries (5.04.10) will be undertaken by UNIDO in 1972 (ID/B/80/Add.1, para.213). The main subject for consultation and promotion concerns the manufacture of plastics for use in agriculture, building and packaging. The team, composed of specialists from UNIDO in petrochemical and plastics technology, investment promotion and technical information, as well as a

consultant in plastics utilization, will compile specific project proposals including technological, financial and probable investment requirements. These project proposals, together with forecasts of the likely impact of such industries on industrial development, are to be sent to selected developing countries to generate interest in more detailed consultations with the team. At the request of the Governments, the team will visit countries to conduct consulting services in planning, transfer of new technology, management, identification of technical assistance needs and in business and financial aspects. If successful, this activity would be expanded in 1973 to cover other areas related to the petrochemical and plastics industries.

240. In 1973, UNIDO proposes to convene in London a seminar, in co-operation with the Government of the United Kingdom, the Plastics Institute and the British Plastics Federation, on the Application of plastics (5.04.11). The seminar, to be held in conjunction with the International Plastics Fair (INTERPLAST), would deal with the important uses of plastics in packaging, building, agriculture, transport, domestic appliances and apparel. The opportunity would be taken to arrange for participants from developing countries to visit the Fair, where examples of various uses of plastics will be exhibited; on-the-spot discussions with the manufacturers could also be arranged. Specific proposals with regard to technological, financial and investment requirements for establishing domestic plastics manufacturing facilities would be examined, followed by a discussion on the need for plastics technology centres to provide consulting services. Special plant visits would also be arranged. The seminar would be organized in collaboration with Groups 3 (Construction and Building Materials Industries), 9 (Industrial Information), 12 (Industrial Programming, Project Planning and Policies) and 17 (Industrial Branch Reports and Across-the-Board Techniques).







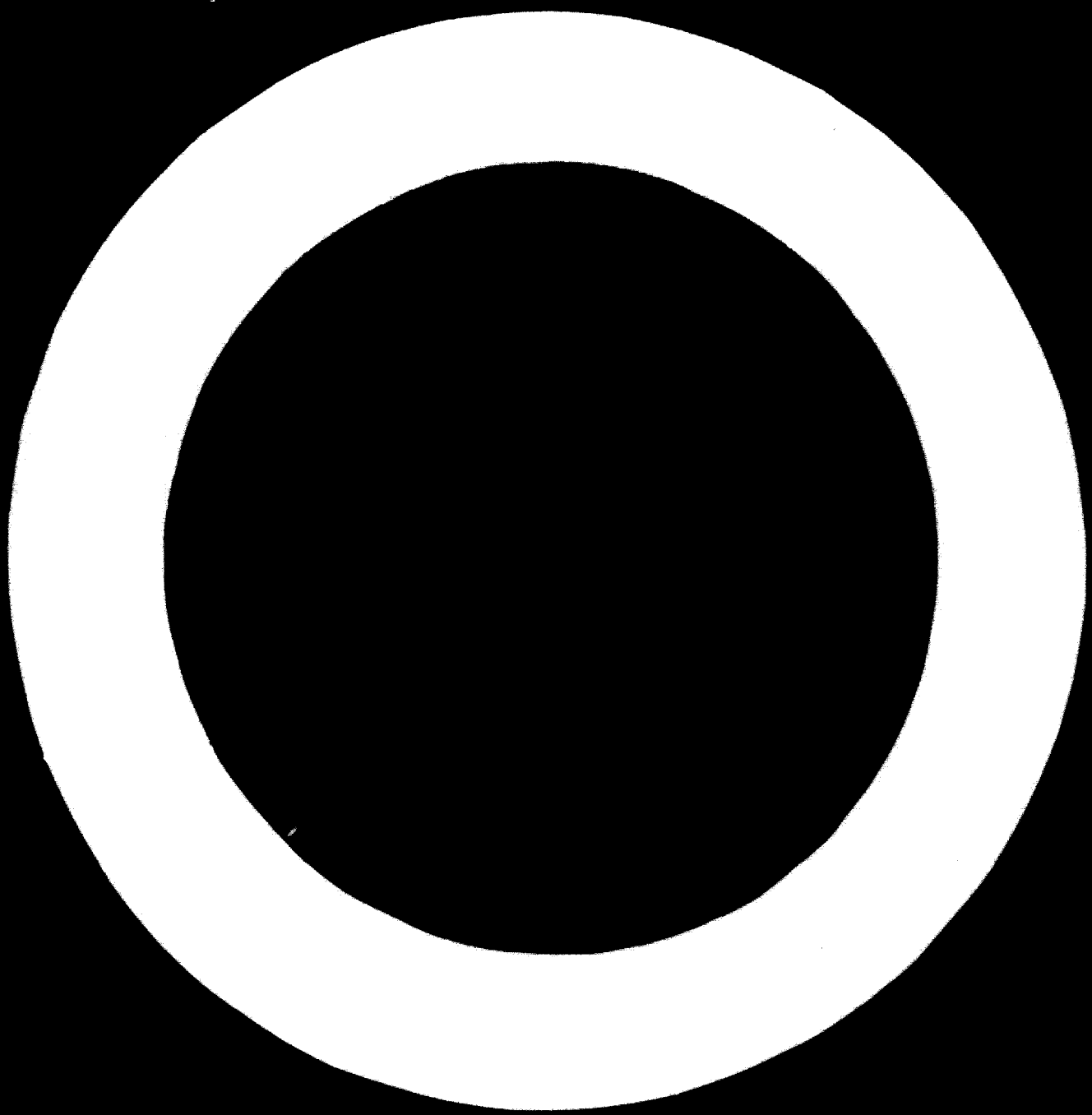
Printed publications

<u>1971 publications programme</u>		<u>Languages</u>	<u>Cost (US\$)</u>
ID/44	Directory of fertilizer production facilities Vol.I: Africa (5.01.01)	E	
ID/46	Petrochemical industries in developing countries Vol.I: Report of the interregional petrochemical symposium, 1969 (5.04.01)	F S R	
<u>Fertilizer Industry Series</u>			
ID/SER.F/6	Fertilizer demand and supply projections to 1980 for South and Central America (5.01.07)	E S	
<u>Petrochemical Series</u>			
ID/SER.J/5	Establishing standardization of plastics in developing countries	F	
ID/SER.J/6	Guidelines for the production and marketing of acrylic sheet in developing countries (5.04.04)	E S	
			<u>12,101</u>
<u>1972 publications programme</u>			
ID/44	Directory of fertilizer production facilities Vol.II: Asia (5.01.01)	E	
ID/75	Industrial production and formulation of pesticides in developing countries Vol.I: General principles and formulation of pesticides (5.03.04) Vol.II: Chemistry and production of active ingredients (5.03.04)	E F S E	
ID/76	World supply and demand and price trends of sulphur (5.02.01)	E	
ID/SER.F/6	Fertilizer demand and supply projections to 1980 for South and Central America (5.01.07)	F	
ID/SER.J/6	Guidelines for the production and marketing of acrylic sheet in developing countries (5.04.04)	F	
-	Report of the Second Interregional Fertilizer Symposium (5.01.05)	E R	
			<u>18,600</u>

Forecast of 1973 publications programme

		<u>Languages</u>	<u>Cost</u> <u>(US\$)</u>
ID/44	Directory of fertilizer production facilities Vol.III: Latin America (5.01.01)	E S	
	Vol.IV: UNESOB region (5.01.01)	E	
ID/75	Industrial production and formulation of pesticides in developing countries Vol.II: Chemistry and production of active ingredients (5.03.04)	F S	
-	Fertiliser Manual (revised edition) (5.01.11)	E F S	
-	Expert group meeting on synthetic proteins from hydrocarbons Report of meeting (5.04.06)	E	
-	Report on the use of the universal process training in developing countries (5.04.09)	E	
			<hr/> 28,200

Notes: In the computation of the printing costs a standard formula was applied based on an average cost of internal and external printing.



## GROUP 6: LIGHT INDUSTRIES

### Introduction

241. UNIDO's programme of activities in the field of light industries is concerned primarily with the provision of effective technical assistance to the textile, food processing, wood processing, leather and leather products, rubber products and printing industries. The knowledge accumulated by UNIDO in these areas has contributed to a more efficient programme of assistance that is suited to the specific needs of the individual countries and that facilitates the solution of their particular industrial problems.
242. Several delegations at the fifth session of the Industrial Development Board pointed out that light industries were particularly suited to help solve the problem of employment as well as to make maximum use of local raw materials (A/8416, para.103). Light industries also have a significant role to play in expanding the export possibilities of developing countries by producing new goods with a demand potential on the international market.
243. The assistance given by UNIDO takes on a number of forms - from brief diagnostic missions by staff members and/or outside experts to identify technical assistance requirements and to ascertain the priority needs of developing countries, to missions by selected experts to assist in on-the-spot solutions of specific problems and in improvements in the efficiency of existing production units.
244. UNIDO is carrying out an increasing number of sectoral studies to assess the situation of specific industries and to recommend policies for the further development of these industries. This activity is complemented by comprehensive, long-term development studies directed towards individual industries, or groups of industries, and their successful operation. Projects on this scale, which entail the preparation of detailed feasibility studies and the formulation of programmes for implementation, culminate in the establishment of semi-commercial pilot and demonstration plants and development centres. At the same time, emphasis is placed on the promotional aspects of these activities with a view to encouraging the establishment of light industries in the developing countries.

### OPERATIONAL ACTIVITIES

245. Within the operational activities of UNIDO related to the textile industry, several regional studies have shown that the major reasons for retarded industrial development are often inability to take advantage of potential economies of scale and inadequate production processes. UNIDO is thus devoting increased attention to these problems; as was remarked at the fifth session of the Industrial Development Board, the need for continuous updating of the equipment selection studies has been recognized and steps will be taken in this direction (A/8416, para.104).

246. UNIDO is also assisting in the making of techno-economic assessments as a preparatory step towards long-term development projects within the textile industry. Short-term activities usually comprise direct assistance to specific sectors of textile production, with a view to increasing productivity and improving quality control. A good example of the activities of UNIDO in this field is the recently completed techno-economic assessment of the textile industry in the East African Community, an assessment that is expected to have considerable influence upon the long-term co-ordination of the industry in the countries belonging to the Community. Assistance is also being provided to a quality control centre in Alexandria, Egypt, and tangible results are already being achieved.
247. UNIDO's continued endeavours to promote the proper utilization of local natural resources are best evidenced by the UNDP/SF project that has been initiated in Mongolia for the establishment of an experimental and demonstration plant for the processing of cashmere and camel hair. It is hoped that the success of this project will make other countries aware of the contribution that UNIDO can make towards national industrial development, especially in the more sophisticated and technologically complex industries.
248. The long-term comprehensive research and product development programme with the International Institute for Cotton (IIC) and its member States, which was presented as an innovation at the fifth session of the Industrial Development Board (cf. ID/B/80/Add.1, paras.217 and 219), proved to be over-optimistic in its aspirations and has, to date, failed to materialize owing to the lack of UNDP funds for interregional projects. Nevertheless, there have been continued endeavours to devise alternative forms of co-operation, notably through linking parts of the IIC programme with existing or planned field projects for the cotton industry. The Institute's co-operation has also been secured in the expert group meeting on new techniques of yarn and fabric production (6.91.04), which is to be held in Manchester, United Kingdom, in June 1972.
249. The programme of co-operation with the International Wool Secretariat (IWS) related to the establishment of quality control laboratories (cf. ID/B/80/Add.1, para.219) has not resulted in official requests for assistance in connexion with the Woolmark scheme. However, UNIDO continues to maintain close contact with IWS, an example of successful co-operation being the planned establishment of a central dyeing and finishing facility for the Punjab wool knitting industry in India.
250. The requests for assistance in the food industry sector submitted to UNIDO by the developing countries show that in many instances the industries concerned have remained largely geared to supplying raw materials to the benefit of the economies of their traditional trading partners. However, as UNIDO is endeavouring to show, the burden on national economies resulting from the export of unprocessed materials can be effectively reduced. With the proper commercialization of indigenous raw materials, developing countries can evolve from being simple producers of raw materials supplying traditional markets to processors of products that can be sold competitively at home and abroad. Particular emphasis is laid on sugar production, vegetable oil processing, fish processing, meat processing, animal feedstuff production, fruit and vegetable processing, industrial production of protein-rich foods from non-traditional raw materials, and the planning of entire food processing sectors (agro-industrial complexes).

1. A survey of the sugar industry in Jamaica was completed in 1961 and a staff mission accompanied two experts on a diagnostic mission to assess the current situation in the sugar industry in preparation for a tentative industrial modernization plan. UNIDO is providing assistance to the development of the sugar industry in a number of developing countries in Africa as well as to the North-West region of Argentina. Advice is also being given on sugar refinery development in Thailand, and the Philippines Sugar Institute is receiving UNIDO technical assistance in industrial fermentation.

252. The integrated approach, which includes the marketing aspects, to agro-industrial development is becoming increasingly acceptable. Following the completion of the formulation of the plan for agro-industrial development in Iran (cf. ID/B/80/Add.1, para.220), other countries have subsequently expressed interest, notably Uruguay, where consultants are being sought to prepare a feasibility study for the establishment of a model agro-industrial combine. The integration philosophy was also evident in the joint UNIDO/FAO preliminary survey missions to Nigeria, Thailand and Romania, which led to the elaboration of joint projects for assistance in the establishment of integrated soyabean product industries. A similar trend is also to be observed in UNIDO's role as an associated agency to the FAO executed UNDP/SE project that provides assistance to the agricultural-food complex in the Bosanska-Krajina region in Yugoslavia, where UNIDO is assisting in the preparation of a plan for the development of the food industry.

253. Two UNIDO missions visited Brazil and Nigeria to study the adaptation of a process for enhancing the protein quality of cassava that is being processed in these countries. From these missions, specific recommendations emanated for the large-scale development of protein-enriched materials. Furthermore, expert assistance will be given to Paraguay for the planning of a plant to process cassava into dried chips and pellets for export as an animal feedstuff ingredient. The interest in cassava continues to grow and several countries are expressing a desire for technical assistance in the industrial processing of this widely-grown tropical crop.

254. Assistance to the vegetable oil processing industries continues to expand in an equally dynamic manner. Special efforts are being made to improve and utilize the production of coconut oil and other by-products for food and feed purposes as illustrated by the projects in Ceylon, in Papua and New Guinea and in the Philippines. Assistance is being given by UNIDO to the industrial production of karité butter from karité nuts in Chad, and plans are being made to reorganize the vegetable oil industry in Ghana.

255. Modern ranching methods give rise to a need for properly prepared mixed feeds, and UNIDO is currently assisting in the establishment of modern feedstuff factories in Rwanda, Swaziland and the United Republic of Tanzania. Markets in the highly specialized animal feed area have also been identified by UNIDO experts working on reorganization and capacity improvement of the fish-protein concentrate plant in Morocco (cf. ID/B/80/Add.1, para.221). Discussions continue with Chile and Peru regarding the promotion of fish-protein concentrate production with UNIDO assistance.

256. The feasibility study prepared by a UNIDO expert on the establishment of a soluble coffee plant in Ethiopia has roused the interest of foreign investors, and the same expert will be

returning to advise on implementation. A preliminary study of the milk processing industry in Mongolia recommended the further development of the industry in that country, and activities are expected in this field. Similar developments are expected in the rice processing sector, following the completed report on the rice processing industry in Thailand and the joint UNIDO/FAO/ECAFE Interregional Seminar on the Industrial Processing of Rice (6.02.06), held in Madras, India, in 1971. Requests for technical assistance are also expected to result from the Expert Group Meeting on Processing Selected Tropical Fruits and Vegetables for Export to Premium Markets (6.02.08), held in Salvador (Bahia), Brazil, in 1971.

257. In the wood processing sector, UNIDO's programme of assistance is designed to promote the efficient utilization and processing of locally available wood resources and/or suitable agricultural residues. Following UNIDO's Expert Group Meeting on the Production of Panels from Agricultural Residues (6.03.02), held in 1970, requests were received for technical assistance in the production of panels from agricultural residues and the utilization of annual crops that had not been used previously. There is also a growing awareness of the significant role that the furniture and joinery industries can play in reducing the import of finished goods to developing countries, in satisfying the growing demand concomitant with the envisaged rise in living standards, and in taking advantage of the growing international demand for panels. The integration philosophy germane to modern food processing industries is also applicable to the growing exigency for vertically integrated wood processing complexes.

258. UNIDO is also pursuing the goal of establishing development and demonstration centres to provide centralized facilities for the dissemination of extension services, such as model low-cost housing units, prototype furniture designs and prefabricated joinery products. There is every indication that these centres will form nuclei for continued assistance properly tailored to local requirements.

259. Chad, Swaziland and Western Samoa have requested assistance from UNIDO in determining the feasibility of using papyrus, bagasse and coconut stems for the manufacture of panel products. Furthermore, ad hoc assistance will be provided to a particle board plant using cotton stalks in Iraq.

260. Assistance to the furniture industries was given, inter alia, to Israel (quality control), Mauritius and Singapore (production). The Indonesian Match Manufacturers' Association benefited from the advice given by a UNIDO expert, and experts are being recruited for similar projects elsewhere. Development centres are projected for Chile, Honduras and the Philippines in the field of low-cost housing, and for Colombia and Yugoslavia in the furniture sector. These centralized facilities are expected eventually to embrace ancillary activities such as machinery maintenance and repair, training and marketing, which are indispensable to the sound development of a viable wood processing industry.

261. The feasibility study for the establishment of a vertically integrated wood processing complex in Cyprus, completed towards the end of 1971, is an excellent example of a turn-key project. Similar steps towards integration on a lesser scale are being made in other countries, and negotiations continue with regard to the co-operative programme between Czechoslovakia, Pakistan and the Sudan for the sectoral development of the wood industry in the Sudan.



25. The leather and leather products industries offer excellent development opportunities to countries with ample domestic supplies of hides and skins and abundant labour. Furthermore, as was remarked at the fifth session of the Industrial Development Board (ID/B/80/Add.1, para.11), the leather industry, by reason of its intrinsic nature, modest size and economic importance, is a suitable area for the application of the concept of pilot and demonstration plants. While processing difficulties are no longer insuperable, certain obstacles remain with regard to regional or national integration and marketing, and the direct assistance of UNIDO experts has been, and continues to be, requested with regard to the operation of new and existing tanneries and factories producing shoes and leather goods.

263. As in the other light industry sectors, increasing importance is being given to sectoral studies such as the study relating to the footwear industry in Brazil and a similar comprehensive study planned for Ethiopia. Both studies include the marketing aspects and export potential, which are being investigated with a view to establishing viable export leather and footwear industries. All the surveys, except one, that were listed in the document presented to the fifth session of the Industrial Development Board (ID/B/80/Add.1, para.224) have been successfully followed up, and it is expected that other countries will request similar technical assistance. As a direct follow-up of the feasibility study for a new tannery in Uganda, a request was received for technical assistance in establishing the tannery, and the project is expected to start early next year.

264. The applied research and experimental centre for the leather and leather goods industry in Mongolia is already an operational project, and the supplementary UNDP/SF project for an experimental plant for the utilization of scrap leather in Mongolia has been approved. UNIDO continues to provide assistance as an associated agency to the FAO executed UNDP/SF project in Turkey for a central research and training institute for hides, skins and leather. Of the six prospective UNDP/SF projects mentioned in last year's work programme, three have now been formally approved: the establishment of a centre for leather training, development and promotion in Fiji, where pre-project activities have already begun; the establishment of a leather goods development and demonstration centre in Madras, India; and a pilot demonstration project for the manufacture of leather footwear and leather products in the People's Democratic Republic of Yemen. It is envisaged that the number of requests for long-term technical assistance will continue to increase as industrialization expands in the developing countries. This development will be paralleled by a similar increase in the number of short-term expert assistance projects.

265. In the printing and graphics industry sector there is a growing awareness of the need to produce or adapt modern printing processes as a means of combating illiteracy and reducing the costs of textbooks. It also is being realized that the introduction of manufactured products on the markets of the developed countries requires high-quality packaging if they are to make an impact. Consequently, UNIDO directs its assistance towards expertise for existing plants and the preparation of studies for new plants, as well as towards the establishment of development centres for the graphics industry to complement the technical assistance component. Two projects are under way in Egypt to advise on the establishment of a modern offset printing house and on the practice of tin lithography and varnishing as applied to the packaging industry. Six other similar projects are awaiting approval.

266. In the rubber products sector, the services of a second expert have been requested by the Government of Thailand to broaden the scope of the assistance to the rubber goods industry there. In Rwanda, a UNIDO expert completed a feasibility study for the establishment of a factory for the reconditioning of rubber tires; the study was presented to the Third African Meeting to Promote Specific Industrial Projects, held in Abidjan, Ivory Coast, in 1971. With increased car ownership and mechanization in the developing countries, it can safely be asserted that requests for assistance in this field will increase.

Value of approved field projects and forecast of requirements, 1971 to 1973  
(in thousands of US dollars)

Source of funds	1971 estimated expenditure	1972			1973		
		Approved projects	Requirements for new projects	Total	Approved projects	Requirements for new projects	Total
UNDP/SF	269.9	1,994.3	3,835.9	5,830.2	1,345.9	5,995.0	7,340.9
UNDP/TA	225.8		(880.5) <sup>a/</sup>			(3,150.0) <sup>a/</sup>	
RP	241.6	206.6	-	206.6	230.0	-	230.0
SIS	858.6	910.1	950.0	1,860.1	-	2,200.0	2,200.0
GTF	13.4	20.0	30.0	50.0	-	60.0	60.0
FIT	<u>35.0</u>	-	<u>33.0</u>	<u>33.0</u>	-	<u>33.0</u>	<u>33.0</u>
Total	1,644.3	3,131.0	4,848.9	7,979.9	1,575.9	8,288.0	9,863.9

Note: UNDP/TA and UNDP/SF are to be merged, effective 1 January 1972.

<sup>a/</sup> Annual estimated costs of projects included in the UNDP Country Programmes or projects officially submitted to UNDP for approval.

**List of Approved Projects and Projects  
under Active Consideration**

Projects over US\$100,000

Projects under US\$100,000

Textile industry

UAR-62 (SF) - Textile quality control centre,  
Alexandria  
BRA-70/900 (SIS) - Reorientation of textile  
industry  
IND-116 (IPF)\* - Assistance to the jute indus-  
tries research association  
INS-31 (SF) - Textile industry rehabilitation  
and development centre, Bandung  
MON-8 (SF) - Experimental and demonstration  
plant for processing goat and camel's hair,  
Ulan Bator  
PHI (IPF)\* - Textile and garment industry  
THA-40 (IPF)\* - Establishment of a textile  
institute

UAR-71/1157  
UAR-70/759  
CAF/06/1/1\*\*  
DAH/06/2/2\*\*  
DAH/06/1/3\*\*  
ETH-71/1  
ETH-70/705  
ETH/06/2/1\*\*  
IVC-71/1292  
KEN/06/2/1\*\*  
MOR-71/1364  
SUD-71/1509

SUD-70/1017  
SUD/69/1\*\*  
AFR-68/564  
BRA-70/1018  
CHI-68/337  
DOM-69/496  
ECU-68/302  
JAM-71/1449  
CEY/70/10  
INS/06/1/3\*\*  
KMR/06/2/1\*\*  
NEP-70/1063

PHI-71/1135  
THA-71/1252  
THA-71/1440  
CYP/06/2/1  
HUN/69/2\*\*  
HUN/69/3\*\*  
ISR-70/363  
POL/70/5\*\*  
ROM/70/5\*\*  
YUG-71/1407  
YUG-70/1110

(7 projects)

(35 projects)

Food industry

MOR-33 (SF) - Feasibility study for a fish  
protein concentrate plant  
NIR (IPF)\* - Integrated soyabean processing  
NIR (IPF)\* - Production of protein-enriched  
cassava food  
CUB-9 (IPF)\* - Assistance in establishment  
of centre for industrialization of sugar  
cane bagasse  
CUB-10 (IPF)\* - Assistance in establishment  
of centre for industrial fermentation

ALG-67/85  
ALG/06/2/2\*\*  
ALG-70/884  
UAR-71/1299  
UAR/69/1\*\*  
UAR/70/23\*\*  
UAR-70/749  
BDI/06/1/1\*\*  
CON(B)-70/855  
CON(K)/06/1/1\*\*  
CON(K)/06/2/1\*\*  
CMR/06/2/1\*\*  
CHD-69/676  
CHD-71/1241  
CHD-69/674  
CHD/06/2/2\*\*  
DAH-69/665  
ETH-71/1245  
ETH-69/694  
ETH-70/993  
GUI-67/186  
GUI-70/1088  
GUI-VC/6/9  
KEN/06/2/1\*\*  
MAG/06/1/3\*\*  
MAG/06/2/4\*\*

MAG-70/1064  
MAG-67/154  
MAG-70/843  
MLI/06/1/3\*\*  
MOR-71/1458  
NER-71/1411  
NER-71/1412  
NIR-70/1129  
NIR-71/1242  
RWA-69/571  
RWA-69/567  
RWA-68/328  
RWA-69/569  
RWA/06/2/1\*\*  
SEN/06/1/3\*\*  
SEN/06/1/2\*\*  
SUD-71/1357  
SUD-71/1358  
SUD/06/1/1\*\*  
SUD/06/1/5  
SUD/69/5  
SUD-68/377  
SWA-71/1430  
TAN-70/944  
TAN-70/1016  
TAN/06/2/1\*\*

TOG-67/166  
TOG-69/682  
TOG-70/822  
TOG/06/1/3\*\*  
TOG/06/2/1\*\*  
TOG-70/967  
TUN/06/1/3  
TUN/06/2/1\*\*  
UPV/06/1/1  
AFR-71/1249  
ARG/06/1/1\*\*  
ARG/06/2/2\*\*  
ARG/71/13  
BOL-71/1450  
BRA-71/1465  
COS/06/1/2\*\*  
CUB-71/1336  
CUB/06/2/3\*\*  
DOM-69/620  
GUY-68/355  
GUY/06/2/2\*\*  
HAI-71/1185  
JAM/06/1/3  
MEX/06/1/1\*\*  
PAR/06/1/2\*\*  
PAR-69-019/70

\* Projects not yet approved but included in the Country Programmes and projects officially requested.

\*\* Fellowship posts.

Projects over US\$100,000

Projects under US\$100,000

Food industry (cont'd)

TRI-69/584	THA/06/2/1**	ROM-70/1001
AFG-71/1335	THA-71/1235	ROM-70/998
CEY-69/662	THA/70/24**	ROM/70/18**
CEY-68/435	AFE/06/1/4	ROM/70/21**
CEY-71/1254	AFE/06/2/3	ROM-70/999
IND/70/46**	BUL/06/2/2**	SYR-69/579
IND/06/2/2**	BUL/06/1/1**	YUG-70/848
IRA/68/28	CYP-70/1029	YUG-14 (FAO executing)
LAO/71/7	IRQ-71/1213	INT/70/11
MON/69/2	ISR-70/914	INT-VC/6/10
NEP-70/910	LEB/70/9	INT/06/1/11
PAK/70/55**	LEB-71/1360	
PHI-71/1166	MAT/06/2/1	
SIN-69/609		

(5 projects)

(116 projects)

Wood processing industry

COL (IPF)* - Assistance to wood processing industry	ALG-69/559	SOM-70/1013	PAK/69/9
	ALG/69/11	TAN/06/1/1**	PHI-70/818
PHI (IPF)* - Wood and furniture industry	UAR-70/857	AFR/06/2/3	SIN/06/1/3
	UAR-70/867	AFR/06/1/3	SIN/70/8
	BDI-68/413	DOM/06/1/1**	SIN/06/2/2**
	CAF/06/2/1**	PAR/06/2/1**	CYP-70/722
	CHD/06/1/1	PAR-69/494	IRQ-71/1380
	ETH/06/2/2**	CEY/06/2/2**	ISR-70/969
	GUI/06/2/2**	INS-70/813	YUG-70/845
	MAC-70/966	LAO-69/614	YUG-10 (FAO executing)
	MAR-70/1116	MAL-69/503	YUG-71/1512
	SEN-65/685	MAL-69/504	INT/70/9

(2 projects)

(36 projects)

Leather and leather products industry

JAM-9016-70 (FIT) - Footwear production	UAR/06/1/2**	ARG-69/474	FIJ-69/532
URU (IPF)* - Establishment of a quality control department for leather and leather products	UAR-70/819	BRA/06/1/2**	IND/70/33
	ETH-71/1315	BRA/06/2/1**	IND/06/2/2**
FIJ-6 (SF) - Centre for leather training development and promotion	MAU-70/702	BRA-70/789	IND-68/288
	SUD-68/262	COS-70/886	MON/68/8
IND-113 (IPF)* - Leather goods development and demonstration centre	TUN-70/747	URU-71/1176	MON-9027-71
	TUN/71/8	URU-70/882	PAK/06/2/6**
MON-6 (SF) - Applied research and experimental centre for leather and leather goods industry, Ulan Bator	UGA-71/1270	URU/06/1/2	PAK-70/1019
	UGA/06/1/1**	URU-12	PAK-70/1020
	AFR/69/25	AFG-71/1384	POL/71/8**
	ARG/06/1/2**	CEY-71/1326	

\* Projects not yet approved but included in the Country Programmes and projects officially requested.

\*\* Fellowship posts.

Projects over US\$100,000

Projects under US\$100,000

Leather and leather products industry (cont'd)

MON-9 (IPF)\* - Experimental and demonstration plant for the utilization of scrap leather

PHI (IPF)\* - Shoe and leather industry

TUR-30 (SF) - Leather footwear industry and leather goods (executing agency: FAO)

SOY-14 (IPF)\* - Establishment of pilot demonstration training project for manufacture of shoes and other leather products

(9 projects)

(32 projects)

Printing and graphics industry

UAR/69/12

UAR-71/1475

ISR-69/508

(3 projects)

Rubber and rubber products industry

RWA-69/568

(1 project)

Multisectoral

ROM-70/1073 (SIS) - Flood emergency replacement of industrial equipment

MLI/06/1/1\*\*

URU/06/2/1\*\*

THA-71/1149

(1 project)

(3 projects)

\* Projects not yet approved but included in the Country Programmes and projects officially requested.

\*\* Fellowship posts.

## SUPPORTING AND OTHER ACTIVITIES

267. The supporting and other activities of Group 6 are classified under the following projects:

Textile industry	6.01
Food industry	6.02
Wood processing industry	6.03
Leather and leather products industry	6.04
Printing and graphics industry	6.05

### Textile industry (6.01)

268. In its supporting programme related to the textile industry, UNIDO continues to place emphasis on activities that are of immediate and practical value. Thus, documentation has been prepared on the selection of equipment in the dyeing and finishing industry and on quality control in the textile industry. UNIDO continues to promote close co-operation with other international organizations active in the textile industry sector such as the International Wool Secretariat (IWS) and the International Institute for Cotton (IIC).

269. Following the Expert Group Meeting on Quality Control in the Textile Industry (6.01.01), held in 1970, four papers specifically recommended by the Group were commissioned and have since been completed. The studies, as well as the report of the Meeting, are to be incorporated in a composite document which is scheduled for publication in 1972.

270. The study on the Selection of equipment in the textile dyeing and finishing industry (6.01.02) was completed in 1971 and is scheduled for publication in 1972. The meeting on machinery selection in the knitting industry (Priority B), originally scheduled for 1971 (ID/B/80/Add.1, para.232), could not be held owing to lack of resources.

271. The second Interregional workshop on textile industries (6.01.03), originally scheduled for 1971, will not be held as previously explained (cf. ID/B/80/Add.1, para.233). It has been decided to concentrate on specific problems facing the textile industry (cf. 6.01.04 and 6.01.06).

272. Preparations are in progress for the expert group meeting on New techniques of yarn and fabric production (6.01.04),<sup>5/</sup> which received the support of several delegations at the fifth session of the Industrial Development Board (A/8416, para.105). The meeting will be held in collaboration with the International Institute for Cotton in Manchester, United Kingdom, in June 1972. It will be attended by consultants and experts in technology, economics, marketing and finance, from both industrialized and developing countries, as well as by manufacturers of spinning machinery. It is anticipated that during this meeting contacts between potential investors from developed countries and entrepreneurs from developing countries will lead to investments. The report is scheduled for publication in 1973.

<sup>5/</sup> This project component was previously entitled "New yarn production and modification techniques" (ID/B/80/Add.1, para.234).

2. In 1971, a Textile Seminar (4.01.05), sponsored by UNIDO, was held to discuss the situation of the textile industry in the Arab countries. A number of projects were initiated and UNIDO provided financial support in addition to technical assistance. UNIDO also sponsored the establishment of a textile institute in Cairo, and UNIDO has received a formal official request from the Government of Egypt for assistance in this matter.

3. Recent techno-economic surveys of the textile industry conducted by UNIDO in the developing countries have shown that by systematic analysis it should be possible to draw generally valid technical and economic conclusions. These data, together with material gathered during textile management clinics and the experience gained during the UNIDO in-plant textile training course in Lodz,<sup>6/</sup> could provide an initial basis for a study that would concentrate on such factors as economies of scale, management policies, export promotion and training programmes. Hence, it is proposed to prepare, in the course of 1973, in consultation with the appropriate groups of activities within UNIDO, a study on the Restructuring of the textile industry in developing countries (6.01.06). Co-operation with other international organizations dealing with the textile industry would be sought through the appropriate channels and the interest of other United Nations agencies would be determined.

#### **Food industry (6.02)**

275. Most activities in the food industry sector are directed towards the reorganization, expansion and modernization of fruit and vegetable processing, sugar production, meat and fish processing, rice and cassava processing and the cereal milling industry. A further feature of the activities in this sector is assistance given to the planning of agro-industrial complexes. UNIDO is also giving assistance in the fields of oils and fats, while close contact and co-operation is maintained with other United Nations organizations, such as FAO, in keeping with the thoughts expressed by some delegations to the fifth session of the Industrial Development Board (A/3416, para.107).

276. Considering the preamble of the ECOSOC resolution 1640 (LI) on edible protein, particularly paragraphs 3, 5 and 6, UNIDO has increased its efforts to assist the developing countries by incorporating into the 1973 work programme a number of projects dedicated to industrial production of proteins and protein-enriched foods and feedstuffs. UNIDO has continued to pursue its pioneering efforts particularly in the field of fish-protein concentrate production, in the industrialization of protein-enriched cassava staple products (*gari* in Nigeria, *manioc* in Brazil), production of different protein-rich oil cakes and protein-enriched animal feedstuffs from vegetable oil bearing materials, and in the production of protein-rich rice bran through up-to-date industrialization of rice. UNIDO has also assisted in the exploration of using coconut protein by the introduction of up-to-date direct processing of the coconuts (wet coconut) and of industrially producing fodder yeast (Brazil, Libyan Arab Republic) and spirulina protein (Mexico). In addition, a great number of action-oriented projects have been carried out dealing with the use of soy protein for human consumption (Nigeria, Romania and Thailand) and the industrial production of protein-enriched bagasse (Cuba) for animal feedstuffs.

<sup>6/</sup> These activities are included in the operational activities of Groups 10 (Industrial Management and Consulting Services) and 16 (Industrial Training).

277. The report and proceedings of the joint UNIDO/FAO Expert Group Meeting on the Production of High-Protein Concentrate (6.01.01), held in 1969, were published in 1971. The UNDP/SF project, through which UNIDO is assisting the Government of Morocco in developing a fish-protein concentrate plant, became operational in March 1971. Further in 1971, UNIDO published the report together with a digest of technical papers, of the 1965 Seminar on Integrated Food Processing (cf. ID/B/43, paras.195, 196).

278. In view of the increasing importance of selecting food processing systems and equipment suited to conditions prevailing in the developing countries, it is proposed to reschedule for 1973 a seminar on the Selection of food processing equipment (6.02.03), which had to be cancelled previously, owing to difficulties in securing host facilities (ID/B/80/Add.1, para.239). This seminar would be carried out in co-operation with Group 7 (Industrial Administration). In addition, the co-operation of other international organizations, for example the International Organization for Standardization (ISO), would be sought and negotiations would be held with certain developed countries to secure financial support. The meeting would consider the establishment of a permanent secretariat for the food processing industry in order to promote the standardization of systems and equipment in the industry.

279. Owing to the interest of several developing countries in cassava industrialization and protein-enriched foods, it is proposed to reschedule for 1973 the expert group meeting on cassava processing, which had to be cancelled owing to the lack of resources (ID/B/80/Add.1, para.240). The meeting would be retitled regional seminar for Latin America on Processing of cassava (tapioca/manioca) for export markets and for domestic consumption (6.02.04). The co-operation of FAO would be sought for this seminar and the participants would investigate possible export promotion and the establishment of new enterprises in co-operation with foreign investors. In addition to considering the technological and marketing aspects involved, the seminar would make recommendations to strengthen UNIDO operational activities in this area.

280. The expert group meeting on Pre-investment considerations and technical and economic production criteria in the oil-seed processing industry (6.02.05),<sup>V</sup> as approved by the Industrial Development Board at its fifth session, will be held in October 1972 (ID/B/80/Add.1, para.241). Background papers for the meeting were prepared in 1971 and the co-operation of ECAFE was secured for the meeting. The expert group will discuss technical and economic aspects of investment and production criteria as well as the optimum utilization of oil-seed raw materials. The group is expected to make recommendations as to the most suitable industrial processes for the production of edible and technical vegetable oils, especially for protein food and feed products. At the meeting, particular attention will be given to the fact that the establishment of local processing industries to satisfy domestic and foreign requirements is a more rational production and investment goal than the mere export of oil-seed raw materials. Observers will be invited from all branches of the industry and allied sectors, such as importers, exporters, equipment manufacturers and financiers; participants from the developing countries will be given an opportunity to discuss and evaluate specific aspects of the oil-seed processing industry and its development. UNIDO's Industrial Programming and Planning Division will collaborate in the meeting, and the co-operation of other United Nations organizations is being sought through appropriate channels. The report of the expert group meeting is scheduled for publication in 1973.

<sup>V</sup> This component was previously listed under the title "Technical and economic criteria in the oil-seed processing industry" (ID/B/80/Add.1, para.241).



281. The joint UNIDO/FAO/ECAFE Interregional Seminar on the Industrial Processing of Rice (6.02.06) was held in co-operation with the Government of India in Madras in 1971. The Seminar, which was attended by some 200 persons directly engaged in the production, processing of rice on a private or governmental level, stimulated particular interest in the semi-industrialization of rice. Work in this sector is of particular importance in view of the world-wide problem of efficiency. In addition to the exchange of technical and economic information, the Seminar laid down broad guidelines for future development of industrial rice processing in developing countries. Local and foreign machinery manufacturers were provided with a unique opportunity to discuss matters concerning the import and export of their respective machinery and industrial promotion in general. The Seminar also enabled participants and observers to make personal contacts with consultants specializing in the modernization of the rice processing industry. International organizations, in particular UNIDO, were encouraged to facilitate the transfer of new technologies by determining a code of uniform minimum specification factors and safety requirements. The need for co-ordinated research, development and training programmes was also emphasized, and the international organizations were encouraged to offer financial support to permit the completion of pre-investment planning and feasibility studies before modern rice processing plants were established in developing countries. The guidelines relating to the re-organization, modernization and expansion of the traditional rice processing industries in the developing countries will be incorporated in the report and proceedings, scheduled for publication in 1972. The participants of the Seminar felt that there was a continuing need for such international meetings and recommended that smaller specialized meetings for rice processing engineers and economists be held to consider specific problem areas in depth.

282. In the Food industry series (6.02.07), work was completed on the paper on wood as a packaging material, which is scheduled for publication early in 1972. It is hoped that the study will elicit the developing countries' interest in wood as a suitable packaging material for the newly expanding industries and export markets. The projected studies on cassava and meat processing, started in 1970 and 1971 respectively (ID/B/80/Add.1, para.243), had to be cancelled owing to the lack of suitable material. It was decided, however, to enlarge the original study on vegetable oil processing to a composite document on oil-seed processing. The composite document will be based on the findings of the 1972 expert group meeting on the oil-seed processing industry (6.02.05) and on the work of four consultants hired for that meeting. The final study is scheduled for publication in 1973. At a later date, and subject to the availability of a qualified expert, it is proposed to start work on a study on soluble coffee and tea.

283. The Expert Group Meeting on Processing Selected Tropical Fruits and Vegetables for Export to Premium Markets (6.02.08) was held in Salvador (Bahia), Brazil, in 1971 in close co-operation with the State Government of Bahia. ECLA, FAO, UNCTAD, the Institut Francais de Recherches Fruitières Outre-Mer (IFAC), Paris, the Tropical Products Institute, London, and the Tropical Centre of Food Research and Technology, Campinas, Brazil, also co-operated in the Meeting, which was attended by representatives of financial and industrial organizations, as well as by equipment manufacturers, potential investors, representatives from import organizations, fruit and vegetable processors and consultant engineers. Various regional organizations expressed interest in repeating the Meeting and in relating it to the problems hampering the development of the

fruit and vegetable processing industry in this region. Particular emphasis was laid on investment and export promotion; specific industrial projects were analyzed and in-plant training programmes discussed. Negotiations with potential investors are being held. The report and the proceedings of the Meeting are scheduled for publication in 1974.

284. In 1972, UNIDO plans to start with a preliminary survey and a preparation of background documentation on the Prospects for industrial meat processing in developing countries (6.02.10) (ID/W/4/Ann.1, para.27). In view of the current decline of the meat processing industry in some developing countries, UNIDO proposes to review past technical assistance and to examine the feasibility of more recent processes for use in tropical countries.

285. In view of the interest shown in this subject, UNIDO proposes to hold in 1973 a symposium that would deal solely with certain specific processing problems facing the African cattle-hold countries. The countries concerned would be invited to submit individual projects for an analysis of the technological, economic and marketing issues involved. Potential investors and importers of semi-processed meat products would also be invited. It is hoped to hold the symposium in co-operation with ECA and OCAM, and the active participation of FAC and UNCTAD would be sought through the appropriate channels. It is felt that the findings of this symposium would be applicable, to a certain degree, to some of the Latin American countries and could prove to be of interest to a number of countries importing, or planning to import, meat from Africa.

286. In 1973, UNIDO proposes to hold a seminar on the Modernization and diversification of the cane-sugar industry in developing countries (6.02.11), in close co-operation with regional and international organizations and certain internationally acknowledged sugar industry institutes. Specifically oriented towards Latin America, the seminar would seek to identify practical solutions, promote the reorganization and modernization of the industry as well as the transfer of more efficient technology and the increased utilization of sugar by-products for the production of alcoholic beverages, animal feedstuffs, particle boards etc., which would represent increased revenue for the developing countries.

287. As another new activity in 1973, UNIDO proposes to hold, in co-operation with ECAFE and the Administrative Committee on Co-ordination (ACC), a symposium on Engineering aspects of up-to-date coconut processing (6.02.12). The participation of FAO would be sought through the appropriate channels. The symposium would concentrate on the evaluation of certain technical and engineering aspects of coconut processing and the transfer of engineering know-how, leading to the elaboration of guidelines for the application of appropriate processing technology. Activities of this nature are planned by UNIDO as its contribution towards easing the protein deficiency.

288. Subject to availability of funds, UNIDO proposes to hold in 1973 an expert group meeting on Milling of African cereals, particularly small millet grains (6.02.13; Priority B). The meeting would be directed towards the establishment of economically viable milling installations and the formulation of a long-term programme of action in this area. The co-operation of FAO would be sought through the appropriate channels, and an attempt would be made to enlist the co-operation of institutions and firms from the private and public sectors in both developed and developing countries.

### Wood processing industry (6.03)

9. In this sector, UNIDO is providing assistance in the establishment and expansion of industries engaged in the manufacture of furniture, modular components for prefabricated houses, joinery, matches, and particle boards from bayside and other agricultural wastes. Assistance in this sector is also being given in the preparation of feasibility studies, selection of machinery, evaluation of tenders, production methods, production planning, quality control and marketing.

10. The report of the 1969 Study Group on Production Techniques for the Use of Wood in Housing under Conditions Prevailing in Developing Countries (6.03.01) was published in 1971.

11. The report of the 1970 Expert Group Meeting on the Production of Panels from Agricultural Residues (6.03.02), originally scheduled for publication in 1971, will be published early in 1972.

12. In 1971 UNIDO held as planned (ID/B/80/Add.1, para.250), in collaboration with the Government of Finland, a Seminar on Furniture and Other Secondary Wood Processing Industries (6.03.03). At the Seminar, participants from all over the world were given an excellent opportunity to familiarize themselves with modern industrial furniture and joinery production. They also learnt to identify and overcome the major obstacles to the development of the secondary wood processing industry in their own countries. Since Governments nominated three times as many candidates as could be accommodated, and in view of the positive reaction registered by UNIDO and the Finnish authorities alike, it is proposed to repeat the seminar in 1972 and 1973 on a regional basis, limiting the scope of the seminar to furniture and joinery. The report and proceedings of the 1971 Seminar are scheduled for publication in 1972 and will serve as the main documentation for future seminars, at which factory visits will be increased.

13. In 1972, UNIDO will prepare documentation for a seminar on the Selection of woodworking machinery (6.03.04) (ID/B/80/Add.1, para.251), which, in accordance with the recommendations made by several delegations at the fifth session of the Industrial Development Board (A/8416, para.112), it proposes to convene in 1972. Should there be no UNDP funds available for this purpose in 1972, it is tentatively proposed to hold this meeting in 1973 as an expert group meeting, to be financed from the UNIDO regular budget, during the Hannover Fair. The meeting would be designed to assist the developing countries in the logical development of their wood products industries by discussing available machinery, assessing its suitability for use in developing countries, and establishing guidelines and common terminology to encourage the successful introduction of improved systems into the developing countries for the benefit of both the potential users and the equipment manufacturers. In the preparation and implementation of this meeting, Group 6 would work closely with the Industrial Policies and Programming Division and would secure the technical co-operation of the European Committee of Woodworking Machinery Manufacturers (EUMABOT3). Further, the collaboration with the regional economic commissions, UNESOB and the specialized agencies - especially ECE and ILO - would be sought through the appropriate channels. The report and the proceedings of the seminar are scheduled for publication in 1972.

294. In accordance with the suggestions and recommendations made at the fourth and fifth sessions of the Industrial Development Board (A/8016, para.160 and A/8416, para.112), UNIDO will hold in 1973 a workshop on the Manufacturing of adhesives for the wood processing industries (6.03.05) (ID/B/50/Add.1, para.252). A group of some ten to fifteen wood technologists and chemical engineers specialized in the production of adhesives for the wood processing industry would be invited to Vienna to recommend types of adhesives for manufacture in developing countries and to suggest model schemes for the establishment of factories manufacturing adhesives in developing countries. As was fully recognized at the 1970 Expert Group Meeting on the Production of Panels from Agricultural Residues (6.03.05), the establishment of adhesives industries using local raw materials would greatly assist the development of plywood and particle board industries that have been hampered by their reliance on imports.

295. At the invitation of the Government of Canada, UNIDO participated as co-sponsor in the World Consultation on the Use of Wood in Housing (with special emphasis on the needs of developing countries) (6.03.06), which was held in Canada in 1971. Other co-sponsors were the United Nations Centre for Housing, Building and Planning (UNCHBP), FAO and the International Union of Forestry Research Organizations (IUFRO). The Consultation provided a forum for over 300 participants from 58 countries to discuss mutual problems and to exchange information with the objective of increasing and extending the use of wood in housing, in particular in the developing countries. UNIDO contributed to the Consultation through studies on the production of pre-fabricated wooden houses, one of which was published in 1971, and supplied reports and papers that had been presented at the 1969 Study Group on Production Techniques for the Use of Wood in Housing under Conditions Prevailing in Developing Countries (cf. 6.03.01). As a consequence of the Consultation, several requests for technical assistance in this field have been received, and UNIDO has met with representatives of UNCHBP and FAO to study the implementation of the recommendations addressed to international agencies.

296. UNIDO proposes to hold in 1973 a workshop on Criteria for the choice of production processes in wood processing industries (6.03.07) as a follow-up of the 1972 meeting on the selection of woodworking machinery (cf.6.03.04). Participants at this workshop would study the advantages and limitations of various production processes under conditions prevalent in the developing countries. The findings of the group would be of particular value to UNIDO experts in assisting existing plants, establishing new industries and surveying the status of the wood processing sector.

#### **Leather and leather products industry (6.04)**

297. In this sector, UNIDO is strengthening its programme of technical assistance and encouraging the introduction of modern methods for the industrial production of semi-finished and finished leathers from indigenous and imported hides and skins. Due attention is also being devoted to the manufacture and marketing of well-designed leather footwear and other leather products acceptable to both domestic and foreign markets. Emphasis continues to be placed on quality control of leather and leather products as well as on studies of markets and export possibilities. Co-operation is also being sought with FAO in matters relating to the production of high-quality hides and skins as suggested by the Industrial Development Board at its fifth session (A/8416, para.115).

299. The Seminar on the Development of the leather and leather goods manufacturing industry (6.04.01) was held in Vienna in early 1971. Twenty-five participants from African countries, observers from many European countries and international agencies, and representatives of the leather industries and development organizations discussed the state of the leather industry sector. The active participation of UNCTAD, FAO, IDRC and other international organizations ensured that a diversified approach was maintained, while the contributions made by UNIDO's Industrial Policies and Programming Division on investment opportunities and subcontracting programmes met with great interest. Both the participants from African countries and representatives of commercial firms made full use of the opportunity to establish promising business contacts. Subsequent to the Seminar, UNIDO received several requests for technical assistance in this field. A report of the Seminar was reproduced internally and distributed in 1971, and five of the six studies completed for the Seminar are expected to appear in print in 1972.

300. In 1972, UNIDO will hold, as planned (ID/B/80/Add.1, para.256), a regional seminar for Asia and the Far East on the Development of the footwear manufacturing and the leather goods manufacturing industries (6.04.02). The seminar will be convened in co-operation with the Central Leather Research Institute and the Central Footwear Training Centre, Madras, India. International organizations, financial institutions, equipment producers, importers, exporters and other trade representatives will be invited to participate as observers. The co-operation of ECAFE will be sought through the appropriate channels.

301. In 1972, UNIDO will commission a study on Fur industries and their development (6.04.03) (ID/B/80/Add.1, para.257). The study will include an investigation of the feasibility of utilizing the skins of various indigenous wild and domesticated animals, with a view to creating export industries in the developing countries for semi-finished and ready-made fur products. The study is scheduled for publication in 1973.

302. In 1973, UNIDO proposes to hold a regional workshop for Europe and the Middle East on leather industry development (6.04.04) in co-operation with the International Union of Leather Chemists' Societies and the Austrian Association of Leather Technicians (VOLT) during the Union's bi-annual congress in Vienna in September of that year. The workshop would be designed to assist the developing countries in the rational development of their leather industries by concentrating on technological and economic aspects of development and by establishing effective means of investment promotion for specific industrial projects.

#### **Printing and graphics industry (6.05)**

303. In this field, technical assistance rendered by UNIDO to developing countries has increased as these countries have stepped up their literacy campaigns. A second significant factor is the growing demand for attractive graphical presentation on export packaging of locally manufactured products.

303. UNIDO therefore proposes to complement its technical assistance projects by convening in 1973, subject to availability of funds, an expert group meeting for countries using the Arabic alphabet on the Development of the graphics industry (6.05.01; Priority B). The expert group would discuss the major problems hindering the development of this industry, in particular the lack of modern type-setting equipment for non-Roman alphabets. The group would be expected to recommend to UNIDO a long-term plan of action geared to the needs of the graphic industry in the developing countries as well as means to diffuse new technologies. The meeting would also provide a forum for investment promotion and licensing agreements.

See table overleaf.





<u>Leather and leather products industry</u>											
6.04.01	2	2	-	1.8	-	-	-	-	37.0 TA	-	-
6.04.02	3	5	2	-	3.0	-	-	-	-	45.0 TA	-
6.04.03	-	2	-	-	2.0	-	-	-	-	-	-
6.04.04	-	-	1	-	-	-	-	-	-	-	17.0 TA
<b>Total</b>	<b>37</b>	<b>30</b>	<b>35</b>	<b>25.0</b>	<b>27.8</b>	<b>13.0</b>	<b>15.0</b>	<b>23.9</b>	<b>93.0 TA</b>	<b>95.0 TA</b>	<b>215.0 TA</b>
									<b>8.0 GTP</b>		

<u>Backstopping and servicing of operational activities</u>											
	76	120	145								
	<b>113</b>	<b>150</b>	<b>180</b>								

Project (Priority B)

6.02 Food industry

6.02.13

-	-	-	2	-	-	7.0	-	-	-	-	2.7
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6.05 Printing and graphics industry

6.05.01

-	-	-	1.5	-	-	15.0	-	-	-	-	14.4
-	-	-	3.5	-	-	22.0	-	-	-	-	17.1

**Total**

a/ Operational costs shown above are included in the table on page 92.

Printed publications

<u>1971 publications programme</u>		<u>Languages</u>	<u>Cost</u> <u>(US\$)</u>
ID/10	Production techniques for the use of wood in housing under conditions prevailing in developing countries Report of the study group (6.03.01)	E F S	
ID/48	Integrated food processing in Yugoslavia Report of seminar and digest of technical papers	E F S	
ID/60	Production of fish-protein concentrate Vol.I: Report of the joint UNIDO/FAO expert group meeting (6.02.01) Vol.II: Proceedings of the joint UNIDO/FAO expert group meeting (6.02.01)	E F S E	
ID/61	Production of prefabricated wooden houses (6.03.06)	E S	
			<hr/> 8,121

1972 publications programme

ID/60	Production of fish-protein concentrate Vol.II: Proceedings of the joint UNIDO/FAO expert group meeting (6.02.01)	F S	
ID/61	Production of prefabricated wooden houses (6.03.06)	F	
ID/72	The role of wood as a packaging material in the developing countries (6.02.07)	E F S	
ID/79	Production of panels from agricultural residues Report of the expert group meeting (6.03.02)	E F S	
-	Quality control in the textile industry Report of the expert group meeting (6.01.01)	E	
-	Selection of equipment in the textile dyeing and finishing industry (6.01.02)	E F	
-	Industrial processing of rice Report and proceedings of the seminar (6.02.06)	E F S	
-	Processing selected tropical fruits and vegetables for export to premium markets Report and proceedings of the expert group meeting (6.02.08)	E	
-	Furniture and other secondary wood processing industries in developing countries Report and proceedings of the seminar (6.03.03)	E	

1973 publications programme (cont'd)

	<u>Language</u>	<u>Cost (US\$)</u>
- The problems and prospects for the development of the leather industry in developing countries (6.04.01)	E F	
- Fancy leather goods factory for developing countries (6.04.01)	E F	
- Marketing and export possibilities of leather and leather products manufactured in developing countries (6.04.01)	E F	
- Guideline figures for the leather industry (6.04.01)	E F S	
- Wet blue chrome leather for export (6.04.01)	E F	
		<u>21,300</u>

Forecast of 1973 publications programme

- Quality control in the textile industry Report of the expert group meeting (6.01.01)	F S	
- New techniques of yarn and fabric production Report of the expert group meeting (6.01.04)	E	
- Pre-investment considerations and technical and economic production criteria in the oil-seed processing industry Report and proceedings of the expert group meeting (6.02.05)	E	
- Oil-seed processing (6.02.07)	E	
- Processing selected tropical fruits and vegetables for export to premium markets Report and proceedings of the expert group meeting (6.02.08)	F S	
- Furniture and other secondary wood processing industries in developing countries Report and proceedings of the seminar (6.03.03)	F S	
- Selection of woodworking machinery Report and proceedings of the meeting (6.03.04)	E F S	
- Fur industries and their development in developing countries (6.04.03)	E	
		<u>22,700</u>

Notes: In the computation of the printing costs a standard formula was applied based on an average cost of internal and external printing.



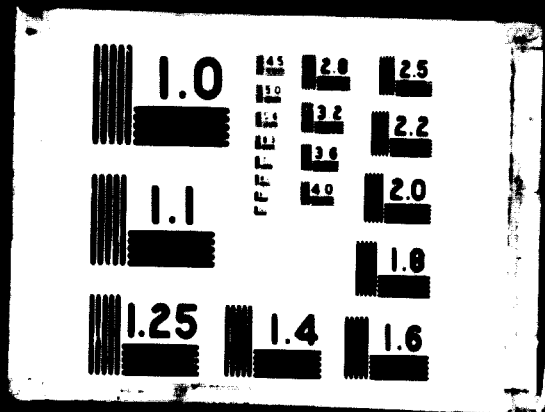
**22.7.74**

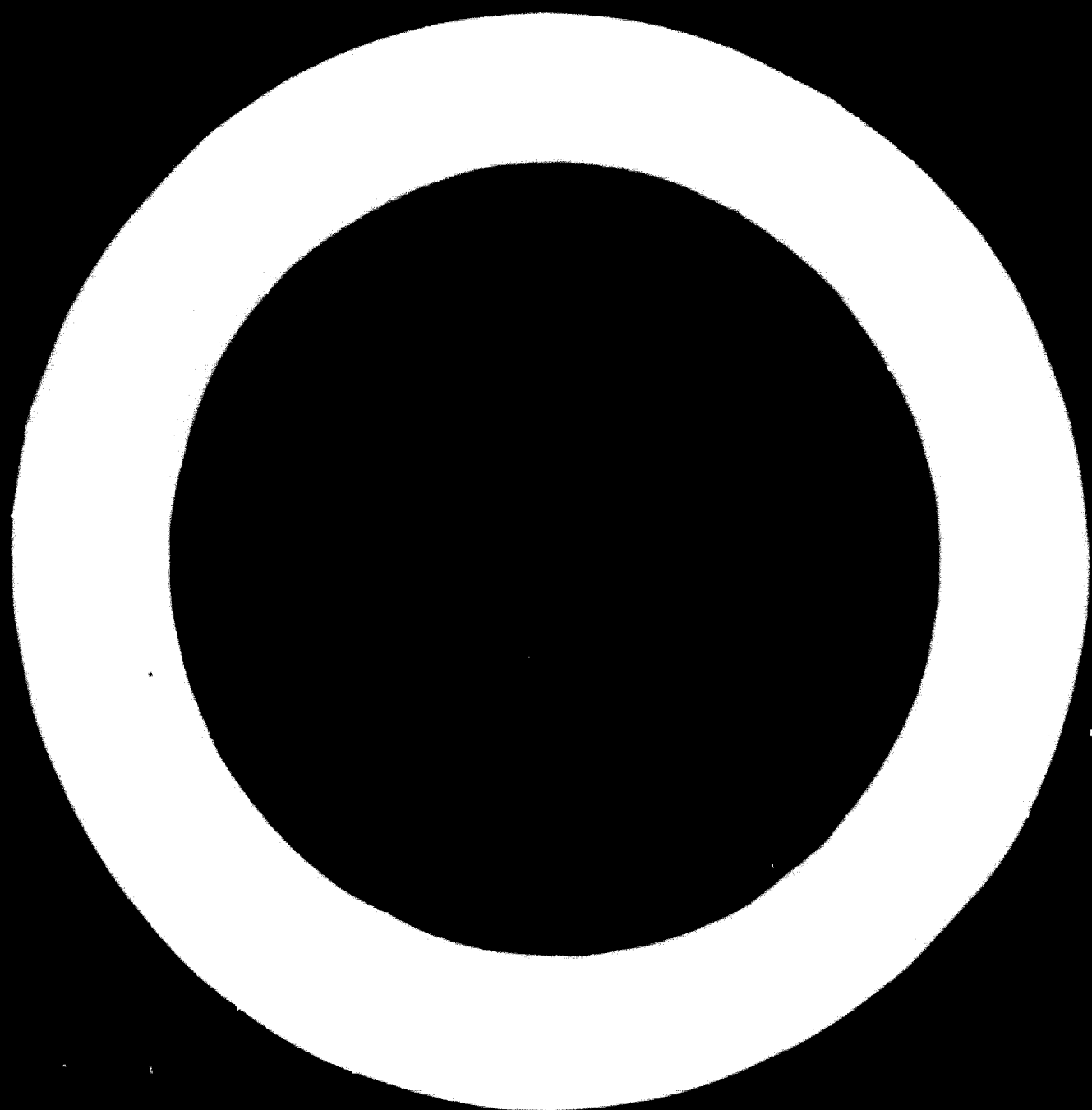
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## GROUP 17: INDUSTRIAL BRANCH REPORTS AND ACROSS-THE-BOARD TECHNIQUES<sup>8/</sup>

### Introduction

304. UNIDO's programme of activities under Group 17 is closely related to, and integrated with, the programmes being carried out by Groups 1 to 6. The branch reports, for example, have a global approach and include information from both developed and developing countries. From 1972 onwards, emphasis will be laid on the elaboration of sectoral (branch) prospects in which the trends and prospects will be outlined for the development of selected industrial branches in the developing countries during the 1970s and in which the problems and issues that are likely to confront the particular branches concerned will be identified. This series will contribute to the formulation of a sectoral development strategy and thus, perhaps, be of some assistance to Governments and industry in the formulation of long-term industrial programmes. Two major industrial branches will be studied each year, and the choice of industrial branches for inclusion in the series will be determined by such factors as the actual or potential importance of the industry to developing countries, the availability of statistical and other data, the nature of the industry and the opportunities it offers for supporting other UNIDO activities.

305. The programme of UNIDO in packaging is also dealt with by Group 17 since packaging is multisectoral and has a bearing on a number of other industrial activities. During the last two years UNIDO has increased considerably its involvement in this area, focusing on the introduction of modern packaging techniques in a selected group of industries, on the improvement of the manufacture of packaging media and on the establishment of national and regional packaging research and promotion centres. The preparation and implementation of these projects are carried out in co-operation with Group 14 (Promotion of Export-oriented Industries) and with the other groups of activities in UNIDO that specialize in particular industrial branches.

306. Within the general areas of environmental planning, management, and control, UNIDO is concerned with the environmental problems created by the process of industrialization since industry itself is one of the primary sources of pollutants and wastes. During the fifth session of the Industrial Development Board, several delegations felt that the programme of UNIDO in the environmental field was too modest (A/8416, para.129). Thus the programme on environmental engineering has been expanded to cover the major environmental problems of direct industrial origin. In this context, UNIDO is concerned with the formulation of appropriate policies; the establishment of guidelines to prevent and resolve environmental conflicts; the establishment of environmental standards and institutions; the development of appropriate technology for the protection and management of the environment; and action programmes of a technical and economic nature as they relate to the preparation and implementation of industrial projects and plans.

<sup>8/</sup> For administrative purposes the number of this group of activities has been changed from 15b to 17; the title, competence and responsibilities of the group remain the same. To avoid confusion, references in the present documentation to specific projects and project components of this group in last year's work programme document (ID/B/20/Ann. A, para. 17.03.02) have been changed in accordance with the new numbering, i.e. 17.03.02.

307. Activities within the area of industrial design are also multifactorial and will be handled in Group 17 since this area also contains a number of other industrial activities. During 1971, UNIDO participated in the General Assembly and World Congress of the International Council of Societies of Industrial Design. Industrialists, government representatives, educators and industrial designers from 20 countries attended the Congress. One of the main agenda items was "Industrial Design in the Low-Income Countries". As a result of UNIDO's participation, contacts were made that might lead to activities on design capabilities in the developing countries.

### OPERATIONAL ACTIVITIES

308. In the field of branch-oriented activities, Group 17 handles projects that are interconnected, involving several industrial branches. The backstopping of such projects is normally done in close collaboration with other groups of activities within the Industrial Technology Division. Through a UNDP/SF project in Algeria, UNIDO is assisting in the establishment of a centre for industrial and technological studies; the centre will prepare branch studies, investigate investment opportunities in different sectors and advise on projects to be carried out under the Algerian national industrial development programme. Studies on machine tools, steel pipes, food processing, cosmetics and plastic production units as well as market studies on twelve different mining products, polyurethane foam and various plastic products are presently being implemented. Phase II of this project is scheduled to start in 1972.

309. UNIDO provided a team of experts to survey the chemical industries of Morocco with a view to formulating recommendations for the improvement of existing plants and investigating new investment opportunities in this sector. UNIDO has received a request from Madagascar for a study of the possibility of building an industrial complex that would utilize available mineral resources and exploit the hydro-electric potential of the Ikopa-Betsiboka basin.

310. The major areas of UNIDO's activities on regards packaging are: modernization of packaging systems; improvement in the production of packaging materials and containers made out of these materials; preparation of feasibility studies for the establishment of national packaging research and promotion centres and assistance in developing such institutions; and survey and development of the packaging industry. In 1971, UNIDO carried out a number of projects in the field of packaging, and several major projects are in the pipeline.

311. In the field of product improvement and process control UNIDO is co-operating with IAEA, the executing agency in a technical assistance project in Argentina.

312. Technical assistance projects related to human environment have been carried out by various groups of activities, particularly the groups that deal with specific industries causing pollution or that are developing technical measures to solve pollution problems. In keeping with the approaches that have been developed during the preparations for the United Nations Conference on the Human Environment, more co-ordinated efforts are planned during 1972 and 1973, and these efforts are expected to lead to projects on a broader basis.



313. UNIDO has implemented projects in the following developing countries: studies on the location of air and water pollution (Poland and Thailand); development of standards for the location of particular industries within certain regions, as well as the study of the concentration of polluting industries within these regions (Saurashtra); development of suitable processes and technologies for pollution abatement and the recovery of valuable materials from wastes and pollutants (Yugoslavia); and the provision of technical assistance in environmental engineering (Colombia).

314. During 1972 and 1973, it is expected that, as a follow-up of the Seminar on Air and Water Pollution in the Iron and Steel Industries, held in Leningrad by OCE with the participation of a group from the developing countries (organized by UNIDO), several requests will be submitted for assistance in abating air and water pollution in the metallurgical industries.

Value of approved field projects and forecast of requirements, 1971 to 1973  
(in thousands of US dollars)

Source of funds	1971 estimated expenditure	1972			1973		
		Approved projects	Requirements for new projects	Total	Approved projects	Requirements for new projects	Total
UNDP/SF	157.4	} 399.4	86.6	486.0	30.0	1,716.0	1,746.0
UNDP/TA	-		(80.0) <sup>a/</sup>			(1,100.0) <sup>a/</sup>	
RP	12.0	5.8	-	5.8	10.0	-	10.0
SIS	71.2	74.2	70.0	144.2	-	200.0	200.0
GTF	-	-	3.0	3.0	-	4.0	4.0
FIT	-	-	3.0	3.0	-	3.0	3.0
Total	240.6	479.4	162.6	642.0	40.0	1,923.0	1,963.0

Note: UNDP/TA and UNDP/SF are to be merged, effective 1 January 1972.

<sup>a/</sup> Annual estimated costs of projects included in the UNDP Country Programmes or projects officially submitted to UNDP for approval.

**List of Approved Projects and Projects  
under Active Consideration**

Projects over US\$100,000

Projects under US\$100,000

Industrial branch reports

ALG-18 (SF) - Centre for industrial and tech- IRA/15/2/5\*\*  
nological studies

ALG (IPF)\* - Continuation of the centres activ-  
ities under Country Programmes

(2 projects)

(1 project)

Packaging

BUL (IPF)\* - Research institute of  
packaging, Nicra

UAR-71/1301

MOR-71/1437

TUN-70/1041

ARG-71/1215

PAN-71/1391

URU-71/1214

LAT-71/1237

HOK-70/734

IND-71/1327

PAK/15/1/6\*\*

PHI-71/1236

SIN-70/746

THA-70/990

VIE-71/1328

BUL-70/777

CYP-70/1036

IRQ-70/1059

LEB-70/963

LEB-70/964

ROM-70/1023

SPA-71/1152

INT-70/898

(1 project)

(22 projects)

Environmental engineering

EME/02/1/2\*\*

(1 project)

Product improvement and process control

ARG-37 (IAEA executing)

(1 project)

Multisectoral

UAR (IPF)\* - Pilot project for coding, index-  
ing, filing and reproduction of technical  
documents for preventive maintenance ser-  
vice in integrated industrial plants

(1 project)

\* Projects not yet approved but included in the Country Programmes and projects officially requested.

\*\* Fellowship posts.

### SUPPORTING AND OTHER ACTIVITIES

315. The supporting and other activities of Group 17 are classified under the following projects:

Industrial branch reports	17.01
Perspectives for selected industrial branches in the 1970s	17.02
<b>Across-the-board techniques</b>	
Packaging	17.03
Environmental engineering	17.04
Product improvement through process control techniques	17.05
Industrial design	17.06

316. The programme of industrial branch reports and perspective studies, in which Group 17 is engaged, is an outgrowth of the studies and papers that were prepared as background documentation for the International Symposium on Industrial Development, convened by UNIDO in Athens in 1967. Subsequently, studies on nine different sectors have been published in the series of UNIDO monographs on industrialization of developing countries. It soon became evident, however, that a study of the current state of a particular industry was inadequate and that it was necessary to view the industry in perspective and to forecast its expected development to the extent possible.

317. In addition, the launching of the Second United Nations Development Decade as a concerted effort in international development has underlined the need to take a perspective view of industry and has introduced a new dimension by way of providing a horizon for the assessment of the long-term prospects for the development of different industrial branches in the developing countries. This was explicitly recognized by the Industrial Development Board in its resolution 24 (III), in which UNIDO was requested to develop its contribution to the Second United Nations Development Decade.

318. In accordance with the wish expressed by the Industrial Development Board at its fifth session (A/8416, para.119), UNIDO has been taking steps to amalgamate the industrial branch reports (17.01) with the perspective studies (17.02). To facilitate the reporting on the implementation of the 1971 programme, the two separate project titles have been maintained. The branch reports planned for 1972 and 1973, however, have been incorporated with perspective studies and are described under that heading.

319. In view of the delays and the economic costs involved in preparing manuscripts for formal publication, emphasis in this part of the programme is not being placed on publication per se; studies and reports will be published only when the interest in the industrial branch concerned and the results obtained justify publication. Once studies have been completed, they will be reproduced internally in sufficient numbers for dispatch to interested parties and will also be utilized in other areas of UNIDO's activities.

### Industrial branch reports (17.01)

320. The branch reports were initiated with the objective of assessing the current position of the main industrial branches in the developing countries; the assessment was to serve as one of the bases for a diagnosis of the growth potential of the branches concerned and as a means of devising methods to encourage the growth thus identified. By the end of 1971, four branches had been covered in this series: the report on the Iron and steel industry (17.01.01), which has been circulated to member countries and was originally scheduled for publication in 1971, will be issued in 1972, preparatory to the third interregional symposium on iron and steel (cf.2.03.06); the report on the Non-ferrous metals industry (17.01.02) has been submitted for editing and is scheduled for publication in 1972; the study on the Cement industry (17.01.03) has been edited and is scheduled for publication early in 1972; and the study on the Agricultural machinery industry (17.01.04), which is based largely on the papers submitted to the 1969 UNIDO Expert Group Meeting on the Agricultural Machinery Industry in Developing Countries (1.01.01), will be reproduced internally and circulated to member countries in early 1972.

321. In keeping with the directives of the Industrial Development Board, UNIDO has already begun to merge the branch reports with the perspective studies. Thus, the branch report on Industrial machinery and especially the machine tools industry (formerly 17.01.05) has been combined with the study on the Demand for industrial machinery (formerly 17.02.09); both studies now appear under the heading, "Industrial machinery industry" (17.02.09). The branch report on Inorganic basic chemicals industry (formerly 17.01.06) has been incorporated into the study described under project component number 17.02.03. The branch report on the Leather industry (17.01.07), proposed for 1972 (ID/B/80/Add.1, para.272), will not be carried out owing to lack of resources. It is planned to incorporate the substance of this study with the study proposed for 1973 under project component number 17.02.14.

### Perspectives for selected industrial branches in the 1970s (17.02)

322. Although UNIDO's work on perspective studies is of a continuing nature and cannot be the subject of a full evaluation at this stage, it is possible to make a preliminary assessment of some of the results achieved. Work carried out in connexion with some components of this project has led to close consultations with individual developing countries and with the industrial sector concerned within these countries. These consultations have had beneficial effects on UNIDO's assessment of the real needs of these countries as well as on its technical assistance activities in the area surveyed.

323. As regards perspective studies, previous work in connexion with the study on Petrochemicals (17.02.01) led to the elaboration of country tables summarizing the expected consumption of a range of petrochemical products and the opportunities for domestic production that they presented, together with some estimate of the capital costs involved. These tables were sent to member countries and their petrochemical organizations. After the receipt of replies, the study was finalized and is scheduled for publication in 1972. The study on Textiles (17.02.02), which was published in 1971, was circulated upon request at the annual meeting of the International Federation of Cotton and Allied Textile Industries in 1971.

324. The study on Fertilizers (17.02.03) was submitted in draft form to the Second Interregional Fertilizer Symposium (5.01.05), held in India and the Union of Soviet Socialist Republics in 1971. The UNIDO forecasts of the fertilizer requirements of the developing countries during the Second United Nations Development Decade aroused considerable interest and served as the basis for the World Bank's estimate of the investment requirements for this sector. The study is being revised in the light of discussions at the Symposium and is scheduled for publication in 1972.

325. The study on the Automotive industry (17.02.04) was circulated in draft form to French-speaking countries and as a background document to the joint UNIDO/ECLA Inter-American Development Bank Expert Group Meeting on the Economies of Scale in the Latin American Automotive Industry held in Santiago, Chile, in September 1970. The study was revised in 1971 in the light of comments received and is scheduled for publication in 1972.

326. Substantial progress was made in the preparation and revision of the studies on the Copper industry (17.02.05), the Pharmaceutical industry (17.02.06) and the Tin plate industry (17.02.07). The copper study is being finalized and is scheduled for publication in 1972. A draft of the study on tin plate was submitted to the 1970 joint UNIDO/ECLA Seminar on Tin Plate Production, and the comments at the Seminar are being taken into account in the revision of the study (cf.2.03.04). Both the study on the tin plate industry and the one on the pharmaceutical industry are being finalized for circulation to interested countries to appraise them of expected developments in this sector. The results obtained in the assessment of the Impact of major steel-works projects on the steel industry of developing countries (17.02.08) will be utilized at the forthcoming third interregional iron and steel symposium (cf.2.03.06).

327. In spite of a substantial difference in their orientation, the branch reports (17.01) and perspective studies (17.02) are largely complementary. This was the view expressed by the Industrial Development Board at its fifth session, when it urged the secretariat to merge the two series at an early date. A move in this direction was made in 1971 with the combination of the branch report on "Industrial machinery and especially the machine tools industry" (17.01.05) and the perspective study on the "Demand for industrial machinery" (17.02.09) into one study on the Industrial machinery industry (17.02.09). This study will combine the stock-taking and diagnostic approach of the branch report with the perspective nature of the Second United Nations Development Decade studies. Work was begun on the study in 1971 and a completed first draft is expected by March 1972; after revision it will be published in 1973. The plans to carry out in 1971 (ID/B/80/Add.1, para.275) projections for the Agricultural machinery industry (17.02.10) and a perspective study of the Electrical machinery industry (17.02.11) did not materialize owing to lack of financial and other resources. Accordingly, both projects have been cancelled.

328. In 1972, UNIDO will continue its programme of perspective studies with a study on the Construction industry (17.02.12) that was started in 1971 and that draws upon the studies that have already been prepared on the cement industry and the iron and steel industry. The Industrial Development Board at its fifth session drew attention to the need for further expansion on the construction industry in the work programme of UNIDO, and it was proposed that studies be initiated in this field (A/3416, para.73). Developments in the construction industry have a bearing on a multitude of industrial branches, namely the construction machinery industry and the various industries supplying building materials. Since the construction industry normally absorbs a large share of the total investment in the developing countries, it offers a major market

for a number of domestic manufacturing industries such as plastics, steel, non-ferrous metals and prefabrication. The United Nations Centre for Housing, Building and Planning (UNCHBP) has expressed interest in co-operation in this project, and the ways and means for such co-operation are being discussed.

329. UNIDO also intends to carry out in 1972 a perspective study of the Inorganic basic chemicals industry (17.02.13) that will combine within a single study the two separate studies on the subject originally planned for 1972 (17.01.06 and 17.02.13). The scope of the original perspective study on this industry will be enlarged to include the essential elements of the industrial branch report, for which work had already been undertaken. Among the chemicals to be included in the study are sulphuric acid, caustic soda, soda ash and chlorine, chemicals that are not only indispensable basic materials for the chemical industry itself, but are also of considerable interest for other industrial branches.

330. In 1973, UNIDO proposes to carry out a perspective study of the Leather industry (17.02.14). In accordance with the request made by the Industrial Development Board at its fifth session to the effect that greater use be made of specialized organizations and institutes in the developing countries in implementing these studies (A/8416, para.122), preliminary contacts have been established with the Indian Central Leather Research Institute with a view to enlisting its collaboration in preparing this study. A study on the actual state of the leather industry (17.01.07) in the developing countries was previously planned for 1972 (ID/B/80/Add.1, para.272) but had to be cancelled owing to a lack of resources. The preparatory work carried out by UNIDO in 1971 on the leather branch report will be utilized, however, in the perspective leather study.

331. Also proposed by UNIDO for implementation in 1973 is a perspective study on the Iron and steel industry of the developing countries (17.02.15). This study would serve as a major background document for the third interregional iron and steel symposium, to be held by UNIDO in 1973. It would also be linked to the activities of ECE in this field aimed at forecasting steel consumption and production on a world-wide basis up to 1985. In respect of the developing countries, the study would be carried out along the lines established in consultation with ECE and would draw upon the two studies on the subject already prepared by UNIDO, with their being revised and updated as appropriate. Close collaboration would be established with the regional economic commissions and UNESOB, and it is envisaged that each of them would study the position of this industry within their own region.

#### **Packaging (17.03)**

332. The main objectives of UNIDO with regard to packaging are the adequate protection and identification of manufactured and other products and the stimulation of sales through attractive design and proper packaging. Although packaging is one of the final steps in the production process, it is a vital component of many branches of industry. In most of the developing countries, packaging is in an early stage of development.

333. UNIDO has increased its contacts with the main regional packaging federations as well as with the World Packaging Organization, under the auspices of which an international packaging congress will be held in Barcelona in 1973. UNIDO has been asked to participate in this congress.

334. The main areas of UNIDO's technical assistance in packaging as well as the most efficient ways of generating and implementing projects in this field were discussed at the Expert Group Meeting on Packaging (17.03.01), which was held in Vienna in 1971. Fifteen experts from developing and developed countries as well as from UNCTAD, the Asian Packaging Federation, the Industrial Development Centre for Arab States (IDCAS) and the World Packaging Organization participated in the Meeting. Papers presented to the Expert Group dealt with such problems as the establishment of proper information channels in developing countries; the relation between local production and imports of packaging materials; and methods of improving packaging for export.
335. The Expert Group recommended the preparation of a UNIDO information brochure on packaging for distribution to the developing countries, with a view to stimulating their interest and assisting them in the formulation of requests for technical assistance in this area. The Expert Group also helped to delineate guidelines for the future activities of UNIDO in packaging. Possible forms of training for personnel involved in the production and usage of packaging material were also identified. It is expected that as a result of this Meeting the technical assistance activities in this field will be intensified. The report of the Expert Group Meeting is scheduled for publication in 1972.
336. In keeping with the recommendations of the joint UNIDO/ECLA Seminar on Tin Plate Production in Developing Countries held in 1970 (of. 2.03.04), UNIDO will organize in 1972 a seminar on the Production and use of tin plate containers in the developing countries (17.03.02) (ID/B/80/Add.1, para.281). ECLA has reconfirmed its interest in this seminar as a regional project for Latin America.
337. In view of the interest shown by several developing countries as well as of the favourable comments of the Industrial Development Board at its fifth session (A/8416, para.127), UNIDO plans to hold a series of In-plant training programmes in packaging (17.03.03).<sup>2/</sup> The first such programme, a training course in packaging for export goods for participants from Spanish-speaking countries, scheduled for 1972 in Spain, will concentrate on market requirements, technical facilities and institutional factors (ID/B/80/Add.1, para.282).
338. In 1973, UNIDO proposes to hold the second of these courses for countries in the ECAFE region. The co-operation of ECAFE would be sought through appropriate channels. In addition, the interest would be ascertained of three Asian professional organizations, i.e. the Asian Packaging Federation, the Asian Productivity Organization, and the Federation of Hong Kong Industries. So far, favourable comments on the proposed activity have been received from the Asian Packaging Federation and the Federation of Hong Kong Industries. Other training programmes are planned for the English- and French-speaking developing countries.
339. Several Arab countries have expressed interest in establishing national packaging centres. These centres should ensure a constant flow of information on packaging developments and provide the respective countries with facilities for testing and applied research in this field. The latter, especially, involves high cost investments, which many countries might not be able to

<sup>2/</sup> These programmes are also included in the operational activities of the Industrial Training

affairs. To ensure that the results of the symposium are disseminated, a Regional symposium on the use of plastics in the packaging industry will be held in 1972. The symposium will be held in the form of a series of seminars, one in each of the regional institutes of the United Nations, to be held in 1972.

340. Plastic packaging offers a number of advantages; but with it the expertise necessary to assess the technical and economic considerations involved, in a great variety of plastic materials and their fabrication methods, is more of the right material difficult. There is a need to define the criteria that could be used in developing countries in substituting plastic packaging for conventional packaging materials. Such knowledge would place the developing countries in a better position to submit specific project proposals and to make investment decisions. It is suggested to increase the subject at a seminar on application of plastics, which is being proposed by Group 5 (Fertilizer, Textile and Petrochemical Industries; cf.5.04.11), to be held in London in 1973.

341. The development of the food processing industries is closely connected with the problem of proper packaging. In many developing countries, one of the factors inhibiting the growth of national food processing industries is the necessity to improve the packaging of goods for both domestic and foreign markets. UNIDO therefore proposes to hold in Latin America in 1973 a seminar on Food processing and packaging (17.03.05) to discuss the food processing and packaging industries of the Central American subregions, including the Caribbean countries, their requirements for packaging materials and containers as well as recent advances in food processing and packaging. This seminar would be organized in co-operation with the Central American Institute for Research and Technology (ICAITI), which has already confirmed its support for this meeting.

#### **Environmental engineering (17.04)**

342. During 1971, UNIDO took part as a member of ACC's Ad Hoc Working Group on the Human Environment Conference in the preparations for this Conference, which will take place in Stockholm in 1972. These preparations included consultations on the agenda, the position papers, and the action papers to be submitted to the Conference. In addition, UNIDO is preparing a study on Industrial development and human environment (17.04.01) that will not only be submitted to the Conference as a background paper but will also be circulated to member States. The study will reflect the main aspects of environmental planning, management and control as they relate to the industrialization of the developing countries.

343. UNIDO also participated in the ECE Seminar on Air and Water Pollution in the Iron and Steel Industries, held in Leningrad in 1971. At the request of the individual Governments, UNIDO supported the participation of seven representatives from the developing countries, who formed a special group at the seminar to discuss their specific problems. The representatives have submitted country reports identifying major pollution problems and areas for technical assistance.

344. Consultations are taking place among UNIDO, ECE and Yugoslavia to prepare a similar seminar in 1972 on the control of emissions from the non-ferrous metallurgical industries. Strong interest has been shown in this seminar by many developing countries including Brazil, Chile, Greece, Mexico, Turkey and Zambia.



345. As a result of its participation in the preparatory work for the United Nations Conference on the Human Environment, the anxieties expressed by some of the developing countries concerning the potential higher cost of development owing to international concern over the environment, and recommendations made at the ECAFE Seminar on Development and Environment held in Bangkok in 1971, UNIDO proposes to start in 1972 with the preparations for a workshop on Industrial waste treatment and non-polluting technology (17.04.02) to be held in Bangkok in 1973. At the workshop, discussions would centre on the industrial branches of particular interest to the Asian countries. Such a workshop would be in keeping with the recommendations of the Industrial Development Board at its fifth session (A/8416, para.19), when the need to accord greater priority to environmental problems was stressed by several delegations. Further, in planning the workshop, use has been made of the documents already available from the preparations of the Stockholm Conference. Detailed planning would be carried out after the Conference, giving full consideration to its final recommendations. UNIDO would also seek the co-operation of other United Nations agencies interested in this field, particularly WHO and FAO.

346. As a result of the recommendations of the Stockholm Conference, UNIDO may have additional proposals for environmental projects in 1973. If so, they will be presented to the Industrial Development Board at its seventh session.

#### **Product improvement through process control techniques (17.05)**

347. The role of product improvement through process control techniques cannot be over-emphasized as a factor in increasing industrial efficiency. Isotopes and radiation processing constitute one of the means of improving quality and reliability in industrial production. Although radio-isotope usage and nuclear techniques are by no means unknown in the industrial sector, they are not necessarily treated as another aid available to the industrial engineer. UNIDO completed in 1971 a study on Radio-isotopes and radiation in industrial development (17.05.01), providing a brief review of nuclear techniques that have passed tests of economic and technical viability and have been accepted in industrial practice. Copies of this study have been circulated to developed and developing countries for their information with a view to stimulating interest in this approach to product improvement and process efficiency.

348. Depending upon the interest shown in this area of activity, the project planned for 1972, Consultations on product improvement and process control techniques (17.05.02) (ID/B/30/Add.1, para.286), will be reactivated in 1972.

#### **Industrial design (17.06)**

349. The contacts made by UNIDO during the 1971 World Congress of the International Council of Societies of Industrial Design (ICSID) will be further strengthened during 1972. UNIDO will continue to co-operate with ICSID concerning the organization of a seminar on the problems of industrial design in the developing countries. At present, alternatives for such a seminar are being investigated.

350. The ICSID has under consideration the preparation of a Guidebook on industrial design in the developing countries (17.06.01), and UNIDO has been requested to assist in its preparation. The major activities of UNIDO in this field during 1972 will be strengthening the co-operation with ICSID, identifying specific problems in the developing countries and investigating alternative projects. As a result of the 1972 activities, specific projects may be suggested for implementation in 1973; if so, they will be presented to the Industrial Development Board at its next session.

See table overleaf.

Expenditures and estimated costs for supporting and other activities, 1971 - 1973  
(in m/m and thousands of US dollars)

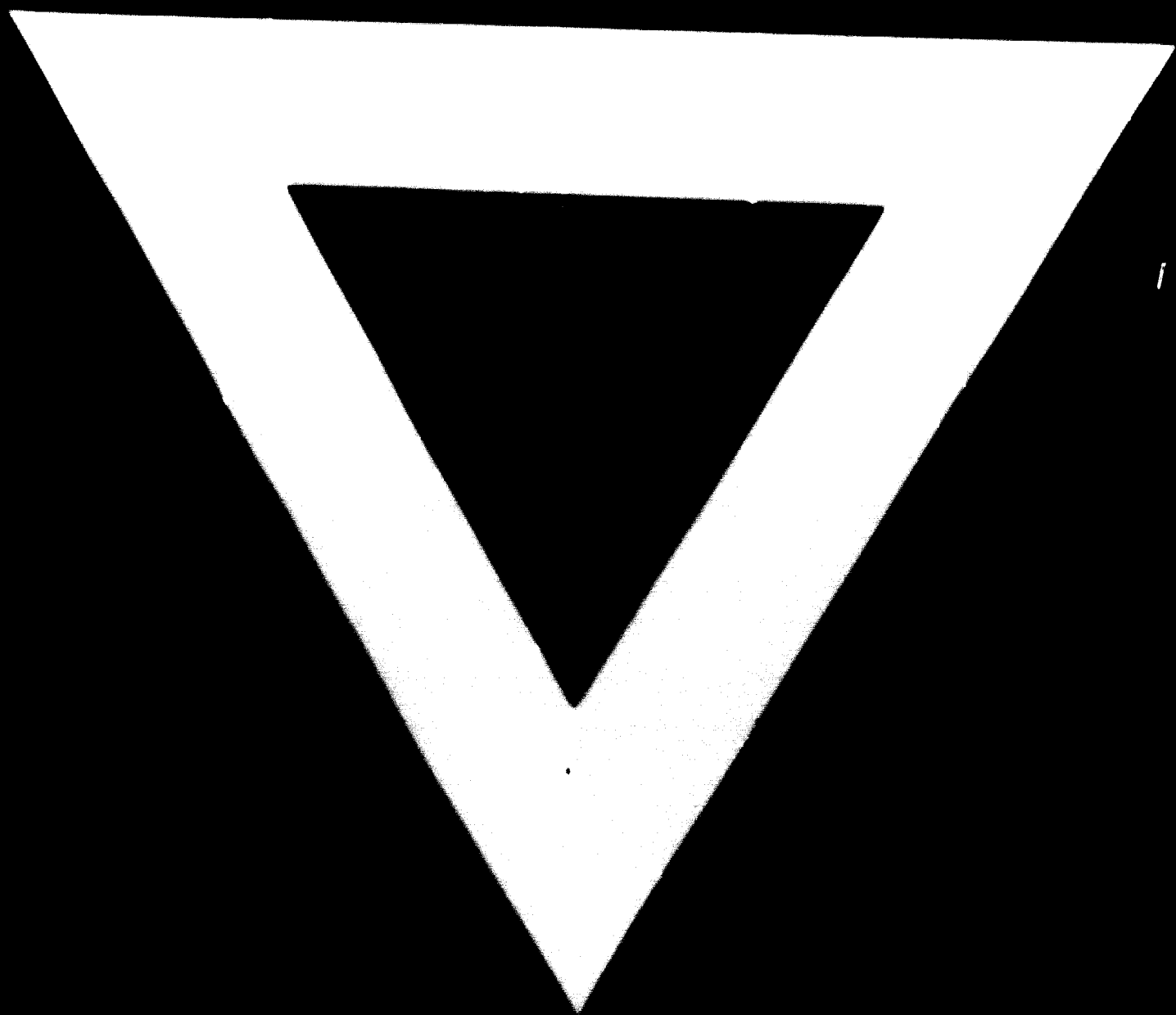
Project (Priority A)	Regular budget						Extra-budgetary resources (\$)		
	Staff (m/m)			Consultants (\$)			Expert group meetings (\$)		
	1971	1972	1973	1971	1972	1973	1971	1972	1973
17.01 <u>Industrial branch reports</u>									
17.01.01	1	-	-	-	-	-	-	-	-
17.01.02	1	-	-	-	-	-	-	-	-
17.01.03	2	1	-	-	-	-	-	-	-
17.01.04	2	1	-	-	-	-	-	-	-
17.02 <u>Perspectives for selected industrial branches in the 1970s</u>									
17.02.01	1	1	-	-	-	-	-	-	-
17.02.02	1	-	-	-	-	-	-	-	-
17.02.03	1	1	-	-	-	-	-	-	-
17.02.04	2	1	-	0.2	-	-	-	-	-
17.02.05	1	1	-	1.6	-	-	-	-	-
17.02.06	1	-	-	-	-	-	-	-	-
17.02.07	1	-	-	0.5	-	-	-	-	-
17.02.08	3	1	-	-	-	-	-	-	-
17.02.09	2	4	2	10.5	-	-	-	-	-
17.02.12	1	2	2	0.8	4.3	-	-	-	-
17.02.13	1	3	2	-	2.5	-	-	-	-
17.02.14	1	2	4	-	-	5.0	-	-	-
17.02.15	-	1	1	-	-	1.0	-	-	-
17.03 <u>Packaging</u>									
17.03.01	4	2	-	6.0	-	-	4.9	-	-
17.03.02	2	4	1	3.5	-	-	-	-	25.0 TA



Printed publications

<u>1971 publications programme</u>		<u>Languages</u>	<u>Cost</u> <u>US\$</u>
<u>Perspectives for selected industrial branches in the 1970s</u>			
ID/63	The textile industry (17.02.02)	E S	
			<u>1,590</u>
<u>1972 publications programme</u>			
<u>Industrial branch reports</u>			
ID/81	Non-ferrous metals industry (17.01.02)	E	
-	Cement industry (17.01.03)	E F S	
<u>Perspectives for selected industrial branches in the 1970s</u>			
ID/63	The textile industry (17.02.02)	F	
ID/78	Automotive industry (17.02.04)	E F S	
-	Petrochemical industry (17.02.01)	E F S	
-	Fertilizer industry (17.02.03)	E	
-	Copper industry (17.02.05)	E	
<u>Packaging</u>			
-	Report of the expert group meeting on packaging (17.03.01)	E F S	
			<u>8,300</u>
<u>Forecast of 1973 publications programme</u>			
-	Industrial machinery (machine tools) perspective only (17.02.09)	E	
			<u>800</u>

Note: In the computation of the printing costs a standard formula was applied based on an average cost of internal and external printing.



**22.7.74**