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17040-E

Distr.  
LIMITED

PPD.89(SPEC.)  
16 September 1988

ORIGINAL: ENGLISH

UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION

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Expert Group Meeting on  
the Processing of Raw Materials

Vienna, Austria, 22-26 August 1988

REPORT\*

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\* This document has not been edited.

1/89

V.88-28655

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## I. ORGANIZATION OF THE MEETING

### Participation

The Meeting was attended by 16 experts who participated in their own capacity as well as by 10 representatives from various countries and international organizations.

The list of participants is shown in Annex I.

### Opening of the Meeting

The Meeting was formally opened by Mr. H. P. F. Wiesebach, Deputy Director-General, Department for Programme and Project Development, who, on behalf of the UNIDO secretariat, welcomed the participants to the meeting.

In his opening statement, Mr. Wiesebach said that the economies of many developing countries continued to depend on agricultural and mineral commodities. Accordingly, these countries were seriously affected by the downward trend of commodity prices which, in the early 1980s, saw prices (in real terms) fall to their lowest levels in 50 years. Industrial processing of raw materials in the developing countries could therefore reduce dependence on fluctuating raw material prices and unfavourable demand trends.

Referring to important issues relating to raw materials processing, Mr. Wiesebach noted that the national planning of the use of industrial raw materials called for knowledge of the quantity and quality of the resources available. Greater awareness of possibilities offered by technological developments was essential in policy making and planning of raw materials processing. Development and articulation of a clear policy and strategy regarding raw materials processing also implied human resources development. These should focus on development of skills in industrial plant construction, operation and maintenance, consulting and design engineering capabilities, research and development, standards, marketing, management, and technological and entrepreneurial activities.

Mr. Wiesebach explained that the objective of the meeting was to formulate a programme or strategy for developing countries with the aim of assisting them to optimize the economic benefits of exploiting their raw materials. It was expected that the meeting would, inter alia, consider and recommend technologies for exploitation, processing and utilization of specific raw materials, as well as identify and recommend possibilities for co-operation among developing countries in the marketing and distribution of raw materials. The report and recommendations of the Expert Group Meeting would be presented to the First Meeting of the Action Committee on Raw Materials of the Group of 77, scheduled to take place in Nigeria in the early part of 1989, Mr. Wiesebach concluded.

#### Election of Bureau

Following consultations with the participants, Dr. A. K. Fasina, member of the Raw Materials Research and Development Council of Nigeria, was unanimously elected Chairman of the meeting. Messrs. S. Badui Dergal, H. Cohen and F. Burkitt were elected rapporteurs of three working groups, on food processing, non-metallic minerals and textile fibres respectively.

After taking the Chair, Dr. Fasina thanked the participants for their confidence and presented a brief historical account of the industrialization process in developing countries after independence, drawing attention to some of the problems. He stressed that despite the many problems and difficulties encountered, developing countries had no alternative but to forge ahead with industrialization.

Dr. Fasina reminded participants of the importance of the meeting in mapping out a strategy and plan for assisting the developing countries achieve true industrialization and to meet the basic requirements of their population for food, shelter and clothing. All three were influenced to a great extent by the nature and type of raw materials available, and their processing had to be seen as the corner-stone of meaningful development. The importance of the Expert Group Meeting on the Processing of Raw Materials therefore extended beyond the mere need to add value to these raw materials.

Referring to the need to increase the value-added of raw materials before their exportation, Dr. Fasina cited examples of raw materials which developing countries exported in their natural, unprocessed form at very low prices and re-imported the processed products at, in some cases, up to one hundred times the export prices. In conclusion he emphasized that in order for developing countries to derive more benefit from their raw materials, it was imperative for them to carry out some degree of processing, keeping in mind that successive stages of processing would add even more value to the raw material.

The representative of the United Nations Conference on Trade and Development (UNCTAD), Mr. O. Ostensson, said that since many developing countries depended primarily on commodity exports for their foreign exchange earnings, increasing and stabilizing the earnings from this source, in particular by increased processing, had always been a primary objective. While new opportunities for increasing processed commodity exports from developing countries were likely to arise from the outcome of the current Uruguay round of multilateral trade negotiations and from South-South trade co-operation, expansion and modernization of processing capacities in developing countries, and increased attention to marketing were needed to realize those opportunities.

He went on to say that processing and marketing of commodities had been one of the major areas of attention for UNCTAD since its establishment. At the Seventh UNCTAD Conference in July 1987, Governments had provided a new direction to this work, recognizing that for most developing countries horizontal and vertical diversification of their economies was a long-term objective towards which international co-operation between producers and consumers should be intensified. The conference had also requested the UNCTAD Secretariat to assist diversification as well as processing, marketing and distribution programmes.

He also said that since the Seventh Conference, UNCTAD had started the work on several projects which dealt with the processing and marketing of commodities. Among these was one project which stemmed from a proposal by the Government of Japan and which aimed to draw upon the experience of international organizations as well as of developed and developing countries in order to identify and implement processing projects within the context of a strategy for development of the commodity sector.

Furthermore, a regional project for Africa would start in November 1988. The objective of that project was to assist in the upgrading of the technical and institutional capacity of African governments to develop, re-orient and implement commodity programmes and policies. Other projects were under way for Latin America and Asia.

Finally, a project aimed at identifying the policies or instruments most likely to advance the integration of the minerals sector into the economy as a whole had recently been initiated with the support of the Government of Sweden.

In conclusion, he stated that UNCTAD was ready to assist developing country governments in the development of policies and programmes aiming at expanding the processing of raw materials and thus reduce export of primary commodities.

H.E. Ambassador A. C. H. Emenyi, head of the Nigerian delegation, expressed the sincere gratitude and deep appreciation of the Nigerian Government to both the Chairman of the Group of 77 in New York and the Director-General of UNIDO for their respective and collective contributions towards the organization of the Expert Group Meeting. He underlined that the decision of the Nigerian authorities to seek UNIDO's sponsorship of the present meeting was based on the belief that such a meeting was necessary in order to ensure a solid preparation of the meeting of the Action Committee on Raw Materials which Nigeria planned to host in 1989.

Referring to the rationale for hosting the Action Committee, the head of the Nigerian delegation listed the current world economic crisis; the largest slump in world prices of raw materials; the need for processing of raw materials into more tradable goods; access to the appropriate technologies; financial constraints; inadequate research and development institutions, and other problems. He hoped that the meeting would address the structure of industries in developing countries also from the scientific and technological point of view with the aim of mapping new directions which would enhance the processing of raw materials in developing countries. He went on to say that processing of raw materials could be undertaken in developing countries in order to enhance the value-added of finished products and raise the self-sufficiency ratio of developing countries.

Furthermore, he expressed the desire of his delegation that the present meeting would give UNIDO the mandate to institutionalize the meeting of experts on raw materials. Periodic consultations on the subject among experts under the auspices of UNIDO every two years would enrich the work of the Action Committee on Raw Materials.

The Head of the delegation informed the Meeting that the Nigerian Government had established a Raw Materials Research and Development Council with the mandate to co-ordinate and stimulate advanced research in several Nigerian Research Institutions. Also four countries - Algeria, Morocco, Togo and Zaire - had signified to the Nigerian Government their support for the Action Committee on Raw Materials. Under the Caracas Programme of Action, a minimum of three countries was required to form an Action Committee.

He concluded by reaffirming Nigeria's commitment to South-South co-operation and urging the international community to give more technical and financial support to UNIDO.

#### Adoption of the Agenda

The meeting adopted the following agenda:

1. Opening of the meeting
2. Election of chairman
3. Adoption of the agenda
4. Organization of work, including election of rapporteurs
5. Working Group discussions on the exploitation, processing, marketing and distribution of raw materials
6. Presentation of Working Group reports containing conclusions and recommendations
7. Adoption of reports
8. Closure of the meeting



### Organization of Work

The Meeting adopted its programme of work and split into three working groups, as follows:

Working Group I	Food processing
Working Group II	Non-metallic minerals
Working Group III	Textile fibres

### Documentation

The main background papers considered by the working groups are listed in Annex II.

### Closure of the Meeting

The meeting was concluded on 26 August 1988 with the adoption of the draft report and a request of UNIDO to finalize, edit, reproduce and circulate it to the participants, the Group of 77 and other interested parties.

Closing statements were made by the rapporteurs of the three working groups, Mr. F. Burkitt, Mr. H. Cohen and Mr. S. Badui Dergal; Mr. Herbert May, Director, Special Programmes and Activities Division, UNIDO; and the Chairman, Dr. A.K. Fasina.

Mr. Herbert May congratulated the meeting on its successful work and commended its document to the Action Committee on Raw Materials of the Group of 77. Its conclusions and recommendations would also be of immediate practical value at two UNIDO TCDC meetings - at the forthcoming International Packaging Conference in Beijing, China, and at the World Materials Congress in Chicago, U.S.A. UNIDO would also examine its own TCDC programme to see how the meeting's recommendations could be incorporated, especially with regard to the importance of work on raw materials in the Organization's Medium-Term Plan.

Mr. May also recommended that the results of UNIDO's many technical co-operation projects touching on raw materials be summarized for presentation to the Action Committee. He referred especially to those with a high-technology content which developing countries could exploit as a result of their strengthened infrastructure and R and D capability. Examples were new applications for natural rubber, silicone water technology, natural-fibre-based carbon fibre, advanced ceramics and a growing number of applications of biotechnology.

UNIDO would also approach donor countries and other sources of project finance - including developing country enterprises themselves, in the context of enterprise-to-enterprise co-operation - with respect to projects in raw materials, Mr. May concluded.

Closing the meeting, Dr. Fasina thanked all the participants, especially the UNIDO experts, for their contributions. The meeting's conclusions, he said, were important for not only developing countries but mankind in general, since there would not be peace until everyone was to a reasonable extent happy. They would form the basis of a working paper for the first meeting of the Action Committee in Lagos in 1989.

## II. CONCLUSIONS AND RECOMMENDATIONS

### Background

Given the need to strengthen co-operation among developing countries in the field of commodities, in their primary and processed forms, in order to improve the terms of trade and ensure increased earnings from exports, the Intergovernmental Follow-up and Coordination Committee of the Group of 77 (IPCC-VI) decided to initiate an Action Committee on Raw Materials. In preparation for the First Meeting of the Action Committee, the Group of 77 requested UNIDO to assist in the organization of an Expert Group Meeting on the Processing of Raw Materials.

WORKING GROUP I - FOOD PROCESSING

A. Conversion of Agricultural Raw Materials into Food Products

The Working Group on agricultural raw materials for food processing concluded that developing countries' utilization of raw materials locally for industrial food processing had suffered very serious neglect and that this had slowed down the industrialization process. Many countries still used agricultural practices that had not changed over hundreds of years. They experienced high post-harvest losses, many of which were due as much to cultural-social phenomena as to physical, chemical or biological factors. At the same time they had poorly exploited the by-products of agriculture and food processing, despite the large quantities of such materials generated.

As a consequence, the constraints on agricultural raw material processing by both large and small-scale industry ranged from inadequate, unreliable raw materials supply to lack of storage facilities, technology and processing, marketing and distribution, skilled technical personnel and management, R and D, and financing and investment. However, many of these problems could be overcome by developing countries that co-operated among themselves, the Working Group felt.

A further problem was that the critical economic situation in developing countries today no longer supported importation of food raw materials. Almost certainly, they would not have the capacity to generate the foreign exchange resources required to import an estimated 125-145 million tons of total foods estimated for 1990. Lack of finance and debt service obligations had already meant little or no local development of technology.

The failure of many past government efforts to ameliorate the food situation in their countries indicated the need for stronger measures, such as a ban on imports of items designated for self-sufficiency, or (like wheat imports) a ban on items that impeded self-sufficiency in other products. Programmes aimed at food self-sufficiency, however, should be framed so that the private sector played a major and active role.

The Working Group agreed that an efficient oil-bearing raw materials processing industry was a fundamental agro-industry, essential both for food supply and overall industrialization. It was the starting point for refined oils (used in cooking and frying oils, salad dressings and ice-cream), hydrogenated and fractionated vegetable oils (for margarine, shortening and ghee), and technical oils (the basis of oleochemicals). Its by-products went into soaps and detergents and the seeds and fruits of many oil-bearing materials, rich in protein, were crucial in animal feedstuffs indispensable to modern animal husbandry.

It agreed that by-products of agriculture, agricultural raw materials preparation and food processing should be more widely recognized as raw materials for food processing. Their utilization, the Working Group felt, was more important now than ever. Those currently underutilized included farm residues (suitable for conversion to animal feed), soap stock and offal. Sugar mill by-products could be used in animal feed, industrial alcohol and other organic chemicals, paper, textile fibres, cellulose derivatives and fibre boards, and other products.

**B. New Trends in Market Demand**

The possibilities for developing new products from local raw materials were illustrated by three different approaches:

- Product development based on backward integration, e.g. pounded yam and cassava processing in Nigeria;
- Import substitution (or replacement), e.g. sorghum extract instead of malt extract in beverages, sorghum syrup in confectionary production, and sorghum and other malts in beer brewing; maize instead of wheat products as grits, corn germ, flour, and bran and offals;
- New products such as soybean/maize combinations in breakfast cereals, baby foods, cocoa beverage and convenience foods.

C. Role of Research Centres

The Working Group found that many developing countries were not able to adapt large-scale technologies, which, apart from their cost, would also involve changing rural production habits. Developing countries varied considerably and each one needed to study all available technologies to choose the one most viable. The appropriate technology might be the result of a combination of a highly specialized technology and a low-cost small-scale technology.

For this reason, R and D capability was essential to adapt processes and equipment for conversion of primary grains and root raw materials to intermediate (industrial) raw materials, or to convert the intermediates to finished goods. Agriculture requires development of high-yield disease-resistant varieties, research into soil types, and species that grow all year round or yield shapes suitable for mechanical peeling. Inhibitor mechanisms and storage systems to prevent rotting and sprouting in yams must also be researched and designed locally.

The Working Group agreed that research centres and similar institutions had to be the nucleus of the development of the agricultural raw materials processing industry. Their focus should be raw materials production, storage, transport, processing, marketing and distribution, planning and management of production, engineering and food science and technology.

D. Processing Development

The Working Group found that significant changes had taken place in the oilseeds and fruit processing industry in the past 25 years, some of them in developing countries themselves. These developments included:

(a) Raw materials storage and facilities:

Modern silos in steel, concrete and wood, techniques and automatic temperature control, even and heavy-duty ventilation, microprocessor control, refrigerated air.

**(b) Preparation and mechanical oil extraction:**

Fluidized bed technology for energy saving (soybean); extrusion (soybean); sterilization and mechanical fruit removal (palm fruits); dehulling (sunflower seeds); milling, heating and solvent extraction (rice bran).

**(c) Continuous solvent extraction:**

Large extractor system with maximum energy recovery.

**(d) Meal desolventizing:**

DTDC (desolventizer, toaster, dryer, cooler) systems; flash desolventizing with positive solvent recovery combined with flake stripping and cooking (soybean); VDVD (vapour desolventizing, vapour deodorizing) for soybean but applicable to reduce antinutritional and toxic factors in cotton seed and rapeseed meals and groundnut. Full-fat soybean extrusion, for production of animal feed from soybean and cotton seed meal.

**(e) Protein foods and concentrates from other oil seeds:**

Protein isolate process for groundnut kernels; acetone extraction for low gossypol products from cotton seed; special preparation of coconuts and industrial production of coconut cream.

**(f) Refining and deodorizing:**

Elimination of soybean oil reversion flavour; new bleaching procedure for constant, high quality edible palm oil.

**(g) Hydrogenation:**

Specific rheological properties in oils and fats through control of reaction conditions, heat-recovery systems.

**(h) Rearrangement of fats:**

Transesterification, interesterification or ester interchange for direct rearrangement of fatty acids on glycerin present: used to make confectionary fats from palm kernel oil, palmoil etc.

**(i) Fractionation:**

Palm oil fractionation to produce olein, as a liquid oil substitute, and stearin for margarine, vegetable fats and cosmetics.

New technologies were also being investigated for some lesser known sources of oils, fats and related products - rice bran, olive oil, castor oil, grape seed oil, safflower, jojoba seed and new maize hybrids (for high-value maize germ oil).

**E. Product Technologies**

As far as roots and grains were concerned, notable developments leading to new products included:

- **Corn-soy flours:** Corn-soy flours with vitamins and minerals added had been developed by government agencies in Mexico and South American countries; further work was needed to improve dough rheological properties;
- **Corn flour:** Lime-heat treatment used in converting corn into a ready-to-use flour reduced cost and wastes; the product faced consumer resistance, however;
- **Par-boiled rice:** Parboiling by cleaning and soaking rice prior to steaming and drying increased vitamin B retention—reducing susceptibility to beri-beri disease;

- **Yam transformation:** Dehydration using drum dryers to produce instant flakes capable of rehydration;
- **Cassava flour:** Detoxification and conversion to flour using a process similar to that for yams.

**F. International Market Penetration**

The Working Group confirmed that tariff and non-tariff measures hamper international trade in oil seeds, oils and oil meal protein to a great extent. Non-tariff measures were applied not only by the developed but also by the developing countries. They included import bans, quotas and licences, automatic authorizations, levies, health and sanitary requirements and other standards and regulations. They created additional problems for developing countries by adding to the instability of prices in the world markets.

Almost all countries applied health and other standards and regulations, e.g. packaging. But their requirements and complicated procedures could also be used to obstruct, delay or prevent imports. Quality standards, mycotoxin, pesticides and heavy metal content regulations and packaging requirements also created obstacles to developing countries when trying to penetrate international markets. Co-operation among developing countries should therefore include quality standards, their appropriateness and their upgrading. They should also exchange information on existing and proposed measures, laws, regulations and procedures controlling imports.



**G. Recommendations**

**1. At national level, developing countries should establish clear-cut policies, coherent strategies and detailed programme to:**

**(a) Identify products and set up a timetable for national self-sufficiency, together with the appropriate measures to achieve it;**

**(b) Establish priorities for expanding and utilizing local raw materials for existing products and for developing new ones based on such materials. This would include upgrading selected traditional technologies for products closely reflecting local demand and consumer tastes, and, where necessary, development of education programmes to promote long-term changes to align consumer demand with what the food industry can supply under current constraints;**

**(c) Give priority to developing and promoting technologies to reduce post-harvest losses, including access to funds for erection of silos and application of loss-prevention systems; an example is the technology for conversion of perishable roots into shelf-stable intermediates, e.g. cassava chip technology;**

**(d) Promote and organize farmer co-operatives and small-scale producers devoted to supplying and processing agricultural raw materials for industry, as a means to pool resources, promote quality control, popularize grain variety, achieve equitable pricing and promote efficient use of local materials;**

**(e) Institute studies to identify, upgrade and simplify selected technologies for use by rural industry and small-scale processors;**

**(f) Conduct surveys, collect and evaluate data needed for planning and investment decisions and process them in national comprehensive data banks on agricultural raw materials for industry, their derivatives and quantities used by industry;**

(g) Define and agree national standards and gradings for agricultural products and popularize such standards;

(h) Set up co-ordinated, extensive agricultural support services for all aspects of farming, including marketing information, power and water supplies. (Here private sector initiative would also be important);

(i) Ensure adequate tax incentives to promote supply of suitable quality agricultural raw materials for industry by the private sector; protect local industry from unfair competition from imported goods;

(j) Take steps to improve market organization, market intelligence, information and education;

(k) Organize government-industry co-operation to identify areas for process development in agricultural raw materials for industry, and to fund the appropriate research and equipment;

(l) Encourage formation of R and D associations aimed at improving process and product development.

2. At regional and international level co-operation among developing countries, established and supported jointly or separately by the appropriate United Nations agencies should:

(a) Enhance face-to-face exchange of information, including exchange of personnel;

(b) Develop and provide access to a data base on food processing technology;

(c) Establish regional comprehensive data banks on agricultural raw materials for industry, their derivatives and quantities used by industry;

(d) Promote co-operation among their research centres and similar R and D institutions. This would cover exchange of scientific experience, research findings, inventions, innovations, and scientists themselves. Joint scientific and research work would lead to establishment of regional centres for specific oil seeds and oil fruits, and for their processing;

(e) Commercialize the results of R and D and promote practical applications in industry by promoting information exchange (publication and distribution of technical papers, preparation of project scale up proposals, organization of industrial fora for scientists and industrialists, participation in trade fairs) and facilitating transfer of the technology for larger-scale testing and production;

(f) Promote technical co-operation in the area of manpower training by setting up joint training centres and exchange of fellowships;

(g) Organize agricultural areas to specialize in producing raw materials for industry, form co-operatives and jointly finance farm inputs, post-harvest processing, joint storage and quality monitoring;

(h) Negotiate trade agreements within the General System of Trade Preferences covering tariffs and trade regulations to simplify and promote subregional and international trade in agricultural raw materials for industry; particularly with regard to vegetable oils, developing countries should take advantage of the General System of Trade Preferences to establish parallel markets to satisfy their own requirements;

(i) Promote joint ventures to optimize transfer of technology and use of national resources, especially human skills and natural resources.

3. At international level, co-operation between developing and developed countries should proceed by means of:

(a) Contract packaging and marketing in developed countries;

(b) Production-based partnerships with licencing and raw material supply to the developed country partner;

(c) Joint ventures to develop, monitor and implement strategies, to provide information, material back-up, training and R and D, and to identify growth opportunities.

4. The Working Group also recommended a number of actions to international organizations, in addition to their support of the above TCDC/ECDC arrangements:

(a) UNIDO should issue a compendium of new technologies developed in, used by or developed for developing countries in the field of food processing as a means of exploiting their local materials; the compendium would describe the technology and indicate the scale range in which it can be used, the raw materials and equipment required, any materials the technology can replace, and the technology source;

(b) UNIDO should continue to organize international fora, consultations, solidarity ministerial meetings, round table ministerial and high-level meetings for co-operation, and to implement advisory services, study tours, training and other joint industrial programmes;

(c) FAO, ISO, UNIDO, WHO and others should help developing countries to understand international quality standards as a prerequisite to penetrating world markets and to upgrade (revise) them when trading among themselves.

5. The Working Group also recommended that the Action Committee on Raw Materials (ACRM) of the Group of 77 should among other things:

(a) In conjunction with UNIDO and other international organizations as appropriate, organize a series of "Standards Forums" to enhance understanding of standards and their use in domestic and various types of interational trade;

(b) Follow up the conclusions and recommendations of the First Interregional Consultation on the Food-processing industry, to be held in Havana, Cuba, 26-30 September 1988, with appropriate action in the field of sugar processing and its by-products;

(c) Within the framework of the General System of Trade Preferences, make suggestions relating to trade in the commodities covered by the Action Committee.

WORKING GROUP II - NON-METALLIC MINERALS

A. Introduction

Non-metallic minerals account for the major part of the value of global non-fuel mineral production. They are produced and consumed in virtually all countries and are utilized in the production of all manufactured goods, as well as in construction, agriculture and environmental protection. Against this background, it may seem paradoxical that the production and utilization of non-metallic minerals are rarely accorded a commensurate level of priority in national development plans. One reason is that the production of non-metallic minerals, given their generally low prices and relatively high transport costs, usually does not provide profit margins of the same magnitude as the production of metallic minerals or, even more significantly, mineral fuels. Thus, colonial powers and transnational corporations historically took less interest in developing production of non-metallic minerals. Even later they were not regarded as a major potential source of export income for developing countries.

A strong case can nevertheless be made for promoting the production of non-metallic minerals in developing countries. The range of uses of individual mineral commodities is very large and is growing rapidly. For example, clays are used in paper, plastics, rubber, paints, fertilizers, insecticides, foodstuffs, structural products, pharmaceuticals, cosmetics, bone implants, drilling fluids and many other commodities. These minerals offer significant opportunities for import substitution based on comparative advantages. Since transport costs are high relative to the value of the products, domestic production has an initial competitive advantage vis-à-vis imports, which may often outweigh other disadvantages such as limited access to technology.

Furthermore, non-metallic minerals production can often be initiated on a small scale, using relatively simple technology, thus limiting the need for large initial investments in fixed capital and imports of equipment. Since production rates are usually flexible, they can be increased gradually, and the output can be adjusted according to demand. This also means that the operation can function as a training ground for technical and managerial staff, allowing them to upgrade their skills as output expands and as the product range comes to include more specialized, higher value-added products. Another advantage is that production of non-metallic minerals can usually be initiated relatively quickly. There is thus no need for the long lead times between discovery of a deposit and entry into production associated with metallic ore mines.

Finally, the production of non-metallic minerals often offers the possibility of establishing linkages, both backward and forward, to the rest of the economy, given the relatively less advanced inputs and the capability of local economies to absorb the output. Thus non-metallic minerals production can lead to rapidly increasing and diversified employment and output in manufacturing and construction thereby contributing to the improvement of the quality of life.

#### B. Mining

It is accepted that only Government has the resources necessary for initiating a comprehensive mineral resources industry. Each country either has, or could create, an entity for mining development (such as a Mining Development Corporation). This should report to a cabinet level Minister and should be responsible for the promotion of developing and using industrial mineral resources. An appropriate organization may already be in place from existing metal mining activities, but may need restructuring and/or strengthening for the special industrial mineral requirements.

A first task for this entity should be the compilation of a national mineral inventory. This inventory should provide quantitative data for each mineral deposit and for the derivable products in a form suitable for

industrial and commercial assessment. For this purpose, the Corporation would require inputs from geological survey records, as well as inputs from industrial, research and commercial organizations. The mineral inventory should be continuously updated and should form an essential starting point for national and for collaborative international projects.

The Mining Developing Corporation or another appropriate government body should have executive authority and powers to initiate mining, processing and manufacturing projects, for example by commercial tender, by licensing, or by direct governmental initiative. A special responsibility would be to provide support and encouragement for small ventures and for co-operative enterprises. In this connection, it should be recalled that the capital required for the exploitation of non-metallic mineral resources is generally low compared to investment in metallic ore exploitation and that there is no critical minimum size. This allows mining to be started even at the village level, with subsequent stagewise growth.

Such a body would contribute to the formulation of legal and regulatory measures with respect to environmental protection, land use compensation and general co-ordination of mining and other local interests.

Further it would be expected to take the lead in formulating national mining and mineral policies. It would need to collaborate with appropriate agencies in planning transport, water, power and related infrastructure aspects.

#### C. Industrial Utilization

The major part of non-metallic minerals is consumed by manufacturing and construction industries. The promotion and expansion of the non-metallic mineral sector therefore requires the services of a government body which has responsibility for the expansion and diversification of national industrial activity. This entity should work closely with the Mining Development Corporation to stimulate and ensure integrated growth of mineral production and of mineral-based manufacturing.

Its prime function would be to identify national requirements for mineral raw materials in existing and planned local industry. In this context it would be necessary to initiate market surveys defining the type and quantity and as well as future trends in consumer usage and applications. It should also carry out an aggressive marketing programme for primary minerals and associated by-products. This task is essential given the multitude and diversity of markets for non-metallic minerals, as well as the fact that greater part of the value of non-metallic mineral products is often created at the product development and marketing stages rather than at the initial mining stage.

One of the obstacles to a diversified industrial application of non-metallic minerals is lack of information on potential uses and the related technologies. It is therefore essential that governments, through the appropriate entity, have access to data bases comprizing the following categories of information:

- Processing technology profiles;
- Uses of non-metallic minerals including quality standards and specifications;
- Range of suppliers of equipment, materials and services;
- Non-metallic mineral product prices, transport charges and tariff and non-tariff measures.

These data bases could form part of the network described below and should be linked to international organizations such as UNIDO.

The responsible body would have the capacity to carry out, or to participate in feasibility studies for new mineral products. It would provide and/or negotiate financial arrangements and services for such projects. These functions are especially important in providing assistance to smaller industries and to facilitate the formation of viable co-operatives based on very small mining units.



D. Research and Development

The dynamic growth in types and ranges of use of industrial minerals and their products necessitates a permanent capability for applied research and development. The capability should cover the following functions:

- Raw materials testing and evaluation;
- Products development and evaluation;
- Process and plant design;
- Technological trouble-shooting, including the provision of technological extension services to small enterprises; and
- Dissemination of scientific and technological information.

A service needs to be provided for the mutual reconciliation of user requirements and producer capabilities. To this end it is necessary to establish and monitor product qualities in response to changing user specifications. This is especially important for satisfying export markets.

In order to allow the efficient utilization by developing countries of research and development resources, several problems have to be overcome. The diversity of uses, technologies and raw materials make it virtually impossible for any single developing country to build up a complete spectrum of knowledge and know-how. A possible solution to this problem could be the establishment of a global network for industrial minerals which would:

- Collect and disseminate information from and among the participating countries;
- Operate a computerized data base with direct links to national focal points;
- Promote and coordinate joint activities in the field of research, training and technology transfer including consultancies;

- Act as an interface for sources of technology and know-how outside the network;
- Contribute to the formulation of a strategy for industrial minerals development.

Constraints on resources such as staff and equipment make it impossible for some developing countries to establish their own research and development facilities. Co-operation between developing countries on a regional basis or on the basis of common interest in a particular commodity, could be called upon to alleviate these constraints.

Processing technologies are often proprietary, with the price of licenses and other conditions forming obstacles to the processing of a particular mineral in a developing country. Again, co-operation between developing countries in the form of joint research could be a solution.

Finally, there is a need to establish and maintain functioning interfaces between research and development on the one hand, and industry on the other so as to focus R and D work on production related needs and to ensure the rapid and efficient introduction of new technologies. This can be achieved through government level co-ordination, for instance in the form of monitoring committees, or through financial incentives directed either towards industry or the R and D agency concerned. Levies on production can be used to finance research and development activities, contracts for which are given by the producing organization to the research and development agency and credited against the levy. Financial incentives offered to research and development agencies could take the form of linking the level of direct support from the government budget to the amount of contract work carried out.

E. Training and Manpower Development

The achievement of effective growth by developing countries in production of industrial minerals and various mineral based industries depends on the availability of trained personnel. It is recommended that appropriate programmes of training should be arranged by developing countries for various categories of staff. Initially, it would be important to establish a system of exchange of information on available training facilities in areas of production, research and development, management and marketing. This would assist in defining additional needs for training facilities aimed specifically at the industrial minerals sector. The very wide potential range of uses of industrial minerals gives special importance to training in marketing and market development.

At production level, training of operators and supervisors would need to include appreciation of the necessary quality aspects of product specifications and importance of proper process control and operational procedures. Training in all aspects of plant maintenance is essential. Many industrial ventures fail because of inadequate attention to this problem.

In order to maximise the usefulness and minimize the cost of training, co-operation between members of the Group of 77 should be on widest possible basis. It should provide for exchanges of experts and trainers, joint courses, on the job training and regular review meetings to assess the changing needs for training.

An important principle of manpower development is that every new project should have a training element through the initial stages of process design, pilot testing and plant design. This would allow potential operators to acquire familiarity with the raw materials equipment and with the specific process requirements. Proper methods, procedures and organizations for training have been discussed extensively at international level. Reference is made to the Report of UNIDO Second Consultation on the Training of Industrial Manpower, Paris, 1987.

F. International Co-operation

The achievement of an accelerated development along the lines outlined above will only be possible through an increased flow of information, technology and financing by means of international co-operation.

Members of the Group of 77 themselves should be the main contributors to this co-operation by sharing the accumulated know-how and experience which, to a varying degree, is available in all of the countries. A network structure, consisting of a central secretariat with connections to national focal points placed in appropriate institutions in each country would greatly facilitate this co-operation.

The industrialized countries and, in particular, research and development institutions as well as mining and manufacturing companies could also make a significant contribution. For maximum efficiency, the network structure should also be used to facilitate access to technologies and data by all interested developing countries. UNIDO is expected to play an important catalytic role in this development process by drawing on the expertise and financial resources available in both industrialized and developing countries. The structure of UNIDO allows it to perform this function in several different ways:

- Providing technical assistance through consultancies, training and institution building, primarily at the national level;
- Establishing an interregional network for industrial minerals and support to its operation;
- Promoting co-operation, among governments or their relevant institutions and industries with particular interest in a specific mineral;
- Promoting co-operation, at the enterprise level inter alia through trust funds arrangements;

- Promoting twinning arrangements between R and D institutes;
- Organizing group training programmes, seminars and expert group meetings and participation in larger similar events;
- Operating a data bank.

To ensure the maximum use of the available expertise in the developing countries, a directory of their specialists and institutions should be maintained and made available to member countries.

Since only a relatively modest part of the products of the non-metallic minerals sector enters the international market, there is a good scope for this co-operation in a spirit of solidarity. This is particularly relevant in the exchange of know-how and services among the Group of 77 which could only benefit from the process.

WORKING GROUP III TEXTILE FIBRES

A. Introduction

Given the size of the textile sector and the wide ranging nature of the complex issues involved, the Working Group agreed to confine consideration to cotton and cotton products. All other fibres were excluded either because of their limited importance to the Group of 77 or because they are considered by other international fibre organizations, for example the International Jute Organization and the International Wool Secretariat.

Attention was focussed on adding value both by increasing the unit value of output at each product stage (yarns, grey fabrics, finished fabrics, garments) and by upgrading from one product area to another. Increasing value-added would expand developing countries' home and export trade and increase co-operation between them.

It was generally agreed that certain agricultural practices associated with cotton production could have a deleterious effect on fibre and fabric quality as well as on textile processing efficiency. Given the importance of seed purity, absence of contamination, harvesting methods, seeds cotton storage, the range of varieties grown in a country etc., the Working Group proposed that UNIDO request FAO to prepare a paper on raw cotton production to be made available to the Action Committee. It was fully recognized that improving production practices through raising yields, lowering the costs of production, improving ginning facilities etc., were particularly important to the many countries of the Group of 77 which grow cotton.

B. Major Issues

Ginning, cleaning, baling and packaging were recognized as being crucial to fibre and yarn quality, ease of transportation and acceptance by spinners. In this connection there was a need for adequate facilities to reliably assess the main characteristics of the cotton crop. Use of internationally acceptable test methods, participation in check-tests organized by bodies in the Federal Republic of Germany and the United States, regular maintenance and adequate personnel training were particularly recommended.

The Working Group recognized the key role of spinners as the primary customers of raw cotton suppliers and their concern for efficient processing, low processing losses and the necessity to produce high quality yarn. Among new spinning methods available, only rotor systems were of commercial importance. Currently they accounted for about 20 per cent of all staple yarn production. The combination of fibre properties required for effective rotor spinning are quite different from that required for conventional ring spinning.

The growing importance of cotton knit goods and the recent availability of data and know-how to improve product quality, reflected reduced development time and costs. They also ensured more effective use of yarn and knitting machinery.

The Working Group underlined the great increase in the value of fabric resulting from the many and varied finishing processes used to convert fabric from the loom into a decorative product with attractive handle and performance. However the know-how required for these operations was not as readily obtainable as that for yarn and fabric production.

Reviewing trends in production and processing, the Group focussed attention on the need for clean, mature and undamaged fibre. Cotton fibre quality was generally in decline just when spinners were demanding a higher quality raw material. If this trend continued, cotton would be at a serious disadvantage vis-à-vis other competing fibres, it warned.

The Group agreed similarly that in marketing of raw cotton and cotton products there were serious implications for buyers selling into an already saturated market. Again good quality and presentation were important, as well as the traditional commercial factors involved in successful trading.

With importers/merchants acting as a pivot between the exporters and the processors, specifications had tended to become more rigorous, especially with respect to cotton yarns and cotton grey fabrics, the Working Group found. In addition to being competitive in terms of quality and price, the Group considered that in order to facilitate entry into export markets, marketing tools should be utilised. These included the availability of samples, sales promotion, participation at yarn and fabric fairs, trade delegations etc. Despite continuing difficulty of access due to the quantitative restrictions under the Multifiber Agreement, gains could still be made by the developing countries by obtaining a higher value per unit of output.

### C. Conclusions

Further conclusions by the Group concerning topics that arose from the background papers fell into the following areas:

#### 1. New Product Possibilities

Although cotton (cellulose) was being converted into a wide variety of paper and chemical products, the vast majority of the crop would continue to be consumed in the traditional end-uses: apparel, household products and industrial textiles.

#### 2. Sources of Information

Information on the technical aspects of cotton production and processing, and statistical information on raw cotton production, yields and trade and for market trends in major textile end-uses were available from many international, national and private sources.

A list of such sources is presented in annex III.



3. Demand Stimulation

The Group recognized that textile processors, retailers, and consumers have no fibre loyalty. Hence activities which ensure a continuing demand for cotton had to be supported. The programmes of International Institute for Cotton (IIC) should be not only expanded in Western Europe and Japan but also extended to developing countries where cotton was under serious threat from man-made fibres.

4. Collaboration between Developing Countries

The Group felt that there were excellent opportunities for co-operation between developing countries which had a long history of cotton production and processing and those which were relative newcomers. Specific subjects for such collaboration were information exchanges on all aspects of cotton growing, processing and marketing, training in those same subject areas and joint operation of regionally-based fibre and yarn testing centres.

D. Actions and Recommendations

- (i) Steps should be taken to ensure that demand stimulation programmes for cotton are maintained in developed countries and are initiated in those developing countries where cotton is under threat.
- (ii) International barriers to trade in textiles and clothing should be dismantled in order to stimulate demand.
- (iii) UNIDO should request FAO to undertake studies on those cotton production factors which influence the quality of the fibre.
- (iv) Emphasis should be placed on the efficient use and proper maintenance of existing cotton processing machinery rather than the development of new machinery, given the wide range of technologies and processes presently available.

- (v) Adequate fibre testing facilities should be established and maintained in all major cotton growing areas.
- (vi) Full advantage should be taken of recently developed data and know-how on the production of high quality knitted cotton fabrics.
- (vii) Countries with a large cotton processing industry should establish technical research centres to provide a wide range of services to that industry.
- (viii) Organizations in countries with a long history of cotton production and/or processing should be encouraged to offer their expertise and services to those which are relative newcomers.
- (ix) Efforts should be made to ensure that all developing countries have ready access to the vast amount of information on cotton which is available from many organizations world-wide.
- (x) Full advantage should be taken of modern marketing techniques fashion trends and marketing skills should be further encouraged. The practical experience and expertise of ITC and IIC in this respect could be more widely utilized.

EXPERT GROUP MEETING ON THE  
PROCESSING OF RAW MATERIALS  
Vienna, 22-26 August 1988

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List of documents prepared by UNIDO Consultants

<u>Title of Document</u>	<u>Name of Author</u>
<u>Food Processing</u>	
1. INDUSTRIAL PROCESSING CONSIDERATION FOR THE CONVERSION OF GRAIN AND ROOT RAW MATERIALS INTO FOOD PRODUCTS IN DEMAND OF MARKETS	Dr. Oluniyi Babatunde Omosaiye
2. INDUSTRIAL PROCESSING CONSIDERATIONS FOR THE CONVERSION OF OIL-SEEDS AND OIL FRUITS INTO EDIBLE OIL AND PROTEIN ANIMAL FEED COMPONENTS	Mr. J. Turinski
3. INDUSTRIAL PROCESSING CONSIDERATIONS FOR THE CONVERSION OF GRAIN AND ROOT MATERIALS INTO FOOD PRODUCTS IN DEMAND OF MARKETS	Dr. Salvador Badui Dergal
<u>Non-Metallic Minerals</u>	
4. STRATEGIES FOR THE OPTIMAL UTILISATION OF KAOLIN RESOURCES BY THE DEVELOPING COUNTRIES: A TECHNO-ECONOMIC APPROACH	Prof. U. Aswathanarayana
5. UTILIZATION OF KAOLIN CLAYS IN DEVELOPING COUNTRIES	Prof. Henry E. Cohen
6. THE TECHNOLOGY OF KAOLIN MINING, BENEFICIATION AND INDUSTRIAL APPLICATION	Prof. Henry E. Cohen
7. THE ROLE OF MINERAL RESEARCH INSTITUTES OF DEVELOPING COUNTRIES IN PROMOTING EXPLOITATION OF KAOLIN AND INTERNATIONAL COOPERATION	Mr. ZHOU Guifang
8. KAOLIN SITUATION IN BRAZIL AND THE ROLE OF R AND D CENTERS	Dr. Alexandre R. Zandonadi
<u>Textile Fibres</u>	
9. THE EXISTING MECHANISM OF MARKETING AND DISTRIBUTION OF RAW COTTON AND COTTON PRODUCTS	Mr. Iftkhar Afzal
10. TRENDS IN THE PRODUCTION AND PROCESSING OF COTTON	Mr. Frank H. Burkit
11. PAPER ON TEXTILE FIBRES	Mr. Ibitoye Aladeselu

Sources of Information

Cotton Production

**International:**

FAO  
ICAC  
ICGP

**National**

IRCT  
USDA  
ODA

Several countries with a long experience of cotton production (including Egypt, India, Pakistan, Zimbabwe, etc.)

**Private:**

Suppliers of herbicides, insecticides, etc.  
Manufacturers of agricultural machinery, gins, presses, etc.  
Consultants

Cotton Processing

**International:**

UNIDO  
IIC

**National:**

Fibre Institute Bremen

Organisations in countries with a long experience of cotton processing including Egypt, India, Pakistan, etc.

**Private:**

Suppliers of chemicals and machinery to the textile industry  
Consultants

Marketing (including statistics)

**International:**

ITC	ICAC
IIC	ITMF
GATT	OECD

**National:**

Numerous bodies in the major cotton exporting and importing countries eg. Textile Statistic Bureau, U.K. and CIRFS, France.

**Private:**

Cotton Outlook (raw cotton market reports)  
Numerous publications.