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INTRODUCTION

1. The Second General Conference of UNIDO held at Lima, Peru, in March 1975 recommended that UNIDO establish a system of continuing consultations between developed and developing countries and between developing countries.
2. In 1977, the first consultation meetings were convened on the fertilizer, iron and steel, leather and leather products, and vegetable oils and fats industries, and preparations were begun for consultations on a number of other industrial sectors including petrochemicals.
3. As a first step in preparing for a consultation meeting, the First Panel of Industrial Experts on the Petrochemical Industry met in Vienna on 20 and 21 June 1977. This Panel recommended that a further meeting be held after the first draft of the UNIDO World-wide Study on the Petrochemical Industry had been completed.
4. The Second Meeting of the Panel of Experts was held in Vienna from 20 to 23 February 1978. Its purpose was to consider the UNIDO Study in draft form, to decide whether it would be useful to hold consultations on the petrochemical industry and to suggest some topics that might be considered at the Consultation Meeting. The list of documents circulated at the meeting appears in the annex.
5. At its twelfth session, subsequent to the Panel Meeting, the Industrial Development Board authorized the UNIDO secretariat to convene first consultation meetings on the petrochemical and agricultural machinery industries in 1979.

CONCLUSIONS AND RECOMMENDATIONS

The participation of developing countries in the growth of the petrochemical industry throughout the world up to 2000

6. The Lima Declaration and Plan of Action on Industrial Development and Co-operation established the goal that developing countries would achieve 25 per cent of total world industrial output by 2000. The petrochemical industry should contribute in a substantial manner towards the 25 per cent share; the potential for growth of this industry in developing countries is of such a magnitude that a share substantially higher than 25 per cent of world output in 2000 can be envisaged.
7. The growth potential is high because (a) the population of the developing world is likely to double between 1975 and 2000 and (b) petrochemical products help to satisfy the basic needs for food, clothing, housing and public health and the improvements in the quality of life that must be obtained. Petrochemical products are vital in the conservation of water resources, irrigation and in the storage, packaging and transport of food. Where land and water resources are limited, the supply of natural materials such as cotton, wool, timber and leather is not sufficient to meet future needs without affecting primary food production. The developing world therefore needs to use synthetic materials such as plastics, elastomers and fibres in imaginative combinations with natural materials to meet these requirements.
8. The wider use of petrochemical products will be encouraged by the assured availability that follows the establishment of local production units to meet the basic needs of individual countries with large populations or to serve groups of neighbouring countries in a region. Local production will spur marketing and application and technical assistance for the downstream processing and conversion units. These conversion units can be of smaller size, more widely dispersed and generate more substantial employment opportunities. They will also stimulate the development of other industries.
9. The oil and gas producing countries have to convert their raw materials and refined products, in particular hydrocarbon gases, to higher value items such as basic and intermediate petrochemicals. Apart from avoiding wastage of gas, investment in this area provides for them a natural avenue for industrialization, a focal point for growth and diversification and a use for available capital resources. Secondary production and investment in conversion industries may be appropriate for other countries.

10. Certain developing countries have already exhibited capacities for installing and operating modern petrochemical plants; others have made a breakthrough in developing local skills in designing and in fabrication of capital equipment. There is much to be learnt from such successful efforts and much to be gained in obtaining optimum co-operation between developing countries and between their institutions.

11. Developed countries have a substantial part to play. It is inevitable that international trade in petrochemical products will increase substantially, not only between developing countries, but also with developed countries. A thorough examination of the problems arising from such changes in trade is also necessary for the good health and orderly growth of this world-wide industry.

Co-operation with developed countries required to develop the petrochemical industry in developing countries

12. Co-operation from developed countries is necessary for the development of the petrochemical industry in the developing countries. Co-operation is required on a world-wide level in order to co-ordinate further petrochemical industry growth with the reallocation of part of that growth to developing countries in such a way as to realize the Lima targets.

13. Since co-operation between developed and developing countries is highly dependent on the policies and practices of transnational and other companies involved in petrochemical activities, it may be expedient to define the role that such companies could play in the scheme of co-operation suggested. This co-operation could begin with information exchanged on the planned projects and on the size of markets so that an awareness of the real situation in the petrochemical industry could be created.

14. In order to develop the petrochemical industry in the developing countries, co-operation from developed countries would be required in the following areas: finance, technology and market development. It is generally appreciated that development of the petrochemical industry in developing countries will require financial support from the developed countries through banks, credits etc.

15. Technology is the focal point in the co-operation between developed and developing countries. Technology includes training, technical assistance, product application developments and research development. Under the scheme of co-operation, these should be made available under the same conditions as the most favourable offered to other countries.

16. Most petrochemical plants built in developing areas will be designed primarily to meet local demands. The production available as a result of other new capacity built in developing countries should be supported by the possibility of export to the developed countries. The developed countries should provide for such imports in planning their future capacities. Once an equitable market share between developed and developing countries is realized, the possibilities of having open trade between regions could be considered.
17. International organizations such as UNIDO should facilitate this co-operation by encouraging contacts and by organizing collection, analysis and dissemination of information.

Co-operation between developing countries in the petrochemical industry

18. The experience acquired by some developing countries in the petrochemical industry may contribute to the planning and execution of petrochemical projects in other developing countries that do not have this experience in such areas as purchase of technology, training and the start up and operation of petrochemical projects.
19. Some developing countries have substantial reserves of hydrocarbons; other countries have no hydrocarbon resources on which to establish a petrochemical industry. In this case, regional associations or groups of countries can plan the joint development of national markets as a basis for establishing petrochemical projects.
20. The following types of co-operation between developing countries were suggested but this list is not exhaustive:

Co-ordination of national plans for development of the petrochemical industry and the joint development of regional markets

Exchange of raw materials, intermediate and final products

Provision of engineering services, technical assistance, training of personnel and assistance in the start up and operation of projects

Financial co-operation including investment by countries producing intermediates in plants in other countries buying these products

Exchange of information concerning technical capabilities, achievements in projects and the availability of petrochemical products for export

Exchange of information on terms and conditions of joint-venture agreements made with companies from developed countries

Supply of machinery and equipment

21. The ways and means to achieve this co-operation could be as follows:

Establishing joint ventures in the production of petrochemicals, including contributions to the investment required

Exchange of experience in planning and execution of petrochemical projects

Joint negotiation of purchase of technology and licensing agreements

Establishment of joint marketing companies to distribute petrochemical products

Specific contractual agreements in other phases of the industry

22. To facilitate the development of such co-operation, periodic meetings between the parties concerned should be organized with the assistance of an international organization such as UNIDO. For initiating and following up such contacts for promoting the development of the petrochemical industry, regional and subregional organizations could be used.

The need for a consultation meeting

23. Since the growth potential of the petrochemical industry is very high and the factors governing it are complex and affect many diverse countries, a debate between all interested parties is urgently needed. A consultation meeting at this juncture would help to define roles in the growth of the industry and define what may be acceptable or unacceptable in modes of co-operation.

24. Bearing in mind the above conclusions drafted by the Panel, the following topics were suggested as suitable for discussion at a consultation meeting:

Confirmation of the basis for establishment and growth of the petrochemical industry in the developing countries

Estimates of world-wide consumption of petrochemical products in 1990 and 2000 in the context of meeting basic needs of developing countries

Targets for production in developing countries and exports to world markets

Co-operation with developed countries required to achieve such targets and possible strategies to overcome constraints relating to markets, finance and skills

Opportunities for co-operation between developing countries relating to raw materials, markets, finance and skills

I. ORGANIZATION OF THE MEETING

25. The Second Meeting of the Panel of Experts on the Petrochemical Industry was convened in Vienna, 20-23 February 1978. The meeting was attended by 16 participants from 10 developing and 2 developed countries and observers from 3 international organizations.

26. The meeting was opened by A. Hacini, Head of the Negotiations Section, which is responsible within UNIDO for the preparation and organization of consultation meetings.

27. The meeting was chaired by E. Becker-Boost, Director, Investment Co-operative Programme Office, World Bank/UNIDO Co-operative Programme, and Chairman of the task force established within UNIDO to prepare for consultations on the petrochemical industry.

28. The following agenda was adopted:

Consideration of the Summary of the UNIDO Draft World-wide Study on the Petrochemical Industry

The growth of the petrochemical industry throughout the world up to 2000 and the participation of developing countries in this growth

Co-operation with developed countries required to develop the petrochemical industry in developing countries

Co-operation between developing countries in the petrochemical industry

Consideration of the draft report of the meeting

29. The Panel formed three small groups towards the end of the meeting to draft conclusions on (a) participation of developing countries in the growth of the petrochemical industry throughout the world up to 2000; (b) co-operation with developed countries required to develop the petrochemical industry in developing countries; and (c) co-operation between developing countries in the petrochemical industry. These reports formed the basis for the conclusions and recommendations of the panel.

II. SUMMARY OF THE DISCUSSION

Comments on the UNIDO Draft World-wide Study of the Petrochemical Industry

30. The Panel noted that the Study estimated that consumption of petrochemicals between 1975 and 2000 would increase tenfold in developing countries and fourfold in developed countries even if the lower forecasts were considered. The Panel saw no reason to question such a large increase in developing countries, but the figure for developed countries was considered much too high in view of the signs that some markets were nearing saturation.

31. The Panel did not consider in detail the methodology used to prepare forecasts of consumption but felt that the opinion of many different experts should be considered before UNIDO finalized its forecasts of consumption up to 2000. Several participants reported that national market studies looking 10 years ahead were made in their countries and the results could be made available to UNIDO on a confidential basis. In some developing countries there had been a definite turning point when demand for petrochemicals suddenly started to increase rapidly. It would be useful for UNIDO to examine this phenomena as a basis for projections in other developing countries.

32. The Panel recognized that a petrochemical complex usually takes from five to eight years to plan and construct. New capacity that would be available by the year 1985, therefore, could be determined today on the basis of decisions already taken. To obtain a background for decisions on further additions to capacity to be completed after 1985, UNIDO should forecast levels of demand in 1990 as well as for the year 2000. The demand for different products should be considered; estimates for different regions should be made for both 1990 and 2000.

33. In this way, the UNIDO Study could establish the world and regional context in which plans for new petrochemical plants in developing countries could be made. The UNIDO Study should also help those responsible for establishing petrochemical projects to justify to their authorities the large investment required. Since the petrochemical industry produced synthetic products that competed with natural products, there was a need for the Study to show why petrochemicals

were needed. In this connection, the experience of developing countries that had already established an integrated petrochemical industry was relevant. The Panel stressed the importance of establishing downstream processing industries as a basis for the local production of basic and intermediate petrochemicals. This aspect needed more emphasis in the UNIDO Study and it was felt that the experience of countries such as Brazil, Mexico and the Republic of Korea could be examined in detail.

34. Some participants expressed surprise that the Study did not consider the petroleum refining capacity available in the world; the growth of the petrochemical industry in many countries would depend on refineries for its raw material. It was, therefore, suggested that the Study should cover petroleum refining as well as petrochemical production.

35. Interest was expressed in the estimate that in 1977, 78 per cent of the cost of producing ethylene was attributable to feedstock, compared to 42 per cent in 1973, that is, before the increase in oil prices. The participants felt that since the pattern of production costs and feedstock prices varied considerably from one location to another, examples using other locations and different feedstock prices should be considered in the Study.

36. Some participants corrected the statistical information for their countries detailed in the Study. The UNIDO secretariat welcomed these corrections and other comments and indicated that they would be taken into account when the Draft Study was revised.

The growth of the petrochemical industry in the world up to 2000

37. Participants from developed and developing countries viewed the growth of the petrochemical industry in the world up to 2000 in different ways. Participants from developing countries stressed their interest in discussing, not only the potential for further growth of the industry, but also the share of total output which developing countries should achieve by the year 2000. It was appreciated that the 25 per cent share of world output was a figure that was adopted at the Lima Conference for the industrial sector as a whole. The petrochemical industry, however, used raw materials that were abundant mainly in developing countries. Petrochemicals was, therefore, one of the sectors of

industry on which the Lima Declaration and Plan of Action placed special importance and there was every reason to expect that developing countries should be able to produce at least 25 per cent of total world petrochemical output by the year 2000.

38. Participants from developed countries pointed out that the growth of the petrochemical industry in Western Europe had been very rapid in the 1950s and 1960s, slowed down in the early 1970s and virtually stagnated after the rise of oil prices at the end of 1973. In Japan, growth also slowed since 1973. Demand had fallen in the United States of America after 1973 but had reached a new high level in 1977; however, it was pointed out that oil and gas prices in the United States were still below international levels. Forecasts of the level of demand in developed countries should take that background into account; it was certainly most unlikely that consumption in 2000 would be almost four times the current level, as the Study forecast.

39. It was suggested that petroleum resources were so valuable that they might eventually need to be reserved for their most productive use - the production of petrochemicals. Although oil and gas would continue to be a major source of energy up to 2000, some petrochemical companies had begun to examine possible alternative sources of feedstock that could be used, such as coal, wood, gas from municipal waste, vegetable oils and other agricultural sources. The alternative feedstocks were not petroleum-based.

40. Another possibility was that as the world shortage of hydrocarbons became more serious, the advantages of locating new petrochemical production facilities in oil-producing countries would be more actively considered.

In that connection, it was suggested that oil-producing countries should concentrate on the production of basic and intermediate petrochemicals. The markets for those products was generally more open to suppliers without tied outlets, and the products did not require intensive technical services to be offered on the spot to customers. Final products such as polymers and detergents, which require special distribution facilities, were generally more difficult to export.

41. It would be important for the Consultation Meeting to consider (a) which products developing countries might supply to world export markets in the future and (b) what type of co-operation would be needed to facilitate such exports.

Some oil-producing countries might wish to assist in the establishment of processing industries in other countries; such industries could act as a tied outlet for part of their production of basic and intermediate petrochemicals.

Co-operation with developed countries required to develop the petrochemical industry in developing countries

42. The Panel saw a need for international co-operation to cover principally three areas: markets, financing and technology. As regards markets, when a developing country established an integrated petrochemical complex, it would be interested in exporting that part of the production surplus to its domestic requirements. Assistance with the marketing of such surplus production could be the subject of an agreement with a partner from a developed country.

43. It was recognized that free trade is important for all producers wishing to sell in world markets. Tariff and non-tariff barriers for final products as well as basic and intermediate petrochemicals should, therefore, be examined by UNCTAD as a basis for consideration in multilateral trade negotiations. The need for some developing countries to protect their newly established petrochemical industry was also acknowledged.

44. As regards financing, the order of magnitude of the investment required to build petrochemical industries in developing countries was examined in the Study; the requirements were so large that it would be important to consider in what forms such financing might be provided. If there was to be reliance on joint ventures and foreign investment, there might be a need to discuss the investment guarantees that developing countries could provide at the Consultation Meeting.

45. Technology was considered the focal point in co-operation between developed and developing countries. Co-operation in technology involved the acquisition of technical knowledge that would enable the recipient country to enhance its technological capabilities and to plan and execute specific petrochemical projects in the future with a maximum participation of the country's own resources; it also involved training, assistance in operating plants, access to manufacturing know-how, assistance in the development of new product applications etc. Such technical co-operation was usually best obtained from experienced petrochemical producers in the form of a joint venture.

46. Joint ventures with an experienced petrochemical producer would often be mutually advantageous because the foreign partner could (a) help to market the products in export markets; (b) train management and skilled personnel in operating the plant; (c) contribute his own manufacturing know-how; and (d) share the heavy cost of investment. In exchange, the developing country could offer reliable supplies of raw materials to the joint venture under a long-term contractual agreement and contribute its own skills in marketing in the domestic market. The Panel noted that the price of raw material supplies was often a critical point in the successful conclusion of such joint-venture negotiations.

47. Petrochemical companies and national and international oil companies that had started petrochemicals as an additional activity should, therefore, play a very important role in developing the petrochemical industry in developing countries. They should be invited to participate in the Consultation Meeting and in the Global Preparatory Meeting that might be held prior to the Consultation Meeting.

Co-operation between developing countries in the petrochemical industry

48. The need for developing countries to combine their markets and resources was stressed by the Panel. The combining of markets offered the opportunity to produce a broader range of products in larger size manufacturing units. Such co-operation within a group of developing countries could lead to the establishment of units producing basic and intermediate products in some countries and units producing final products in other member countries. The precise form of such co-operation might be considered at the Consultation Meeting.

49. Developing countries without previous experience might consider the construction of a plant of the same size and design as built in another country. If such a duplicate plant was constructed, the saving in engineering costs might be as much as 10 per cent of the cost of the whole project; furthermore, training would be facilitated and the plant could be completed at an earlier date. It was common practice to duplicate plants within the same country; the approach offered opportunities for increased co-operation between developing countries.

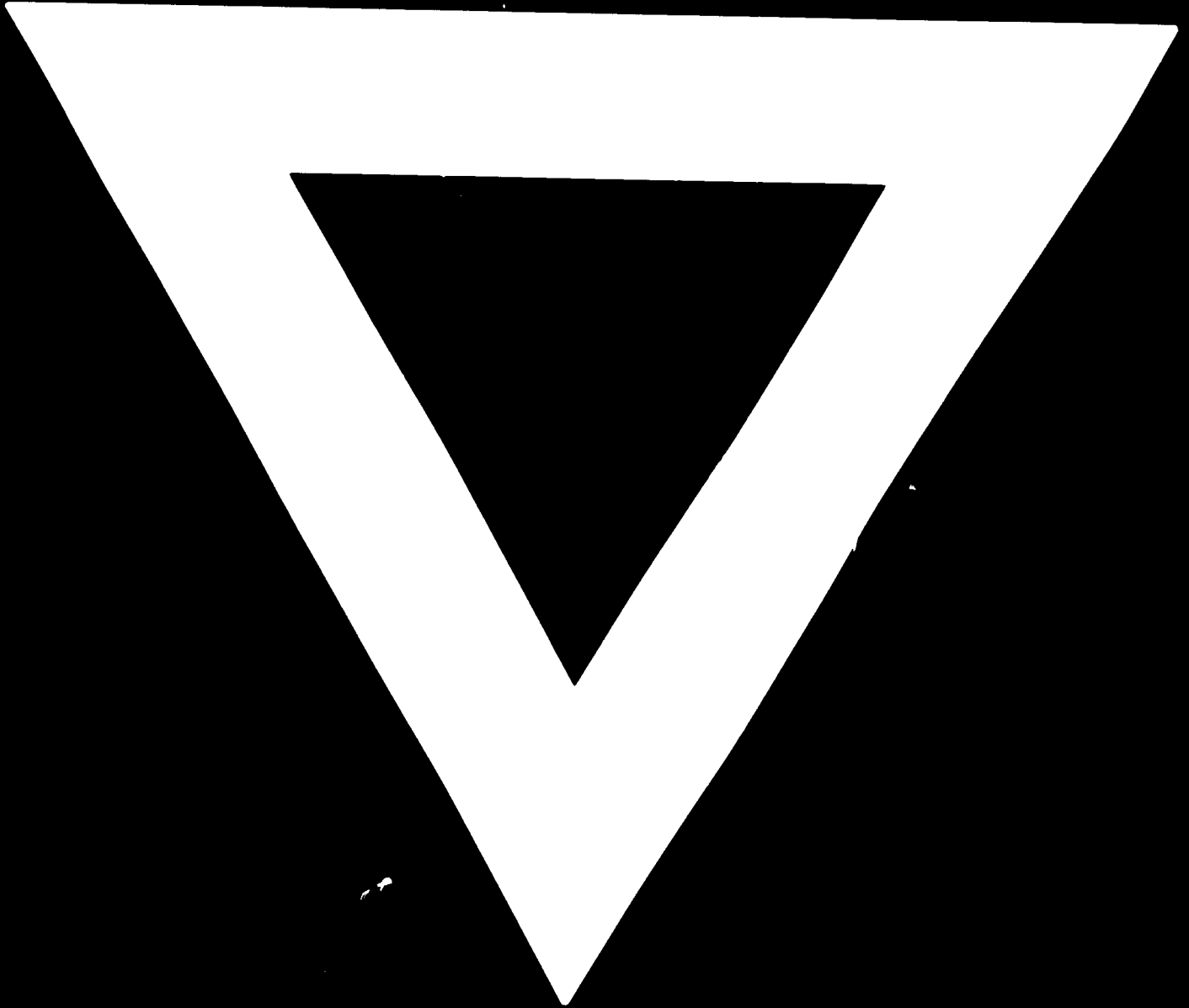
Annex

LIST OF DOCUMENTS

- ID/WG.268/1 Japanese co-operation with developing countries for establishing petrochemical industries
Yoshiniko Hirakawa
- ID/WG.268/2 Ways and means in which to develop the internal market for plastics in developing countries and the form which international co-operation could take
C.A. Brighton
- ID/WG.268/3 Development and outlook of the petrochemical industry in Mexico
F. Manzanilla
- ID/WG.268/4 Summary of the draft world-wide study of the petrochemical industry
Secretariat of UNIDO
- ID/WG.268/5 The growth of the petrochemical industry in the world up to the year 2000 - Topics suggested for discussion
Secretariat of UNIDO
- ID/WG.268/7 List of participants
- UNIDO/EX.25 First Meeting of the Panel of Industrial Experts on the Petrochemical Industry, Vienna 20-21 June 1977 - Report of the Meeting



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