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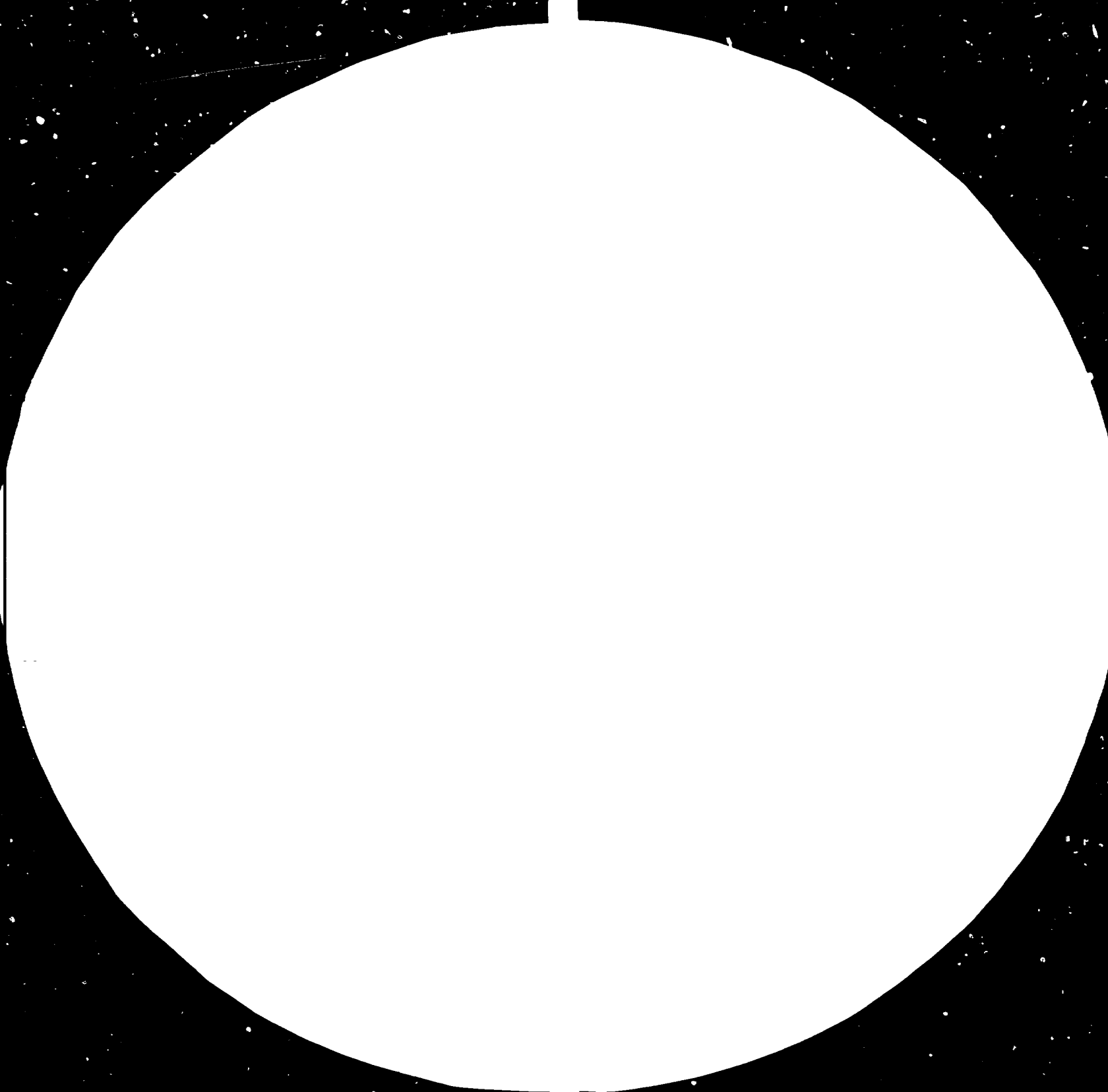

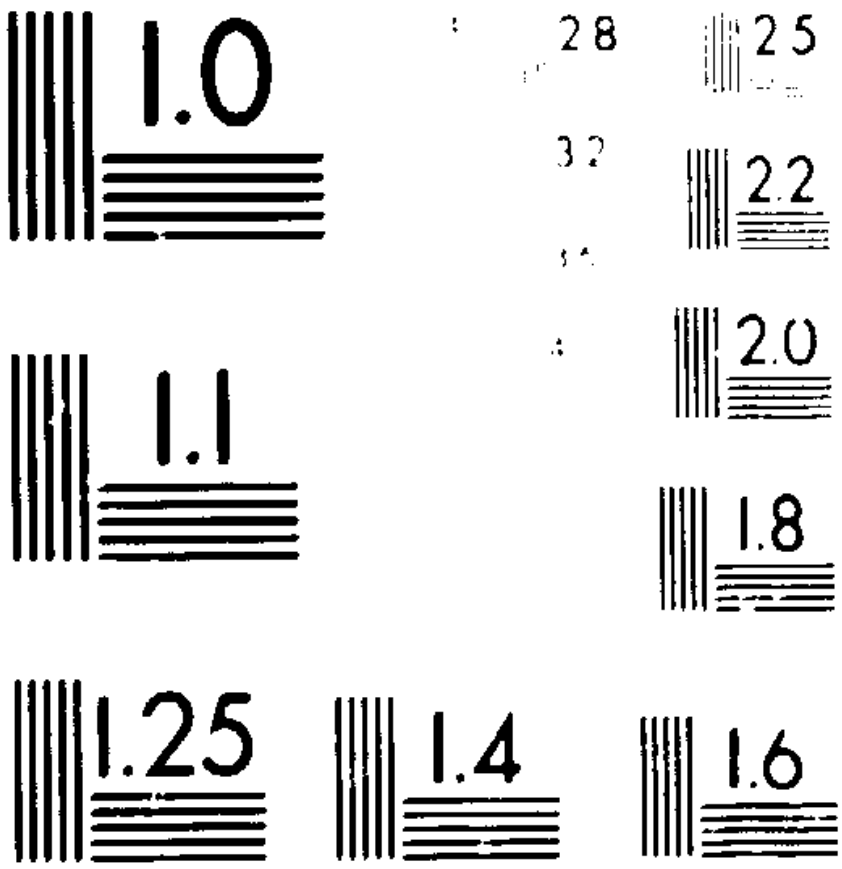

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LONG-TERM ARRANGEMENTS FOR PETROCHEMICAL DEVELOPMENT.
Co-operation between the European CMEA countries and developing countries

Sectoral Working Paper Series

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SECTORAL WORKING PAPERS

In the course of the work on major sectoral studies carried out by the UNIDO Division for Industrial Studies, several working papers are produced by the secretariat and by outside experts. Selected papers that are believed to be of interest to a wider audience are presented in the Sectoral Working Papers series. These papers are more exploratory and tentative than the sectoral studies. They are therefore subject to revision and modification before being incorporated into the sectoral studies.

This document was prepared by Mr. O. Mesaros, Head of Section, Office of the Prime-Minister of Czechoslovakia, as UNIDO consultant. The designations employed, the presentation of material and the views expressed in this document are those of the consultant and do not necessarily reflect the views of the UNIDO secretariat.

Preface

As part of its study programme on petrochemical industries, UNIDO has commissioned the preparation of this research paper. It presents an input to a wider study on the petrochemical industry which is being prepared as background document for the Third Consultation meeting on the industry. Following the recommendations of the Second Petrochemical Consultation to study all forms of co-operation and long-term arrangements, this paper presents another facet of industrial development through certain types of co-operation and trade relations established by ECMEA countries and the developing countries. In its efforts to explore different forms of co-operation which could be utilized by the developing countries to accelerate the development of the petrochemical industry, UNIDO is introducing this paper which was prepared by its consultant, Mr. A. Mesaros, Chief of Section, Office of the Prime Minister, Prague, Czechoslovakia.

The document is presented in the Sectoral Working Paper Series in the hope that it may stimulate a discussion of various forms of co-operation arrangements.

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Explanatory notes

References to dollars ($) are to United States dollars, unless otherwise stated.

A comma (,) is used to distinguish thousands and millions.

A full stop (.) is used to indicate decimals.

A slash between dates (e.g., 1980/81) indicates a crop year, financial year or academic year.

Use of a hyphen between dates (e.g., 1960-1965) indicates the full period involved, including the beginning and end years.

Metric tons have been used throughout.

Besides the common abbreviations, symbols and terms and those accepted by the International System of Unites (SI), the following abbreviations and contractions have been used in this report:

Economic and technical abbreviations

CMEA	Council for Mutual Economic Assistance
ECMEA	European Council for Mutual Economic Assistance
IBRD	International Bank for Reconstruction and Development
R and D	Research and Development

INTRODUCTION

Economic growth and the restructuring process which has taken place in the European CMEA countries since 1950 has had an evident importance for the trade and economic relations with developing countries. Trade with developing countries was the dynamic component in comparison with other regions at the early stage - over the period 1950-1965 though it started from a very low initial level. Between 1965 and 1980 exports to developing countries continued to be the fastest rising export component exceeding the growth of imports. The excess of exports over imports was mainly due to trade with OPEC member countries. This trend is still continuing.

As far as the commodity structure is concerned, the share of machinery in exports has risen and that of all major other commodity groups, except chemicals, declined. Foodstuffs and fuel have become together with raw materials very important import commodities. Regarding imports of manufactures from developing countries, they have sharply declined during the seventies.

Seen from the viewpoint of the developing countries, co-operation aims particularly at:

- The implementation of structural changes through industrialization, the contribution to the foreign trade balance by means of import substitution or export oriented production and improvement of living standards in accordance with the plans of socio-economic development.

- The creation of permanent jobs, the improvement of technological standards of production and technical training, introduction of new products and production technologies and advanced management methods.

The benefits to the developing countries from the trade with the European CMEA countries could be seen in delivering significant amounts of machinery and equipment for their national development programmes on credit provided on

very lenient terms. The opening up of markets in the European CMEA centrally planned economies meant securing additional export possibilities to such countries like Algeria, Argentina, Brazil, Ethiopia, Ghana, India and Syria.

Bilateral government to government agreements and other arrangements including the settling of balances in non-convertible currencies had its advantages. Such arrangements, having in mind shortage of convertible currencies in most of the developing countries, contributed to the import potential while simultaneously securing a market for exports. They frequently stipulated repayment of loans with traditional exports or with the output of aid-financed projects in these countries, made the burden of debt servicing easier than it would have been, had repayment been made in convertible currency.

The most significant aspect from the point of view of the developing countries is the interconnection of trade with aid extended by the European CMEA countries for the construction of specific projects closely related to their national development programmes and their national needs. According to the ECMEA statistics, at the end of 1982 over 4,900 infrastructural and industrial projects had been or were being implemented with the assistance of the European CMEA countries. Many of these have been effective and greatly contributed to the economic development of the developing countries.

1. FORMS OF ECONOMIC CO-OPERATION, TYPES OF ARRANGEMENTS AND SECTORS OF INDUSTRIES INVOLVED

European CMEA (ECMEA) countries' economic co-operation with the developing countries during the fifties as well as sixties was based upon classical foreign trade operations. The ECMEA trade profile had reflected international division of labour according to classical lines, i.e. exports to developing countries being around two-thirds machinery and equipment and on the other hand, imports from developing countries consisted of foodstuffs and raw materials. Seen from the side of the developing countries the magnitude of trade on the whole has not been high up to now. Exports to the ECMEA countries have accounted for between 3 and 4.5 per cent of the total exports of the developing countries and imports for between 4.5 and 6 per cent of their total imports. As already said in the introduction, the benefits to the developing countries from trade with the ECMEA countries have been among others in integrating machinery and equipment deliveries with the national needs, advantageous credit terms, repayment of loans with local produce and/or in non-convertible currencies.

The classical foreign trade operations were gradually complemented by more advanced forms. This direction, which became substantially more important during the seventies, is related to the call and objective need for a qualitatively higher and entirely new international division of labour. The present stage could be characterized as a stage of transition to more advanced forms, although the basis of co-operation continues to be represented by traditional forms related to simple exchange of goods and services as well as implementation of investment development programmes and/or projects based on bilateral agreements or executed through United Nations specialized agencies. This is particularly true with respect to the petrochemical industry.

In the industrial co-operation with the developing countries the ECMEA countries have applied the following forms and types of arrangements:

- Delivery of machinery and equipment, complete production lines and/or factories, with their repayment in the form of products manufactured by these plants or other products manufactured in the country;

- Transfer of technologies and their repayment in the form mentioned above;

- Granting of technical assistance, technical training and education in specific cases free of charge;

- Establishment of joint ventures; and

- Tripartite co-operation (both forms have been utilized so far only partially).

Co-operation activities have been extended in both mining and manufacturing industries. In mining it has covered the following areas:

(a) Geological prospecting activities;

(b) Rendering of technical know-how and preparation and evaluation of mining projects;

(c) Assistance in exploitation of resources through the supply of drilling equipment, erection and in mining;

(d) Construction of pipelines, oil refineries and other activities.

Co-operation of this kind has been implemented with several developing countries, e.g. Iraq, Syria, Algeria, Venezuela. In the case of Iraq, co-operation has been based on agreements signed with the Iraqi National Oil Co. by the USSR, Czechoslovakia, Romania, Bulgaria and Hungary. Oil refineries were built by Czechoslovakia in Syria (Homs) and Iraq (Basra and Sallahudin). Credits extended to Iraq have been partly repaid by the supplies of crude oil.

As far as manufacturing industries are concerned, ECMEA countries have particularly assisted the developing countries in iron and steel, capital goods, building materials, food processing and leather industries. Except for refineries mentioned earlier, there has been hardly any important participation

in petrochemical development. A number of joint ventures of both commercial and production nature have already been established in the developing countries in pharmaceutical industries (Bulgaria and Hungary) and wood working industries (Romania).

The following principles and ways are therefore expected to be much more frequently applied between the ECMEA and developing countries:

(a) Preparation and implementation of integrated programmes in the fields of research, design, technology development, production and exchange of goods. Through specialization and co-operation the developing countries will gradually become permanent and important suppliers of many industrial products. This is not an easy task. Such approach requires several prerequisites and conditions to be fulfilled e.g. mutual planning, strengthening of supplier-customer relations, improved knowledge of markets, technological improvements and product adaptations;

(b) Comprehensive transfer of technology will be required combined with manufacturing entrepreneurship oriented towards manufacturing new products that have not been produced in the country and towards improving technological standards of existing production in the branch and with spin-off effects on the industrial sector as a whole;

(c) Joint construction of industrial projects, including participation of foreign suppliers in production, management and product sales;

(d) Increasing role of tripartite co-operation using wide positive experience of industrial co-operation between ECMEA countries and market economy developed countries as well as the more advanced developing countries.

It appears, considering the application of the above outlined approaches to the international division of labour, that ECMEA countries are natural partners of developing countries. From the very substance of the ECMEA countries' economic system, in which the state plays a decisive role being in command over internal and external economic activities of the respective country, stems that the mentioned principles of international economic

co-operation should be applied in practice. Governments of these countries have a strong central planning and monitoring organization capable of undertaking formulation and implementation of development plans.

The socialist states as entrepreneurs of a special kind are interested in securing high profitability of any industrial unit they help to establish but only as a means to reach, as efficiently as possible, national economic objectives. When making decisions whether to join an industrial co-operation scheme with a particular developing country, they have in mind the long term national economy objectives of both (all) partners and ways and means to reach them efficiently and in a mutually advantageous way. It is quite evident that this approach differs from those established by the market economy countries and offers very different possibilities for industrial co-operation with developing countries.

Achieving any measure of success in attaining these principles, it can be possible only, if there is a joint effort made in the above briefly described directions both by the developing and the socialist countries. It is particularly true with respect to government interest in formulation and implementation of economic development plans, participation in industrial activities and direct intervention in certain industries. The special features of some industrial sectors like capital goods, iron and steel, energy, petrochemicals and building materials with complex backward and forward linkages, long gestation and recoupment period, capital and technology intensive, call for long-term comprehensive planning to be able to effectively contribute to a harmonious development and integration with the national economy.

The main areas of co-operation by the ECMEA countries in building up industries in developing countries have so far been in the following sectors: energy, iron and steel (including the raw material base), mechanical and electrical engineering industries, non-ferrous metallurgy and building materials. Regarding petrochemicals, co-operation has been extended towards refineries. The ECMEA countries, while having been able to continue in this

activity, they themselves, import certain machinery and equipment for petrochemical, semi-finished and finished products from the market economy developed countries.

Intergovernmental agreements on economic, scientific and technical co-operation supported and implemented through contracts concluded between trade and industrial organizations or enterprises of the ECMEA countries and corresponding institutions in the developing countries have been the institutional framework for the above-mentioned activities.

2. MODALITIES AND MUTUAL BENEFITS OF ARRANGEMENTS

Co-operation in establishing industries in developing countries is usually a part of a much broader framework of overall agreements on economic, scientific and technical co-operation between the ECMEA countries, long-term intergovernmental agreements on economic, scientific and technical co-operation. These agreements identify the main directions and field of mutually advantageous co-operation, lay down the guidelines to be followed in implementing the co-operative endeavours in various sectors and usually contain the provisions for setting up the appropriate institutional framework. For the developing countries, such comprehensive long-term agreements take on added importance in view of the complex and long-term task of restructuring and modernizing their economies involving building up of various sectors of industries, expanding the technological and research base and upgrading the level of manpower skills throughout the economy. Within the framework of intergovernmental agreements it is possible to tie co-operation measures in specific industries with programmes in related industrial, scientific and training fields.

The intergovernmental agreements of a general nature are usually supplemented by agreements extended by the ECMEA countries in implementation of individual large projects and the development of certain sectors. This type of agreement was concluded e.g. between the USSR and India in case of major projects in iron and steel and heavy engineering industries. Due to the complexity of petrochemicals, specific intergovernmental agreements on co-operation in this sector might prove to be suitable instruments. This applies in particular to developing countries where the state sector assumes the leading role in specific industries.

With increasing volume and complexity of economic co-operation under the above-mentioned intergovernmental agreements, new organizational forms emerged in the 1960s: the permanent intergovernmental commissions for economic, scientific and technical co-operation. These joint commissions are set up by the respective ECMEA and developing countries with the tasks of analysing the state and main problems of co-operation between the partner countries, working out jointly measures to be taken to stimulate trade, economic production,

scientific and technical links, co-ordinating actions of the partner countries, and dealing with practical issues arising in the course of implementation of the agreed co-operation schemes. Within the commissions, specialized working groups are usually set up to deal in more detail with various fields (e.g. trade and finance, industry, agriculture, science and research etc.).

In some cases, joint intergovernmental commissions have been set up for co-operation in specific industrial sectors, again being structured into various working groups. Thus e.g. the joint German Democratic Republic-Syria Commission deals inter alia with co-operation in electrical power engineering and the construction of cement plants in Syria. Though such specialized joint sectoral commissions working on a permanent basis are still only few, they may be considered a very promising type of an institutional set-up for the effective formulation and implementation of the co-operation programmes in the area of other specific industries.

The establishment of such permanent specialized commissions is connected with the recent trend towards concluding the agreements at the ministerial and departmental levels. In the USSR the industrial ministries are now responsible not only for the construction of specific enterprises in the developing countries under intergovernmental agreements, but also for organizing industrial co-operation, supply of spare parts and maintenance of machinery and equipment delivered abroad. In discharging these duties, the ministries are vested with the authority to conclude interdepartmental agreements with departments in partner developing countries.

An important element in improving the mechanism for co-operation can be seen in the establishment of closer direct contacts between the central planning bodies of the socialist and developing countries. Such long-term contacts are a key prerequisite for achieving the important aim of creating, through co-operative efforts, mutually complementary economic structures in the dynamic process of industrialization of developing countries. There are differences in character and role of planning in socialist and developing countries. However, the accumulated experience of the ECMEA countries' co-operation with planning agencies in some of the developing countries (e.g.

India) shows that it is possible, based on adequate economic pre-conditions, to create a system for at least partial co-ordination of industrial plans. In addition, the close co-operation of planning agencies facilitates exchange of experience on planning techniques, contributes to better understanding of planning mechanisms in partner countries, which by itself, enhances the scope of more efficient and flexible co-operation in various industrial sectors. Such approach in co-ordination of industrial activities could lead to further improvements in industrial co-operation and specialization including the introduction of qualitatively new intergovernmental agreements on industrial co-operation.

At the level of corporations, the intergovernmental agreements on co-operation are usually filled with a concrete content and implemented through contracts concluded between trade and industrial organizations (enterprises) of the ECMEA countries with corresponding organizations in developing countries. Thus e.g. in the USSR, Neftechimpromexport supplies oil refineries, petrochemical and chemical plants. Sojuzchimexport deals with exports and imports of petrochemical semi-finished and finished products, Sojuznetexport deals with crude oil, gasoline and various other petroleum products. In Czechoslovakia, Technoexport is involved among others in the design and supply of oil refineries, the Polish association, Polimex-Cekop, specializes in exports of complete plants, in particular sugar and chemical industries, including all the necessary technical assistance.

In response to the requests from developing countries, the ECMEA countries became increasingly involved in establishing joint ventures with partners in developing countries. Admittedly, the majority of these joint ventures are mixed trade companies aimed at promotion of two-way trade relations. However, this entrepreneurial form of co-operation is gradually being applied in industrial production activities. Joint ventures have been set up in pharmaceutical, wood working and also in mechanical and electrical engineering and in metal working industries.

Another form of closer co-operation which does not involve equity participation of socialist countries are buy back arrangements which have been successfully practiced in particular in raw material extraction and processing

sectors. Under these arrangements, the socialist countries provide a comprehensive assistance in carrying out, and sometimes, operating the projects. The cost of assistance which is covered by long-term credits is repayed by deliveries of the output of the established industrial plants. The buy back arrangements often extend beyond the limits of loan repayment thus providing a permanent market for the newly established capacities in developing countries. Although the buy back agreements have the largest scope of use in the mineral resources sector, they can be also used as an effective instrument for promoting the participation of socialist countries in establishing other industries. Thus for example, it was envisaged that Czechoslovakia's participation in building up heavy and light engineering industries in Iran would be combined with compensation agreements providing for long-term supplies of Iranian natural gas, oil and petroleum products.

The ECMEA countries organizations started entering into agreements with state and private companies in developing countries on specialization and co-operation in production with good prospects existing in mechanical engineering, metalworking, agricultural machinery and transport equipment industries. Due to the difference in the industrial development level between socialist and developing countries, specialization and co-operation have initially started with socialist countries supplying parts, units and certain types of materials to be used in the manufacturing industries of the developing countries. Gradually, with the technical assistance of the socialist countries, the share of locally-made components is being increased and finally, the developing countries enterprises start supplying final products and/or components to the partner organizations in socialist countries.[1/]

There are possibilities in expanding this type of co-operation and exports of developing countries to centrally planned economies not only concerning parts, components and units for cars and trucks, tractors, freight cars, electric motors, some types of machine-tools, consumer durables but in

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1/ See The Industrial Co-operation of the Soviet Union and the other CMEA Countries with Developing Countries, paper prepared for UNIDO by Mr. L.Z. Zevin, ID/WG.293/9.

petrochemical products as well. Through this type of specialization and co-operation in production a stable base is being built for a new pattern of international division of labour resulting in export of manufactures from developing countries thus increasing the share of manufactures in their trade.

The need for adopting a complex, long-term attitude in developing co-operation between the ECMEA and developing countries is linked to the principle of mutual advantage. At the operational level, the application of the principle of mutual advantage in the area of industrial co-operation requires an assessment of the benefits that are to be derived by both developing and ECMEA countries from the implementation of the co-operation programmes.

The long-term economic relations based on mutuality of advantages between the ECMEA countries and Syria could be cited as an example. Co-operation has been based on mutual trust, confidence and interest fully supported by political approval. At the level of each government there is an agreement on economic and technical co-operation supported by intergovernmental commissions, specialized committees at the ministerial and departmental levels, working groups and various contracts between trade and industrial organizations, institutions and enterprises. It is important to mention that between central planning commissions there are direct contacts which are a key prerequisite for long-term mutual economic and investment planning and co-ordination.

The ECMEA countries provide credits to supply machinery, equipment, other goods including project studies and reports with respect to various industrial plants. Such projects as oil refineries, lubricating oils, rubber tyres and others have already been built. Credit conditions have generally been as follows: 10 per cent downpayment, 90 per cent credit with 2.5-6 per cent interest extended up to 10-12 years with one year of grace period. Payments have been made partly in kind and partly in convertible currencies. Centrally planned economies imported various goods of manufacturing industries as well as raw materials e.g. cotton and cotton products, phosphates and products, fertilizers, consumer goods including handicrafts and for the future such products as lentils, shoes and other leather products and detergents.

3. CRITERIA IN PROJECT SELECTION FOR INTERNATIONAL ARRANGEMENTS

When it comes to identifying mutual interests of the participating countries, assessing the efficiency of various alternative industrial co-operation schemes and, considering the issue of distribution of benefits, the need arises for a methodology to be established at the international level. In regard to bilateral co-operation between individual ECMEA and developing countries, mechanisms and procedures have been gradually established and have been functioning well. These comprise meetings of the heads of state and government representatives, a system of consultations at various levels, intergovernmental agreements and permanent intergovernmental commissions for economic, scientific and technical co-operation, working contacts among planning organizations etc. The experience shows that, provided the adequate institutional set-up is formed, the more comprehensive the range of co-operation activities, the greater the possibilities of identifying the areas of mutual interest and balancing the benefits derived from the totality of co-operative endeavours of the countries concerned. The mechanism for multilateral co-operation among the ECMEA and developing countries is only beginning to function. This form of co-operation offers additional possibilities of expanding co-operation in this field, at the same time facilitating the achievement of higher levels of efficiency than bilateral co-operation.

One of the basic features of the socialist countries' co-operation with developing countries is the unity of approaches and principles applied at both the governmental (macro-economic) and enterprise (micro-economic) levels. This is an intrinsic characteristic of the socialist economic system which is based on the social ownership of the means of production. Planning at macro, sectoral and enterprise level is used as an instrument for securing the co-ordination and harmonious development of economic activities including those related to developing countries.

A national strategy for economic, social and industrial development should provide a basis for co-operation, i.e. planning, identification of projects and programmes, their formulation, evaluation and implementation. The successful programme of co-operation depends on the proper selection of

sectoral programmes and projects, which is a continuous process and one of the basic components of mutual industrial planning. A real base for effective collaboration is the industrial plan which lays down the social objectives and priorities between industrial sectors and regions. A realistic co-operation, its initiation and/or effective extension, can hardly be promoted without proper national project planning and evaluation.

A national development plan is the best framework for the preparation and evaluation of projects which could be at the same time negotiated for mutual co-operation at various international levels. There are several phases of project development being taken as an integrated process which may be divided into project preparation, its evaluation and implementation. As far as project appraisal and execution are concerned, these two stages are possibly subject related to international negotiation and arrangements. It is at the same time important to point out that the project, developed at the national level which is later taken for bilateral and multilateral evaluation and eventually implementation, should not only be properly prepared but subsequently evaluated at the national level. It should be noted that the ultimate success of an investment decision at the international level depends equally on both of the above-mentioned stages.

The use of limited resources is in each country subordinated to its own development objectives. Once these objectives are established and ranked for a certain period of time, industrial projects should be prepared in order to determine to what extent they can contribute towards the desired results. In order to improve investment decisions, there are criteria for selection, modification and/or rejection of industrial investment proposals. Such criteria serving as methodological tools should assist in answering several principal questions, e.g. whether the limited resources will be used efficiently in a particular project, or whether alternative investment project proposals would contribute more efficiently towards national objectives. At the same time, they should aid in the modification of projects in order to make their national as well as commercial contribution more positive.

For the evaluation and selection of a project it is an indispensable, though sometimes rather elaborate task, to have some kind of advantage over other possible candidates. Thus feasibility of a project should be based on the net financial benefits accruing to the owners of the project as well as on the net overall impact of the project on the whole national economy. This method of project selection is based on the technique of commercial and national profitability calculation applied already to various degrees in the CMEA and developing countries.2/

These countries, due to different types of economic systems, and having been at various stages of development, apply specific management methods and tools but with the same goal, i.e. seeking rationality and competition in the utilization of relatively limited resources. Whatever the interest is, the core of the evaluation process in both groups of countries is somewhat similar. They compare costs and benefits of the project both at commercial and national profitability levels in a way that facilitates its comparison with other candidate projects. They identify inputs and outputs, appropriate prices for both in order to calculate the respective values of costs and benefits.

As far as commercial profitability is concerned, it is usually the first step in investment project evaluation. It comprises investment profitability and financial analyses. The investment profitability analysis could be assessed either by simple or by discounted cash flow methods (net present value, internal rate of return). The financial analysis includes liquidity and capital structure calculations. In addition to this, some kind of ratios and indicators have been applied in evaluation exercises, e.g. capital/output, capital/labour, production costs per unit, local versus imported raw materials, energy intensity, etc.

2/ There are various national schemes for project evaluation and implementation within and/or outside the planning system based on the theory and to various degrees adapted to operational needs. Apart from this, several guidelines and manuals have been prepared by UNIDO and IBRD.

For measuring a project's contribution to the national economy, the mentioned commercial profitability calculations may not give a good picture and may not be always a good guide. As in the case of commercial profitability for national profitability calculations, several criteria with various degrees of sophistication are being applied at the national level. Apart from the value added criterion (net, national, total including indirect), as the main device for measurement of the impact of a project on the national economy, there are additional criteria being used particularly in the ECMEA countries, e.g. environmental implications, employment effects, foreign exchange implications, increasing the international competitiveness of export products, price adjustments, adjusted rate of foreign exchange, and social rate of discount. The selection of a social rate of discount is particularly relevant not only regarding domestic investments but in this case, in relation to investment abroad.

What has been said above with respect to the process of industrial project evaluation and selection is equally important at the international level for both the ECMEA and developing countries not only with respect to the so-called national projects without external participation, but also for those projects for which a developing country is going to seek capital abroad or foreign participation. The evaluation exercises at the national level would become a prerequisite for international negotiation on contractual arrangements. In the period of negotiation, additional aspects both political and economic, should be considered; e.g. advantages coming from the new international division of labour, a need to exchange technology for raw materials and foodstuffs, competitive prices of machinery and other products, a need for subsidy to technology exporters and selection of proper forms of arrangements (barter, buy back, credits, etc.).

The above-mentioned criteria and the process in project selection for international arrangements have been with certain adjustments applied in all cases, some of which will be discussed in subsequent parts of this paper. It is well known that in practice, there are a number of obstacles preventing full or even partial application of efficiency criteria at the national level which greatly affects the quality of international negotiations and of various arrangements. The same set of efficiency criteria could be, however, used in

project evaluation and selection in the course of international negotiation. Such sort of substitution is hardly possible if the main components of management systems are weak or missing (national and sectoral firm objectives, planning, statistics, etc.). These realities should be taken seriously by policy makers in order to create conditions which will improve investment decisions and increase mutual effects arising from international co-operation.

4. TYPE OF INVOLVEMENT OF THE PARTIES TO SUCH ARRANGEMENTS

Generally speaking, long-term arrangements of co-operation between the centrally planned economies and the developing countries in the field of industry represent different modalities of the mutually advantageous transfer of technology from the former countries to the latter ones.

The receiving party is interested in acquiring access to advanced technology and, eventually, in acquiring full control over the advanced means of production with a view to foster its economic and social development. Consequently, apart from the so-called technology hardware (i.e. machinery and equipment), developing countries have become increasingly interested within such arrangements in acquiring software and org-ware (i.e. skills, managerial and technical mastery, data, information etc.). In practical terms, this means the transfer of skills and knowledge to national entrepreneurs, managerial personnel, supervisors, designers, process engineers, operators and maintenance personnel.

From the viewpoint of the involvement of the parties to such arrangements, a number of different forms and combinations of various elements have found application in the field of industry, including the petrochemical industry. In this connection, we can distinguish among the following main elements present in the above arrangements: equipment delivery, technologies, training, managerial know-how, manufacturing, marketing, finance, research and development, etc.

In the field of industrial co-operation between the centrally planned economies and the developing countries, the most widespread form has so far been the delivery of complete industrial plants or lines for various sectors. The selection of plants to be established in co-operation with partners from the centrally planned economies is being made on the basis of long-term industrial development plans and programmes of the developing country concerned. Far from being restricted to simple delivery of machinery and equipment, these arrangements involve also the training of national personnel, technical assistance in launching the plant's operation and in reaching the

plant's full capacity. In some cases, they include also assistance in maintenance, know-how and skills, in the building of sale on third markets, etc.

Considering the importance of training for local personnel, the training package includes in many cases both the training of selected professions in the supplier's country prior to the erection of the plant and the training of professions and skilled personnel on the spot.

Machinery and equipment are being delivered on credits which may be either long-term governmental credits under advantageous concessional conditions or commercial credits. This is especially important for the developing countries with scarce foreign exchange. Perhaps the most significant feature of this type of arrangement, however, is represented by the fact that the training package forms an inseparable part of the arrangement, which is usually not the case with the partners from the developed market economy countries.

As we have seen, therefore, the above type of arrangement invariably involves the delivery of machinery and equipment and the training package. In addition, the so-called software is also present in many of these arrangements. Credit financing is another significant feature.

Another form of industrial co-operation is represented by licence or know-how agreements. Usually, these agreements involve the transfer of patents or know-how with respect to a certain industrial product or industrial process to be introduced in the developing country concerned. The two parties to the agreement agree to achieve the stated purpose through the transfer of know-how, drawings, manufacturing procedures, prescriptions, processes, etc.

As far as joint ventures are concerned, the partner from the centrally planned economy mostly contributes to the assets with machinery and equipment, technical documentation, know-how and technical assistance and shares in profits derived from their operation. Apart from equity investment and commercial credits, consulting services are often rendered in connection with the preparation and implementation of the project concerned. The management of joint ventures is usually undertaken on a parity basis.

A number of joint ventures belonging to different industrial sectors are in operation in the developing countries, involving the partnership with centrally planned economies. In the case of Romania, for example, there were 24 joint ventures functioning in the developing countries in 1980 that had been established by various Romanian enterprises and organizations and their local partners. These joint ventures are engaged in mining, oil industry, chemical industry, building materials industry, metalworking industry and wood working industries.

This kind of arrangement could be illustrated by means of two projects now under operation in Malta which have the form of joint ventures between firms in Czechoslovakia and Malta.

The idea of setting up such joint ventures emerged from talks between the management of the Malta Development Corporation (MDC) and the representatives of a Czechoslovak foreign trade corporation who visited Malta with the task to review the present economic situation as to the possibilities of raising the volume and level of mutual exchange of goods and services. The mission was stimulated by preceding intensification of political relations between the two countries.

Industrial co-operation was found to be the best instrument for the above purpose. The discussions ultimately concentrated on mechanical engineering as the most suitable sector to bring about new exportable products. In a basic agreement, vernier calipers and hydraulic components for machine tools were identified as products which could be manufactured in Malta on the basis of Czechoslovak know-how and technological documentation. Simultaneously, a memorandum on industrial co-operation was signed by MDC and Czechoslovak trade and manufacturing companies responsible for commercial and technical aspects of envisaged projects. The memorandum and articles of the association as well as its statute were agreed upon and two joint venture companies were set up and registered in Malta. The collaboration between the Czechoslovak foreign trade corporation and Czechoslovak manufacturers was regulated by contracts between them. The joint venture companies were named Hydraulic Units Ltd (HU) and Engineering Instruments Ltd. (EI).

Thus the contractual, legal and organizational arrangements were finalized and soon afterwards the construction of the buildings began while the first deliveries of machine tools and equipment from Czechoslovakia were dispatched before the end of 1976.

The motivation of the Maltese side was to create new employment opportunities and diversify exportable products. The Czechoslovak side was motivated (in addition to the wish to increase mutual trade) on the one hand by the need to free some capacities of selected TST factories for the expansion of the production of precision devices for numerically controlled (NC) machine tools (applies to EI) and, on the other hand, by the desire to replace imports from other territories (applies to HU). Given these motivations and the above form of implementation, the whole exercise can be safely classified as product transplantation, while of course no second-hand equipment was used in the newly constructed factories in Malta.

The companies in Malta are limited by shares, the shareholders being MDC (60 per cent) and the Czechoslovak foreign trade corporation (40 per cent). Their memorandum and articles of association and the statute comply in the form with the business habits in Malta and are formulated according to Maltese laws which stem from the British legislation. Specific modifications are regulated by the mentioned agreement on co-operation.

The Czechoslovak side delivered also, apart from the obligations resulting from various contracts, a considerable amount of technical assistance. About 40 qualified workers and technicians underwent free of charge training in Czechoslovakia for several months. The financing came from the technical assistance funds of the Government. Czechoslovak partners in the joint venture supplied several specialists not available in Malta, such as the technical manager, the financial supervisor, chief technologist and several foremen. Their wages enter the operation costs of the two companies.

The two companies provide jobs for some 500 people. The production started in the middle of 1977, first products were exported to Czechoslovakia towards the end of the same year, the break-even point was reached in the course of 1979, i.e. in less than two years from the take-off of the projects.

The total volume of the production, which by now is slightly less than $US 5 million, is being exported to Czechoslovakia. Along with the envisaged expansion of both joint ventures, a diversification of their product-mix as well as the markets will most probably take place.

Being aware of the fact that, from the long-term point of view, the transfer of technology and know-how alone is not enough for achieving industrial mastery and gaining full control over the production, many developing countries stress the need for co-operation in the building-up of their technological capabilities in the field of design, manufacturing processes, product development, research activities, etc. This type of co-operation arrangements is, as a rule, negotiated under long-term intergovernmental agreements on economic, scientific and technical co-operation. As of 1980, such bilateral agreements were in force between the European CMEA member countries and 80 developing countries of Asia, Africa and Latin America.

Within the framework of such agreements, an industrial co-operation arrangement was concluded between Czechoslovak manufacturers of JAWA motorcycles with a motorcycle assembly plant in Egypt. The contract provided for an extension of the Egyptian plant assembling Czechoslovak motorcycles CZ 125, CZ 175, CZ 250 and JAWA 350. The idea was to launch local manufacture of component parts in three stages. First stage - 16 per cent of local manufacture within one year, second stage - 40 per cent within a two-year period and third stage - 60 per cent within one year. The above contract included an engineering project, licence sale, deliveries of machinery and equipment, erection supervision, technical assistance and deliveries of components staged over the contract period of seven years.

A contract was also signed on co-production in the manufacture of IRIS 2350 irrigation sets between a Czechoslovak manufacturer and Helwan Diesel Engine Co. in Egypt. The set includes an Egyptian made Diesel engine and Czechoslovak pump equipment.

In the framework of intergovernmental agreements, a number of research, development and design organizations and centres have also been established in the developing countries in co-operation with the ECMEA countries. MECON

State Metallurgical Engineering Consultants Corporation in Ranchi, India, established in co-operation with the USSR can be mentioned as an example. The corporation has become one of the leading design organizations in India.

As far as the field of formal education is concerned, 56 colleges, specialized professional schools and 124 training centres have been established in various developing countries in co-operation with ECMEA countries in the course of the last three decades. In addition, approximately 100 such institutions are under construction. Besides that, an increasing number of students from the developing countries receive education at the universities, colleges and specialized professional schools in the centrally planned economy countries. In 1980 alone, the number of students, post-graduate students and trainees from the developing countries exceeded 41,000.

5. TYPE AND MODALITIES OF COMPENSATION

Under the arrangements which have been briefly described in the preceding section, the specific type of compensation varies depending on both the needs and possibilities of the two parties concerned.

In the case of the delivery of machinery and equipment including the plant's erection on credits, the compensation may be either in monetary terms specified in the credit agreement or in kind, or else, it may represent a combination of the two possibilities. The compensation in kind may involve either products manufactured by the plant established with the supplier's cc-operation or other exportable products of the developing country concerned. The repayment of the credit rendered by means of the products manufactured in the plant itself, when undertaken on a long-term basis and beyond the repayment period, represents in fact a higher form of industrial co-operation characterized by partial division of labour.

As an example, in a contract concluded in this respect between an ECMEA country and an investor, it was specifically stipulated that part of the instalment and interest was to be utilized for the purchase of crude oil available at respective ports at prices prevailing at the free international market. The two partners concluded also a general crude oil sale contract which specified the schedules of crude oil deliveries and other relevant conditions. The former contract included also a provision to cover a situation when crude oil would not be available to pay for instalments and interest on the dates of their maturity. In such a case, these amounts were to be paid in full on the date of maturity in free dollars in favour of the contractor.

Similar is the situation with respect to licence or know-how agreements concluded between partners in the centrally planned economies and the developing countries. Under such agreements, the centrally planned economy provides a package of technical information and know-how which normally is an object of industrial property rights. The licensee's payments are only for the right to use the set of knowledge and know-how. These payments may again be effected in monetary terms or in kind, through the supply of the licensed products or other type of products to be mutually agreed upon.

The pricing of goods entering the above arrangements is, as a rule, based on world market prices for the same or comparable products.

In other words, the prices of machinery and equipment supplied under these arrangements by the centrally planned economies to the developing countries are formed under the competitive conditions of the supply-demand position existing on the given market. Machinery and equipment must meet certain technical, performance and operational standards. Participation in international competition of tenders is a normal feature in this field. When reviewing various offers, the investor from the developing country is naturally inclined towards the most advantageous offer in terms of technical standards, delivery terms, payment conditions, delivery and erection time etc.

Analogical is the situation with respect to the pricing of products of the developing countries which are used under compensatory arrangements for the repayment in kind. Here, quality and price considerations are decisive for the acceptance of these products under such arrangements. Naturally, transportation costs and other relevant commercial considerations should also be taken into account.

In exceptional cases, the prices of goods entering such arrangements may differ, for various specific reasons, from the world market price level, e.g. prices of specific products may be higher than world market prices for comparable products. In such cases, the two parties usually agree to balance the above difference by means of pricing the counterpart products so as to maintain the terms of trade as unchanged under the arrangement.

Another type of specific cases which are related mainly to geological prospecting and extraction of minerals may also present certain deviations from normal pricing procedures. Under these arrangements, the partner from the centrally planned economy finances the prospecting work and, if positive, also mining and dressing. In exchange, he acquires the right of preemption to a certain portion of the output. The purchases made within the period specified in the contract are then effected either at world market prices or at preferential prices for the developing country concerned. These arrangements are, as a rule, used with respect to minerals of strategic importance in terms of their position at world markets.

Under normal circumstances, however, the arrangements relating to geological prospecting are also based on world market prices. They may take the form of joint ventures, equity participation or priority purchasing arrangements whereby the inputs by each of the two parties and corresponding outputs are valued on the competitive basis.

6. IMPACT ON ECONOMIC ACTIVITIES OF PARTNER COUNTRIES

International industrial co-operation is seen by the European CMEA countries as an element of mutually advantageous international division of labour on a long-term basis, to be backed by the creation of the necessary institutional framework and financial means.

This is advantageous for both the developing and ECMEA countries as both parties can take account of these arrangements in their long-term development plans and programmes.

International industrial co-operation between the ECMEA and developing countries is of relatively short history and has so far been oriented towards selected sectors and branches which have been considered most apt for international co-operation arrangements. Mostly, though not exclusively, it has been aimed at promoting the development of the public sector in the interested developing countries.

Recent data[3/] show that some 4,900 projects have been built or are under construction in the developing countries in co-operation with the ECMEA countries. Some 3,300 of them have already been commissioned and are in operation.

In a number of developing countries, these capacities have made a sizeable impact on their industrial structures and economies. Thus, for example, such capacities are responsible for 100 per cent of oil extraction in Syria, 90 per cent of steel output in Algeria, 100 per cent of oil extraction and automobile tyre manufacture in Ethiopia etc.

As of January 1980, the capacities built or under construction in co-operation with the ECMEA member countries are presented in the following table:

3/ Source: Co-operation of the CMEA member countries and the Council for Mutual Economic Assistance with the developing countries, Moscow, 1982.

Capacities	Provided for under agreements	Of which already commissioned
Electric power stations (million kW of installed capacities)	23	11
Steel (million tons)	30	8
Iron ore (million tons)	14	11
Coal (million tons)	22	3
Petroleum (million tons)	67	63
Petroleum products (million tons)	50	30
Bauxites (million tons)	2.5	2.5
Aluminium (thousand tons)	300	300
Mineral fertilizers (thousand tons)	200	200
Cement (million tons)	7	5

As can be seen, some of these capacities belong to the petrochemical sector including oil extraction and refinery.

In co-operation between the Soviet Union and Iraq, for example, an oil field in Northern Rumaila was put into operation; one of the largest oil refineries in the Middle East (6 million tons annually) was built in co-operation with Czechoslovakia at Basra. It is worth mentioning that in some cases such co-operation was preceded by participation in the construction of plants manufacturing equipment and spare parts for the oil industry. Refineries Salahuddin I and II in Iraq, also constructed in co-operation with an ECMEA country, reached the capacity of 3.2 million tons per year.

Oil refineries with a total annual output of 12 million tons were built in co-operation with the USSR in India, others have been completed or are under construction in Afghanistan, Egypt and Ethiopia.

Romania assisted in building oil refineries in Guahati (India), Karachi (Pakistan) and Banas (Syria). Another plant is under construction in Zarka (Jordan). It should be mentioned that Romania has attained high technical standards in certain export-oriented branches of its engineering industry. Oil drilling and extraction equipment, chemical and petrochemical installations belong to such branches. As far as oil well drilling equipment is concerned, Romania holds now the position of the second largest world exporter. In addition, a soda ash plant and a phosphate enriching complex are under construction in co-operation with Romania in Egypt.

The arrangements under discussion are advantageous to the centrally planned economies as well, especially to the smaller ECMEA countries which are characterized by fewer natural resources and which need necessary inputs for their developed industrial structures. Inputs provided under these arrangements from the developing countries have increasingly contributed to the diversification of the sources of supply, to the development of industries requiring considerable import inputs and to the overall improvement of the supply situation. That is one reason why the division of labour with the developing countries is becoming ever more important. Traditional export commodities of the developing countries, such as primary materials of plant and animal origin, minerals and mineral fuels represent a flow of promising potential for the future, too, as the satisfaction of raw material and energy demands will continue to be of great importance for the ECMEA countries.

Another reason is connected with the so-called buy back arrangements, especially those involving industrial products, such as engineering products, chemicals etc. These arrangements are to be seen as alternatives to domestic investments. These higher forms of industrial co-operation arrangements, e.g. compensatory arrangements, co-production and subcontracting arrangements provide a good basis for long-term complementary development between these two groups of countries. Their contribution consists of the introduction of advanced technological and managerial standards in the creation of new and permanent jobs in the developing countries. They contribute also to the improvement of the balance of foreign trade of these countries either through the reduction of foreign exchange requirements due to import substitution or through increasing the volume of export-oriented production. Last but not

least, their contribution consists of the introduction of the desired, industrialization-geared structural changes through the building of new capacities in the developing countries. On the side of the ECMEA countries, these arrangements make possible more rational specialization, reaping the benefits of economies of scale in specialized product lines, increased outlets for exports and concentrating on product lines involving high capital and R+D intensity.

Examples of such arrangements can be found in a number of various industrial sectors. Two of them are mentioned below:

The deliveries of bauxite to the Soviet Union from the bauxite mining complex built in co-operation with the USSR in Guinea have since become an essential item of Guinean exports. The same applies to natural gas extraction in Afghanistan and Iran.

Seamless pipes from a plant built in India with the co-operation of Hungary are now being supplied on a long-term compensatory basis to Hungary.

7. INSTITUTIONAL AND LEGAL FRAMEWORK

The broadest international framework for the above arrangements between the centrally planned economies and the developing countries in the field of industry is represented as already mentioned by long-term intergovernmental agreements on economic, scientific and technical co-operation.

Intergovernmental agreements usually stipulate the amount of credit to be granted and state the purpose, e.g. delivery of equipment and erection of a chemical plant. They also stipulate the conditions of repayment, e.g. in 10 annual instalments in the form of products to be manufactured by the plant concerned, to be delivered over and beyond the framework of the current exchange of goods between the countries concerned. In addition, such agreements may also delineate the areas of co-operation in the field of science and technology for economic development. This includes services to be rendered by experts and advisers, education and training of national personnel, exchange of scientific and technical information, transfer of various components of technology, participation by scientists and specialists in conferences, seminars and consultations.

As it has been already mentioned, joint commissions or committees have been established in a number of cases to supervise the implementation of such intergovernmental agreements. Composed of the representatives of competent authorities of the two parties to the agreement, these commissions and committees meet regularly to consider the progress achieved and to deal with possible shortcomings or problems. They also prepare detailed programmes of co-operation for the forthcoming periods within the terms of the agreement.

The areas of co-operation which are broadly stipulated in intergovernmental agreements are then translated into specific terms in contracts concluded between respective organizations and firms of the parties to such agreements.

The mechanism of industrial co-operation can be illustrated on a case involving Czechoslovakia and India. Suggestions involving industrial co-operation arrangements are presented by either side at regular meetings

of the Czechoslovakia-India Joint Commission, mostly within the respective working group. When considered advantageous by both sides, they are being further analysed and elaborated by the respective foreign trade and manufacturing organizations of the two parties and, eventually, translated into the form of specific contracts. The Commission regularly reviews the overall developments and seeks to find ways and means to resolve problems which can possibly arise in the implementation of such co-operation arrangements.

The above Commisssion established three working groups - for trade exchange, for industrial co-operation and for co-operation in electronics, science and technology. Rather extensive industrial co-operation arrangements between the two countries involve, for example, the following:

- Czechoslovak ZETOR tractors: Czechoslovak tractors were originally supplied C.K.D. to be assembled in India. In complying with the Indian partner's wish to launch local manufacture, the project involved stage-wise component delivery to India with increasing local manufacture content. In the course of five years, 100 per cent local manufacture of ZETOR tractors was reached. In 1982, the 100,000th ZETOR tractor was produced under this arrangement in India.

- Czechoslovak JAWA motorcycles: Under an analogical scheme, the manufacture of motorcycles was introduced.

- Machine tools: The co-operation programme involves in this line drilling machines, milling machines and lathes.

- Hydraulic dampers: The manufacture of hydraulic dampers for railway gears was transferred from Czechoslovakia to India and their manufacture in Czechoslovakia was terminated. The needs of the Czechoslovak economy are now being fully met through hydraulic damper imports from India.

The typical legal framework of contracts under these arrangements involves provisions of the governing law, patent rights, defect liabilities, bank guarantee in the form of performance bonds, arbitration clauses and provisions related to compensation for defects and delays. These generally applicable provisions are briefly characterized below.

(i) Governing law

The contract is governed by the laws in force in the developing country concerned and its courts have exclusive jurisdiction, except for such actions or proceedings which are subject to arbitration.

(ii) Patent rights

The contractor is solely responsible for any claims arising from any infringement or alleged infringement of patent, design or copyrights by use of the works constructed. On the other hand, technical documents, plans, specifications etc. handed over by the contractor in connection with the execution of the works shall not be used by the receiving organization for the construction and erection of new works without the expressed consent of the contractor and shall not be disclosed to any third party except when this is provided for in the contract.

(iii) Defect liabilities

Under this provision, the contractor guarantees that the works will be free from defects in design, engineering, materials and workmanship and shall meet all of the performance and other requirements set forth in the contract. The contractor also guarantees that the works will operate satisfactorily during all stages of operation. The contractor is responsible for providing remedies (at his own expenses) to any breaches of these guarantees up to the expiration of the maintenance period (one year from the issuance of the test run certificate).

(iv) Bank guarantees

The contract provides also legal guarantees for the cases of suspension by the contractor of the work, for abandoning the work or becoming bankrupt. These provisions, including a performance bond to be deposited by the contractor, shall protect the developing country's firm from the consequences of any of the above-mentioned events.

(v) Arbitration clauses

Should the two parties fail to arrive at a mutually satisfactory settlement of any possible dispute, the case is to be submitted for arbitration in which case the decision of the arbitrators should be considered final, binding and shall be subject to no appeal. Three arbitrators are appointed, one by each party and the third - chief arbitrator - is to be nominated by the two appointed arbitrators or, if they fail to agree, by the International Chamber of Commerce, Paris, France.

(vi) Compensation for defects or delays

The time of completion is stipulated in the contract, together with the nature of events which may be considered as valid reasons for extending the deadline beyond the stipulated date. The contractor is motivated to have the works ready for commissioning before the stipulated time of completion by a bonus for each complete day of advance. If, however, there is a delay in the completion of the works, the same daily amount is substracted from the contract price. The number of days applicable for the calculation of the above is limited to ninety days and a maximum of 5 per cent of the contract price respectively.

As has been mentioned already, the above legal framework is of general validity in this type of contracts concluded between partners in the developing countries and centrally planned economies.

Among other cases, it was also applied between ECMEA countries as contractors and Iraq as investor. The contracts concerned the design, procurement and construction in Iraq of oil refineries and associated facilities.

The work to be performed by contractors involved:

- Complete design including the design of the civil part of the works;
- Procurement and delivery of the equipment;
- Erection and installation of the plant;
- Supervision and commissioning of refineries and guarantee tests;
- Training of local personnel in proper operation and maintenance of the refineries.

Technical documentation provided by the contractors to Iraqi organizations according to the schedule mutually agreed upon included:

- Detailed design drawings;
- Respective standards;
- Assembly drawings for mechanical equipment;
- Welding procedures for welds to be done during erection;
- Technical procedures for inspection and testing of machinery and equipment.

For record-keeping purposes, the contractors were obliged to provide the following documentation:

- Refinery general information;
- Process design manual
- Drawing record book;
- Equipment manual;
- Inspection book;
- Original copies of design drawings;
- Building record books.

To encourage local industry, it was provided under the contracts that the contractors would purchase all materials and manufactures of the developing country concerned which met the specifications. The contractors agreed not to import such materials and products except with prior written approval by Iraqi organizations.

The investors, Iraqi organizations, were responsible in particular for the furnishing of construction sites, execution of civil engineering works and for the supply of certain facilities and utilities during the period of construction and commissioning.

8. CHANGING PICTURE OF THE WORLD PETROCHEMICAL INDUSTRY AND POSSIBILITIES OF FUTURE CO-OPERATION BETWEEN THE ECMEA AND DEVELOPING COUNTRIES IN THIS FIELD

The petrochemical industry is significant for both developed and developing countries. It provides basic inputs for synthetic organic chemicals as well as for some inorganic chemicals. Petrochemical products are in many respects functionally superior to natural materials. The main users of organic chemicals (plastics, synthetic fibres, synthetic rubber, etc.) are to be found in the packaging, building and construction, textile, transportation and other industries. As far as inorganic chemicals are concerned, they are represented mainly by ammonia designed for further chemical processing and for the production of industrial fertilizers.

The world petrochemical and chemical industries and their branches experienced extremely rapid growth since the sixties. A similar situation exists with respect to the ECMEA countries with much higher growth rate of chemical and petrochemical industries than the total industrial production since the 1960s. The overall growth of the world chemical industry was naturally reflected also in the growth of the world's oil refining capacity which grew from 603 million tons in 1950 to 1,735 million tons in 1965 and to 4,085 million tons in 1981.[4/] Being the main feedstock for the petrochemical industry, oil and natural gas assumed added significance after the first oil crisis in 1973.

According to the OECD World Energy Outlook[5/], the USSR holds the third position in the world after Saudi Arabia and Kuwait as far as proven oil reserves are concerned. Other centrally planned economies depend on imports of crude oil and gas, the bulk of which is being supplied to them from the USSR as can be seen from the following table:

4/ Industry in a Changing World, UNIDO, ID/304, 1983.

5/ Paris, 1982.

Supplies of oil and natural gas from the USSR to the other CMEA member countries in 1951-1980 (accumulative total)

	1951-55	1956-60	1961-65	1966-70	1971-75	1976-80
Oil (million tons)	6.2	21.0	59.0	138.0	270.0	364.0
Gas (thousand million cubic metres)	0.6	1.0	1.6	8.0	31.3	90.0

Source: Kozlov, I.D.: Energeticheskoye khozyajstvo SEV, Moskva, Nauka, 1980.

The above data illustrate the extremely rapid development of intra-CMEA supplies of oils and gas during the past three decades. Notwithstanding, the share of demand covered by these, supplies dropped in 1980 to some 70 per cent in the case of oil and 75 per cent in the case of oil products. This was largely due to more difficult natural and technical conditions of extraction that involved greater costs of maintaining the volume of extraction achieved, let alone increasing it. Thus in 1976-1980 the cost of production of one ton of petroleum in the USSR more than doubled as compared with the period up to 1972 and it is expected to grow even more. In 1980, imports of oil from the developing countries (mainly from the OPEC countries) represented 28.9 per cent of total oil imports by the CMEA countries and 13.8 per cent of their import of oil products.

The ECMEA member countries started to import oil regularly from non-member countries only in the seventies. The share of these imports did not so far exceed 1.8 per cent of total OPEC exports. The prognoses, however, show that these countries will increase both oil and oil products imports in absolute and also in relative terms. Some estimates indicate that the demand by the ECMEA countries only for oil imports from the developing countries may approximately double between 1983 and 1990. As far as the commodity structure is concerned, the share of oil in the ECMEA countries from the developing countries amounted in 1983 to 27.8 per cent, while imports of chemicals, oil

products, synthetic liquid fuels, fertilizers made up just 1 per cent of total imports in the same year. This is the present situation which has resulted from the existing international division of labour at the world level as well as within the ECMEA countries.

Present patterns of specialization within the ECMEA countries are characterized by the USSR supplying raw materials and material and energy intensive heavy chemical products and the majority of other ECMEA countries exporting fine chemicals. The German Democratic Republic specializes in photochemicals, dyestuffs, plant protection chemicals, synthetic rubber, potassium fertilizers. Hungary supplies pharmaceuticals, plant protection chemicals and plastic products, Poland - paints and varnishes, cosmetics and pharmaceuticals, organic dyestuffs, Bulgaria - plant protection chemicals, soda products and pharmaceuticals, Romania - polymers, certain kinds of synthetic rubber, caustic soda and synthetic fibres, Czechoslovakia - chemical reagents and dyes.6/

The evolution of exports and imports of selected petrochemicals in 1970, 1980 and 1981 in a geographical breakdown according to groups of countries is shown in Appendices 1 and 2.

Important changes could be expected in the territorial distribution of the world chemical and petrochemical production. At present, some 80 per cent is located in Western Europe, USA and centrally planned economies and 10 per cent in Japan. It is estimated that by the end of the eighties the share of Western Europe, USA and Japan will substantially diminish. According to the study worked out by the Econometric Research Ltd. of Canada as consultants to UNIDO,7/ the fastest rates of growth in demand for petrochemical products are expected to be in the developing countries, particularly in South-East Asia and the Arab region.

6/ The development of chemical and petrochemical industries in the European CMEA countries, UNIDO study prepared by Mr. V.G. Gerus, 1984.

7/ World Demand for Petrochemical Products and the Emergence of New Producers from the Hydrocarbon Rich Developing Countries, UNIDO/IS.427, Sectoral Studies Series No.9, p.58.

Rapid development of the petrochemical industry in the forthcoming 5-6 years is expected particularly in the USSR, Saudi Arabia, Canada and Mexico. According to some estimates, the share of the USSR in the world production of ethylene will increase by 1990 from 5 to 7 per cent, of ammonia from 22 to 28 per cent and of methanol from 15 to 17 per cent. The oil-exporting developing countries have been creating new petrochemical and chemical centres, particularly in the Middle East, Latin America and South-East Asia. It is obvious that growth prospects are the best in countries with ample supply of feedstock. These countries are therefore expected to sell not only oil but petrochemical products as well.

It has been estimated that the Middle East countries alone could produce in 1990 some 2.6 million tons of ethylene, 1.4 million tons of polyethylene, 140 thousand tons of PVC, 765 thousand tons of ethylene glycol, 450 thousand tons of ethylene dichloride and 615 thousand tons of styrene. On the other hand, if one compares these estimates with the Econometric Research data on consumption in the same year,[8/] it is obvious that there are going to be some important surpluses for export or for co-operation exchanges. The new centres will make use of local feedstock, fuels and cheaper labour. Hence their competitive position will be particularly strong in raw material and energy intensive lines, e.g. common type polymers. It should not be overlooked, however, that the world market in petrochemicals is clearly dominated by several transnational corporations which possess both know-how and capital. New centres can hardly be expected to enter soon those manufacturing lines which are distinguished by intensive research and development.

Given the comparative advantage of cheaper feedstock and fuels, the petrochemical industry in the developing countries will gradually demonstrate its real potential. It is obvious that this development will be reflected not only in the changing world territorial structure but also in relevant changes in the international division of labour with all its consequences. According to the background document for the second consultation meeting on the

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8/ Op. cit., No. 9, 1983, p. 59.

petrochemical industry[9/] a new type of international interdependencies is going to be developed with oil exporting countries building petrochemical processing capacities and being gradually able to export semi-processed and/or final petrochemical products in exchange for capital goods from the developed countries. The contribution of developed countries is expected to continue in direct investments, transfer of technology and extension of credits for export of capital goods.

As far as the ECMEA countries are concerned, they have been so far exchanging capital goods for raw materials, fuel, semi-finished products and foodstuffs. In the petrochemical sector some countries like Hungary, Poland, Czechoslovakia and Bulgaria have exported to developing countries plastics, polyvinylchloride, synthetic dyes and fibres. In the case of Czechoslovakia more intensive exchange of petrochemical products has taken place particularly in synthetic dyes and fibres.[10/] Co-operation in petrochemical investment projects has so far been in petroleum, gas, fertilizers and extraction of phosphates. Prospects are promising both in the growth of trade and in the exchange of capital goods for petrochemical products. Due to underutilization of production capacities, labour, oil and energy resources in the developing countries as well as a need to create conditions for efficiency in production scale and costs there are real possibilities to initiate arrangements on production specialization in this industry.

It is important to mention that there is already in force the institutional structure for mutual co-operation between the ECMEA and developing countries and various forms are being already used in many industrial branches, particularly in engineering sectors mentioned. Moreover, these forms of co-operation have mostly brought mutually advantageous results. There is therefore every reason to apply the same institutional infrastructure and forms of co-operation in the petrochemical field as well.

9/ See "Second World-side Study on the Petrochemical Industries". UNIDO/IS.336/3.

10/ See appendix 1 and 2 attached to this paper.

To sum up, such development may possibly lead to three broad types of mutually advantageous collaboration, i.e.:

(a) based on specialization, apart from trade, an exchange of specific semi-finished and finished products;

(b) to exchange machinery for petrochemical products by participating in the development of petrochemical industry on a much broader base and thus increase imports originating in this industry;

(c) in order to enlarge co-operation in this industry, much broader application should be given to tripartite collaboration which has already been practised particularly by Poland.

In the area of petrochemical products exchange, imports by ECMEA countries of some products from the developing countries may be as advantageous and efficient as their imports from other centrally planned economies, particularly in the material, energy and labour-intensive types of products. Imports of such products would serve not only the interests of the developing countries (better utilization of production capacities, outlet for products, deeper specialization, etc.) but also the interests of e.g. smaller centrally planned economies in reducing and rationalizing (less energy-intensive products, improvement in efficiency, etc.) their production programmes and making it possible for them to concentrate more on the most advanced technologies.

The ECMEA countries have already been to some extent engaged in petrochemical investment programmes, especially in building of oil refineries in several developing countries such as India, Egypt, Iraq, Syria, etc. Another way how to pay for the increased imports of petrochemical products, centrally planned economies can intensify their participation in building petrochemical capacities in some developing countries.

In conclusion, a model of long-term compensation arrangements in petrochemical development between an ECMEA country and a developing country is recommended which could basically be of two types:

(a) long-term arrangements on specialization and exchange of petrochemical products between an ECMEA and developing country should be negotiated and attention among other things be given to:

- better use of existing production capacities;
- list of products for exchange to be fixed;
- time element should be clearly arranged;
- price policies to be fixed;
- guarantees against economic risks should be agreed.

(b) an ECMEA country would undertake delivery of machinery and equipment, appropriate transfer of technology, adequate after sale service, technical assistance and training and credit facilities; a developing country would provide inputs and if necessary buildings, pay for facilities and supplies by means of products from the new petrochemical plant or other plants.

It is understood that such activities should be well evaluated, financial facilities agreed upon and the balance of such arrangements maintained and if necessary readjusted over the agreed period of time. Some other means of contractual balance, e.g. premium if the objectives were fully attained, could be employed.

A combination of both types of recommended arrangements is also feasible, particularly in cases when an agreement on specialization could lead to an extension of production capacities.

9. CONCLUSIONS AND RECOMMENDATIONS

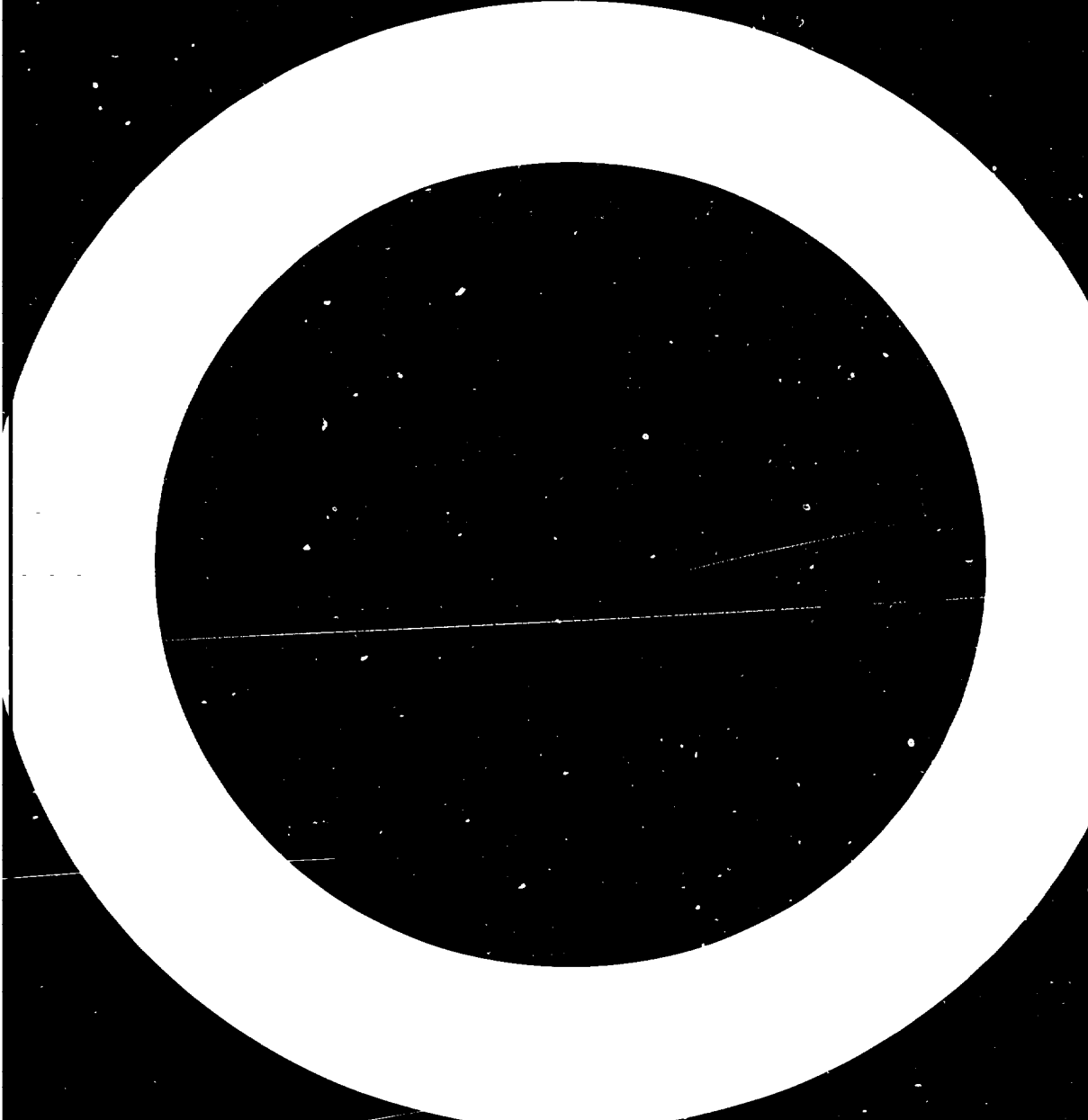
The approach to co-operation between the ECMEA and developing countries in the field of petrochemical industry has been mainly based on implementation of investment projects in petroleum and, to some extent, in gas, extraction of phosphates and fertilizers. This international industrial co-operation is relatively recent and has so far been oriented towards selected sub-sectors. Both parties can take advantage of long-term arrangements based on their development plans and programmes and of the interconnection between trade and aid to engage in long-term arrangements for the construction of specific projects and repayment of loans in kind. For various specific reasons, under such arrangements, prices may differ from the prevailing world market prices for comparable products.

The world petrochemical and chemical industries have experienced an extremely rapid growth. A similar situation has prevailed in ECMEA countries. The present patterns of specialization within the ECMEA countries are characterized by the USSR supplying raw materials and energy-intensive heavy chemical products and the majority of other ECMEA countries exporting fine chemicals. In the seventies, the ECMEA member countries have started to import oil regularly from non-member countries and in 1983 the share of this commodity in total imports from the developing countries amounted to nearly 28 per cent while imports of various petrochemical and chemical products made up only 1 per cent of the total.

Given the comparative advantage of cheaper feedstock and fuels, the newly built petrochemical industry in the developing countries will gradually demonstrate its real potential. It is quite obvious that this development will be reflected in the international division of labour with all its consequences. The oil-exporting countries will be able to export semi-processed and/or final petrochemical products in exchange for capital goods and other products. Prospects exist both in the growth of trade and in the exchange of machinery and equipment for petrochemical products. It is of mutual interest to initiate arrangements on production specialization in this industry in order to improve production efficiency.

The solution to these problems, bearing in mind the on-going process of a new international division of labour, is seen to be direct negotiations between the ECMEA and developing countries on specific arrangements regarding production specialization as well as exchange of capital goods for petrochemical products.[11/] The Third Consultation Meeting on the petrochemical industry being actively prepared by the UNIDO secretariat could assist this process exploring various elements of such co-operation, particularly policies, structures and conditions of production specialization, possibilities and support to tripartite collaboration, management and planning procedures. Apart from this, the UNIDO secretariat could study and suggest a new framework of agreements on long-term specialization and exchange of petrochemical products, i.e. listing of products, price policies, guarantees against economic risks, etc., strengthening mutuality of interests of the parties concerned.

11/ This paper indicates in detail some concrete and practical aspects of procedures and arrangements related to this type of co-operation between the industrialized and developing countries.



Appendix 1

Geographical distribution of exports of petrochemicals
from the CMEA countries
(per cent)

	1970			1980			1981		
	I a/	II b/	III c/	I a/	II b/	III c/	I a/	II b/	III c/
Acetone									
Bulgaria	47	52	1	40	53	7	71	28	1
Benzene									
Hungary	-	-	-	30	70	-	50	50	-
Caprolactam									
Hungary	-	-	-	66	34	-	15	85	1
Poland	-	100	-	-	-	-	-	100	-
Detergents									
Czechoslovakia	95	-	5	87	-	13	93	-	7
Ethylene									
Hungary	-	-	-	100	-	-	100	-	-
Methanol									
Poland	-	100	-	91	-	10	90	-	
USSR	57	43	-	61	39	-	53	47	
Plastics									
Hungary	-	-	-	21	57	22	34	51	15
USSR	72	5	23	99	1	-	98	2	-
Czechoslovakia	68	19	13	52	45	3	60	33	7
Polyethylene									
Bulgaria	94	6	-	23	76	1	9	91	-
Poland	-	-	-	86	-	-	100	-	
Polyvinylchloride									
Hungary	-	-	-	22	55	23	32	52	16
Poland	43	57	-	100	-	-	95	5	-
Polystyrene									
Bulgaria	77	19	4	-	100	-	-	100	-
Synthetic fibres									
Bulgaria	47	52	1	40	53	7	7128	1	
Hungary	-	-	-	96	4	-	99	-	-
Poland d/	59	22	19	87	6	7	92	3	5
Czechoslovakia d/	86	4	10	85	14	1	79	15	6
Synthetic dyes									
Bulgaria	67	-	33	66	1	33	64	-	36
Poland	77	7	16	64	14	22	76	9	15
Czechoslovakia e/	89	5	6	82	15	3	86	9	5

a/ I = the socialist countries
b/ II = developed countries
c/ III = developing countries
d/ Chemical fibres
e/ including paint and varnish materials.

Source:

Appendix 2

Geographical distribution of imports of petrochemical products by the CMEA member-countries (percent)

	1970			1980			1981		
	I a/	II b/	III c/	I a/	II b/	III c/	I a/	II b/	III c/
Acetone									
Hungary	-	-	-	60	40	-	35	65	-
Benzene									
Hungary	-	-	-	43	57	-	-	-	-
Poland	100	-	-	37	63	-	100	-	-
Caprolactam									
Poland	100	-	-	-	100	-	-	-	-
Methanol									
Hungary	76	24	-	98	2	-	100	-	-
Phthalic anhydride									
Bulgaria	20	80	-	33	67	-	84	16	-
Hungary	-	-		4	96	-	-	100	-
Poland	-	100	-	-	100	-	-	100	-
Plastics									
Hungary	18	81	1	80	70	-	32	68	-
USSR, M. Roubles	20	80	-	13	87	-	16	84	-
Czechoslovakia	16	83	1	32	67	1	31	68	-
Polyamide resins									
Hungary	-	100	-	-	100	-	-	100	-
Polyethylene									
Bulgaria	87	13	-	13	85	-	30	70	-
Hungary	28	72	-	91	9	-	61	38	1
Poland	50	50	-	29	71	-	55	45	-
USSR, M. Roubles	1.8	10.8	44.9	52.9	4.9				
Polyvinylchloride									
Bulgaria	87	23	-	82	18	-	89	11	-
Hungary	-	100	-	9	91	-	42	58	-
Poland	-	100	-	69	31	-	70	30	-
Polypropylene									
Poland	-	-	-	-	100	-	56	44	-
Polystyrene									
Bulgaria	79	21	-	81	19	-	66	34	-
Hungary	39	61	-	52	48	-	54	46	-
Poland	92	8	-	-	100	-	-	100	-
Synthetic fibres									
Bulgaria	-	100	-	47	53	-	65	45	-
Hungary	9	91	-	42	58	-	31	69	-
Poland e/	40	60	-	32	66	2	37	56	7
USSR	-	100	-	-	100	-	7	93	-
Czechoslovakia e/	15	70	15	40	41	19	47	33	20
Synthetic dyes									
Bulgaria	67	33	-	58	42	-	52	48	-
Poland	28	72	-	34	66	-	48	52	-
USSR	-	-	-	87	13	-	70	30	
Czechoslovakia d/	20	62	18	18	66	16	19	63	18
Xylene									
Poland	100	-	-	55	45	-	92	8	-

a/ I = socialist countries
b/ II = developed countries
c/ III = developing countries
d/ inclusive of varnish and paint materials
e/ chemical fibres

Source: Foreign Trade Statistics of the above-mentioned countries.

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Long-term arrangements for petrochemical developments - Co-operation between the European CMEA countries and developing countries

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