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Agenda item XI/7

THE ROLE OF THE WORLD BANK GROUP IN
THE DEVELOPMENT OF THE FERTILIZER
INDUSTRY IN DEVELOPING COUNTRIES^{1/}

by

World Bank Group
Washington USA

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SUMMARY

THE ROLE OF THE WORLD BANK GROUP IN THE DEVELOPMENT OF
THE FERTILIZER INDUSTRY IN DEVELOPING COUNTRIES^{1/}

World Bank Group
Washington, USA

Part I of the paper discusses considerations relating to the establishment of fertilizer industries in LDCs (**raw materials availability, technical innovations, market sizes, and influence of tie-aid on world fertilizer trade**).

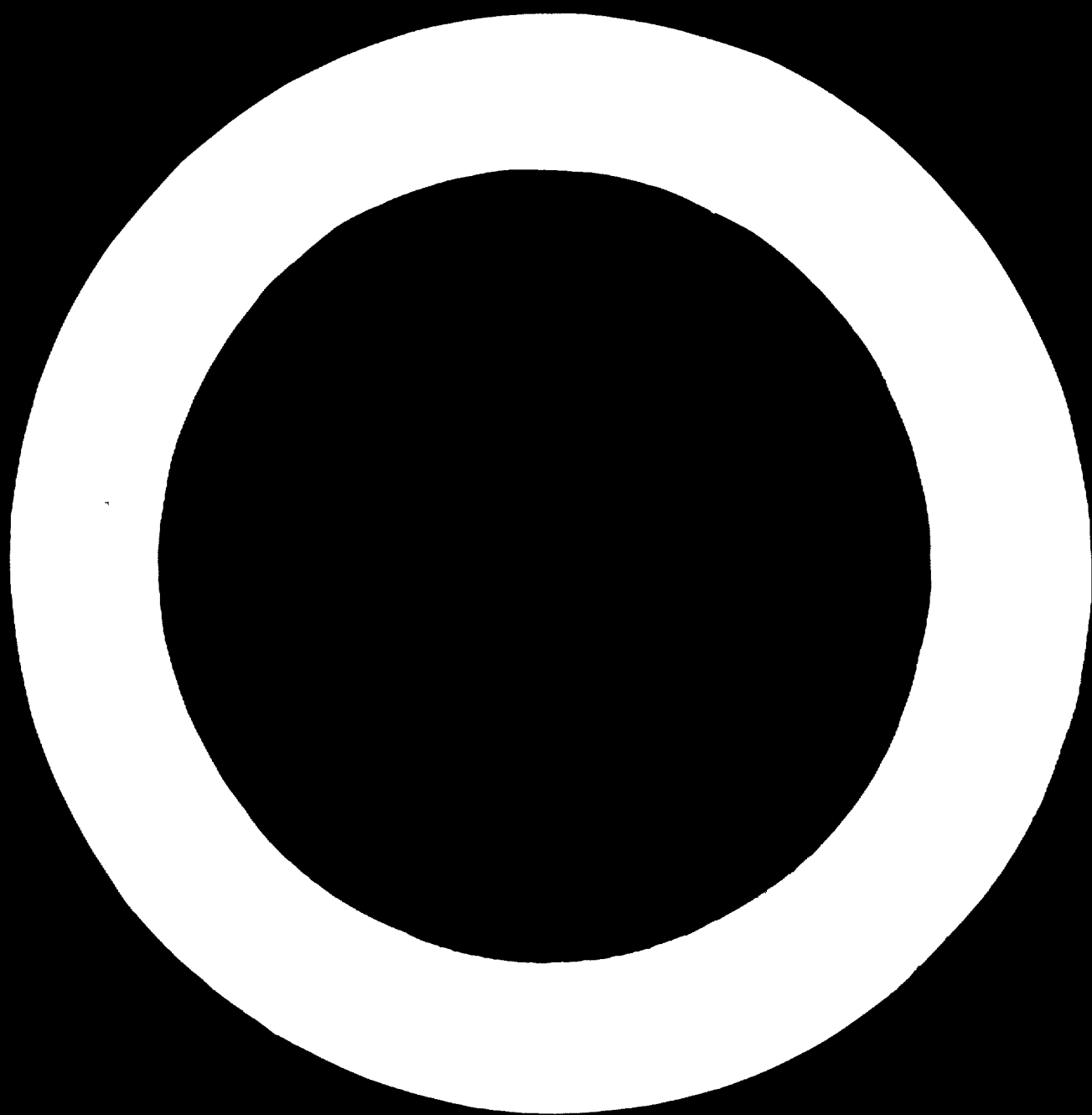
Part II discusses the main factors affecting soundness of fertilizer industries in LDCs and necessary policy changes (**adaptation of supplies to demand patterns, acquisition from cheapest sources, trade development among LDCs, taking advantage of economies of scale**), and cites difficulties encountered by some producing LDCs (Persian Gulf countries, for example) because of competing exports from donor countries to captive and financed markets.

Part III describes the activities of the Bank Group in assisting fertilizer production in LDCs, through

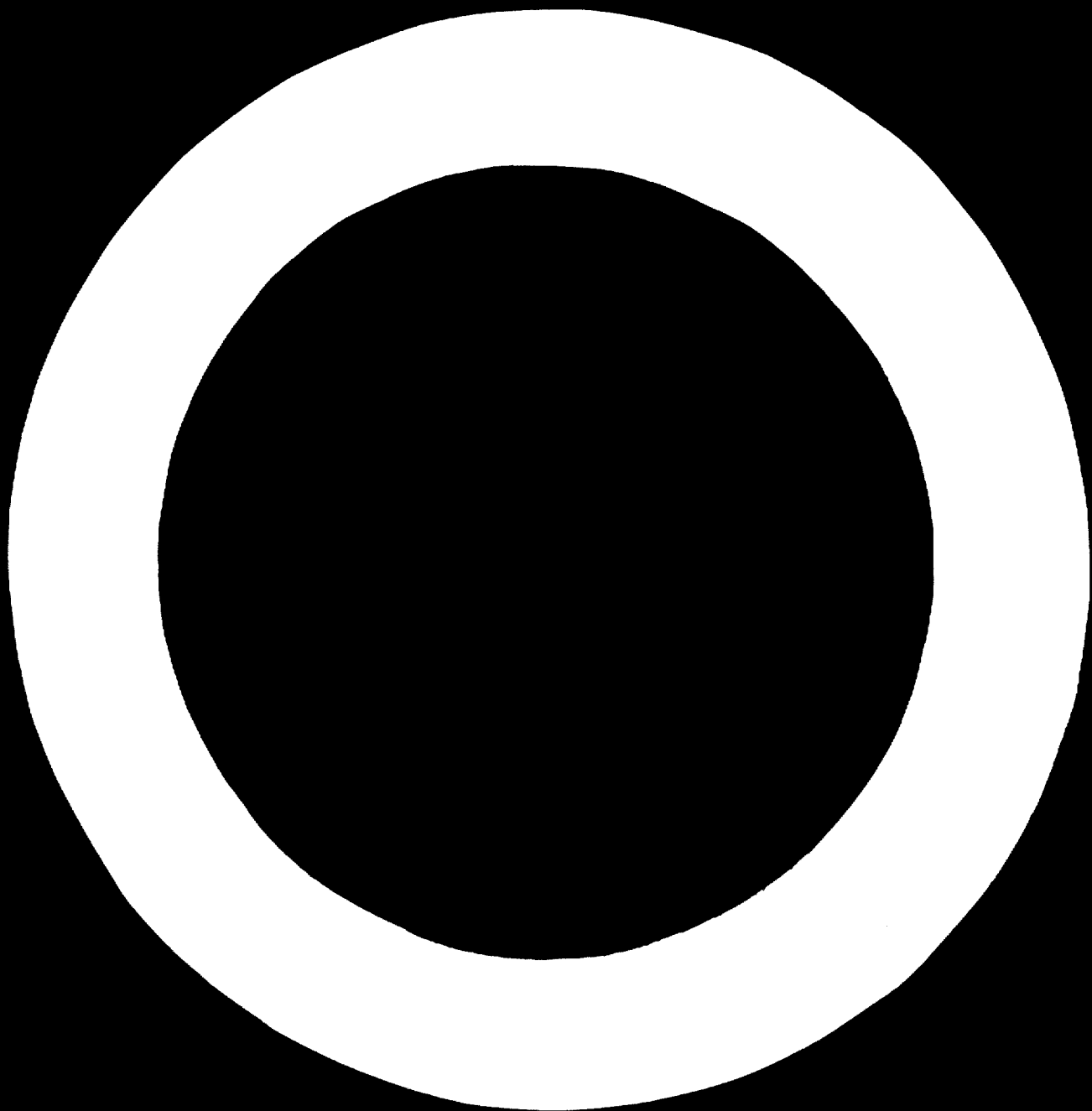
- (a) financial assistance for specific fertilizer projects;
- (b) national fertilizer sector reviews;
- (c) recommendations to governments through general economic reports;
- (d) general studies and research.

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Part IV discusses prospective activities of the Bank Group in the light of possible measures to increase trade among LDCs, joint venture arrangements, untying of aid for fertilizer imports - as now being considered by OECD member countries - and better coordination of aid policies.



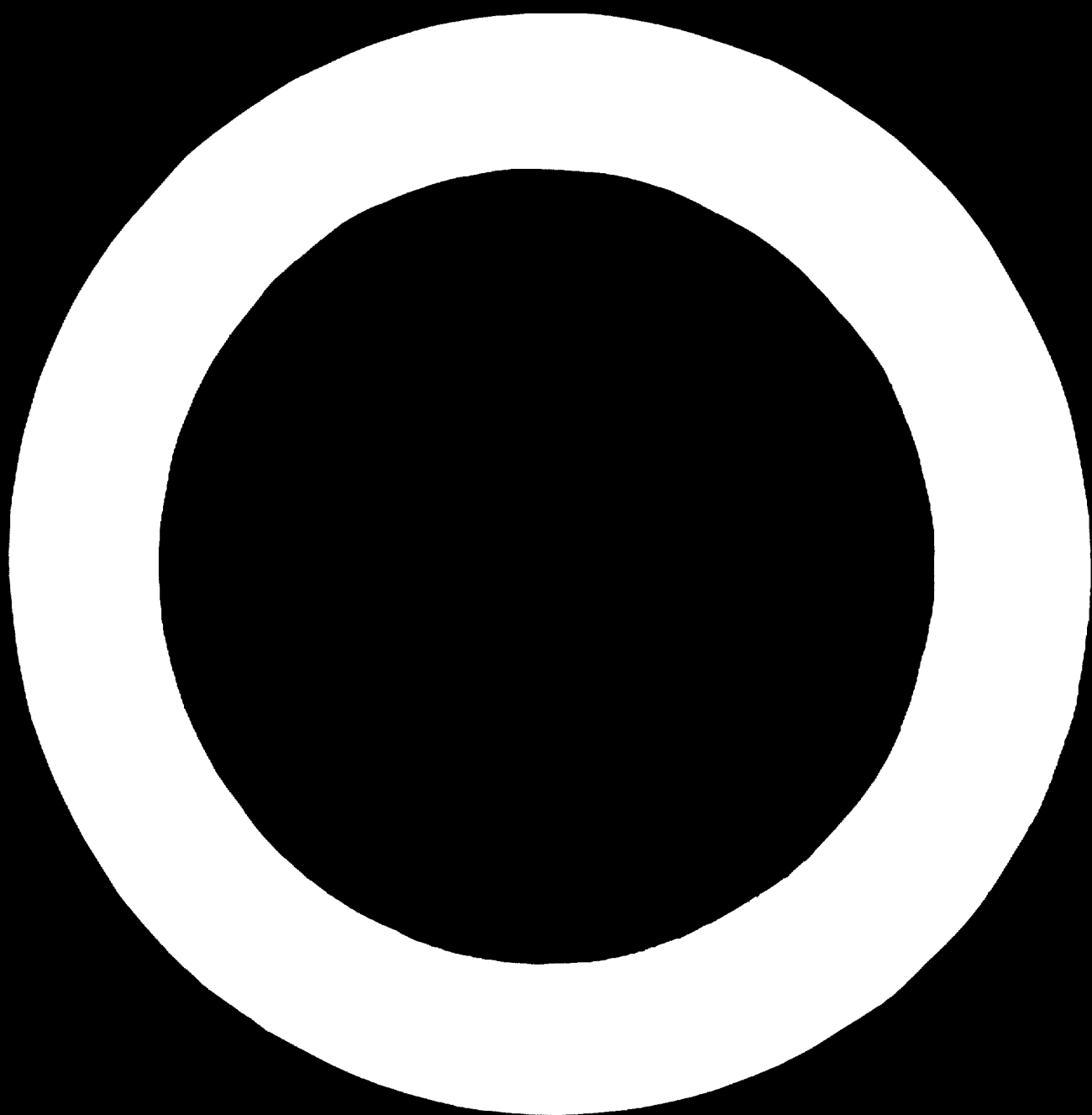
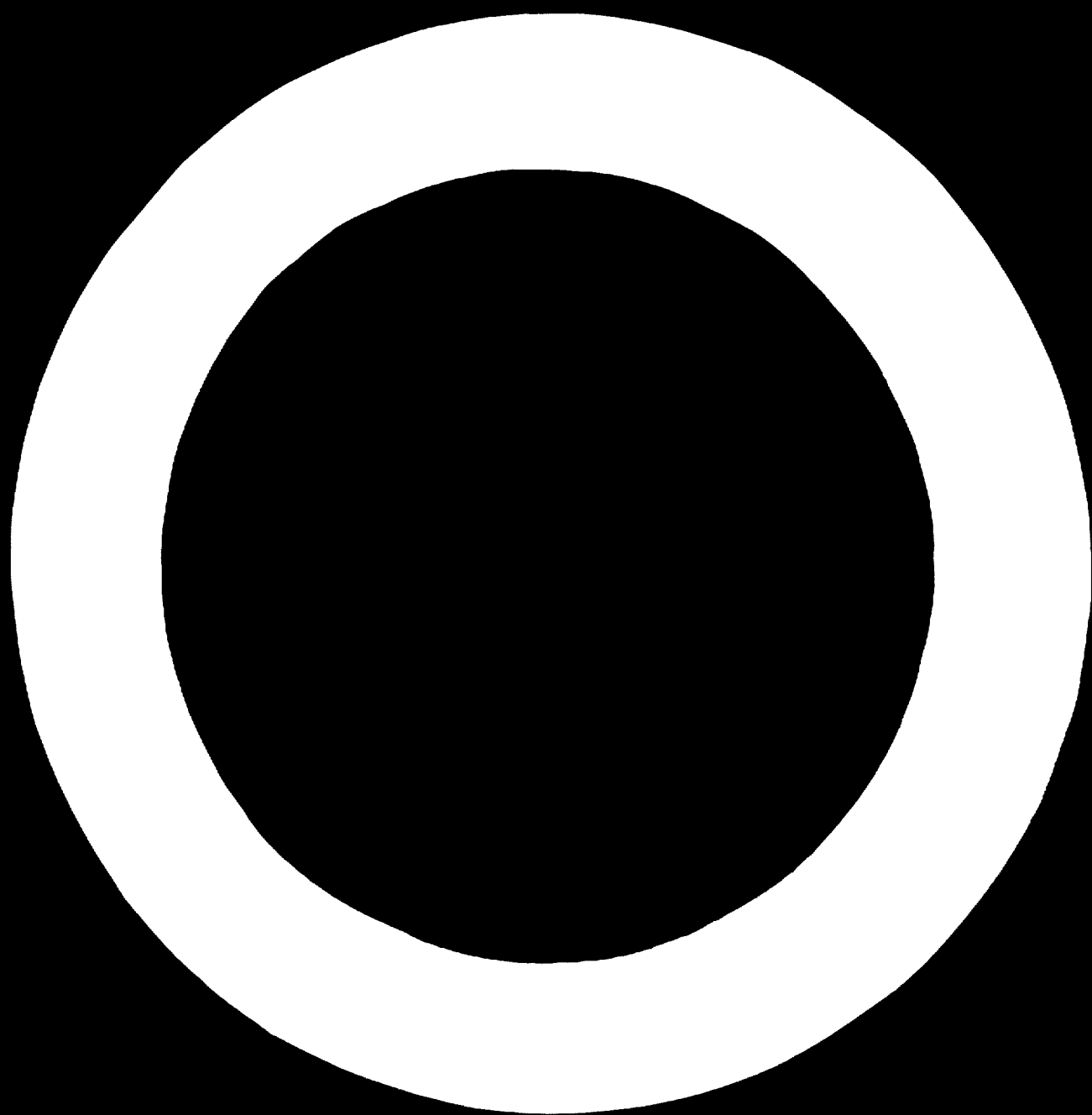


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This paper summarizes some of the major economic issues that less developed countries (LDC's) face in their efforts to develop sound fertilizer industries, and it highlights some of the ways of solving major existing or potential problems. It also deals with the nature of current and prospective assistance by the World Bank Group to fertilizer industries in LDC's. The World Bank Group (referred to in this paper as the Bank Group) consists of the International Bank for Reconstruction and Development (IBRD) and its two affiliates, the International Finance Corporation (IFC) and the International Development Association (IDA).

Fertilizer Industries and Trade in Developing Countries: Recent Trends and Main Problems

The four basic raw materials used to produce the three major types of fertilizers are hydrogen (from natural gas, solid or liquid fuels), phosphate rock, potash salts and sulphur. Factors affecting the location and types of production facilities in developing countries are (a) the availability of raw materials, (b) the regional consumption pattern, (c) production techniques, (d) transport techniques and costs, and (e) the world pattern of aid-financed trade in fertilizers.

1. Availability of Raw Materials

a. For Nitrogenous Fertilizers: the cheapest hydrogen sources are natural gas followed by naphtha and refinery off-gases. While still an important source in present world production capacities, coal cannot economically compete for future plants. LDC's are well endowed with natural gas resources, and natural gas availability has been a determining factor in creating large export-oriented ammonia-urea plants in the Caribbean Area, in North Africa and in the Middle East, or import substituting plants in Pakistan and Indonesia, for example. There are also considerable deposits of natural gas in Southern Latin America, Nigeria, and the Far East which might attract further investments in ammonia-producing units. The establishment of oil refineries - often supplied as part of package deals for long-term oil contracts - has also been an indirect factor for establishing local ammonia manufacturing facilities; due to refineries' design and to types of crude oil supplied, the production pattern for petroleum products has been in many LDC's substantially different from the local demand pattern. Surpluses of fuel or naphtha were often generated (in India, for example), making therefore unused raw material available for ammonia production, although at a higher cost of production. Naphtha and fuel are more expensive

feedstocks than natural gas; it is frequent that natural gas is flared and, therefore, costs no more than transporting it to the plant site. Investment costs for plants based on naphtha and particularly in those based on fuel are also higher than for plants based on natural gas.

b. For Phosphatic Fertilizers: LDC's are also particularly well endowed with phosphate rock resources. In 1970 they accounted for about 30% of the world production and for about 55% of the world trade. Phosphate rock mines are, however, concentrated in a relatively limited number of regions namely North Africa, Western Africa and the Middle East. Sulphur - an essential input for the production of phosphate fertilizer in most of the currently used processes - is, however, rarely available near rock mines. Mexico (close to Florida rock suppliers) is an exception. However, phosphate rock availability has been a determining factor for production of finished phosphatic fertilizers in LDC's (Morocco, Tunisia, Algeria, Senegal and Israel). Technical innovations in recent years permitted long-distance shipments of intermediate products (in particular 54% P_2O_5 phosphoric acid and concentrated phosphatic fertilizers like mono-ammonium phosphate). This has favoured location of export-oriented production facilities near mines.

c. For Potash Fertilizers: Potash fertilizer production is tied to potash salt deposits which are even more restricted in location than phosphate rock mines. Potash production is also more a mining and beneficiation activity than a genuine manufacturing industry. LDC's have a minor share in the world supply and demand for potash fertilizer. Spain, Israel and to a minor extent, Congo (Brazzaville), Chile and Peru are the only LDC potash suppliers. Potash will continue to be internationally traded and supplied by the existing major producers (West and East Germany, France, North America, USSR); little can be done to change the pattern of plant location and trade because of the resource-oriented nature of the industry. In addition the current and prospective world oversupply situation limits the development opportunities for new mines.

2. The Regional Consumption Pattern

The share of developing countries as a whole in world consumption increased during the last decade. Several individual countries or regional groups of countries also reached in the 1970's the admitted minimum market size to justify local or regional production of nitrogenous or phosphatic basic fertilizers. For example, total nitrogen consumption in India increased from 250 thousand tons in 1960 to about 1,250 thousand tons in 1969, creating not only room for local production, but also market opportunities for export-oriented plants located in neighboring countries. For example, several plants are being established in the Persian Gulf to supply South East Asia and more particularly India.

3. Production Techniques and Innovations

The outstanding innovations during the last five years have been:

- a. A rapid increase in ammonia unit sizes from a maximum of about 400 to 500 tons/day of ammonia in 1965 to 1,000 to 1,500 tons/day in 1970, bringing about substantial economies of scale in production.
- b. Use of natural gas, naphtha and refinery off-gases as the only basic raw materials for modern plants.
- c. Construction of large ammonia plants for export located close to cheap natural gas sources, particularly in developing countries - Caribbean area, North Africa, and Middle East.
- d. At the end of the decade phosphoric acid also became an internationally traded commodity as a result of **increases in plant size** (now about 500 tons/day of P_2O_5 for modern plants) which led to marginal sales outside the plant and helped develop the acid trade. At the same time, several LDC's (Tunisia, Israel, Mexico, Iran) also developed export-oriented phosphoric acid units.
- e. New processes have led to a strong trend toward higher grade products in international trade and therefore have lowered transport costs per ton of nutrients.

4. Transport Techniques and Costs

1/ Adequate techniques are now available for transport of liquid ammonia and phosphoric acid at competitive costs. This was (together with the increase in plant size) a major breakthrough in the decaptivation phenomenon for ammonia and phosphoric acid and in the development of an international trade for those two intermediate products. As already mentioned, this opened the route for large export-oriented plants located in LDC's.

5. The World Pattern of Aid-Financed Trade in Fertilizers

One of the outstanding features in the nitrogenous and phosphate fertilizers' international trade is that a substantial portion of this trade is financed through tied aid. Procurement of fertilizers by importing LDC's from aid donor country sources therefore exclude from the trade existing or potential cheaper supply sources often also located in LDC's.

On the basis of an OECD Development Centre Study on the aid-financed trade in fertilisers for the years 1968 and 1969, it has for example been estimated that more than 95% of Indian fertilizer imports are financed under tied aid for DAC2/ countries (about 85%) and under barter agreements from Eastern Europe (about 10 to 12%). As regards P_2O_5 trade, net imports by LDC's reached about

- 1/ The development of a liquified natural gas trade may in the long run challenge the present advantages of producing ammonia at the source of natural gas.
- 2/ Development Assistance Committee of OECD.

1.3 million tons of P_2O_5 in 1969 (or about 45% of the 2.8 million tons internationally traded) and again about 35% of these imports was financed by tied aid.

An outstanding example of the impact of this situation on LDC's fertilizer industries is that of the Persian Gulf nitrogenous fertilizer plants. The Persian Gulf countries have a comparative cost advantage in the production of ammonia and straight nitrogenous fertilizers on the basis of their plentiful supply of cheap natural gas. ^{1/} Persian Gulf countries benefit also from a transport cost advantage over European and American suppliers with regard to deliveries to the growing Asian market. Export-oriented production capacity in these countries is now rising very rapidly, and major additions to capacity are currently being made.

However, the sales outlook for this increasing production (consisting mostly of liquid ammonia for export and urea) is very depressed because imports into their natural marketing area, the Asian countries, are supplied mostly from aid donor countries through tied aid. By 1975, quantities available for ~~export~~ by Persian Gulf suppliers will amount to about 1.5 million tons of nitrogen (0.5 million tons in the form of urea and 1 million tons in the form of liquid ammonia), i.e., about 25% of the present world nitrogen trade and roughly 50 to 55% of the present net imports of nitrogen by LDC's. Under present circumstances, it is difficult to imagine how and where this quantity of nitrogen will be sold since, due to the general world oversupply situation, established manufacturers in developed countries are likely to fight back with distress sales. Also, potential LDC importers have limited foreign exchange resources of their own to finance commodity imports.

II. Factors Affecting Soundness of Fertilizer Industries in Developing Countries

Sound fertilizer industries in LDC's could be defined as those that would have been (or will be) developed if (a) economic forces had cleared (or will clear) markets in the total absence of distorting elements like trade barriers and aid tying effects and (b) if adequate economic appraisal of projects had

^{1/} Estimated delivery prices to India for bulk urea range from US\$ 48 to US\$ 52/ton when procured from Persian Gulf as against about US\$ 70 to US\$ 85/ton when procured from aid donor country sources and at prevailing international freight rates (range of quotations from US Gulf Coast, Japan, West Germany and United Kingdom during year 1970). Shipping under aid donor countries' flags - sometimes an obligation usually increases transport costs and delivery prices.

been made (or will be made). Under such conditions, the major guiding criteria would be:

- a. Adapting the pattern of production (or of imports) to the local pattern of demand for the different types of products.
- b. Lowering costs of procuring and delivering to farms the needed fertilizer through internationally competitive local production or through imports from the cheapest sources.
- c. Taking advantage of economies of scale, in local production and of technical innovations in transport of intermediates.
- d. Developing trade among LDC's and offering market opportunities to existing (or future) facilities installed (or to be installed in) these countries.

LDC's as a whole will certainly derive greater benefit if part of the present international trade in fertilizers is progressively replaced by intra-trade among LDC's themselves. Such a change in trade patterns would first call for a better coordination of aid policies. The present Persian Gulf situation reflects inconsistent policies by aid donor countries, the OECD Development Centre has estimated that the total foreseen investments (actually committed or under consideration) in the Persian Gulf up to 1975 will amount to about US\$ 500 million. Of this amount, an estimated US\$ 200 million to US\$ 250 million are to be supplied by seven DAC donors, mostly in the form of export credits but also with some equity participation by private investors. In this case, policies geared to export of equipment by aid donors appear to be clearly in contradiction with tying of their own fertilizer exports to developing countries. Many of the investment credits given are guaranteed export credits, and donor governments, therefore, have some leverage on such investment decisions.

Unified commodity loans could greatly contribute to the most economic solutions for production and trade. Given a likely lowering of average delivered prices of fertilizers to importing LDC's, if procured from cheaper sources and transported over shorter distances, this would first entail a reduction of the overall amount of aid needed. Secondly, tripartite arrangements^{1/} as a first step towards wider untying of commodity loans - could also help both the fertilizer importing country and the industry in exporting LDC's.

As indicated, Persian Gulf (liquid ammonia) and North African countries (phosphoric acid) have developed (or are developing) large production facilities

^{1/} Aid is given by donor A to a country B for procurement of fertilizer from country C which in turn procures equipment from A using the proceeds of fertilizer sales to country B.

for exportable intermediates. However, importing countries are often reluctant to become dependent on imports of intermediates because of uncertainties attached to transport and production in the exporting country. Joint ventures through equity participation between producing and importing countries can also contribute to the most economic solutions, promote regional economic integration and avoid protection of industries regardless of the cost. Joint ventures also permit importing countries to have a voice in production in the exporting country.

III. Activities of the Bank Group in Promoting Sound Fertilizer Industries in Developing Countries

The current efforts of the Bank Group in promoting adequate fertilizer industries in developing countries consist of four types of activities: (a) financial assistance for specific fertilizer projects, (b) national fertilizer sector reviews, (c) recommendations to Governments through general economic reports and (d) general studies and research. In addition, the Bank Group also has many occasions to review the fertilizer sector in individual LDC's through agricultural project appraisals or sector studies; although more oriented toward agronomic considerations and fertilizer use problems, this activity also largely bears on fertilizer industries in an indirect way through studies on markets, distribution, storage and credit, through organisation of extension services, and through recommendations for product specifications, etc.

Through mid-1971, the Bank Group has lent to (IBRD, IFC, and IDA) or taken equity participation in (IFC) 12 fertilizer manufacturing projects in 10 different countries. The total commitment amounts to about US\$ 170 million. Projects financed covered a variety of types of fertilizers: ammonia, ammonium nitrates, urea, TSP, NPK fertilizers and potash. The Bank Group always carries out a thorough project appraisal for each project before financial assistance is approved, and such a review often leads to modifications of the project. The appraisal covers technical, financial and economic aspects, deals with the agro-industrial aspects of the project and usually includes a review of international markets for the products concerned. Supervision of projects is also currently carried out for projects already financed. This effort tends to ensure that development-oriented investments are made and that technical, financial and economic problems have been adequately reviewed. Sometimes projects are also discouraged or delayed when there is no evidence of their real development contribution.

The Bank also conducts national fertilizer sector reviews which generally include: analysis of the sector's structure, review of the supply of inputs, proposals for debottlenecking and extension of production capacity, pricing policies, etc. In the past two years, reviews of the fertilizer industry sector have been conducted in Turkey and India, for example. In some cases, sector surveys in particular depth are also financed by the Bank Group and include a review of distribution systems, fertilizer production, fertilizer demand projects, price subsidies and credit policy and farm management. Such a study has been carried out in Indonesia.

The Bank also prepares general country economic reports (about 50 per year) and general industry sector surveys for its developing member countries. These reports or surveys may include recommendations and proposals for studies relating to the fertilizer industries. They often look at all the interrelated aspects of development together rather than one at a time and permit Governments to make more rational decisions on priorities.

Finally, the Bank conducts or sponsors more general studies (mostly on markets) on international aspects of the development of the fertilizer sector, and one example of such a study is an analysis of the supply demand balance for urea in South Asia prepared by a consultant for the Bank. The Bank also does economic research on problems of broader applicability, for example, a pilot national mathematical model for fertilizer distribution and industry allocation has been prepared and is likely to be operational very shortly.

IV. Bank Assistance to LDC's: General Objectives and Possible new Opportunities in the Fertilizer Sector

The developmental objectives of Bank assistance during the 1970's were stated to the UN Economic and Social Council (November 1970) by the President of the World Bank. Speaking of the recommendations of the Pearson Commission he said:

"...the most significant recommendations of the Pearson Commission were those directed not to the Bank but to the broader issues of development policy itself. Among the most important of these were the recommendations dealing with the organisation of the international development community as a whole.

"The Commission gave a good deal of attention to this matter, and dealt with various aspects of it in a number of specific recommendations. The common thread that runs through all these recommendations is that the past 20 years have witnessed the emergence of an almost **bewildering number** of bilateral and multilateral organizations that in one way or another are

concerned with international development. While recognizing the value of these instrumentalities--and of the specialized experience they have accumulated--the Commission pointed out that the framework which has evolved suffers from four basic shortcomings:

It lacks a process for joint and authoritative monitoring and review of what is being done.

The multiplicity of assistance agencies is not matched by an effective mechanism to integrate their work.

There is, for the most part, a failure to relate development assistance policies to policies concerned with trade and monetary problems.

And, finally, the system does not project sufficient unity of purpose and of approach to make a rallying point for public support in the industrialised countries.

Meanwhile, I believe that the World Bank, consistent with its aims and purposed, can contribute substantially toward making the international development effort more rational and cohesive. There are three principal lines of action, which we propose to follow, to which I would like to refer:

1. We propose to establish working relationships with other international agencies that will make our common efforts in the development field complementary rather than overlapping. We have been working away at this without much fanfare and are beginning to build a pattern of inter-agency cooperation which I believe is impressive, although I suspect it is not widely known outside the institutions concerned.

2. A second way in which the Bank Group is seeking to contribute to rationalization of the international development effort is through its expanded program of country economic missions, to which I referred briefly in my statement to the Council last year. The basic purpose of this program, in addition to meeting our own operational requirements, is to produce current, comprehensive and objective data and analyses concerning each of our developing member countries. The program is designed, on the one hand to assist the government of the country in planning and implementing its own national development strategy, and on the other, to help interested multilateral and bilateral aid agencies to tailor their assistance to the requirements of that strategy.

3. That brings me to the third of our activities designed to contribute to a more coherent international development endeavour - namely, the organization of aid coordination groups provided for regular consultation between each major developing country and the various development assistance agencies interested in helping it. It is through the mechanism of such consultation that a country's program and policies can be reviewed, and a common understanding can be reached on the financial and technical assistance requirements of a satisfactory development effort.

As I see it, we can reasonably expect results of four different kinds:

1. Everyone working in the development field will have up-to-date socio-economic information and analyses of the problem of the developing countries.

2. It will become possible to look at all the inter-related aspects of the development together rather than one at a time. Governments should thus be able to make more rational decisions on priorities and the international community should be in a better position to help governments by illuminating the choices open to them.

3. It will become easier to avoid inconsistent approaches by different aid agencies.

4. It should become possible to curb an inordinate growth in the number of separate missions with which governments have to deal as the international development effort expands.

These general principles for the Bank Group are in line with the type of assistance required (as discussed in Part II of this paper) to promote sound fertilizer industries and trade in LDC's. Among the different activities and new opportunities that may open up involving Bank Group assistance in the next decade, three deserve priority attention: (a) economic appraisal of projects and analysis of their impact on the international development community, (b) coordinating aid policies of different lending agencies and of bilateral donors, and (c) encouraging fertilizer trade development and joint ventures among LDC's.

a. Economic Appraisal of Projects & International Development

As indicated in this paper, many importing LDC's are faced with border prices (for products often produced by other LDC's) lower than local prices. A] key element in implementing sound projects in a given country will first be to look at the international or regional market for fertilizers. The overall interest of the developing world community should be assessed in addition to a narrower economic appraisal conducted from the point of view of the country where the project is to be implemented. At the **extreme** the economic appraisal should (in the case of procurement from another LDC) assess costs **and** benefits for both the importing and the supplier country and provide a rate of return for the community as a whole.

b. Coordination of Aid Policies

This paper has called attention to inconsistencies in aid policies and in particular conflicts between export policies and development objectives. One solution (in the case of Persian Gulf plants, for example) is to loosen aid tying rules and permit procurement by Asian or East African countries from the Persian Gulf. Aid donors have already taken preliminary action on the principle of untying aid. The Ministers of the OECD countries **made the** following statement which was later confirmed by the DAC high level meeting in Tokyo in September 1970:

"Ministers recognised that a policy designed to increase the volume of aid must be accompanied by efforts to improve its conditions. With these two objectives in view, Governments represented in the DAC should consider progressively reducing aid tying, especially where it adds to the cost of goods to developing countries or distorts trading patterns. Member countries indicated their willingness to seek jointly the means to relax aid tying and requested that this question, as well as means to increase the volume of aid, be on the Agenda for the DAC High-Level Meeting in Tokyo next September. Moreover, a number of member countries declared their intention favourably to consider reducing aid tying in appropriate specific areas."

The World Bank Group does not give commodity aid to the fertilizer sector and, therefore, cannot help directly in the aid untying effort. However, it could cooperate with aid donors (the consortia and consultative groups chaired by the World Bank constitutes an ideal forum for such cooperation) through consultations and studies and contribute to a more coherent development effort in the fertilizer field. In particular, if the untying of aid succeeds in freeing to a large extent the fertilizer trade in LDC's, allocation of future investments and aid resources will have to be looked at in a broader way. Investments should be timed and located in order to maximize the benefits of the LDC community. The World Bank Group, given its centralised (and detailed by project and by country) lending program, is in a position to adjust its own lending policy to match an optimum pattern of investment as determined by free economic forces.

c. Development of Fertilizer Trade Among LDC's and Joint Ventures

Trade arrangements between LDC fertilizer producers and consumers for intermediates (liquid ammonia and phosphoric acid) deserve more attention. As indicated in this paper, such arrangements clearly permit the LDC community to benefit from economies of scale and improved factor efficiency.

Approaching integration and trade development through political and tariff agreements is a long and uncertain process, sometimes politically non-negotiable or limited to adjacent countries. Another way of proceeding, admittedly more partial, is to approach the problem at the project level through promotion of international companies and industrial joint ventures.

Schematically, a joint venture^{1/} could be set up in two ways:

- a. separate ownership of the different project links and contractual commercial arrangements between the partners;

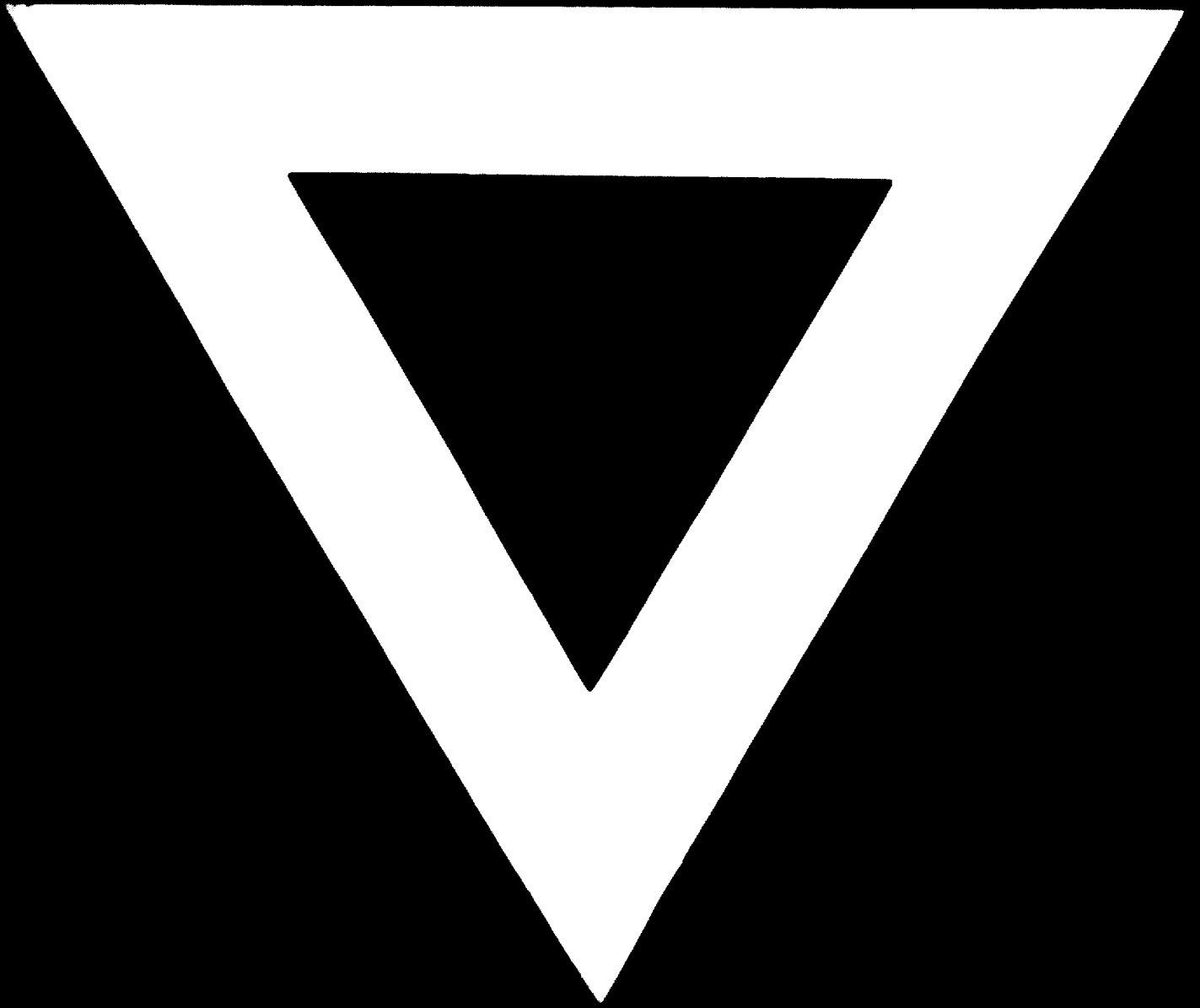
^{1/} It should be noted that a general of partial untying of aid would also help finance exchanges of products between partners (developing countries) in joint venture.

- b. joint ownership in the overall project together with contractual sales arrangements.

There are several examples of such joint ventures in the fertilizer sector: contractual arrangements between Kuwait and Turkey for ~~ammonia~~ sales and between Mexico and the Philippines as well as India for phosphoric acid sales. An example of a joint venture between an LDC and a developed country is Industries Chimiques Maghrebines (ICM-Tunisia), jointly owned by French companies and the Tunisian government, with sales subject to contractual arrangements between the ICM and the shareholders.

Should the benefits derived from such joint ventures become more evident in the future to LDC's and also to international fertilizer manufacturing or trading firms, capital assistance from aid donors to finance such types of project. will be increasingly needed. Being a lender to industry in many different countries and reviewing continuously the economic development of almost all LDC's, the Bank Group is in a unique position to promote joint ventures through technical and financial assistance should this be the desire of member countries.





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