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Expert [illegible]eeting on Fertilizer Plant Cost
Reduction: [illegible]ays to Mobilize Sufficient Financing

Vienna, Au[illegible]ia, 11-14 April 1978

REPORT

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INTRODUCTION

The Expert Group Meeting on Fertilizer Plant Cost Reduction and Ways to Mobilize Sufficient Financing was convened at the headquarters of the United Nations Industrial Development Organization (UNIDO) in Vienna from 11 to 14 April 1978 to formulate conclusions and recommendations that would be submitted to the Second Consultation Meeting on the Fertilizer Industry to be convened in Innsbruck, Austria from 6 to 10 November 1978.

The First Consultation Meeting on the Fertilizer Industry, held in Vienna in January 1977, had recognized that the costs involved in establishing fertilizer plants were very high and could, by raising difficulties for their financing, affect the developing countries' objectives in expanding the fertilizer industry. It suggested that UNIDO and other appropriate international organizations examine the justification for some recent increases in the prices of equipment and services. There was general agreement that the greatest possible use should be made of international competitive bidding and that bilateral aid should as far as possible be untied.

CONCLUSIONS AND RECOMMENDATIONS

A. Increases in the costs of fertilizer plants

1. The Meeting noted that the capital costs of fertilizer plants, particularly nitrogenous fertilizer plants, were a significant part of the cost of production. Since they would have an important effect on the cost of fertilizer, it was desirable to seek ways and means to reduce them.

2. The available data on plant investment costs were not directly comparable owing to differences in: currency, site factors, definition of plant components and definitions of infrastructure. In particular, the cost of building a plant on a developed site was found to be much higher than on a site lacking infrastructure.

3. The trends in the costs of nitrogenous fertilizer plants built in selected European countries were considered in order to obtain a view of the trend in plant costs relative to inflation. Plant costs were converted into dollars[1/] and the increase compared with an average inflation rate of 7 per cent per annum assumed for the United States during the period 1970-1977. The data indicated an annual rate of increase in fertilizer plant costs from 10 to 16.5 per cent, or from 3 to 9.5 per cent above the assumed inflation rate; the weighted average was 12.5 and 5.5 per cent respectively.

4. The costs of phosphatic fertilizer plants probably increased at roughly the same rates as those for nitrogenous fertilizer plants; but only the costs of nitrogenous fertilizer plants, which had a more significant role in increasing world food supplies, were studied in detail.

5. The most important elements of plant costs were reviewed and it was concluded that:

(a) The cost of equipment and machinery had increased somewhat less than the increase in total plant cost, that is, by approximately 3 per cent above the rate of inflation. Part of the extra 3 per cent annual increase was due to additional plant equipment for environmental considerations and more sophisticated operating controls;

(b) The cost of plant erection appeared to have increased at an annual rate of 20 per cent, or 13 per cent above the rate of inflation. It was believed that the increased cost of foreign labour and skilled labour had been contributing factors;

1/ References to "dollars" are to United States dollars.

(c) The cost of off-sites and other expenses had increased at an annual rate of approximately 22 per cent, or 15 per cent above the rate of inflation. The largest increases had again been in the cost of foreign and local skilled labour.

The group stressed that the above data were only indications of trends; they could not be applied to specific countries or locations.

6. The sharp increase in the number of fertilizer plants (as well as other chemicals and process plants) ordered in the period 1973-1975 had also had a significant influence on plant costs. Ways to avoid sharp fluctuations in the number of plants under construction might be considered by UNIDO as a possible topic for the Second Consultation Meeting on the Fertilizer Industry in November 1978.

B. Ways and means to reduce the costs of fertilizer plants

7. For many fertilizer plants, the investment cost was increased by the cost of constructing infrastructure outside the battery limits of the plant such as: (a) port facilities; (b) road and rail connections; (c) power supply connection; (d) water supply connection; (e) township and other civilian facilities and;(f) environmental protection and monitoring facilities. Such additional costs could be minimized by selecting a developed site or expanding an existing plant site. Where this was not possible, the ongoing cost to the project of providing this additional infrastructure could be reduced if the investment was undertaken by the Government and/or concessionary terms of financing were obtained.

8. In some developing countries import duties and taxes added 3 to 10 per cent to the total cost of a plant. In view of the accepted need for low-cost fertilizers, Governments should consider removing or reducing this burden on plant costs.

9. Inadequate project planning could increase plant costs unnecessarily. Project feasibility studies, accompanied where necessary by pre-project engineering studies, and necessary clearances from statutory authorities should be appraised by financial institutions prior to obtaining bids to construct the plant from engineering contractors. A time schedule for completing the project and the scope of the responsibilities of buyer and seller should be determined before an investment decision was taken. The buyer should have a strong project/cost control team working throughout all phases of project

implementation. Consultants should be used to assist the inexperienced buyer. Adequate arrangements for the functioning of this team should be established and agreed with the engineering contractor.

10. Once the investment decision had been made, delay at any stage of implementation would increase the plant cost. For example, for a project costing $200 million, each week's delay might cost:

(a) Approximately $400,000 during the first year (design engineering) mainly owing to the late ordering of equipment;

(b) Approximately $500,000 during the second year (installation stage) mainly owing to the longer installation schedule and higher financing charges;

(c) Approximately $1 million in the final stages mainly owing to loss in production.

Hence the owner and engineering contractor should co-operate to avoid delays by adhering to the agreed time schedule and sound project management using network methods and involving follow-up and proper inspection at all stages of the project.

11. Engineering services and equipment accounted for about two thirds of the cost of a plant. A limited number of prequalified bidders should be invited to tender for the construction of a plant. Countries giving bilateral credits should encourage international competitive bidding for engineering services and equipment to the maximum extent possible. Although this might increase procurement expenses, a reduction in engineering and equipment costs of from 10 to 20 per cent might be achieved; furthermore, the choice of the best equipment available would be facilitated. To develop more specific proposals, there should be discussion between owners in developing countries on all aspects of plant procurement and implementation.

12. A high degree of automation and instrumentation (such as computerization which increased the cost of a plant considerably) that aimed to reduce the number of operating personnel might not be useful for some developing countries. The choice between higher automation and large labour requirements should be made after a careful economic analysis depending upon the location of the plant. The degree of automation should be decided mainly on the basis of the safety of installation for proper operation.

13. To facilitate a reduction in plant costs, it would be useful to standardize plant capacities. Equipment suppliers should be persuaded to standardize rotating machines and major equipment to the greatest extent possible; this

would be particularly advantageous for a country installing a number of plants. This approach might reduce spare parts inventory and also lead to quicker delivery.

14. The harmonization of engineering standards also appeared to be desirable and UNIDO might examine how this might be approached internationally.

15. Use of the same design engineering drawings for the construction of a set of duplicate plants would reduce the licence and know-how and engineering fee considerably. For a plant producing 900 t/d ammonia and 1,500 t/d urea, those fees were of the order of 5 per cent of total plant costs. Such savings could be achieved by a country building several plants or by neighbouring countries who would agree to construct plants of the same type.

16. In those developing countries where engineering capabilities existed, greater use of indigenous engineering personnel could help to reduce engineering costs. In other countries, a beginning could be made with civil engineering gradually spreading to electrical, mechanical, instrument and process engineering. However, the total responsibility and guidance would be that of the engineering contractor.

17. In developing countries where fabricating capabilities existed, local suppliers should be used to the maximum extent possible. Lists of local suppliers and fabricators should be provided to the engineering contractors for qualification purposes at the initial stage. When supervision of these local suppliers was needed it should be provided. The local fabricators should develop a capability to prepare workshop drawings.

18. The investment cost of producing finished fertilizers was considerably reduced if initially the plant relied on imported intermediate products such as ammonia or phosphoric acid. The unit or units to produce these intermediates could be added at a later date financed by funds generated by the initial project.

19. Civil works accounted for approximately 10 to 15 per cent of the total cost of a plant. Cost savings could be achieved by:

(a) Careful site selection and plant layout; for example, sites where a lot of piling was required should be avoided;

(b) Appropriate design; for example, by using high strength steel where corrosion was not a problem; avoiding long-span roofs; constructing open plants as opposed to closed ones etc.;

(c) Employing better construction methods such as slip-forming of prill towers and other high structures; precasting and prestressing, as far as possible, instead of on site construction.

20. Attempts should be made to establish inventory of spares accessible to all operators in a single country or in a group of neighbouring countries. Significant initial savings were possible as a spare parts inventory might cost as much as 10 per cent of the total cost of equipment for the plant. A system to identify spares and to ensure that they could be located through suppliers would also be desirable. To reduce the cost of the initial spares package, a list of recommended spares should be obtained from vendors/ contractors at the stage of main inquiry and orders for spares should be placed at the time of placing the order for the main equipment.

21. The cost of expatriate personnel of engineering contractors deputed to the site, as well as those of vendors' servicemen, could be reduced by getting commitments on the rates and period fielded at the time of signing the original contract (order stage). Good planning was required if the use of these expensive personnel was to be kept to a minimum.

C. Financing of fertilizer plants

22. Currently, sufficient financing was available to cover the number of fertilizer project proposals from developing countries provided these projects were sufficiently well prepared. The question was raised, however, whether the increased volume of financing likely to be required in coming years, of the order of $2 billion a year for the foreign exchange costs of fertilizer plants, might be more problematical. There was up till then no evidence that serious problems would arise, given the priority attached to fertilizer projects by sources of financing. One way to help to ensure a steady flow of well-developed project proposals and to minimize the effects of cyclical investment would be to pay more attention to the forecast of world supply and demand prepared jointly by the World Bank, FAO and UNIDO.

23. Some problems might arise from inappropriate terms and conditions of finance. Currently, there was a lack of comparative data to assess the advantages and disadvantages of different sources of finance in relation to fertilizer projects and it was concluded that UNIDO might study this problem.

24. So far as the formal terms of financing were concerned, the most serious problems arose from inadequate grace periods before repayment of loans commenced. Various banks had developed a number of technical solutions to this problem. UNIDO should make a comparative assessment of the experience gained of such devices as seen from the borrower's point of view.

25. As regards interest rates, it was noted that fertilizer plants, like other revenue earning projects, were commonly subjected to a commercial rate of interest by the Government as onward lender, even when the resources had been obtained on concessionary terms. The fact that in many countries fertilizer sales were subsidized by the Government was seen as a reason for making an exception to this general practice; a direct subsidization of plant construction would be simpler and more efficient. Certainly fertilizer plants, which provided the main input for agriculture, should not pay a higher rate of interest than other agricultural projects.

26. Virtually all of the fertilizer projects examined by UNIDO had involved some form of co-financing. Co-financing had now become such an established practice that the harmonization of terms, rules and procedures should be seriously considered by the financing agencies principally concerned. Suppliers of finance should appoint one person to represent them in dealings with the plant owner and his contractor.

27. The crucial importance of completing new fertilizer plants in time to meet agricultural needs meant that every effort should be made to ensure that mobilization and administration of finance did not delay project completion. Fertilizer plants in this respect were a special case that might justify exception to established and otherwise well-justified procedures.

28. It was noted that for technical reasons the proportion of plants located in remote and difficult areas was likely to increase, at least, in the short- and medium-term. This meant that the problem of financing infrastructure costs would become much more prominent. As in the case of the mining industry, it was advisable that the financing of the plant and infrastructure costs should be separated with the aims of (a) obtaining concessionary terms for the infrastructure portion; and (b) excluding the costs of infrastructure from the assessment of the project's viability.

SUMMARY OF THE DISCUSSION

I. Organization of the Expert Group Meeting on Fertilizer Plant Cost Reduction and Ways to Mobilize Sufficient Financing

29. The Meeting was opened by A. Hacini, Head of the Negotiations Section. He explained the purpose of the Expert Group Meeting and solicited the participants to make practical suggestions that could be considered at the Second Consultation Meeting to be held from 6 to 10 November 1978 at Innsbruck, Austria. (A list of participants was issued as document ID/WG. 274/3.Rev.1).

30. M.C. Verghese, Head of the Chemical Industries Section, and E. Becker-Boost, Director of the Investment Co-operative Programme Office - World Bank/UNIDO Co-operative Programme, co-chaired the Meeting.

A list of the documents distributed to participants is given in the annex.

Adoption of the Agenda

31. The Meeting adopted the following agenda:

Increases in the costs of fertilizer plants;
Ways and means to reduce the cost of fertilizer plants;
Financing of fertilizer plants.

II. Increases in the costs of fertilizer plants

32. The Meeting recognized that the cost of building a fertilizer plant depended on the country and site. Estimates were considered of the cost of constructing a plant producing 100 t/d ammonia and 1,750 t/d urea in (a) a developed country ($150 million); (b) a developing country at a site with some infrastructure ($230 million to $250 million); and (c) a developing country at a remote location ($320-$350 million). The differences in costs could be attributed to site location factors and to the costs of constructing the necessary associated infrastructure.

33. A breakdown of typical capital costs for a complex producing 1,000 t/d ammonia and 1,750 t/d of urea is given in the following table.

Estimated breakdown of capital costs for a complex producing 1,000 t/d ammonia and 1,750 t/d urea

Item	Developed site	Undeveloped site
	Percentage of total cost	
Land, site preparation, civil works etc.	3	7[a/]
Machinery, equipment and spares	61	33
Freight and insurance	2	7
Engineering know-how charges	6	7
Erection	16	18
Off-sites and other costs, including start-up costs	12	28
Total investment cost	$150 million	$320 million

a/ Excluding off-site.(It could be up to 15% if off-site is included.)

34. The Meeting considered indices of plant costs based on evidence of the increase in the costs of fertilizer plants built in some countries in Europe. The increase in the costs between 1970 and 1977 measured in local currency ranged between 66 per cent and 200 per cent. When these estimates were converted into the dollar equivalent, the increase ranged between 100 and 200 per cent; the cost in 1977 expressed in dollars was thus from 2 to 3 times the 1970 level. This evidence showed how difficult it was to compile a meaningful index of the increase of fertilizer plant costs supplied by different developed countries.

35. Participants from developing countries compared prices of plants built in the early 1970s with the estimated costs of plants constructed more recently. Their evidence indicated that the increase in fertilizer plant costs between 1970 and 1977 ranged between 150 and 200 per cent, i.e. 2.5 to 3 times the 1970 level.

36. It was indicated that the sharpest increase was in the costs of personnel for supervision of construction. Local erection costs and costs of equipment and materials had also increased faster than the total cost of the plants.

37. It was recognized that there was a big jump in equipment prices in 1974/75; this was caused by a high level of demand as well as increases in the cost of materials, wages and salaries. The extent of the increase in prices varied from group to group depending on the ability of suppliers to cope with the extra demand. There was some evidence that the increase in equipment and material costs had slowed down after 1976.

38. The Meeting agreed that the increase in the cost of fertilizer plants since 1970 mainly reflected the sharp increase in the rate of inflation generally, particularly increases in the cost of materials, wages and salaries; but the increase in the number of fertilizer plants ordered in the period 1973-1975 was also a significant factor. The participants agreed that if a steady demand for fertilizer plants over a period of years could be achieved, it would help to reduce the cost of fertilizer plants.

III. Ways and means to reduce the costs of fertilizer plants

39. The importance was stressed of conducting a thorough pre-investment or feasibility study to define the scope of the project. An appraisal study by an international financing institution was also considered important in defining a viable project. These two types of studies helped to define the parameters of the project including the choice of site location. The opportunity to import manufactured intermediate products could be considered at the same time. In particular, the cost of the associated infrastructure would need to be considered if the overall cost of the fertilizer plant was to be kept to a minimum.

40. The major components of the infrastructure affecting costs for an undeveloped site in a remote location could be broken down into two categories: one for which costs should be borne by the project and one for which costs should be charged to other agencies or the Government. Among the components for which investment costs should be charged to the project were (a) electric power generating facilities (captive power); (b) a water supply system within the plant; (c) pollution control systems within the plant; (e) steam generation; and (f) training facilities for personnel. Amongst the components for which investment costs should be charged to other agencies or to the Government were (a) railways and access roads, harbours and waterways; (b) a supply of feedstocks and utilities up to the plant site boundary; (c) housing; (d) school and medical facilities; and (e) market development costs including field warehouses.

41. The cost of infrastructure in relation to the cost of the battery limits plant varied from location to location. When a fertilizer plant was built on an undeveloped site in a developing country, the cost of the infrastructure was often so high that the project did not appear viable. However, in developed countries, such infrastructure was available. It seemed appropriate, therefore, to search for ways in which the infrastructure needed by fertilizer plants in developing countries could be financed in a way that did not result in charges to the project.

42. Taking into consideration the infrastructure requirements, availability of raw materials and feedstocks, and the marketing of the product of the fertilizer plant, an optimum siting for the plant could be chosen. It was stressed that when an optimum site was not chosen there was an unnecessary increase in the cost of the plant and the possibility of delay in the project's execution.

43. Ways to obtain a favourable contract price for the buyer were considered. To ensure effective international competition among bidders it was recommended that the number of contractors be limited to five or six pre-qualified bidders for a specific project. It was further recommended that the bid specification should be clear, detailed and realistic so that the seller did not have to add a provision for contingencies to cover unknown risks. It was recognized that plants were built in both developed and developing countries without international competitive bidding and that there was some evidence that savings in time had been achieved in this way.

44. The importance was stressed of maintaining good working relations between the buyer and seller. A case was mentioned where one of the consortium of financing agencies placed a representative on site to liaise with the buyer and seller. It was also stressed that the number of parties in a decision-making consortium in a major venture should be kept to a minimum.

45. The Meeting noted that there was a trend away from turn-key projects and that various types of arrangement were being used by the buyers. Some participants from developing countries emphasized their preference for having a say in the selection of equipment and other aspects of executing the contract. This provided good training ground for their personnel.

46. It was stressed that adherence to a proper time schedule for construction of a plant required strong management on the part of the contractor and co-operation on the part of the buyer. It was pointed out that each month's delay added approximately 2 per cent to the cost of the project. The adoption of a network method, such as the critical path, was recommended to assist in the planning and control of such projects. Any changes proposed by the buyer after implementation began would mean delays in completion of the plant and overruns in the cost. A number of cases of cost overrun were mentioned; these were due to delays in completing the project and unforeseen increases in equipment cost rather than changes in the process technology.

47. It was recognized by the Meeting that standardization of fertilizer plants in a country where more than one plant has been planned had inherent advantages in reducing costs to the client. Engineering costs (excluding procurement costs) for the second and subsequent units were cited as 20-25 per cent less than the initial engineering costs. Surprise was expressed that a greater reduction was not considered possible. Standardization

would also reduce spare part requirements and facilitate interchangeability of certain critical equipment items with plants of similar design. Such standardization of equipment should not necessarily be confined to a country but could be extended to a region where reasonable transport distances were involved. There was also scope for harmonizing engineering standards as they affect the construction of fertilizer plants and UNIDO should examine this matter.

48. It was pointed out that so far there were very few completely identical plants in the world because of the need to adjust to different site locations, climates and other considerations. The Meeting recognized that it would be useful to standardize plant capacities and suggested that this matter be discussed at the Second Consultation Meeting.

49. A further substantial saving could be achieved in the cost of fertilizer plants by the elimination of local taxes and duties on imported equipment. In some developing countries a duty of up to 50 per cent of the c.i.f. price of equipment and spares was charged; elimination of import duties and taxes, therefore, could reduce the cost of a fertilizer plant by as much as from 10 to 15 per cent. It was recommended that in the case of the fertilizer industry - a vital industry affecting agricultural production - the Government should waive such import and excise duties.

50. The discussion mostly concerned large plants such as one producing 1,000 t/d ammonia with an associated urea plant. The advantage of building smaller plants for countries with smaller markets was acknowledged and it was suggested that UNIDO investigate the economics and operating experience of plants that were suitable for such developing countries.

51. Considerable cost savings were claimed for barge-mounted plants on sites with no infrastructure whatsoever. However, it was pointed out that the costs of such plants were difficult to estimate because none had been built so far. While originally a barge-mounted plant was considered as a floating plant, by being shore it could be considered as a possible permanent plant. Since this was still in a conceptual stage, no specific recommendation was made.

IV. Financing of fertilizer plants

52. The Meeting was informed that the problem of financing fertilizer plants was raised by the First Consultation Meeting in connection with the large volume of financing that would be required for plants in developing countries. If the cost of associated infrastructure was included, this was expected to reach approximately from 3 to 4 billion[2/] dollars per annum in the 1980s, of which half or more would be foreign exchange requirements. The estimates made by UNIDO indicated that this would require foreign exchange financing at from 2 to 3 times the present level for fertilizer plants built in developing countries. At present this financing was very roughly divided as follows: one third aid financing, one third Eurodollar financing and one third bilateral export credits.

53. A major part of the World Bank's loans to the industrial sector was directed to fertilizer plants and as a result it was contributing to the financing of perhaps one third of the fertilizer plants being built in developing countries. It was found that other sources of finance were generally willing to give priority to the financing of fertilizer plants.

54. Although there was usually no difficulty in mobilizing the necessary volume of financing, difficulties sometimes arose with regard to the terms and conditions of financing. An opinion survey (Delphi method) showed that a majority of participants felt that the foreign exchange component of project financing was (a) easy to find on hard terms (14 out of 23 opinions); and (b) often possible to find on favourable terms (9 out of 23 opinions) but that local currency financing was generally difficult to find (14 participants).

55. It was the policy of some financial institutions to base their appraisal of a project on the total costs of the project including infrastructure. For this reason, it was sometimes difficult to show that a project in a remote location was viable even though it was an important project from the point of view of the Government of the country. When infrastructure was included as part of the project, therefore, at least part of it would often need to be financed on concessionary terms to improve the project's viability. Although this need was recognized, there were only a few projects in which this approach had been implemented.

2/ A thousand million.

56. The Meeting recognized that it was in the interest of the buyer and the sources of financing that the performance of the seller in constructing the plant was carefully monitored. It was felt that the buyer, in particular, should be more involved in all aspects of the project's development. The procedures of international financial institutions ensured that they were directly involved in a way that protected the client's interests. However, when financing was obtained from other sources, in particular by inexperienced buyers, safeguards were not provided. It was noted that this matter had been considered at a previous UNIDO meeting on contract procedures.3/

57. It was generally appreciated that the discipline imposed by the financial appraisal of a project conducted by development agencies had many advantages. Initially such procedures might appear irritating but they helped to remedy weakness in the project and to ensure that loose ends were tied up. There was room for more involvement of the development agencies in the planning, formulation and implementation of many projects. In this connection, consideration was recommended of the forecasts of regional and world demand/supply balances for five years ahead prepared by the FAO/UNIDO/World Bank Working Group on Fertilizers.

58. The Meeting recognized that international financing institutions, by nature of their statutes, were required to call for international competitive bids. Some developing countries had a similar requirement for projects built in the public sector. When such procedures were followed, expeditious action was required to avoid delays in procurement. The experience of some participants was that competitive bidding resulted in reduced costs. Recognizing this, and bearing in mind the experience with procurement using tied sources of financing, many participants indicated that they would prefer the most flexible source of financing.

59. As regards the form of financing, a long grace period before loan finance had to be repaid was regarded as an important concession. It was for many buyers more important than a lower rate of interest and as important as the flexibility to purchase from world-wide sources.

3/ "Technical Seminar on Contract Methods and Insurance Schemes for Fertilizer and Chemical Process Industries", Lahore, Pakistan, 25-29 November 1977 (ID/WG.259/26/Rev.2).

60. The Meeting recognized that the developing countries had much to gain by a closer co-operation that would combine their own financial resources, raw material resources, markets and available skills. Although considerable efforts had been made to promote co-operative ventures few had so far materialized. The Meeting was informed of a number of concrete projects currently under discussion and noted that development agencies were actively supporting such co-operative ventures. The Meeting recommended that the development agencies should play a more positive role in both fostering and financing such co-operative ventures.

61. Since the foreign exchange requirements for the financing of industrial development in developing countries were very large, it was important to consider what priority should be accorded to the financing of fertilizer plants. Fertilizers are the dominant input in improving agricultural output, therefore, fertilizer plants should receive a high priority for the financing available.

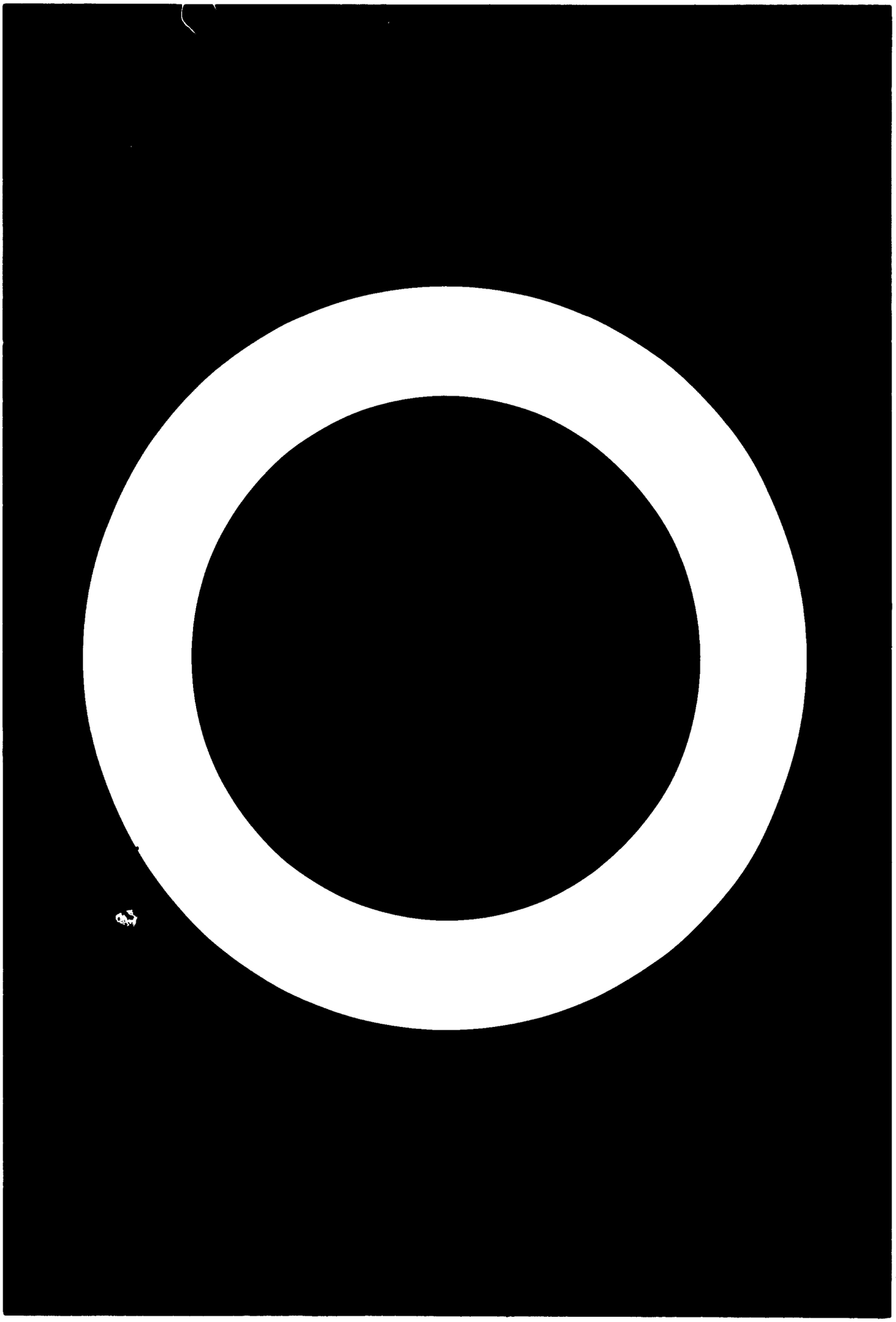
62. The cost of between $200 and 500 million dollars for a large-scale fertilizer plant meant that several sources of financing were likely to be involved. Arrangements for such co-financing had been made, but there was a need to consider whether these were suitable for the special requirements of fertilizer plants. For example, many fertilizer plants were built under reimbursable contracts which made it difficult to estimate precisely the final cost of the project on which the financing plan could be based.

63. Arrangements to finance the foreign exchange component of the cost of a fertilizer plant by buy-back of the products were considered. Although engineering contractors had agreed to handle such arrangements, it was recognized that they were not experienced in such trading activities. Such arrangements had been developed so far mainly for east/west trade. Although this method of financing had some advantages for the buyer, it was considered unlikely to develop on an extensive scale in the case of the fertilizer industry of the developing countries. However, a number of cases were noted where such arrangements had been made between CMEA countries and developing countries.

64. Attention was drawn to the sources of financing available in countries with centrally-planned economies for the financing of fertilizer plants built in developing countries. The International Investment Bank established by the CMEA countries had funds available for lending to industrial projects

in developing countries. UNIDO is co-operating with this Bank in identifying suitable projects but the requirement to use "Transfer Roubles" involving barter on a multilateral basis might prove an obstacle. The Meeting also noted that some CMEA countries have established their own financing agency which was allowed, among other things, to take equity participation in government-owned projects in developing countries.

65. The Meeting noted that only a small proportion of the fertilizer plants in developing countries were built with joint-venture arrangements involving a foreign partner. This trend appeared to be continuing for plants either in the planning stage or under construction. The Meeting noted that the equity investment required was quite large and that it was this and other reasons not a lack of interest that accounted for the small number of joint ventures realized in this industry.



Annex

LIST OF DOCUMENTS

ID/WG.274/1.Rev.1	Provisional agenda
ID/WG.274/2.Rev.1	List of documents
ID/WG.274/3.Rev.1	List of participants
ID/WG.274/4	Ways and Means to reduce the cost of fertilizer plants to be built in developing countries V.S. Pillai
ID/WG.274/5	Some aspects on ways and means to reduce fertilizer plant costs and to mobilize sufficient financing UNIDO secretariat
ID/WG.274/6	Reduce costs by planning the overall project D. Elliott and I.G. Hirst
ID/WG.274/7	Suggestions for increasing standardization of ammonia plant capacities and equipment Frank C. Brown
ID/WG.274/8	Cost of fertilizer plants in Spain, South America and the Middle East Luis M. Marzo
ID/WG.274/9	Reduction in investment and operational costs achieved through the use of ammoniation systems Jaime de Mingo
ID/WG.274/10	The effect of proper project management on reducing costs for fertilizer plants P.V. Clifton
ID/WG.274/11	The mobilization of finance for the construction of fertilizer plants in the developing countries J. White
ID/WG.274/12	Some suggestions for reducing investment costs and mobilizing sources of financing fertilizer plants - experience of Romania in this field N. Popovici
ID/WG.274/13	Means to reduce costs of fertilizer plants - an Egyptian case history A. Raouf Shoukry
ID/WG.274/14	Increase in cost of building an ammonia plant since 1970 Centre d'Etude de l'Azote (C.E.A.)

ID/WG.274/15	Possibilities of reduction of investment in fertilizer projects in developing countries R.R. Poricha
ID/WG.274/16	Reduction of the cost of fertilizer plants in developing countries A. Ben Youssef and M. Sellami
ID/WG.274/17	Report of the Meeting UNIDO secretariat

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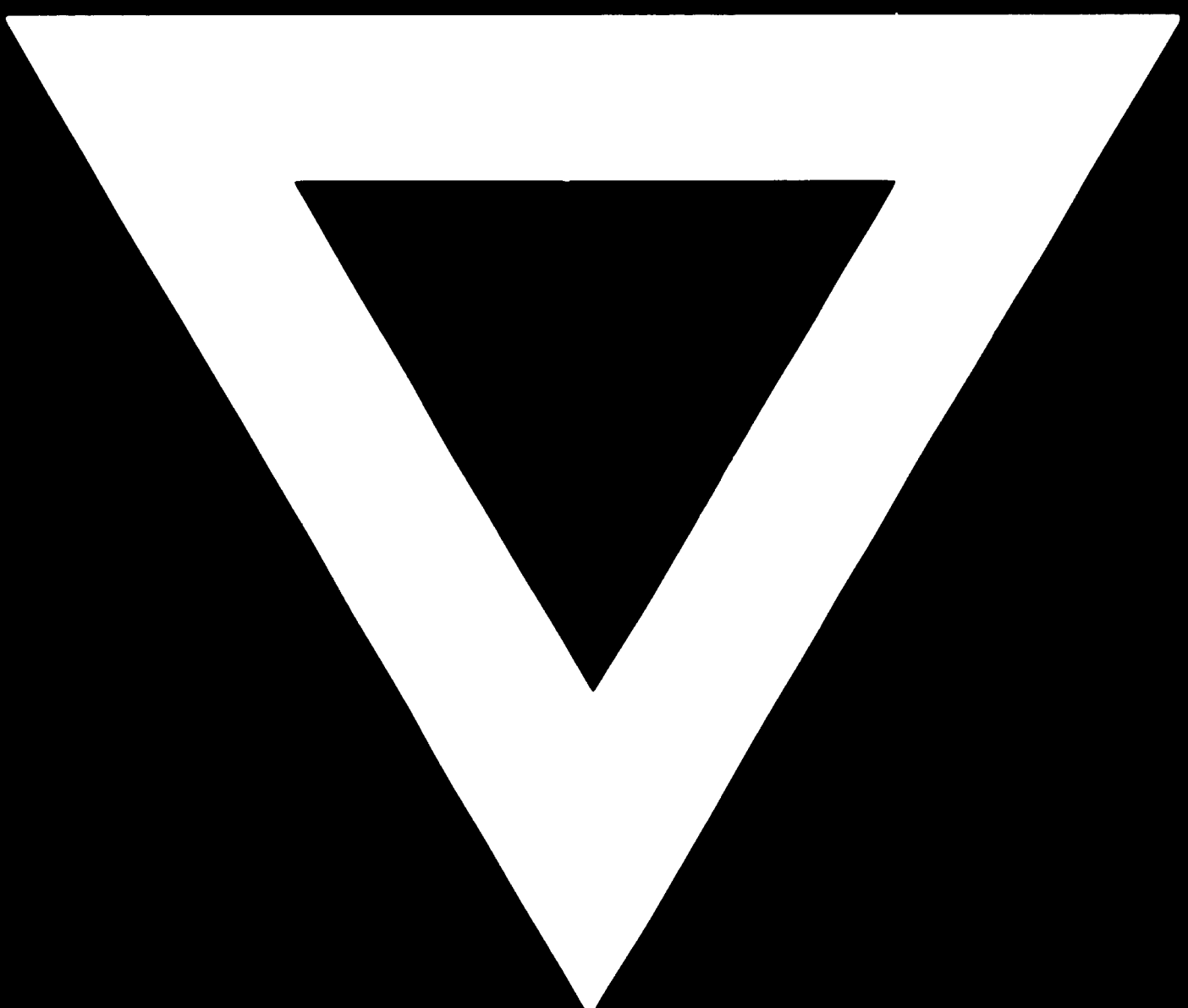

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