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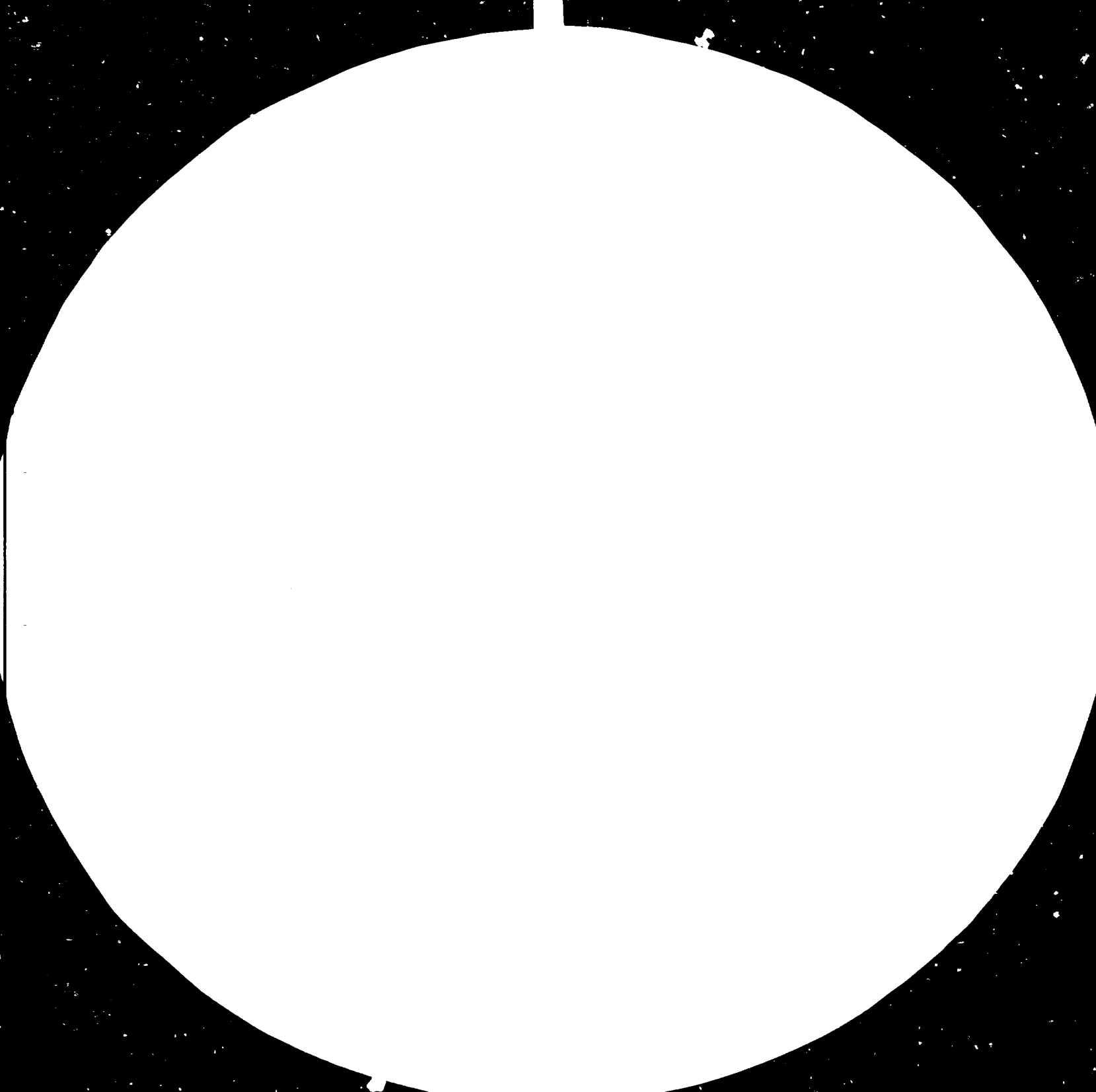
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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

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# FOURTH CONSULTATION ON THE FERTILIZER INDUSTRY

New Delhi, India, 23-27 January 1984

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**REPORT**

*4th consultation on the  
fertilizer industry.*

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## PREFACE

The Second General Conference of the United Nations Industrial Development Organization (UNIDO), held at Lima, Peru, in March 1975, recommended that UNIDO should include among its activities a system of continuing consultations between developed and developing countries with the object of raising the share of the developing countries in world industrial output through increased international co-operation.<sup>1/</sup> The General Assembly, at its seventh special session in September 1975, endorsed the recommendation and requested UNIDO to implement it under the guidance of the Industrial Development Board.

Twenty-one Consultations have been convened since 1977 covering the following sectors and topics: capital goods, agricultural machinery, iron and steel, fertilizer, petrochemicals, pharmaceuticals, leather and leather products, vegetable oils and fats, food-processing, industrial financing, training of industrial manpower, and wood and wood products.

In May 1980, the Industrial Development Board decided to place the System of Consultations on a permanent basis, and in May 1982 it adopted the rules of procedure <sup>2/</sup> according to which the System of Consultations was to operate, including its principles, objectives and characteristics, notably:

The System of Consultations shall be an instrument through which the United Nations Industrial Development Organization (UNIDO) is to serve as a forum for developed and developing countries in their contacts and consultations directed towards the industrialization of developing countries;<sup>3/</sup>

The System of Consultations would also permit negotiations among interested parties at their request, at the same time as or after consultations;<sup>4/</sup>

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<sup>1/</sup> Report of the Second General Conference of the United Nations Industrial Development Organization (ID/CONF.3/31), chapter IV, "The Lima Declaration and Plan of Action on Industrial Development and Co-operation", para. 66.

<sup>2/</sup> The System of Consultations (PI/84).

<sup>3/</sup> Ibid., para. 1.

<sup>4/</sup> Ibid., para. 3.

Participants of each member country should include officials of governments as well as representatives of industry, labour, consumer groups and others, as deemed appropriate by each Government;<sup>5/</sup>

Each Consultation shall formulate a report, which shall include conclusions and recommendations agreed upon by consensus and also other significant views expressed during the discussions.<sup>6/</sup>

The Industrial Development Board, at its seventeenth session held in April-May 1983,<sup>7/</sup> decided to include the Fourth Consultation on the Fertilizer Industry in the programme of Consultations for the biennium 1984-1985.

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<sup>5/</sup> Ibid., para. 23.

<sup>6/</sup> Ibid., para. 46.

<sup>7/</sup> ID/B/308, 19 May 1983.

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## INTRODUCTION

### Fourth Consultation

1. The Fourth Consultation on the Fertilizer Industry was held at New Delhi, India, from 23 to 27 January 1984. The Fourth Consultation was attended by 134 participants from 52 countries and 21 observers from 13 international organizations (see annex 1).

### Background to the Fourth Consultation

2. The First Consultation on the Fertilizer Industry recommended that UNIDO should examine contract procedures to ensure the successful construction and operation of fertilizer plants. Accordingly, the Technical Seminar on Contracting Methods and Insurance Schemes for Fertilizer and Chemical Process Industries was convened at Lahore, Pakistan, in November 1977, to discuss the issue.

3. That Seminar concluded that UNIDO should prepare four model contracts: Turnkey Lump Sum, Semi-Turnkey, Cost Reimbursable, and Licensing and Engineering Services.

4. The Second Consultation on the Fertilizer Industry considered the drafts of all the model contracts, but examined in detail only the draft UNIDO Model Form of Cost Reimbursable Contract for the Construction of a Fertilizer Plant including Guidelines and Technical Annexures (UNIDO/PC.26/Rev.1). It recommended that UNIDO should continue to work on preparing the four contracts and present the final drafts to the next Consultation.

5. The Third Consultation on the Fertilizer Industry examined the revised drafts of the UNIDO Model Form of Turnkey Lump Sum Contract for the Construction of a Fertilizer Plant including Guidelines and Technical Annexures (UNIDO/PC.25/Rev.1) and the UNIDO Model Form of Cost Reimbursable Contract. It recommended that UNIDO should convene an expert group meeting to finalize both model contracts. An expert group meeting was convened at Vienna, and both model contracts were finalized in May 1981.

6. In order to fully meet the recommendation of the Second Consultation, UNIDO prepared second drafts of the UNIDO Model Form of Semi-Turnkey Contract for the Construction of a Fertilizer Plant including Guidelines and Technical Annexures (UNIDO/PC.74), and the UNIDO Model Form of Licensing and Engineering Services Agreement for the Construction of a Fertilizer Plant including Guidelines and Technical Annexures (UNIDO/PC.73). Those draft model contracts were presented to the Fourth Consultation for consideration.

AGREED CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Issue 2: Programme to strengthen co-operation among developing countries in the fertilizer industry

7. The Consultation noted with appreciation the implementation of phase I of the programme of co-operation between developing countries that had been recommended by the Third Consultation, and concluded that UNIDO should continue its efforts to implement phase II of that programme.

Issue 3: Capital costs for fertilizer plants

8. The Consultation recognized the comprehensive nature of the studies on capital-cost control of fertilizer plants in developing countries prepared by the secretariat and concluded that it would be desirable to prepare a pre-contracting manual for the fertilizer industry. It identified important causes for the increase of capital costs in establishing fertilizer plants in developing countries and felt that comprehensive guidelines for project management and capital cost control would be necessary to overcome them.

Issue 4: Mini fertilizer plants

9. The Consultation, appreciating the documentation submitted to it, concluded that the concept of mini fertilizer plants was suitable for application in many developing countries and that technological options within a framework of reliability, which promised to be reasonably cost/energy efficient, were available and could be applied.

10. It also concluded that it might be advantageous to establish a mini fertilizer plant, even though local production costs would be higher than the cost of imports, and that international co-operation might be more easily forthcoming than for large plants.

Proposed new issues

11. The Consultation concluded that:

(a) The promotion of the pesticide industry in developing countries was important in view of its complementarity to fertilizers in increasing food production; however, no agreement had been reached on the proposal to include that issue on the agenda of a next consultation on fertilizers;

(b) Two new issues - new technologies for reducing fertilizer costs and increasing efficiency of fertilizer use and environmental protection for fertilizer plants - were particularly relevant and important to the fertilizer industry in the developing countries, and worthy of inclusion in the agenda of a next consultation on the fertilizer industry.

Recommendations

Issue 1: UNIDO model forms of contract for the construction of a fertilizer plant

12. The Consultation noted the two model forms of contract presented by the UNIDO secretariat, and recommended that:

(a) Two international groups of experts should be convened to examine respectively the UNIDO model forms of semi-turnkey contract and licensing and engineering services. The model form of licensing and engineering services shall be in the form of guidelines containing illustrative clauses. The experts should be selected by UNIDO from developed and developing countries, with preference to participants of the Fourth Consultation, giving due regard to equitable geographical distribution and an adequate representation of interested parties;

(b) The groups of experts should finalize the documents; in cases of disagreement on specific clauses, the alternatives should be presented and given equal weight;

(c) UNIDO, when publishing those documents, should acknowledge that they were finalized by the groups of experts.

Issue 2: Programme to strengthen co-operation among developing countries in the fertilizer industry

13. It was recommended that UNIDO should:

(a) Endeavour to obtain additional host countries including experienced developing countries, to implement more training programmes;

(b) Support the organization of additional regional and interregional meetings to exchange experience in the construction and operation of fertilizer plants;

(c) Complete, in co-operation with interested developing countries, the Directory of technological capabilities related to the fertilizer industry and should update it annually;

(d) Establish, in collaboration with existing regional information networks, an information network for the fertilizer industry giving priority to the needs of Governments and fertilizer companies;

(e) Prepare studies of the various types of joint-venture arrangements in the fertilizer industry entered into by developing countries between themselves;

(f) Report the implementation of the above programme to a next consultation on the fertilizer industry and to meetings of the expanded Bureau in the meantime.

Issue 3: Capital costs for fertilizer plants

14. It was recommended that UNIDO should:

(a) Prepare a pre-contracting manual for the fertilizer industry, covering in particular activities related to preparatory work on: engineering design and assignment of responsibilities and obligations of the contractors; the formation of project teams and the scope of their responsibilities; and invitations to bid, selection of bidders, evaluation of tenders and negotiation of awards;

(b) Prepare comprehensive guidelines for project management and capital cost control with particular reference to evolving an optimum financing package, detailed implementation programme and time schedule with an in-built system of up-dating and adjustment ensuring effective cost control;

(c) Organize activities relating to project management of fertilizer plants, such as seminars, workshops and training programmes, as well as assistance in establishing a computerized project management system.

Issue 4: Mini fertilizer plants

15. It was recommended that UNIDO should:

(a) Identify situations in which the establishment of mini fertilizer plants in developing countries would be desirable;

(b) Study, keeping in mind the reliability factor and cost/energy effectiveness, applicable technological options, including alternative flow-sheets;

(c) Promote co-operation between potential contractors and engineering companies from both developed and developing countries and buyers from developing countries for the establishment of mini fertilizer plants.

16. It was also recommended that UNIDO should report on the implementation of recommendations 14 and 15 to a next consultation on the fertilizer industry.

Proposed new issues

17. It was recommended that:

(a) In recognition of the importance of the pesticide industry to developing countries, the issue of pesticides should be referred to the Industrial Development Board. Also, the issue of pesticides should be discussed in a future consultation meeting;

(b) UNIDO, taking into account the valuable work carried out by the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Environment Programme (UNEP), should undertake, in co-operation with those organizations, work on the industrial aspects of new technologies and environmental pollution.

I. ORGANIZATION OF THE CONSULTATION

Opening of the Consultation

Speech by the Minister of Chemicals and Fertilizers, Government of India

18. The Minister of Chemicals and Fertilizers opened the Fourth Consultation, and said he was particularly pleased to welcome participants to New Delhi at a time when the Republic of India was celebrating its thirty fourth anniversary.

19. He noted the importance of food security for every country in the world, and stressed that fertilizers were essential in that process. In the case of India, security lay in producing for itself as much as possible of the fertilizer needed; he informed the Consultation that India was the fourth largest producer and consumer of nitrogenous fertilizers and the sixth largest producer and consumer of phosphatic fertilizers in the world.

20. He also noted the paramount importance of the issues submitted to the Fourth Consultation for the development of the fertilizer industry. He referred specifically to the need to reduce the capital costs of fertilizer plants and the development of mini fertilizer plants.

21. The Minister then referred to the current manufacturing capacity of fertilizers in India; that capacity included 35 nitrogenous and 55 phosphatic (including SSP) plants with a total annual capacity of 5.17 and 1.48 million tonnes of N and P2O5. There were also proposals for commissioning 8 additional nitrogenous plants by the end of the decade. With regard to phosphatic fertilizers, besides licensing 30 SSP plants, 11 phosphatic fertilizer plants had been proposed. All those additions would raise the capacity of fertilizer production to 7.83 million and 2.98 million tonnes of N and P2O5 during 1986/87 and 9.9 million tonnes of N during 1989/90.

22. He noted that the developing countries had made considerable progress in increasing fertilizer production. However, some of the plants had low capacity utilization owing to various problems and constraints; those had to be

identified and corrective measures adopted in order to improve the operational efficiency of the plants. The Government of India had taken a number of positive policy decisions in that regard.

23. With regard to the Indian capability of manufacturing fertilizer plants and equipment, he informed the Fourth Consultation that the last two decades had been marked by a fast growth of engineering and allied industries, and that currently India was in a position to manufacture and supply about 80 per cent of the equipment required for the modern large fertilizer plants.

24. Referring to programmes of technical co-operation among developing countries (TCDC) in the fertilizer industry, the Minister described the important contribution that India had made through collaboration with various other developing countries such as Algeria, Bangladesh, Senegal and Sri Lanka. He felt, however, that there was a much greater scope for technical co-operation between developing countries than had been undertaken and suggested that such co-operation be institutionalized on a regional basis through workshops and group discussions. He felt that advanced developing countries could perhaps be given the responsibility of convening such meetings on a quarterly basis. In addition, he suggested visits by technologists from developing countries to the plants of the developed countries for practical orientation to the latest technological developments in the field of fertilizers and management practices that were weak in many developing countries.

25. He hoped that the deliberations of the Fourth Consultation would give further impetus to co-operation between developing countries.

Speech of the Executive Director of UNIDO

26. The Deputy Director of the Division of Policy Co-ordination and Head of the Negotiations Branch, representing the Executive Director of UNIDO, read the speech of Dr. Khane, who very much regretted not being able to attend the Fourth Consultation. He would be present in spirit and extended a very warm welcome to all participants. Dr. Khane thanked the Government of India for hosting the Consultation, and said that India's constant and constructive support of the System of Consultations was much appreciated.



27. The problems of the fertilizer industry had received more attention through the System of Consultations than other sectors since the First Consultation on that sector in January 1977. He noted the success achieved in the area of contract procedures for the construction and operation of fertilizer plants. Of the four types of model contracts suggested by the First Consultation, two: the Turnkey and Cost Reimbursable contracts, had been finalized in May 1981. As negotiated documents between international experts, they carried a great promise of creating durable relationships between interested partners.

28. The second element of progress in the sector was the work done to reduce the high costs involved in establishing fertilizer plants.

29. The examination of the viability of mini fertilizer plants was another achievement of the System of Consultations through which UNIDO was trying to assist developing countries. It has been established that mini fertilizer plants represented a viable and economic alternative for most developing countries, and that no new processes were needed except for mini ammonia plants. Another achievement of the previous consultations had been the strengthening of co-operation between developing countries. In that regard, it was recognized that training, exchange of experience and identification of technological capabilities were the priorities in the phase 1 of that programme. Phase 2 would be co-operation between developing countries.

30. He said that a subject on the minds of some participants was the desirability of holding successive consultations on a given sector. A consultation did not have to be a self-perpetuating activity, but rather continuity of a consultation on any given sector should correspond to a demonstrated need. Consultations would need to be organized as long as there were issues to be studied and clarified and problems to be solved.

31. He spoke particularly of one of the three new issues suggested for consideration at the Fourth Consultation, namely, the question of pesticides.

System of Consultations

32. A representative of the secretariat introduced the System of Consultations, which drew considerably on the interdisciplinary knowledge available at UNIDO, namely through its technical assistance, industrial studies and technology programmes.

33. He described the System of Consultations as a dialogue at the sectoral level that had several main characteristics:

(a) Wide participation that included representatives of Government, industry and labour from all member countries who examined general and specific problems of a given sector and suggested possible solutions to them;

(b) Decision-making on the basis of consensus at the level of participants and of the Bureau of the Consultation, with regard to the report of the Consultation including conclusions and recommendations to the Industrial Development Board of UNIDO;

(c) Providing a forum where problems could be tackled continuously from a policy, economic, financial, social and technical point of view.

34. He stressed that continuity was a key characteristic of the System as a consultation was not an end in itself, and that problems were analysed and discussed until solutions beneficial to all interested parties were found. He referred to the speech of the Executive Director that had stressed the continuity in the consultation process on the fertilizer industry.

Election of officers

35. The following officers were elected:

S. Ramanathan (India) Secretary, Ministry of Chemicals and Fertilizers	Chairman
Visavarunee Onsuwan (Thailand) Economist, Office of the Basic Industry Development	Rapporteur
Laszlo Dobo (Hungary) Senior Adviser, Ministry of Industry	Vice-Chairman
Brewster R. Hemenway (USA) Alternative Permanent Representative to the United States Mission to the United Nations organizations in Vienna	Vice-Chairman

Cleantho P. Leite (Brazil)  
Fertilizantes do Nordeste S.A.

Vice-Chairman

Tewfik Mohamed Sarhan (Egypt)  
Chairman, Abov Keir Company  
for Fertilizers and Chemical Industries

Vice-Chairman

Adoption of the agenda

36. The Consultation adopted the following agenda:

1. Opening of the Consultation
2. Election of officers
3. Adoption of the agenda
4. The world fertilizer industry: current situation and outlook.
5. UNIDO model forms of contract for the construction of a fertilizer plant:
  - (a) Second draft of the semi-turnkey contract
  - (b) Second draft of the licensing agreement
6. Co-operation between developing countries in the fertilizer industry
7. Capital costs for fertilizer plants
8. Mini fertilizer plants
9. Proposal for new issues
10. Conclusions and recommendations
11. Adoption of the report of the Consultation

Establishment of working groups

37. The Consultation decided to establish two working groups in order to discuss the issues submitted to it and to propose conclusions and recommendations for consideration at the plenary session:

Working group 1: Issue 3, capital costs for fertilizer plants and issue 4, mini fertilizer plants  
Greif Sander (Federal Republic of Germany), Secretary General of Fachverband Stickstoffindustrie, was elected Chairman

Working group 2: Issue 2, programme to strengthen co-operation among developing countries in the fertilizer industry, and proposal for new issues  
C. de Paiva Leite (Brazil), Member of the Board, Fertilizantes do Nordeste S.A., was elected Chairman

38. It was decided that issue 1, UNIDO model forms of contract for the construction of a fertilizer plant, would be discussed in plenary.

Adoption of the report

39. The report of the Consultation, including the conclusions and recommendations, was adopted in plenary on Friday, 27 January 1984.

Documentation

40. Documents issued prior to the Consultation are listed in annex II.

II. REPORT OF THE PLENARY

The world fertilizer industry:  
current situation and outlook

41. The FAO representative presented the report on the Current World Fertilizer Situation and Outlook, 1981/82-1987/88. He said that the World Food Conference had recommended that the FAO Commission on Fertilizers prepare authoritative forecasts of supply and demand for fertilizers on a regular basis. He reported some of the salient points and conclusions for the period from 1981/82 to 1987/88.

42. He said the time horizon chosen for forecasts of supply and demand developments prepared by the FAO/UNIDO/World Bank Working Group on Fertilizers spanned five years to ensure an acceptable degree of accuracy since the accuracy of investment planning could only be determined within such a period. Judging by the forecasts made annually for the past six years, the forecasts were close to reality and a similar degree of accuracy could be assumed for the current figures.

43. One of the noteworthy developments in 1981/82 was that the production of fertilizer decreased for the first time since the Second World War and there was a fall in consumption for the second time in the same period, the first being in the mid-1970s. The developed market economies, particularly the United States of America, were primarily responsible for the falls due to abundant supplies of food grains and depressed crop prices. The recent world-wide economic recession, availability of foreign exchange, unfavourable currency exchange rates etc. had also adversely affected the global fertilizer industry. A general improvement was expected in all regions in 1983/84.

44. He stated that the FAO Commission had reviewed the forecasts, which indicated an adequate supply of fertilizers up to 1987/88, and had expressed concern that adequate supplies to meet increasing demand in the late 1980s be assured. Therefore, it recommended that the World Bank and UNIDO should take appropriate measures during the next five years to ensure that the required quantities materialized.

45. He said that other sources of plant nutrients such as organic materials, in spite of their positive effects of improving the structure and physical properties of soils, contained only low levels of nutrients; they were therefore most advantageously applied in combination with mineral fertilizers. Their combined use resulted in a synergistic effect that was highly desirable, however, mineral fertilizers retained their preeminence as nutrient suppliers. In view of the increasing costs of fertilizers, FAO was actively engaged in promoting the use of plant nutrients from all sources by means of integrated nutrient supply systems. The FAO representative stressed that to increase the efficiency of fertilizer materials, their placement and timing of application, and stated that it was promoting the use of biologically fixed nitrogen (BNF).

46. He pointed out that the target of the 1975 Lima Declaration and Plan of Action <sup>1/</sup> of achieving 25 per cent of global production had already been achieved in the case of fertilizers in that year and therefore the First Consultation had suggested that self-sufficiency should replace that objective.

47. Some progress in fertilizer production had been recorded in the developing countries, especially the Middle East, in view of the availability of raw materials for nitrogenous fertilizers; the Union of Soviet Socialist Republics would also become an increasingly important source of ammonium and nitrogenous fertilizers. In phosphatic fertilizers, impressive progress had been made in some developing countries, particularly in Africa. In potassic fertilizers, little improvement was expected in their production in view of the lack of physical potash deposits, with a few exceptions such as Jordan, and the import dependence of developing countries on that type of fertilizer would remain.

48. He stressed the importance of fertilizer/crop price relationship to fertilizer use by farmers, and informed the Consultation that FAO and the Fertilizer Industry Advisory Committee (FIAC) was preparing a guide on specific policies and related matters to encourage fertilizer use in developing countries. The guide would be used in the ongoing FAO/FIAC regional seminars on fertilizers.

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<sup>1/</sup> Report of the Second General Conference of the United Nations Industrial Development Organization (ID/CONF.3/31), chapter IV, "The Lima Declaration and Plan of Action on Industrial Development and Co-operation", para. 28.

49. The FAO representative concluded that the main focus of attention of the Fourth Consultation should be the examination of the world supply of fertilizers after 1987/88.

Presentation of the issues

50. Representatives of the UNIDO secretariat presented the seven issues to be considered by the Consultation.

Issue 1: UNIDO model forms of contract for the construction of a fertilizer plant (ID/WG.406/5)

51. A representative of UNIDO said that second drafts of the two model contracts - Semi-turnkey and the Licensing and Engineering Services Agreement - were prepared taking into account the experience gained in preparing the first two model contracts for the Turnkey Lump Sum and Cost Reimbursable and also in the Licensing Agreement for Engineering Services for the Petrochemical Industry. All four model contracts conform to a similar organization with regard to the liabilities and compensations required taking into account the conditions prevailing in most developing countries.

Issue 2: Programme to strengthen co-operation among developing countries in the fertilizer industry (ID/WG.406/6)

52. A representative from the UNIDO secretariat gave the background to issue 2, stressing that the First and Second Consultations had recommended that UNIDO should support the fertilizer co-operation programmes of regional economic groups and of the associations and federations of the fertilizer industry. Limited results had been achieved owing to the lack of resources to implement such programmes. The Third Consultation had recognized that fact and requested UNIDO to carry out a comprehensive co-operation programme to be implemented in phases.

53. The Bureau of the Third Consultation had continued to advise UNIDO on the implementation of the recommendations of the Third Consultation and had been convened twice to define the scope of phase I of the programme. The Bureau recommended three main activities: training, exchange of experience in the

construction and operation of fertilizer plants, and a directory of the technological capabilities in the fertilizer industry existing in developing countries. The results of phase I were presented in the background paper (ID/WG.406/4) to issue 2.

54. He said that phase II should continue selected activities of phase I, and should also include additional activities that might be recommended by the Fourth Consultation.

55. In reference to the suggestion, made by the Minister of Chemicals and Fertilizers of the Government of India in his speech, to institutionalize the programme of co-operation at the regional level and to involve the developed countries in that programme, it was felt that it would be an excellent starting point for the deliberations of the Fourth Consultation on phase II. Work had been done by country and regional associations of fertilizer producers, international institutions and United Nations organizations along those lines. The suggestion of the Minister would involve developing countries with experience in that industry to co-ordinate the regional activities of the programme, and interested developed countries to strengthen north-south co-operation, which would facilitate the direct involvement of a larger number of countries.

56. In addition, participants at the regional meetings that were held to exchange experience on fertilizer plants suggested the need to set up an information exchange network for interested developing and developed countries covering: plant performance parameters deemed important by plant and project managers; the facilitation of informal meetings for plants using the same technology; and the composition of a roster of parties interested in facilitating the promotion of long-term arrangements in the industry, including possible joint-ventures. The network would be complemented by the periodic updating of the directory with the co-operation of country and regional co-ordinating institutions to check the accuracy of the information and its updating.



Issue 3: Capital costs for fertilizer plants (ID/WG.405/7)

57. A representative of the UNIDO secretariat presented issue 3, capital costs for fertilizer plants, and outlined the development of that issue during the last three consultations. The concern at the escalating cost of fertilizer plants, particularly in the late 1970s, and its possible impact on reducing the capabilities of those countries to build viable fertilizer plants resulted in a recommendation for carrying out a special study on the subject. The objective of the study was to assess the causes of cost escalation and recommend possible means for its control. It was explained that the study was based on the analysis of empirical data collected by UNIDO from plant owners, engineering companies, consultants, financial institutions, governmental authorities and other bodies concerned.

58. The findings of the study had shown that the overwhelming majority of fertilizer plants built in developing countries suffered from cost overruns and delays during construction. It had also been shown that plant and total project cost in developing countries was much higher than the cost of equivalent plants built in the developed countries. Major causes of cost escalation were due to poor management, inadequate pre-investment planning, high financing costs and contractual modalities. That was in addition to factors related to location and development.

59. He referred to measures that needed to be taken in order to minimize cost escalation. Certain issues were suggested in the issue paper (ID/WG.406/7) for consideration by the Consultation, including in particular the preparation of a pre-contracting manual.

Issue 4: Mini fertilizer plants (ID/WG.406/8)

60. A UNIDO representative introduced the subject of the development of small-scale or mini fertilizer plants.

61. The Third Consultation had recommended that UNIDO examine the technical viability and economic feasibility of mini fertilizer plants, while recognizing that in many developing countries the demand for fertilizer was not sufficient to warrant successful implementation of large projects. Two

technical seminars were convened with the assistance of two developing countries and a study made, the results of which were given in Mini Fertilizer Plant Projects, Sectoral Studies Series No. 7, Vols. I and II, and in the issue paper (ID/WG.406/8).

62. The conclusions were that under certain conditions mini fertilizer plants could be competitive with large-scale units and, viewed in a broader context, be less costly and less risky. However, the feasibility of mini fertilizer projects should be carefully assessed on a case-by-case basis as there was a diversity of factors to be considered for each particular location. It was also concluded that there was a large potential market for mini plants. The prerequisite to successful implementation of such projects was the availability of raw materials and of the proper technological options for the particular case as there were no existing examples of operating plants with up-to-date technologies.

63. To clarify the issue, it was not meant to replace the setting up of large plants by an extensive promotion of small-scale fertilizer industries. The intention was to fill an evident gap in the development trend of the fertilizer industry that had left many countries in a helpless situation with no practical solution in sight.

64. The conclusions presented in the study and supported by other activities undertaken by UNIDO formed the first step in a pragmatic approach for which the expert advice of participants was needed, particularly in the following areas:

(a) To examine the economic feasibility of mini fertilizer plants, and to advise on further steps to be taken by all the parties concerned to develop their potential in developing countries and to provide suitable technical assistance;

(b) To examine the new mini ammonia flow-sheets and advise the parties concerned on steps to be taken for the commercial application of some of those flow-sheets;

(c) To advise the parties concerned on the testing and development of non-conventional fertilizers such as ammonium bicarbonate, non-metallic minerals saving fertilizer and water, and fertilizers suitable for tropical and semi-tropical conditions;

(d) To advise the parties concerned on activities to be taken towards promoting the manufacture of equipment and engineering services for mini fertilizer plants in developing countries, as complement to the capabilities of developed countries in that industry;

(e) To examine the draft guide to mini fertilizer plants and advise UNIDO on its completion;

(f) To advise UNIDO on means to finance that programme including contributions in kind.

Proposal for new issues (ID/WG.406/10)

Issue 5: Pesticides

65. The representative of UNIDO, in presenting proposals for new issues, said that fertilizers and pesticides were complementary, the former was to increase crop yields and the latter was to preserve those yields and to eliminate competing species. It had been estimated that up to one third of crops were lost due to pests. Since the 1940s the annual growth in sales of pesticides has been 10 per cent and in 1981 the total sales reached US\$ 14 billion for agricultural use. Above average growth was expected for developing countries in the future.

66. In 1974 the FAO World Food Conference in one of its eight-point resolutions had requested FAO and UNIDO to take initiatives in fertilizers, pesticides, herbicides and fungicides. UNIDO technical assistance activities at the country level had led UNIDO to believe that there was a need to bring to the attention, through the System of Consultations, the problems of that sector in order that interested countries could provide inputs. Among the examples of technical assistance projects was the regional network for pesticide development in Asia, which had the support and participation of the Groupement international de fabricants de produits agrochimiques<sup>2/</sup>. UNIDO activities in the pesticide area included formulation, using locally available materials as carriers, diluents and solvents, and the setting up of laboratories for toxicology, screening, and residue analysis. Production of some basic chemicals had taken place in some developing countries.

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<sup>2/</sup> International Association of Agro-chemical Manufacturers.

67. Participants were invited to advise UNIDO on ways:

(a) To study the pesticide sector including trends in the development of synthetic and natural pesticides;

(b) To establish formulation plants using locally available carrier materials and solvents, and set up plants to manufacture basic active ingredients;

(c) To promote and strengthen the pesticide industry in developing countries through improved quality control, packaging of products and pesticide registration.

Issue 6: New technologies for reducing fertilizer costs and increasing the efficiency of fertilizer use

68. The representative of the secretariat in presenting issue 6, referred to the issue papers on capital costs and mini fertilizer plants; he stressed that improvements were needed to reduce operational costs, e.g. management, maintenance and energy saving.

69. Newer fertilizer technology included slow-release fertilizers such as those coated with rubber latex; organic fertilizers such as those obtained through the recycling of agricultural and municipal wastes; the use of peat as soil conditioner or gasification of peat to produce ammonia, perhaps for mini fertilizer plants; urea super granules; ammonium bicarbonate; and the use of non-metallic minerals to save fertilizers and water. The last-mentioned technology was in an experimental stage but on a large scale, and its further examination by UNIDO in co-operation with FAO would be desirable.

Issue 7: Environmental protection for fertilizer plants

70. Pollution problems had been encountered in the fertilizer industry for some time, varying from gaseous, liquid pollutants to solid waste disposal. Evaluation of the impact on the environment was needed at the planning stage; many of the techniques for monitoring and control of pollutants as well as standards and legislation were available in the developed countries but were not so advanced or so widely adopted in the developing countries. UNIDO discussions held through operational projects, seminars and workshops had shown that there was a need for those problems to be brought up for consideration at future consultations.

71. Participants were invited to advise UNIDO:

(a) On the need to prepare a study on environmental problems in the fertilizer industry and on measures to reduce waste and pollution using new technologies;

(b) On guidelines and standards and steps to be taken to monitor pollutants and plan new fertilizer plants.

Summary of discussion

Opening plenary session

72. In the general debate, several statements were made on the usefulness of the System of Consultations as a forum for the exchange of views and experience, and for adoption of concrete and operational measures; it was regretted, however, that not all documents had been received by participants within the required deadline.

73. One participant stated that considerable preparatory work had been undertaken in his country with the involvement of industrial and social partners; the result of that work was contained in a paper that he circulated to the Consultation. He underlined the vital importance of the fertilizer industry for the production of food, and particularly the need for distribution networks, storage facilities, and credits to be made available to farmers in order to ensure the efficient use of fertilizers. In his view, insufficient training of users and management training and local organization constituted key problem areas. International co-operation through UNIDO and other international organizations could play an important catalytic role in overcoming those problems and in promoting the integration of fertilizers in the food production system. Concerning the fertilizer industry, he stressed the importance of taking into account opportunities for using new technologies, namely, in energy, the infrastructure required, the elimination of wastage, and the need to have an overall concept for the development of the fertilizer industry and its upstream and downstream activities.

74. Another participant also noted the importance of the upstream and downstream links of the fertilizer industry; in addition, he recalled that infrastructural costs still often accounted for 50 per cent of total costs, as had been recognized by the First and Second Consultations on the Fertilizer Industry. Turning to the new issues submitted to the Fourth Consultation, he stated in regard to pesticides that reference to "plant protection" was preferable to "pesticides"; he also queried the extent to which progress could be made with regard to environmental protection in view of the already existing international legislation.

75. One participant expressed satisfaction with the documents on mini fertilizer plants and hoped that UNIDO work in that area would be continued.

76. The representative of UNCTAD fully supported the System of Consultations on the fertilizer industry as being of importance for agriculture, particularly in the developing countries in the African region where per capita output was lower in 1980 than in 1970. The downstream processing of fertilizer raw materials by the developing countries was hampered by escalating tariffs, licensing measures, technical standards, quotas and other non-tariff barriers erected by the industrialized countries. The developing countries continued to export raw materials and import manufactured fertilizers. UNCTAD had studied those problems in depth and had prepared extensive documentation of the issues involved.

77. The representative of the Fertilizer Industry Advisory Committee (FIAC) supported the statement made by the representative of FAO on the current world situation of the fertilizer industry. He observed firstly that the demand for and the consumption of fertilizers could only increase when the current depression resulting in low crop prices was successfully overcome. Secondly, he noted that on the supply side many fertilizer plants were either operating at below break-even capacity or had already been shut-down. There had thus been a severe set-back to new investment particularly in the developing countries, and measures were required to redress the situation. He declared further that, although economies of scale continued to play an important role in specific situations in the developing countries, mini fertilizer plants might also offer real advantages. He offered the active support of FIAC to the convening of additional regional and interregional meetings to assist the developing countries in the implementation of their fertilizer projects.

Issue 1: UNIDO model forms of contract for the construction of a fertilizer plant

78. In considering model forms of contract, many participants suggested that it would be impractical to examine the drafts of the semi-turnkey contract (UNIDO/PC.74) and the licensing agreement (UNIDO/PC.73) on a clause-by-clause basis. Therefore, they suggested that, as in the case of the turnkey and cost reimbursable contracts, a group of experts consisting of representatives from all interested groups should be established to examine those drafts. Written comments from interested parties should be considered. Several participants stated that, if such a group were established, more representatives of licensors should participate in the finalization of the licensing agreement. It was pointed out that a licensing agreement for a fertilizer plant would be substantially different from that for the petrochemical industry, therefore, the latter would require substantial changes.

### III. REPORT OF WORKING GROUP I

#### Summary of discussion

79. Representatives of the UNIDO secretariat presented the main findings of two studies: Capital cost control of fertilizer plants in developing countries and Appendices (UNIDO/IS.422 and Add.1) and Mini fertilizer plant projects and Appendices (UNIDO/IS.416 and Add.1).

#### Capital cost control of fertilizer plants

80. A representative of the secretariat presented the study and said that the views and judgements of everyone involved in the construction of fertilizer plants had been considered. The most important outcome of the study had been that the cost of erecting a fertilizer plant in a developing country was much higher than in an industrialized country. The major causes of that discrepancy were attributed to poor management during project preparation and implementation, high cost of equipment and engineering services, delays in implementation, high cost of financing, excessive taxes and customs duties, changes in the scope of work, substantial infrastructural costs not entirely related to the project, and inflation. One participant maintained that inflation in the supplier country was a major cost-escalating factor and cited the example of a 400-per-cent increase in the price-tag of an ammonia plant supplied from a developed country during the period 1974-1983. The Chairman reminded the participants that the conclusions of the report were based on data provided by the developing countries but did not express the situation in any specific country. One participant felt that the general level of inflation during the last decade had probably been lower than actual price increases in equipment and related services. Another reason for cost overruns was related to financing and interest charges, especially those connected with tied credit.

81. The representative of the World Bank stated that his institution had first-hand knowledge of the actual costs incurred in fertilizer plants since it financed them. He agreed that management was of paramount importance in cost control, but cited the change in scope in midstream as another important factor causing cost and time overruns. Low rates of utilization adversely affected the cost of production.



82. Another participant noted that import duties and taxes could add up to 15 per cent of the total plant costs. Sophisticated technology and instrumentation also contributed to unacceptably high costs in terms of fixed costs and outlays for spare-part inventories.

83. Participants described their experience in delays in commissioning, defects in design, inappropriate site selection and contractors' operational systems. One participant noted that delayed delivery of equipment by suppliers was another reason for delays in project completion.

84. The representative of the secretariat pointed out that an effective way of containing cost escalation would be achieved by the greater national participation of the developing countries in project implementation. The compilation of regional cost indices for the fertilizer sector could result in more realistic cost estimates by contractors. However, it was generally felt that that task could not be undertaken by UNIDO, and individual or regional groupings of countries were inherently better equipped to compile such indices. Participants agreed that another means of containment of cost-overruns would be through government fiscal policies in the form of deterrents and subsidies.

85. The necessity of conducting management training programmes was also underlined together with the elaboration of comprehensive guidelines for project appraisal and management as well as a pre-contracting manual. It was pointed out that different project management models should be studied and incorporated in a management structuring system.

#### Issue 4: Mini fertilizer plants

86. A representative of the UNIDO secretariat described the conditions under which the option of mini fertilizer plants would be viable in a developing country. He noted that even in larger countries with adequate raw material endowment and sizeable markets, small-scale fertilizer units could well be justified to relieve pressure on transportation and other infrastructures. He stated that problems of financing packages, risk of low capacity utilization and marketing outlets could also be reduced to manageable proportions. He

reminded the Working Group that mini fertilizer plants were not merely scaled-down replicas of larger plants, and should incorporate specific proven technologies. A representative of the secretariat cautioned that experimentation with new processes should not take place in developing countries unless the contractor assumed corresponding liabilities.

87. A participant suggested that an effort should be undertaken to assess what resources would be available for the US\$ 25 billion investment required in the remainder of the century as indicated in the study.

88. Another participant informed the Working Group that his country had started erecting mini fertilizer plants some 20 years ago based on coal, heavy oil and natural gas with an average capacity of 100 tons per day of ammonia. He commented favourably on the elaboration of the flow-sheets contained in the study but cautioned that there might be a trade-off between energy conservation in fertilizer plants and the reliability of production processes. In addition, he noted the positive experience gained in the production and application of ammonium bicarbonate and the progress recorded in improving its volatile characteristics in storage and transportation. Mini fertilizer plants in his country were generally commercially viable and did not require government subsidies. A number of participants offered co-operation in various fields related to mini fertilizer plants and suggested that UNIDO play a promotional role in that area.

89. Another participant pointed out that utility costs as considered in the study were identical for industrialized and developing countries, which might not be realistic. He enquired about the need for technological innovation that would make mini fertilizer plants more acceptable.

90. Information was provided on a 150 t/d urea plant based on fuel oil currently under construction in Somalia.

91. A representative of the secretariat indicated that the options offered by the mini fertilizer plants would enable a large number of developing countries to produce fertilizers. It was stressed however that dependability should be considered as a major factor together with plant size.

92. A few participants recalled that in spite of considerable interest in mini fertilizer plants, so far little operational experience had been gained with those units and no new technologies had been developed. A representative of the Organization of Arab Petroleum Exporting Countries (OAPEC) felt that since even larger existing plants in some instances were facing commercial difficulties, the 85 mini plants envisaged in the study should be analysed on a case-by-case basis. A participant questioned the 90-per-cent onstream factor used in the study and maintained that in practice that ratio might be considerably lower in developing countries resulting in higher production costs. Many other participants however felt that there was no reason why onstream factors could not reasonably be expected of approximately 90 per cent.

93. A participant felt that preoccupation with energy consumption ratios of plants was unjustified in locations where natural gas was abundant.

94. Several participants pointed out that under equal conditions large-scale plants maintained a competitive edge over smaller units, but conceded that other considerations related to specific situations in developing countries might make mini plants a viable option. In some cases the development of such mini plants might make it possible to take into account considerations other than estimated profit, such as the entire chain of the supply of raw materials, the distribution of fertilizers to the farmers, and the use the farmers made of locally produced fertilizers. The aim would be to integrate the mini plant in an overall rural development plan. Various criteria might be applied with that in mind:

- (a) The cost of fertilizer at the farm-gate;
- (b) The impact of local fertilizer production and supply on the country's balance of payments;
- (c) The immediate effect on local market supply conditions;
- (d) The long-term effect on initiating the process of industrialization;
- (e) The modest financial resources and the low risk involved;
- (f) The multiplier effect on development;
- (g) The possible use of ammonia to increase the urea production level in a large ammonia urea complex.

95. One participant emphasized the importance of those criteria and stated further that appropriate structures should be established at all levels so that the entire process could provide an opportunity for satisfactory forms of co-operation in relevant areas among concerned groups.

96. However, one of those participants felt that raw material availability was a prerequisite for the establishment of fertilizer plants.

97. Another participant considered that mini fertilizer plants might not be appropriate for all developing countries and that it was necessary to consider each case on its merits. On the question of standardization some participants felt that mini fertilizer plants should correspond to specific requirements, while others pointed out that those plants were suitable for standardization.

98. One participant pointed out that the discussions had concentrated on nitrogenous fertilizers, while the advantages of mini plants for phosphates and fertilizer blending were also important.

99. The FAO representative said that bentonite and perlite, in spite of their positive properties, when used in sandy soil, were not practical in view of the prohibitive costs of their mining, processing, transportation and application, and therefore could not substitute for fertilizers.

100. Finally, the Chairman expressed praise for the quality and scope of the work undertaken by the secretariat, but regretted that the documents were not made available in time for early consideration.

IV. REPORT OF WORKING GROUP II

Summary of discussion

Issue 2: Programme to strengthen co-operation among developing countries in the fertilizer industry

101. The Chairman of the Working Group presented the issue paper (ID/WG.406/6) and the background paper (ID/WG.406/4) and reviewed them briefly.

102. A participant stated that the objectives of the Second Consultation on the programme of co-operation, which emphasized that the programme be implemented through regional and country associations or federations of fertilizer producers, were changed by the Third Consultation without explanation. He suggested that before proceeding to discuss the contents of any new programme, its objectives, method of implementation and the parties involved in technical co-operation among developing countries should be defined.

103. The Chairman explained that the Third Consultation considered that to implement the programme through associations of fertilizer producers was insufficient to pursue that issue, and that interested companies and countries should also have the opportunity of direct contact with other parties. It was further stated that a consultation had the right to modify a given recommendation by consensus.

104. Some participants pointed out that several existing associations of fertilizer producers and United Nations organizations were already involved in gathering and disseminating information to their members, which included Governments and industry.

105. The secretariat explained that the request for an information network on the industry had come from plant and project managers who had attended the regional meetings to exchange experience in the fertilizer industry. Those managers indicated that specific information needs were not currently fully covered from available sources. However, existing regional information

networks might help gather the required information and feed a global scale network. UNIDO was asked by a few participants to co-operate immediately with the Fertilizer Advisory, Development and Information Network for Asia and the Pacific (FADINAP) in fulfilling its obligations.

106. Some participants considered that the "Draft directory of technological capabilities in developing countries related to the fertilizer industry" (UNIDO/PC.89) was a useful document. A participant proposed that the Directory include a list of the technologies used by different plants in developing countries; furthermore, that it should be updated annually, with the information being provided directly to UNIDO, and should include available capabilities for trouble-shooting and the start-up and commissioning of fertilizer plants. In order to facilitate the completion of the Directory, the Chairman proposed that participants to the Fourth Consultation submit their updated information in writing to UNIDO not later than 30 May 1984.

107. A participant objected to the above suggestion because he considered that the draft Directory should rather be sent to industrialists in developing countries to obtain their views and comments.

108. Another participant disagreed with the above objection and suggested that the Directory should be quickly completed and distributed to all interested parties.

109. A participant suggested that an information system on the industry needed to be institutionalized in order to facilitate periodic updating and the publication of information and case studies on actual plant operations. He stated further that the more experienced developing countries should give more emphasis to assistance in training that should also be institutionalized along with an exchange of experts from plants using the same technology. A participant indicated that the fertilizer industry association and a number of individual companies in his country provided for such activities as training and expertise.

110. A participant suggested that a global co-operation programme be formulated to solve all aspects of food production; to increase the amount and quality of food for the world fertilizer production was only a part of that effort.

111. Another participant pointed out that co-operation did not mean fertilizer production alone, for it should cover all other activities. That programme should be co-ordinated through governmental organizations and specialized fertilizer associations. It was also stated that farmers' associations should play a role in such co-operation.

112. The secretariat clarified that, in accordance with the recommendation of the Third Consultation, co-operation at operating company and national levels had been carried out. The ultimate beneficiaries of that programme were companies.

113. The three approaches given in paragraphs 110 and 112 could be flexibly combined by interested parties.

114. A participant expressed his country's interest in fully participating in that programme.

115. Some participants requested an explanation as to why UNIDO was not able to set up an African association of fertilizer producers, which had been under consideration since 1978, and suggested that UNIDO set aside funds with the Organization of African Unity (OAU) in order to establish that association.

116. The secretariat recalled the background of its proposal to OAU for setting up such an association, the recent signing of an agreement to set up the African Fertilizer Development Centre in Zimbabwe by OAU and the International Fertilizer Development Centre (IFDC), which would be a nucleus for such an association, and the current activities carried out in the Southern African Development Co-operation Conference sub-region. Further, it was stressed that UNIDO did not finance any association.

117. Some participants expressed interest in learning more of the programmes of UNIDO and obtaining direct assistance from UNIDO.

118. A participant suggested that phase II of the co-operation programme should include an evaluation of existing joint ventures in the fertilizer industry as well as an exchange of experts and case studies on relevant experiences. He also suggested that UNIDO could carry out the work on joint ventures at little expense by compiling case studies on the various types of joint-venture arrangements entered into by developing countries. From those guidelines it would be possible to derive several types of financial and technical arrangements for joint ventures, in particular governmental joint-ventures. Another participant felt that the collection of information on governmental joint-ventures would be simpler than that for private sector joint-ventures. The representative of FAO explained that upon the request of the FAO Commission on Fertilizers, a study on joint-ventures in the industry was being carried out that should be ready by November 1984. He offered to share its findings with UNIDO.

119. The UNIDO secretariat explained that the available resources might enable it to provide only technical inputs to the programme of co-operation, but not travel and per diem expenses, which should be defrayed by the participants; the setting up of an information network on the fertilizer industry catering to the needs of operating companies and Governments in co-ordination with existing regional information networks; and the updating of the "Directory of technological capabilities in developing countries related to the fertilizer industry", for which interested developing countries should provide information on their national capabilities in engineering and capital goods.

120. Another participant suggested that in view of the limited resources of UNIDO, priorities should be established for phase II of that programme.

#### Proposed new issues

121. The Chairman referred the Working Group to the issue paper "Proposal for new issues" (ID/WG.406/10), which was presented by the secretariat at the opening plenary session. The Group was invited to consider the following new



issues: pesticides; new technologies for reducing fertilizer costs and increasing the efficiency of fertilizer use; and environmental protection for fertilizer plants. Participants stressed that the new issues should be considered in the light of the basic objectives of the System of Consultations to increase the share of the developing countries in world industrial production.

Issue 5: Pesticides

122. The Working Group was invited by the secretariat to consider the following questions:

(a) How important were pesticides as industrial inputs for food and fibre production in developing countries?

(b) Was the development of the pesticide industry in developing countries a subject worthy of consideration through the UNIDO System of Consultations?

(c) If yes, should pesticides be introduced as a new issue in future consultations on the fertilizer industry?

123. Those questions were raised on the basis of the secretariat view that:

(a) A resolution of the World Food Conference<sup>3/</sup> recognized the importance of pesticides in contributing to the solution of world food problems and called on FAO and UNIDO to take appropriate action with respect to fertilizers and pesticides;

(b) Savings might be achieved by including pesticides in future consultations on the fertilizer industry.

124. There was agreement between all participants on the importance of the pesticide industry to the developing countries and of its role in alleviating world food problems. Many participants from developing countries described the parallel developments in their own countries in those two industries. UNIDO technical assistance programmes in the fertilizer and pesticide sectors were appreciated.

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<sup>3/</sup> Report of the World Food Conference, Rome, 5-16 November 1974  
(United Nations publication. Sales No. E.75.II.A.3)

125. Many participants expressed their opposition to the inclusion of pesticides in consultations on the fertilizer industry; they considered pesticides and fertilizers to be two distinct industries having entirely different manufacturing technologies and usually involving different producers. They also had reservations to taking up pesticides as a new issue on the grounds that the resources of UNIDO were limited and that priorities therefore had to be carefully established. Those participants doubted whether any savings could be achieved by combining fertilizers and pesticides in one consultation since both types of experts would be required to attend, and felt that inclusion of a new sector in the System of Consultations was a matter to be decided by the Industrial Development Board. They felt that the question of further consultations in the fertilizer industry had yet to be decided

126. Many other participants, however, stressed the close linkages between the two industries in their countries where the same governmental organizations were often responsible for their development. They stressed the urgency of developing the pesticide industry in their countries and wanted that important issue to be included in the next consultation on the fertilizer industry. Furthermore, they pointed out that there would be a saving of time and money for them if those two subjects were dealt with together. They also suggested that UNIDO should study the needs of developing countries for pesticide formulation and active ingredient production facilities.

Issue 6: New technologies for reducing fertilizer costs and increasing the efficiency of fertilizer use and Issue 7: Environmental protection for fertilizer plants

127. There was general consensus on the importance of issues 6 and 7 and some participants suggested the need for UNIDO to undertake further work as proposed in the issue paper, subject to the availability of resources.

128. One participant, while agreeing with the benefits of non-metallic minerals as soil conditioners in intensive agriculture in developed countries cautioned against their widespread use in tropical countries without more work being done on their cost effectiveness.

129. A number of participants pointed out that duplication of work with other United Nations agencies, particularly FAO and UNEP, should be avoided. One participant advised UNIDO to make use of work already done by other United Nations agencies and other international organizations to the extent possible.

130. The UNIDO secretariat clarified that it had established a mechanism of co-operation with various United Nations agencies through working agreements, inter-agency working groups that met regularly and working arrangements at field level for joint technical co-operation projects. The FAO/UNIDO/World Bank Working Group on Fertilizers was cited as an example of close co-operation.

Drafting of conclusions and recommendations

131. At the suggestion of the Chairman, a contact group was set up to draft conclusions and recommendations to be submitted to the Working Group for its approval.

Annex I

LIST OF PARTICIPANTS

Argentina

Hector Armanini, Secretaría de Energía, Gerente de Petroquímica Yacimientos Petrolíferos Fiscales, Avenida Roque Saenz Pena 777, Buenos Aires

Guillermo S. Edelberg, Asesor, Secretaría de Industria, Avenida Julio A. Roca 651, 2o-Piso, Buenos Aires

Austria

Friedrich Herzog, Personnel Procurement Manager, Chemserv Consulting GesmbH St. Peterstrasse 25, 4020 Linz

Bangladesh

A.K.M. Mosharraf Hossain, Chairman, Bangladesh Chemical Industries Corporation Shilpa Bhaban, Motijheel C.A., Dhaka-2

Belgium

J. Libert, Secrétaire général, Conseil Central de l'Economie, Avenue de la Joyeuse Entrée 17, 1040 Bruxelles

Ginette Colson-Parent, Fonctionnaire, Conseil Central de l'Economie, Avenue de la Joyeuse Entrée 17, 1040 Bruxelles

Grégoire Vardakis, Premier Secrétaire, Ambassade de Belgique, 50 N Shantipath, New Delhi, India

Brazil

Cleantho de Paiva Leite, Member of the Board, Fertilizantes do Nordeste S.A. (FERTINOR), Rua Uruguaiana, 10-Gr.1107, Rio de Janeiro

Henrique José Savio Junqueira, Sub-Coordinator for Industrial Development, Conselho Nacional de Desenvolvimento Científico e Tecnológico, Av. W-3 Norte Quadra 511-1o Andar, 70.000 Brasília

Paulo Alberto S. Soares, First Secretary, Embassy of Brazil, 8, Aurangzeb Road, New Delhi, India

Burundi

Ndorimana Benoit, Directeur et coordinateur du projet phosphate, Ministère des travaux publics, énergie et mines, Boite postale 745, Bujumbura

Chile

Alfredo Garcia, Second Secretary, Embassy of Chile, C-6/7 Vasant Vihar,  
New Delhi, India

China

Weimin Sun, Deputy Chief, Planning Institute, Ministry of Chemical Industry,  
Beijing

Qingchun Li, Deputy Chief, China National Chemical Construction Corporation,  
Beijing

Colombia

Jaime Giron, First Secretary, Embassy of Colombia,  
D-82, Malcha Marg-Chanakyapuri, New Delhi-110021, India

Congo

Yvonne Mougany, Chef, Division de l'économie, Ministère des mines et énergie,  
Hydro-Congo, Boite postale 2008, Brazzaville

Bernard Okiorina, Chef, Département Production, Ministère des mines et énergie,  
Hydro Congo, Boite postale 2008, Brazzaville

Democratic People's Republic of Korea

Kim Rong Je, Counsellor, Embassy of the Democratic People's Republic of Korea,  
42-44 Sundar Nagar, New Delhi, India

Kim Gwang Ho, Third Secretary, Embassy of the Democratic People's Republic of  
Korea, 42-44 Sundar Nagar, New Delhi, India

Denmark

Svend Erik Jensen, Union Secretary, Semi-skilled Workers' Union, Nyropsgade 30,  
DK-1602 Copenhagen V

Jan Rask, Economist, Semi-skilled Workers' Union, Nyropsgade 30,  
DK-1602 Copenhagen V

Egypt

Tawfik Mohamed Sarhan, Chairman, Abu-Qir Fertilizer Plant, Abu-Qir Fertilizer  
and Chemicals Industry, Alexandria

Sidky M. Ghoneim, President, Projects, Planning and Follow-up Sectors, El Nasr  
Fertilizers and Chemical Industry, 26 Sherif Street, P.O. Box 1179, Cairo

Ethiopia

Michael Woldu, General Manager, National Chemical Corporation, Box 5747,  
Addis Ababa

Finland

Lasse Veli Forsstrom, First Secretary (Commercial), Embassy of Finland,  
New Delhi, India

France

Francois Buffet, Sous-directeur à la Direction des industries chimiques,  
textiles et diverses, Ministère de l'industrie et de la recherche,  
32 rue Guersant, 75017 Paris

Michèle Sauteraud, Premier secrétaire, Représentation permanente de la France  
auprès de l'ONUDI à Vienne, Walfischgasse 1 (1er étage), A-1010 Vienne,  
Autriche

Christine Brochet, Chargé de mission, Direction des politiques de  
développement, Ministère des relations extérieures, 20 rue Monsieur,  
75700 Paris

C. Basselin, CDF Chimie S.A., Division internationale, Tour Aurore, Cedex 5,  
92080 Paris la Défense 2 - Nanterre

Claude Bracone, Délégué commercial, Division chimie engrais, PEC Engineering,  
62 rue Jeanne d'Arc, 75013 Paris

Jacques de Roquemaurel, Licensing Department, Rhône Poulenc,  
25 quai Paul Doumer, 75016 Paris

Pierre de Vaumas, Directeur commercial, Creusot Loire Entreprises,  
33 quai Gallieni, 92156 Suresnes Cedex

Felix E. Rista, Délégué général de l'U.A.T.I., Palais de l'UNESCO, rue Miollis,  
75007 Paris

Germany, Federal Republic of

Greif Sander, Secretary General, Fachverband Stickstoffindustrie,  
Steinstrasse 4, 4000 Duesseldorf

Oswald Armbruster, Head of Division, Ministry for Economic Co-operation,  
5300 Bonn 1

Hans-Hermann Meynen, Director, UHDE GmbH, Postfach 262, D-4600 Dortmund

Robert Wandel, Ministerial Counsellor, Federal Ministry of Economics,  
D-5300 Bonn

Ghana

Augustine Kwame Kwateng, First Secretary (Commercial), Ghana High Commission,  
New Delhi-57, India

Greece

Nikos Koutsoukos, Managing Director, Nitrogenous Fertilizer Industry,  
Ministry of National Economy, Aeval Valaoritoy Str. 15, Athens

Dimitrios Velemis, Chief, Fertilizer Section, Ministry of Agriculture,  
Acharnon 2, Athens

Achilles Gekas, Manager, Metex SA, 2 Ermou, Athens 10563

George Koutroumboussis, First Secretary, Embassy of Greece, 16 Sundar Nagar,  
New Delhi, India

Hungary

Laszlo Dobó, Chief Counsellor, Ministry of Industry, Martirok utje 85,  
H-1224 Budapest

George Honti, Deputy Director General, Vegyterv, Budapest

India

S. Ramanathan, Secretary, Ministry of Chemicals and Fertilizers,  
Shastri Bhavan, New Delhi

Vinay Malik, Joint Secretary, Ministry of Chemicals and Fertilizers,  
353, Shastri Bhavan, New Delhi

Shyamal Ghosh, Joint Secretary, Ministry of Chemicals and Fertilizers,  
353, Shastri Bhavan, New Delhi

S. Sundar, Joint Secretary, Ministry of Finance, Department of Economic  
Affairs, New Delhi

D.N. Bhowmik, Adviser (Fertilizers), Ministry of Chemicals and Fertilizers,  
Shastri Bhavan, New Delhi

R. Ramanathan, Director (Fertilizers), Ministry of Chemicals and Fertilizers,  
232 "A" Wing, Shastri Bhavan, New Delhi

Krishna Jhala, Director, Ministry of Chemicals and Fertilizers,  
Shastri Bhavan, New Delhi

Duleep Singh, Chairman and Managing Director, Rashtriya Chemicals and  
Fertilizers Ltd., Bombay 400074

P.L. Kukreja, Chairman and Managing Director, Fertilizer Corporation of  
India Ltd., New Delhi

India (Cont'd)

B.K. Bhattacharya, Chairman and Managing Director, Projects and Development India Ltd., 96 Nehru Place, New Delhi

Bhim Sain Kakkar, Managing Director, National Fertilizers Ltd., 20 Community Centre, New Delhi

N.B. Chandran, Chairman and Managing Director, Fertilizers and Chemicals, Travancore Ltd., Cochin (Kerala)

Pratap Narayan, Chairman and Managing Director, Hindustan Fertilizer Corporation Ltd., Madhuban, 55 Nehru Place, New Delhi

S.S. Baijal, Chairman and Managing Director, Indian Explosives Ltd. New Delhi

Karbachan S. Bawa, Executive President, Zuari Agro Chemicals Ltd., Zuarinagar, Goa, 403726

A.C. Muthiah, Vice-Chairman and President, Southern Petrochemical Industries Corporation, 5-A, Bahadur Shah Zafar Marg, New Delhi-110002

Moosa Raza, Managing Director, Gujarat State Fertilizer Ltd., Baroda

Nagarajan Vittal, Managing Director, Gujarat Narmala Valley Fertilizer Co., Bharuch

D.C. Mittal, Chief General Manager, Shriram Fertilizers and Chemicals, Bara Khamba Road, New Delhi-110001

Anant Balwant Datar, Chairman and Managing Director, Mangalore Chemicals and Fertilizers Ltd., 10/2 Kasturba Road, Bangalore

M.H. Avadhani, Managing Director, Indian Farmers Fertilizer Cooperative Ltd., 34 Nehru Place, New Delhi-110019

C.K. Khot, General Manager (Engineering), Bharat Heavy Electricals Ltd., New Delhi

Shashikan V. Palande, Chairman, Process Plant Machinery Association of India, Humphreys and Glasgow Consultants Ltd. (India), Gammon House, Savarkar Marg, Bombay-400025

Gopal Sohbt, Chief Executive, Fertilizer Association of India, New Delhi-67

Joseph Kurian, Chairman and Managing Director, Madras Fertilizers Ltd., Madras

M.S. Chahal, Joint Secretary (Fertilizer), Ministry of Agriculture, Krishi Bhavan, New Delhi-110001

M.S. Grover, Industrial Adviser, Directorate General of Technical Development, Ministry of Industry, Udyog Bhavan, New Delhi



India (Cont'd)

V.K. Bhussry, Joint Secretary, Ministry of Chemicals and Fertilizers,  
Shastri Bhavan, New Delhi

T.N. Jaggi, Chairman and Managing Director, Pyrites Phosphates and Chemicals  
Ltd., 6, Community Centre, East of Kailash, New Delhi

Indonesia

Rukasah Darajat, Plant Manager, Kujang Fertilizer, Cikampek, West Java

Waldemar Simanungkalit, Assistant Operations Manager, P.T. Pusri Palembang,  
Sumatra

J.P. Sundono, Superintendent, Utility II, Petrokimia Gresik,  
Jl. Tanah Abang Dua 63, Jakarta

Iran (Islamic Republic of)

Esfandiar Karimzadegan, Director, Development Projects of Chemical Industry,  
Ministry of Industry, No. 3 1st Street, Gandhi Avenue, Tehran

Kazempour Shahisavandi, Consultant, Department of Chemicals and  
Pharmaceuticals, Ministry of Industry, No. 3 1st Street, Gandhi Avenue, Tehran

M.B. Arastafar, Chemical Project Development Inspector, Ministry of Industry,  
No. 3 1st Street, Gandhi Avenue, Tehran

Italy

Francesco Saviano, Process Engineer, Snamprogetti, S. Donato Milanese, Milan

Marcello Picciotti, Business Development Manager, Technipetrol S.P.A.,  
Viale Castello della Magliana 68, 00148 Rome

Prahlad Kaushik, Adviser, Technipetrol, 115/1-2 Cunningham Road, Bangalore,  
India

Japan

Toshikazu Inui, Deputy Director, Chemical Fertilizer Division,  
Ministry of International Trade and Industry, 3-2 Nukiu-Kitamadi Koganei,  
Tokyo

Keiji Yano, First Secretary, Embassy of Japan, Flat No. 415, 50-G, New Delhi,  
India

Masaaki Shiraishi, Director, UNICO International Corporation,  
2-2-2 Nihombashi Honcho, Chuo-Ku, Tokyo

Japan (Cont'd)

Gsamu Ito, Staff to the President, Mitsubishi Chemical Industries,  
No. 5-2, Marunouchi-2-Chome, Chiyodaku, Tokyo

Hanamura Mototaka, Director of Sales Department, COSMO International  
Corporation, Kaumigaseki 3-2-5, Chiyodaku, Tokyo

Kuwait

Walid Al-Farisi, Assistant Manager, Engineering and Maintenance, Petrochemical  
Industries Co., P.O. Box 9116, Ahmadi

Malaysia

Isaac Lugun, Legal Officer for 2nd ASEAN Urea Project,  
ASEAN Bintulu Fertilizer Sdn. Bhd., P.O. Box 12428, Kuala Lumpur

Mexico

Gustavo Peralta Tron, Co-ordinator, Fertimex S.A., Zacatecas 80, Col. Roma,  
Mexico D.F.

Morocco

Abdellah M'sahi, Economic Counsellor, Embassy of Morocco, 33 Golf Links,  
New Delhi, India

Nepal

Mukeshdev Bhattarai, Chemical Engineer, Ministry of Industry, Tripuseswar,  
Kathmandu

Nirmal Man Pradhan, Agri-Economist, Ministry of Agriculture, Singha Durbar,  
Kathmandu

Netherlands

Hans Erik Hageman, Second Secretary, Royal Embassy of the Netherlands , New  
Delhi, India

Jan P. Oudshoorn, Licensing Manager, Stamicarbon, P.O. Box 10, 6160 MC Geleen

Theodorus Van Kampen, Counsel, Stamicarbon, P.O. Box 10, 6160 MC Geleen

Pakistan

Zahur Ahmad Khan, Chairman, National Fertilizer Corporation of Pakistan,  
Al-Falah Building, Lahore

Panama

Mirta Saavedra, Encargada de Negocios, a.i., Embajada de Panama,  
S-260 Greater Kailash II, New Delhi, India

Philippines

Rodrigo D. Apoderado, Trade Representative, Embassy of the Philippines,  
New Delhi, India

Olivia V. Palala, Third Secretary, Embassy of the Philippines, New Delhi, India

Poland

Janusz Walecki, Commercial Adviser, Embassy of Poland, 50-M Shanti Path,  
New Delhi, India

W. Rybak, Commercial Attaché, Embassy of Poland, 50-M Shanti Path, New Delhi,  
India

Republic of Korea

Seung Kyung Kim, Director, Yong-Nam Chemical Co., 194-27 Insa-Dong, Jongro-gu,  
Seoul

Ha Kyun Yoon, Manager for Purchases and Sales, Yong-Nam Chemical Co.,  
194-27 Insa-Dong, Jongro-gu, Seoul

Kie Young Oh, Director, Nam Hea Chemical Co., 60-1 3-ga, Chungmu-ro, Jung-gu  
Seoul

Rwanda

Anastase Murkezi, Responsable du Programme engrais, Ministère de  
l'agriculture, de l'élevage, et des forêts, Boite postale 621, Kigali

Spain

Pedro Serrano, Ministerio de Industria y Energía, c/ Castellana 160,  
Madrid 16

Francisco Jimenez-Alfaro, Director, Estudios y Planificación,  
Empresa Nacional de Fertilizantes S.A. (ENFERSA), c/ Prim 12, Madrid-4

Fernando Pollastrini, Manager, Dragados y Construcciones, Rosario Pino 5,  
Madrid 20

Sudan

Mahdi Daw El Beit, Managing Director, Sudan-Ren Chemicals and Fertilizers Ltd.,  
P.O. box 2321, Khartoum

Sweden

Stig Anders Goran Gustavsson, Head of Section, Ministry of Industry,  
S-1033 Stockholm

Thomas Stenhede, Director, Swedyards Development Corporation, Box 8922,  
Goteborg

Thailand

Visavarunee Onsuwan, Economist, Ministry of Industry, Bangkok

Somsak Chaewsamoot, Senior Agronomist, National Fertilizer Corporation Ltd.,  
Bangkok Bank Building, Silom Road, Bangkok

Togo

Ajavon Ayayi, Directeur général adjoint du Plan, Ministère du plan et de  
l'industrie, Boite postale 1667, Lomé

Yendoukoi Bayentin, Office togolais des phosphates, Compagnie d'exploitation,  
Boite postale 379, Lomé

Trinidad and Tobago

Nathan Hazel, High Commissioner for the Republic of Trinidad and Tobago,  
Trinidad and Tobago High Commission, 131 Jor Bagh, New Delhi, India

Vere Mustafa, Counsellor, Trinidad and Tobago High Commission,  
131 Jor Bagh, New Delhi, India

Tunisia

Mohamed Marzouk, Directeur, Industries chimiques maghrébines, Bages

Mohamed Sabbah, Manager of Plant, Société industrielle d'acide phosphorique et  
d'engrais, Route de la Plage, Sfax

Uganda

Tinaako F. Rwakiseta, General Manager, Tororo Industrial Chemicals and  
Fertilizers, P.O. Box 254, Tororo

United Arab Emirates

Jaffar Al-Fardan, Assistant Under-Secretary, Ministry of Finance and Industry,  
P.O. Box 433, Abu Dhabi

United Kingdom of Great Britain and Northern Ireland

Robert Roberts, Head, International Technology Group, Department of Trade and  
Industry, 1, Victoria Street, London SW1

Denis Joseph Levy, Senior Consultant, Scientific Design Co. Ltd.,  
9, Kingsway, London WC2

William Charles Lavers, General Manager, British Sulphur Corporation Ltd.,  
Parnell House, 25, Wilton Road, London SW1V 1NH

John Nigel Macgillivray, Area Sales Manager, M.W. Kellogg Ltd., Stadium Way,  
Wembley, Middlesex HA9 0EE

United Republic of Tanzania

Saleh Ally, Production Manager, Tanzania Fertilizer Co. Ltd., P. Bag Tanga

United States of America

Brewster R. Hemenway, Alternate Permanent Representative,  
United States Mission to the United Nations in Vienna, Boltzmanngasse 16,  
A-1090 Vienna, Austria

Stephen G. Gooch, C.F. Braun and Company, 1000 S. Fremont Avenue, Alhambra,  
California, 91000

Steven Hildred Paxton, Managing Director, IMC Corp. (Singapore) Pte. Ltd.,  
96 Somerset Road, No. 09-01, Singapore 0923

Zaire

Adeito Nzengeya Bagbeni, Ambassador, Embassy of Zaire, 160 Jur Bagh,  
New Delhi, India

Chikuru Bagula, Counsellor, Embassy of Zaire, 160 Jur Bagh, New Delhi, India

Zambia

F.K. Kabambe, Deputy High Commissioner, Zambian High Commission, 14 Jor Bagh,  
New Delhi, India

Zimbabwe

Godfrey Garapo, Assistant Secretary (Chemicals), Ministry of Industry and  
Technology, Harare

Observers

United Nations offices and bodies

Economic and Social Commission for Asia and the Pacific (ESCAP)

Luc Marc Maene, Team Leader, Fertilizer Advisory Development and Information Network for Asia and the Pacific, ESCAP Agriculture Division, UN-Building, Bangkok, Thailand

United Nations Conference on Trade and Development (UNCTAD)

Myong Che Chon, Economic Affairs Officer, Manufactures Division, Palais des Nations, CH-1211 Geneva, Switzerland

United Nations Development Programme (UNDP)

M.J. Priestley, Resident Representative, 55 Lodi Estate, New Delhi, India

Jerrold Berke, Deputy Resident Representative, 55 Lodi Estate, New Delhi, India

T.K. Mangun, Deputy Resident Representative, 55 Lodi Estate, New Delhi, India

T.R. Maakan, Senior Programme Officer, 55 Lodi Estate, New Delhi, India

Mr. Satpal, Assistant Programme Officer, 55 Lodi Estate, New Delhi, India

Gerard King, Assistant Resident Representative, 55 Lodi Estate, New Delhi, India

Specialized agencies

Food and Agriculture Organization of the United Nations (FAO)

J.W. Couston, Senior Officer, Fertilizer Economics Group, Land and Water Development Division, Via delle Terme di Caracalla, 00100 Rome, Italy

United Nations Educational, Scientific and Cultural Organization (UNESCO)

M. Shamsul Alam, Programme Specialist, Regional Office for Science and Technology for South and Central Asia in New Delhi, UNESCO House, 15 Jor Bagh, New Delhi, 110003, India

World Bank

William F. Sheldrick, Fertilizer Advisor, Industry Department, 1818 H. Street, Washington D.C., United States of America

Intergovernmental organizations

Arab Industrial Development Organization (AIDO)

Mamoun Abu-Khader, Secretary General, Arab Federation of Chemical Fertilizer Producers, P.O. Box 3156, Al-Saadoon, Baghdad, Iraq

Asian Development Bank (ADB)

Viggo A. Groope, Senior Project Engineer, Pasay City, Metro Manila, Philippines

European Economic Community (EEC)

Richard John Wyatt, Administrator, Directorate General for External Relations, Commission of the European Communities, 200 rue de la Loi, 1040 Brussels, Belgium

Organization of Arab Petroleum Exporting Countries (OAPEC)

Allam Al Kilani, Petrochemical Project Engineer, P.O. Box 20501, Safat, Kuwait

Non-governmental organizations

Asian-African Legal Consultative Committee (AALCC)

Ross Masud, Assistant Secretary-General, 27 Ring Road, Lajpat Nagar IV, New Delhi, India

Bhuander Singh Chimni, Legal Officer, 27 Ring Road, Lajpat Nagar IV, New Delhi, India

Fertilizer Industry Advisory Committee (FIAC)

Alexander E.M. Hood, Liaison Officer, FAO/FIAC, Via delle Terme di Caracalla, 00100 Rome, Italy

Pierre Lateur, Chairman, Société Chimique Prayon Ruppel, 144, rue Joseph Wauters, B-4130 Engis, Belgium

International Fertilizer Development Centre

Chong-Woon Hong, Soil Scientist, Patancheru P.O., Aridhra Pradesh, India 502324

World Association of Industrial and Technological Research Organizations (WAITRO)

Kailash Nath Johry, Head, International Science Collaboration of the Council of Scientific and Industrial Research (SCIR), Grevturegatan 19, P.O. Box 5103, S-102 43 Stockholm, Sweden

Annex II

LIST OF DOCUMENTS

Issue papers

<u>Issue 1:</u> UNIDO model forms of contract for the construction of a fertilizer plant	ID/WG.406/5
<u>Issue 2:</u> Programme to strengthen co-operation among developing countries in the fertilizer industry	ID/WG.406/6
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Proposal for new issues	ID/WG.406/10

Background papers

Current world fertilizer situation and outlook - 1987/88

Papers related to issue 1

Second draft of the UNIDO model form of semi-turnkey contract for the construction of a fertilizer plant including guidelines and technical annexures	UNIDO/PC.74 and Corr.1
Second draft of the UNIDO model form of licensing and engineering services agreement for the construction of a fertilizer plant including guidelines and technical annexures	UNIDO/PC.73 and Corr.1

Paper related to issue 2

Programme to strengthen co-operation among developing countries in the fertilizer industry, Background Paper	ID/WG.406/4
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Capital cost control of fertilizer plants in developing countries	UNIDO/IS.422
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Mini fertilizer plant projects	UNIDO/IS.416
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Information papers

Papers related to issue 2

Report of the First Meeting of the Expert Group to exchange experiences in the construction and operation of fertilizer plants in the developing countries	UNIDO/PC.30
Draft directory of technological capabilities in developing countries related to the fertilizer industry	UNIDO/PC.89 and Corr.1

Papers related to issue 3

Investment and production costs for fertilizers	ID/WG.406/1
The changing structure of the international fertilizer industry	ID/WG.406/2
The effect of energy and investment costs on total fertilizer production costs	ID/WG.406/3

Paper related to issue 4

Report of the Seminar on Mini Fertilizer Plants	UNIDO/PC.61
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