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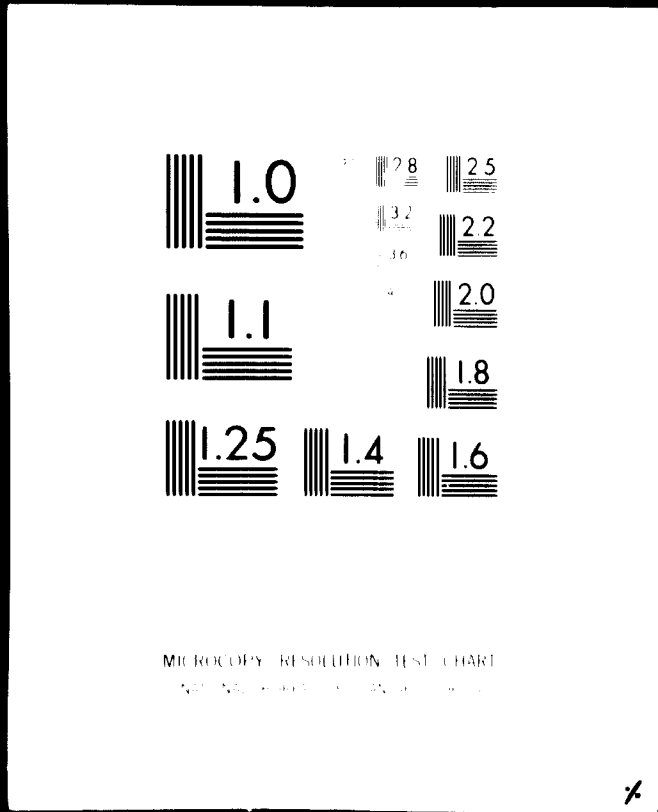
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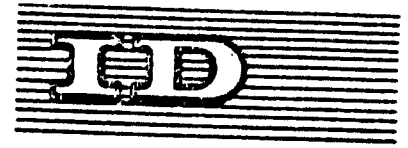
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Expert Group Meeting on Fertilizer Plant Cost
Reduction and Ways to Mobilize Sufficient
Financing

Vienna, Austria, 11 - 14 April 1978

SOME ASPECTS ON WAYS AND MEANS TO REDUCE
FERTILIZER PLANT COSTS AND TO MOBILIZE SUFFICIENT FINANCING*

prepared by
UNIDO Secretariat

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Introduction

1. The Second General Conference of 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 and among developing countries themselves. The objectives of these consultations is to assist the developing countries to achieve their industrialization goals which include in particular the goal of producing at least 25 per cent of world industrial output by the year 2000.
2. The First Consultation Meeting on the Fertilizer Industry convened in Vienna, 17 -21 January 1977, recognized that there were occasions when unduly high prices were asked for or contracted for new fertilizer plants. The meeting also examined the proposal made by UNIDO to investigate the reasons of high pricing for new plants to be constructed in developing countries and supported the scheme for its in-depth examination. (ID/WG.242/R.Rev.1)
3. The Consultation Meeting also recognized the fact that more intensive examination is required on the ways and means to mobilize the large volume of funds required for investment to build new fertilizer plants. The meeting recommended that UNIDO convene an expert group meeting to examine the same.

Three other meetings recommended by the First Consultation Meeting on the Fertilizer Industry were held, namely

- i) Technical Seminar on Contracting Methods for Fertilizer and Chemical Processing Industries, Lahore, Pakistan, 25-29 November 1977; (ID/WG.259/26.Rev.2)
- ii) Expert Group Meeting on Co-operation amongst Developing Countries in the Fertilizer Industry, Vienna, Austria, 8-10 February 1978 (ID/WG.265/)
- iii) Working Group on Contracts and Insurance for Fertilizer Plants, Vienna, Austria, 14-17 February 1978 (ID/WG.269/2)

These meetings already conducted deliberations and their reports have been distributed to the participants of this Meeting.

4. The purpose of the Expert Group Meeting is to provide a forum in which participants from developing countries can discuss ways to reduce the cost of fertilizer plants and specially the forcing exchange burden, which are to be build in developing countries. Ways and means to be examined include:

- a) Improved specification for tendering documents and invitation for bids;
- b) International competitive tendering;
- c) Standardization of plant design and equipment used;
- d) Increased use of locally available supplied and resources;
- e) Elimination of taxation and custom duties imposed on imported equipment;
- f) Reducation in infrastructure costs to be included in project costs;
- g) Local detailed engineering and design;
- h) Equitable contracts - co-operation between developed countries;
- i) Proper scheduling of sub-contracts to avoid delays in civil engineering and construction.

5. As regards mobilizing sufficient financing for such fertilizer plants, the meeting will examine:

- i) Any constraints on availability of financing that may exist at present;
- ii) The sources, terms and conditions of financing available to finance the capital requirements of fertilizer plants;
- iii) Particular difficultires experienced in financing the associated infrastructure required.

I. Increases in the Cost of Fertilizer Plants built in the Period since 1970

6. It has been noted that contractors' indices have substantially increased since 1970 and particularly in the years between 1974/75 when general inflationary pressures were observed globally.

Typical contractors' indices are as follows:

	<u>Nitrogen plants</u>	<u>Phosphoric acid plants</u>
1970	100.0	100.0
1973	124.0	130.0
1975	161.5	165.0
1976	169.5	178.0
expected 1980	200.0	205.0

The meeting is to examine whether these indices are in line with the general increase of commodity prices or not.

II. Costs of associated Infrastructure for Fertilizer Plants built in the Period since 1970

8. Major components of infrastructure costs can be listed as follows for a grassroots plant:

- a) Rail, access roads, harbours and water ways;
- b) Electric power and telephone connexion;
- c) Water supply system;
- d) Effluent discharge system;
- e) Housing for employees;
- f) School, medical health service for employees;
- g) Community shopping centre;
- h) Steam.

The above listed items are all outside the gates of a grassroots plant and have been charged in some cases to new fertilizer projects to be established. The meeting is requested to examine the list and make recommendations as to items that should or should not be charged against the fertilizer project.

If all or some of the items are not to be charged against the fertilizer project, but are considered essential for implementation of the project, who should pay for them, the government or provincial authorities, etc.

III. What are the Major Components of Capital Costs of a Fertilizer Plant and Which Components may possibly be reduced?

9. The Secretariat has reviewed the capital cost requirements for a 1,000 tons/day ammonia plant based on natural gas feedstock and a 1,700 tons/day urea plant based on 75% urea solution as follows:

Non industrialized location Developing country		Industrialized location		Highly industrialized location Developed country	
Item	Total (US\$)	Item	Total (US\$)	Item	Total (US\$)
Basic facility - Ammonia Plant					
Site prep. B.L.	5,121,000	Site prep. B.L.	5,121,000	Site prep. B.L.	4,743,232
Site prep. support	2,049,000	Site prep. support	2,049,000	Site prep. support	1,892,292
Spare parts storage	154,000	Spare parts storage	154,000	Spare parts storage	111,141
NH ₃ store intermediate	3,275,000	NH ₃ store intermediate	3,275,000	NH ₃ store intermediate	2,571,475
NH ₃ store product	4,624,000	NH ₃ store product	4,624,000	NH ₃ store product	3,631,177
Power distribution	204,000	Power distribution	204,000	Power distribution	164,011
Civil works	1,241,000	Civil works	1,241,000	Civil works	1,111,757
Misc. equipment	6,519,000	Misc. equipment	6,519,000	Misc. equipment	5,039,873
Spare parts	1,414,000	Spare parts	1,414,000	Spare parts	1,099,859
Battery limits	64,530,000	Battery limits	64,530,000	Battery limits	52,091,831
	89,131,000		89,131,000		72,470,122
Additional items					
Site prep. B.L.	2,794,000	NH ₃ store product	4,624,000	Contingency	7,247,012
Site prep. support	2,049,000	Add. product storage	5,253,000	Total	79,717,134
NH ₃ store product	4,624,000	Power generation	445,000	Escalated total	92,274,177
Add. product storage	5,253,000	Housing	942,000	Estimated labour per unit product=0.30	
Power generation	445,000	Add.civil works	887,000		
Housing	942,000	Add.misc.equipment	6,389,000		
Add.civil works	887,000		18,540,000		
Add.misc. equip.	6,389,000	Contingency	10,767,098		
Spare parts	2,120,000	Sub-total	118,438,098		
Community facilities	44,000	Escalated total	145,079,089		
Construction equipment	5,901,000	Estimated labour per unit product= 0.90			
Civil works additional	887,000				
	32,335,000				
Contingency	12,146,598				
Sub-total	133,612,598				
Escalated total	163,666,890				
Basic Facility - Urea Plant					
Site prep. B.L.	7,472,000	Site prep. B.L.	7,472,000	Site prep. B.L.	6,919,946
Dry storage bulk	2,098,000	Dry storage bulk	2,098,000	Dry storage bulk	2,010,544
Dry storage bag	1,717,000	Dry storage bag	1,717,000	Dry storage bag	1,644,990
Spare parts	561,000	Spare parts	561,000	Spare parts	435,966
Misc. equipment	2,738,000	Misc. equipment	2,738,000	Misc. equipment	2,116,756
Battery limits	25,888,000	Battery limits	25,888,000	Battery limits	20,734,612
	40,474,000		40,474,000		33,862,834
Additional items					
Housing	732,000	Housing	732,000	Contingency	3,386,283
Site prep. B.L.	7,598,000	Add.dry store bulk	2,098,000	Total	37,249,117
Add.dry store bulk	2,098,000	Add.store bag	1,717,000	Escalated Total:	43,116,598
Add.misc. equipment	5,792,000	Add misc.equipment	5,792,000	Estimated labour per unit product = 0.1	
Spare parts	805,000		10,339,000		
Community facilities	34,000	Contingency	3,661,256		
Construction equipment	4,638,000	Sub-total	55,894,298		
	23,414,000	Escalated total	68,466,937		
Contingency	6,388,798	Estimated labour per unit product = 0.38			
Sub-total	70,276,798				
Escalated total	86,084,579				
Estimated labour per unit product = 0.38					
Grand Total:	US\$ 249,751,459	Grand Total	US\$ 213,546,000	Grand Total:	US\$135,390,775

* In these tables the materials and construction costs are escalated over a three year period at 6%, 5% and 4% for the years 1, 2 and 3 respectively.

** The tabulation originates from the computer runs of the International Fertilizer Development Center (IFDC), Muscle Shoals, Alabama, USA.

10. The meeting is to examine the cost estimates shown as typical ones and recommend ways and means to reduce the costs for the listing given for a developing country.

IV. Ways and Means to reduce the Costs of Fertilizer Plants

11. The following items could lead to reducing of investment costs for fertilizer plants.

a) The commissioning for preparation of feasibility studies in which particular attention is given to site location, when locating a plant at "grassroots" site where infrastructure usually is not available and site preparation costs can be very high.

b) International competitive bidding is to be encouraged based on clear and precise specification issued for bid invitation. Contractors bidding on precise specification reduces uncertainties for which allowances have to be made in the contractors' bids. Usually these are reflected in the contingencies which for a standard battery limits plants run from 5 to 10 per cent, but in cases of construction contracts involving a great many local factors, they can run up to 30 per cent of the total contract value.

c) Contract procedures adopted by a developing country vary a great deal. It may be that for large complexes in countries with no previous experience an independent consulting company should be employed to invite the bids, recommended a choice for contractor and act as a consultant throughout the contract till commissioning phase to the customer.

d) Developing countries who have the intention to build more than one fertilizer complex could find some substantial gain in reducing costs by adopting a standard design and layout for the plants. The cost reduction for engineering services and spare parts inventory for standard design are expected to be substantial. For engineering services reduction in cost must be negotiated with the contractor. For spare parts such as compressor spares, a central inventory serving two or more manufacturing plants could be established for nitrogen and phosphate manufacturing plants.

The meeting is to discuss the order of magnitude of these savings investment costs with the help of the representatives of engineering contractors.

12. Information is available to show that engineering fees for duplicate plants built elsewhere are charged in full to developing countries when they request bids. In most cases for engineering packages of this type only the drawing labels have to be changed and reduced fee could be charged for know-how. The meeting is to discuss these cases and see if guidelines could be set up to recommend that only 50 per cent or less be charged for engineering packages. Similarly when a customer builds a second plant for the same capacity and specification, not only should the cost for basic engineering be reduced, but also the licence know-how fees be appropriately adjusted to lower levels.

13. On the part of the customer the Government of the country in many cases levies import duties on equipment as well as taxes on material and equipment. Whether these taxes are paid by the contractor or customer is not the point in question. To lower the cost of capital investment for a fertilizer plant that serves the food industry of a country, such levies should not be made for items that cannot be manufactured locally of the same quality or to the same specification requested by the contractor.

Many developing countries have made some special licence arrangements for duty and tax free imports for essential equipment as well as spare parts. The meeting is requested to examine this situation and make recommendations to governments to follow up on.

14. Barge mounted fertilizer plants are currently being promoted by several contracting companies who have associated themselves in many cases with the shipbuilding industry. Ammonia plants up to 1,000 tons per day capacity with associated urea plants are being offered at an increased capital cost, but shorter delivery time.

The question of whether there is an economic advantage in saving of construction costs in a developing country vs. a developed country's harbour assembly is to be discussed by specialists present in the meeting. The added cost of the barge easily offset by under certain circumstances where due to lack of infrastructure, local construction expatriate help would be more expensive? Does the time saving of 12 months in the delivery of the plant reduce financing costs to pay for the added investment required for a barge?

V. The Volume and Type of Financing required for Fertilizer Plants and Associated Infrastructure

15. At the First UNIDO Consultation Meeting on Fertilizers, it was recognized that the major programme of investment in fertilizer plants would involve substantial funds. The number of new fertilizer plants likely to be established in developing countries was estimated to reach about 20 per year by 1980, and fund to cover such programme would be in the order of 10 thousand million per annum.

16. Depending on the degree of industrial development of a developing country, the support of local industry will determine the domestic input in such ventures. In some countries like India, Pakistan, Spain, Romania, etc., local manufacturing of machinery and sophisticated equipment can reduce the foreign exchange requirements for a project. These countries are, therefore, able to contribute not only labour but materially to a project.

VI. Sources, Terms and Conditions of Financing available

17. In the Aide-Mémoire's Provisional Agenda, eight different sources for financing of fertilizer plants are expected to grow in spite of chronic balance of payments, debt refinancing and payment moratoria and an unresolved "dialogue" between industrialized and developing countries. However, the following considerations are herewith put forward for discussion for this meeting.

- 1) Should each project be considered on an ad-hoc basis for the structure of financing or are there certain patterns that can be followed for the same?
- 2) Will financing be made available more readily to least developed countries or will there be no differentiation between countries and their degree of development?

Source of funds

VII. Way of combining different Sources of financing Fertilizer Plants and associated Infrastructure

18. The proliferation of joint ventures in the development of global industry appears to be the most significant trend. Their success in execution of contracts as well as operation of fertilizer plants has been demonstrated in many cases.

The meeting, therefore, should give consideration to the following:

- 1) Is financing more easily available for joint ventures between developed and developing countries?
- 2) As in most of the developing countries new ventures will be in the public sector, is this sector interested in joining hand with public or private sector of a developed country to obtain financing for a new fertilizer plant?
- 3) What are the conditions under which international institutions can participate in financing such ventures?

Joint venture can lead to a triangular arrangements with extensive benefits to all parties concerned. The meeting, therefore, should discuss this sort of arrangements where two developing countries get together, one having the feedstock, the other one the market, and the third party having the know-how and financing available.

Naturally these ventures have some pre-requisites such as mutual trust and confidence and access to shared information. The spirit of give and take, and fair and equal apportioning of the burdens and its benefits will have to prevail.



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