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THE SPECIAL NATURE OF THE FERTILIZER INDUSTRY IN DEVELOPING COUNTRIES[1]

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Introduction

1. The growth of the national fertilizer industry within a country or on a subregional basis depends to a large extent on the marketing effort. In most of the developing countries, where farmers do not have enough experience in the use of fertilizers, it is essential to stimulate demand, to distribute fertilizers and to collect payment from farmers in order to establish investment efficiency in the fertilizer business. The advantage of fertilizer use must be tangibly proved to the farmers by field demonstrations and trials. The farmers must be convinced of the profit that can be had from using fertilizer on their crops. From such a point of view, financial aid by the government for farmers to purchase fertilizer and the establishment of a credit system at low interest rates should be quite effective.

2. The distribution of fertilizer in some developing countries is conducted by the government or by government-supported co-operative associations, while private distributors are only subordinate. Frequently, when fertilizer production is carried out by one agency of the government, its distribution is undertaken by another agency. There is often a lack of correlation of these two activities, resulting in poor distribution efficiency.

3. Additional key factors in the growth of the fertilizer industry concern product storage, shipping, distribution and export.

4. After these few introductory words on the fertilizer industry, the discussion will be oriented to the classification of fertilizer plants from the point of view of the movements of their final products. This, in turn, will help to identify the reasons for the occurrence of excess production capacity.

I CLASSIFICATION OF FERTILIZER PLANTS

5. From the point of view of the distribution of the final product, three types of fertilizer industry may be discerned:

(a) A fertilizer industry which from the very beginning was conceived as an export-oriented manufacturing facility;

(b) A fertilizer industry which should serve the subregional market, including the national market;

(c) A fertilizer industry primarily devoted to the national market, which may export a minor part of its production to neighbouring countries, especially a few years after the industry has begun production.

Export-oriented fertilizer industry

6. An export-oriented fertilizer industry is usually built at advantageously placed locations. In the majority of cases, such locations are near deposits of raw materials for fertilizer production with possibilities for good export outlets. Ideally, the manufacturing facilities should be located as near as possible to the seaports. The inhibiting factor of such an industry is the necessity to keep the costs of production as low as possible in order to compete efficiently with other similar manufacturing plants. This kind of fertilizer industry should take maximum advantage of the economies of scale; i.e. the most up-to-date technological concept should be applied, combined with the highest production rate.

7. As an example, the huge ammonia production single train units should be mentioned. Their production capacities are usually as high as 1,000 to 1,500 tons per day of ammonia or 350,000 to 575,000 tons per year. If these units operate on the natural gas feedstock available next door, they can produce at highly competitive production costs. The other no less important condition is that such an industry should be near the seaport outlet. If this is the case, there is not much difference between the production costs, including a reasonable profit, and the fob price of the final product to be exported mainly to the interregional markets. The same principles apply to the phosphate and potassium fertilizer industries.

8. Besides the aspects mentioned above the system of marketing of the fertilizers is vital. Again, two kinds of fertilizer industry may be considered from the financial and organizational point of view - export-oriented fertilizer industry with major equity participation of the foreign concern and/or local government. In this case the products of the industry are usually marketed through the established channels of the foreign concern. If comprehensive and highly qualified studies precede such an undertaking, there is usually not much risk involved in the marketing of the products under normal circumstances.

9. In the latter case the situation is much more complicated involving high potential risks in the production and marketing of the products. It is imperative

that the setting up of the export-oriented industry in the public sector be preceded by extensive pre-investment feasibility studies. These studies should be geared equally to the technical and economic prerequisites of the planned undertaking. Apart from the selection of the most suitable process, much attention should be paid to the availability and training of the operational personnel. Equally essential is the marketing aspect of the products. A comprehensive market study should be made well in advance of any decision to build the industry. It is much better to prevent the emergence of excess capacity than to try to eliminate it after it has come into existence.

10. Such a study should be complex in all aspects, including the scrutiny and definition of the system of transportation and final distribution of the products. Such a study should be made directly in those countries where the products are to be marketed. It should include the evaluation of the existing potential and future competition, analysis of the existing system of fertilizer importation and distribution etc.

11. The following illustrative examples may be taken from Africa. A major export-oriented fertilizer industry with predominant private capital participation is either existing or planned for nitrogenous fertilizers in Libya, for phosphatic fertilizers in Morocco and Tunisia, as well as for potassium fertilizers in the Congo (Brazzaville) and Ethiopia. A national export-oriented fertilizer industry is existing or planned for the future in Algeria for nitrogenous fertilizers and in the United Arab Republic for nitrogenous and phosphatic fertilizers.

Fertilizer industry oriented towards the subregional market, including the national market

12. To this category belong mainly the medium-sized fertilizer plants which cannot compete in the interregional markets. The reason for this is mainly the lack of locally available raw materials important for fertilizer manufacture, a lower rate of production, more difficult access to export outlets and prohibitive geographical distances to the interregional markets. Therefore, regional marketing boards for certain manufacturing products and industries with a high volume of excess capacity should be suggested.

13. Some of these fertilizer plants, which already exist or are planned for construction in Africa, depend on the import of semi-manufactured or finished fertilizer products from the above-mentioned export oriented fertilizer industries. This is, for example, the case with anhydrous ammonia, which could be supplied

by special tankers from huge export-oriented fertilizer industries and stored, usually under refrigeration, at the sites of manufacturing plants oriented to the subregional and national markets. In such a case, a backward-integrated approach to the setting up of the fertilizer industry is carried out. Consequently, a considerable amount of the investment capital is saved. The production in the country starts with the transformation of ammonia into, e.g. nitric acid and ammonium nitrate as a final fertilizer.

14. In this case of the backward-integrated approach, an exploration should be made of additional forward-integrated approaches in the form of possibilities for smaller fertilizer plant, using supplies of export-oriented fertilizer industry and also utilizing its export marketing facilities for products which could be made through better utilization of their capacity. The fertilizer plants in Kenya, Senegal, Togo, Uganda and the United Republic of Tanzania are, for example, conceived in such a way. With the exception of Senegal, all projects are in the feasibility study, blueprint or construction stage. In the case of Senegal only about 50 per cent of capacity proved to be surplus capacity.

15. The fertilizer plants oriented to the subregional and national markets are suffering from the negative effects of the economies of scale. This disadvantage is, on the other hand, frequently outweighed owing to the saving of transport costs incurred if finished fertilizers are imported from huge export-oriented industries, e.g. from Europe, especially in smaller consignments. Fertilizer plants oriented to the subregional and national markets secure the value added accruing in the country of production, thus saving some portion of foreign exchange, if fertilizers are used for local consumption in the country of production and earn the foreign exchange for fertilizers exported to neighbouring countries. It goes without saying that there are other benefits involved in the immediate availability of fertilizers wherever the farmers need them to achieve better yields of their crops. At the initial stage, the usual background of these plants is about 40 per cent of the production capacity for local consumption and 60 per cent for export to neighbouring countries. It is expected that the local market for fertilizers will grow later on, which would reverse the aforementioned proportion to about 60 per cent for local consumption and 40 per cent for export to the neighbouring countries of the subregion.

Fertilizer industry primarily devoted to the national market

16. This category very much resembles the second category of the classification. The plants already built or to be constructed are of relatively small production

capacity. At the beginning they aim at the exportation of some portion of their production to neighbouring countries; this is considered as a transitory period only. The export of fertilizers produced should bridge the time required until the local market for fertilizers grows adequately. The size of these plants is tailored as much as possible to the quantitative consumption of the fertilizers in the country of their construction. Careful study of the breaking even of the production costs should precede the decision to construct such plants.

17. These plants are usually constructed in those countries which do not have their own natural resources for fertilizer production, but feel that local manufacture of fertilizers would be beneficial to their agriculture. The fertilizer plants in the Ivory Coast, with 40 per cent excess capacity when operated, and Mauritius, with 50 per cent excess capacity when operated, could be quoted as examples.

II CONCLUSIONS AND RECOMMENDATIONS

18. For all three above-mentioned categories of fertilizer plants one technical reason for excess capacity may be common. When determining the production capacities of these plants in the design stage, the so-called run-in difficulties are being taken into consideration. Under this term the production shortcomings, more frequent shut-downs etc. are understood. For this reason the manufacturing capacities of newly built manufacturing plants are oversized to cope with the said initial production losses. If, consequently, the commissioned fertilizer manufacturing facilities are run at design capacity sooner than expected (it takes usually eighteen months to reach the design capacity target in developing countries), this will result in some excess capacities. Nevertheless, it is not believed that this issue presents any serious problems and it is only mentioned here for the sake of completeness.

19. The most important problem of the export-oriented industry is the marketing of the finished fertilizer product. If the project is operated by a big international concern, there is no marketing problem, because the products will be distributed through its established international channels.

20. The situation with similar projects in the public sector is quite different. Major efforts must be dedicated to the establishment of reliable pre-investment studies. As a matter of fact it may be mentioned here that the most difficult task will be to estimate the selling prices of the plant's finished fertilizer products. The level of such prices will decide the competitive value of the manufactured fertilizer products in the interregional markets and ultimately

determine the viability of the project. The problem is that the prices of similar products offered by the established competition vary substantially within short periods of time. Such was the case last year when the fertilizer prices went down sharply. Of similar importance is the computation of the cost of production.

21. Another important part of the pre-investment study will be the organization and system of export marketing. Fertilizers are sold to the interregional markets in three principal ways. In some countries, such as Burma, India, Madagascar etc., the import of fertilizers is mainly pooled under government agencies (state trading corporations) with fertilizers purchased on a tender basis. The second method is to sell to the general importers in competition with other fertilizer exporters. This may be done by the use of the plant's own staff or by the use of a broker. The third method is to appoint agents to purchase and distribute fertilizers on an exclusive or semi-exclusive basis.

22. If these principal factors are not studied in detail the venture will most likely fail. There are other factors, sometimes equally important, which should be studied before any decision is taken. Here is vast scope for United Nations assistance to such projects, especially in the pre-investment period.

23. Similar considerations apply to the fertilizer industry oriented towards the subregional market, including the national market. Again there is a need for the assistance of the United Nations with respect to the assessment of subregional fertilizer markets, especially in the Eastern and Central African countries.

24. For fertilizer industry primarily devoted to the national market the biggest problem will be the development of the domestic fertilizer market. The ways and means of building up the national fertilizer market must be studied as outlined above and government policies directed to this end must be proposed. If all this is done well in advance of the start of operations, substantial losses due to excess production capacity can be avoided. The United Nations could help in undertaking the proper studies and in outlining the appropriate government policies in Cameroon, Ghana, Madagascar, the Sudan, Togo and Zambia.

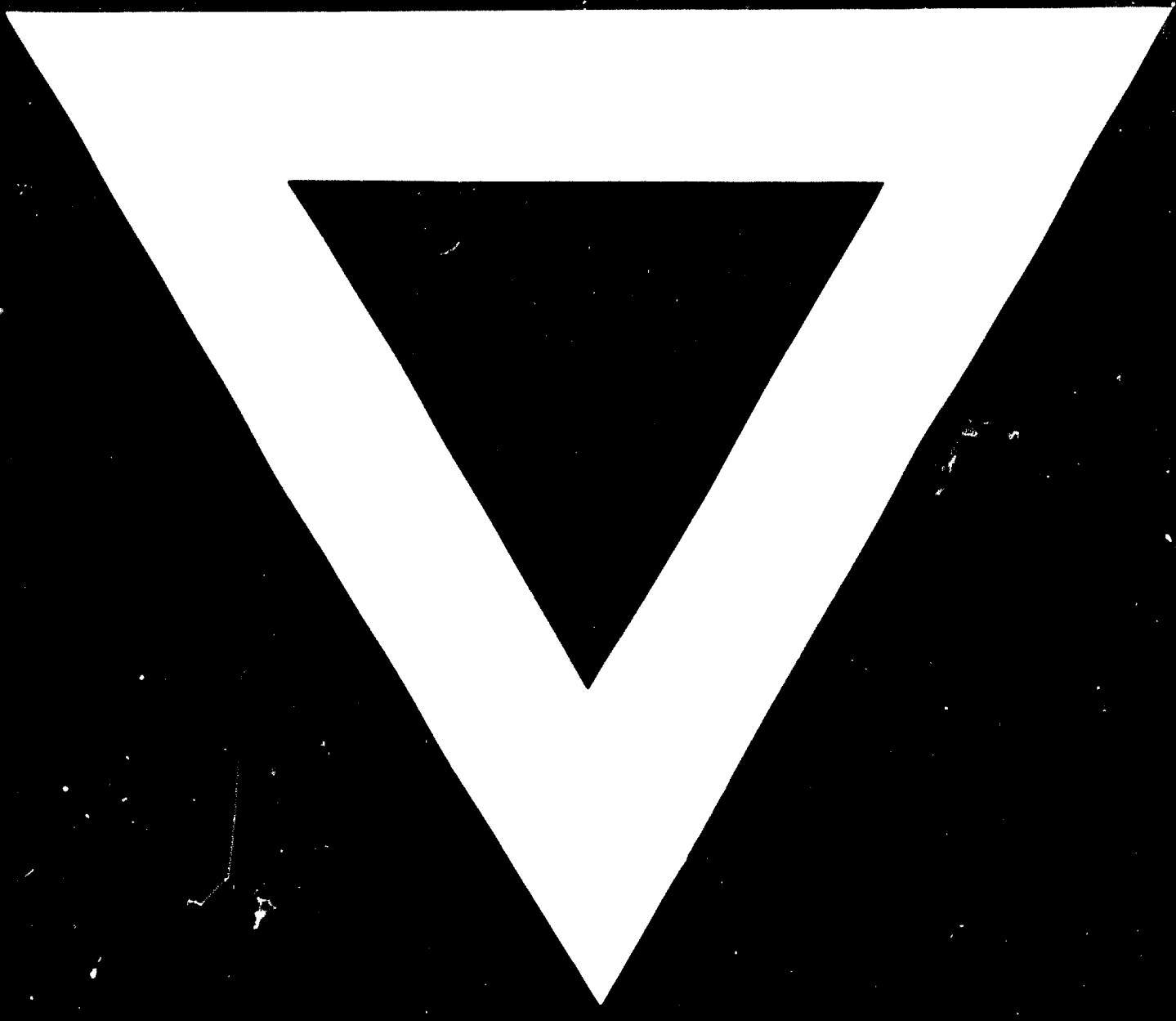
25. Diversification of production is not very practical for huge export-oriented plants. Diversification would require much larger investments with reduced manufacturing capacities for diversified products, and the advantage of a high production rate in terms of operating costs would be lost.

26. **Diversification of production is more useful for plants serving subregional markets.** Higher production costs are compensated by the benefit of lower transport costs compared to those involved in products supplied from developed countries. To avoid the adverse effect of higher investment costs, N-P-K (nitrogen-phosphorus-potassium) liquid-base mixed fertilizers are produced. N-P-K manufacture does not require large investments. The product fully produced in the fertilizer plant, e.g. ammonium nitrate, is mixed with imported triple superphosphate and potassium chloride. Thus, the building of manufacturing facilities for the production of TSP (triple superphosphate) and potassium chloride is avoided, but finally N-P-K fertilizers are produced containing all three principle plant nutrients. This diversification could induce subregional or regional co-operation. For example, Senegal or Togo which will produce SSP (single superphosphate) or TSP, could supply the phosphate-mixing component to Nigeria, which has plans to produce nitrogenous fertilizers.

27. Similar considerations apply to plants serving national markets. A typical case is Togo which will start to produce SSP on a demonstration plant scale (SF project to be approved in June 1969 by UNDP). At a later stage they would use the electric power from Akosombo dam in Ghana to produce phosphoric acid (thermoelectric process) for interregional markets. Togo may repay a part of the bill for supplied electricity by the supply of SSP or, later, phosphoric acid to Ghana.

28. Another practical measure would be the subregional pooling of inputs, such as the sharing of available raw materials and the sharing of investment costs, making agreements for taking final products among the pooled countries etc.

29. It can be concluded that it is far better to undertake preventive steps than it is to solve the problem of excess capacity of fertilizer plants by means of trouble-shooting once the plants are already in operation.



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