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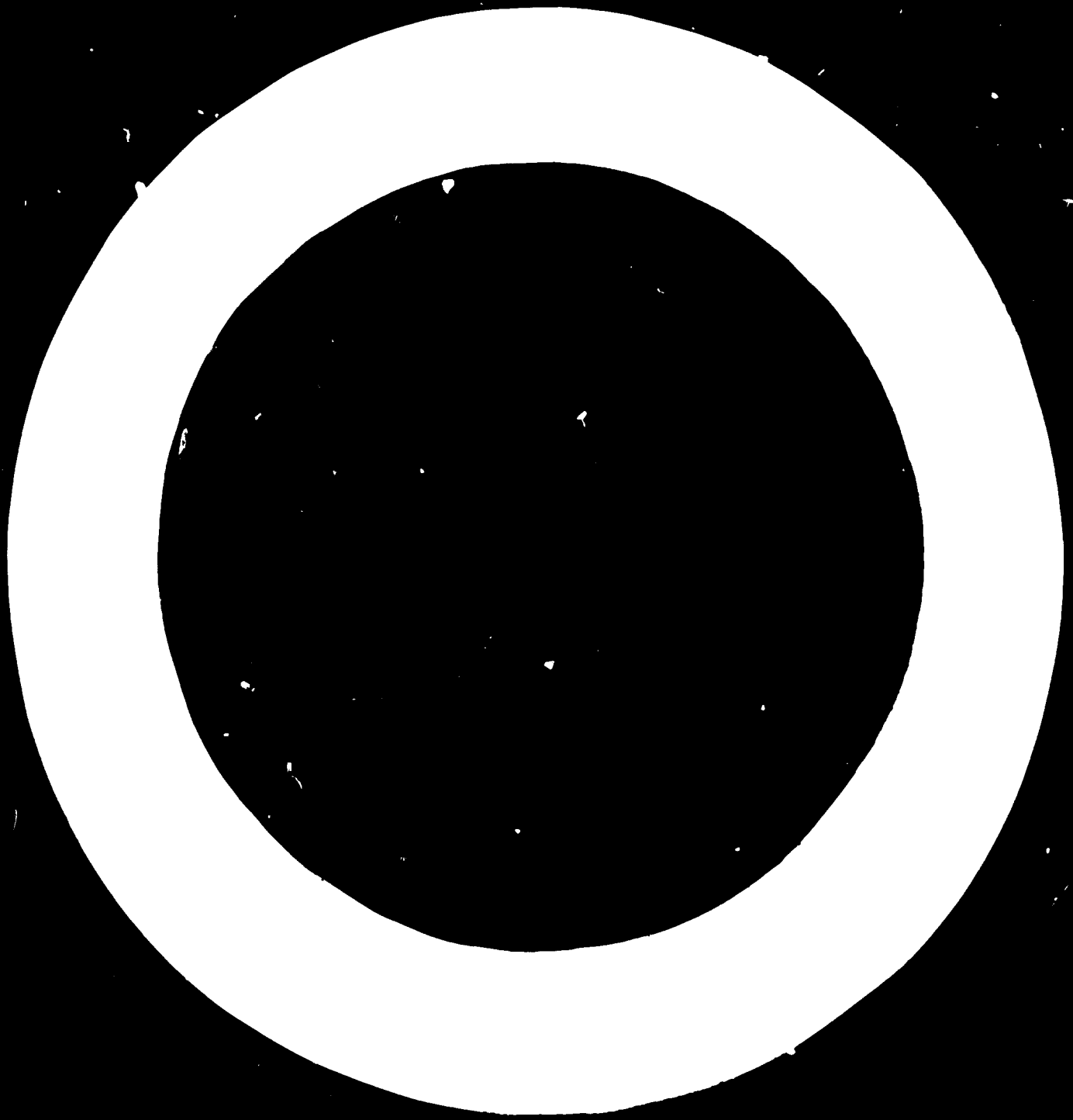
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SOME ASPECTS OF THE INFRASTRUCTURE NEEDED TO ENSURE THE SUCCESSFUL
OPERATION OF FERTILIZER PLANTS IN DEVELOPING COUNTRIES

Submitted by the Government of The Netherlands

^{1/} The Government having submitted a very short paper, it has been treated for purposes of reproduction and distribution as a summary paper and will be distributed in English, French, Spanish and Russian.



Introduction

1. This paper illuminates some of the problems that are encountered when considering the infrastructure required for the operation of fertilizer plants in developing countries. Some of these problems will be of a general nature, while others will only be of particular importance with respect to fertilizer projects.
2. Fertilizers have been chosen because these products figure largely on the shopping list of almost all developing countries. A higher output of agricultural and pastoral products can and must be attained by many means; one of the principal means to this end is the increased utilization of fertilizer.
3. A fertilizer project can also be considered as an example of a heavy chemical industry. Many problems attending the erection of a fertilizer factory will, to a certain degree, run parallel to the problems associated with the erection of other heavy industries. Further, concerning fertilizer projects, the importance of the infrastructure becomes more evident when considering the direct relation existing between the manufacturer and the consumer.
4. This paper does not go into the technical details of the fertilizer factory itself. It is assumed that use can be made of all the knowledge available in the world to build a factory that fulfils the requirements imposed by modern technical science and the specific conditions prevailing in the country concerned.

Realization

5. We may assume that in a considerable part of the developing countries the erection of a fertilizer plant figures largely on the list of desired industrialization projects. Gradually the schemes will become more concrete and the conditions governing their realization will be studied more closely. One will want to process certain raw materials, indigenous or not. On the ground of experience gained in the country itself or elsewhere one will have certain ideas as to the nature of the products to be manufactured and, when planning the capacity of the plants, take into account the growth of the market, the possibility of exports, or both.

6. The required means will have to be obtained on a long-term credit basis, while the money needed for repayment will have to come from savings on fertilizer imports. However, there is a very important facet which requires thorough study if the decision to build a fertilizer plant is to be justified, namely, the existence of an adequate infrastructure. Some aspects of the infrastructure can be subdivided as follows:

The possibilities of an efficient mode of operation

7. We proceed on the assumption that the undertaking has been established and built. Capable engineering companies are to be found in sufficient number. The know-how and experience required for the building of good fertilizer processes are available everywhere.

8. If the factory is well built, two points will stand out:

- (a) The mode of operation must fulfil good standards. This requires properly trained personnel, not only in the key functions, but also at a lower level. This requires not only a thorough schooling and training of this personnel, but also attractive remuneration. Still too often it is seen that the need for skilled personnel in the developing countries is so large that an abundance of jobs is offered to people with only a summary training and many good people within a short time leave their jobs to fill better-paid openings. This situation can only be met by paying the highest possible wages and by continually training replacements.
- (b) The level of maintenance of the plant must be sufficiently high. This is one of the points from which, especially in developing countries, most difficulties can arise.

9. "A chemical factory is in operation when all the moving parts are running". Maintenance of pumps, compressors, motors, machines should satisfy the highest demands. Important points are especially:

- (a) well trained and experienced technical personnel;
- (b) well paid personnel;
- (c) sufficient spare parts and financial means to purchase spare parts at short notice. Exchange restrictions hampering or delaying the purchase of spares and replacements often are disastrous.

The supply of energy and raw materials and despatch of final products should be sufficiently assured

10. Mostly the project provides sufficient storage capacity for raw materials, while the replenishment of stocks is assured. With the final products it is often different. Fertilizer is, as a rule, used only during a certain time of the year; during a large part of the year it is stored. Transportation and storage must be assured, also in periods of heavy rainfalls, etc. The question whether storage should be in one central place or in several places must be decided separately for each individual case.

A properly operating system of wholesale and distributive trades should be available.

11. Actual practice shows that it is impossible to create a properly operating system after the plant has gone into operation. If the country in question already imported fertilizer, the existing channels between importer and consumer are the proper routes along which to distribute the home-made fertilizer.

The farmers should be familiar with and trained in use of fertilizer

12. This too is an important point. The final buyer will have to get to know the value of the appropriate use of fertilizer from experience. If he is not convinced of the attractive profits this will bring him, he will not be prepared to invest what for him are considerable sums in the purchase of fertilizer.

13. The training and education of the consumer can take years and will probably have to be realized by:

- (a) The establishment of demonstration fields scattered over the area;
- (b) Subsequently, the making available of small amounts of fertilizer, either free of charge, or at a much reduced rate to selected farmers from the surrounding areas, who then should use it under the supervision and in accordance with the direction of experts;
- (c) Simultaneously, the giving of courses, lectures, demonstrations etc.;
- (d) The provision of the amounts of fertilizer demanded by the farmer against normal payment, which amounts are, however, to be applied on the advice of agricultural consultants;

(e) Only when this proves to be successful and the demand increases can it be assumed that the training of the farmer has reached a stage ensuring regular sales.

14. Evidently it is extremely risky to create a fertilizer plant on the basis of sales to consumers before stage (e) has been reached. It seems obvious therefore first to dress the area with imported product and to postpone the erection of the fertilizer plant to the moment when sales are assuredly sufficient.

Credit possibilities for the farmer and a deferred payment system

15. This too is a point of extreme importance. Utilization of fertilizer does not prevent crop failure. With floods, prolonged droughts, insect pests and other disasters fertilizer will be no panacea for crop failures.

16. The farmer, who often has received credit for the purchase of fertilizer, will get into insurmountable difficulties if there are no possibilities for him to defer payment on acceptable conditions.

17. Mostly, the Government will have to make provisions by which the farmer is relieved of the said risk. Nothing acts more like a brake on the use of fertilizer in a certain district than when farmers observe that one or several of them can no longer keep their heads above water due to the purchase of fertilizer. In many countries it is exactly in this respect that there are insufficient or no provisions.

18. It is no exaggeration to contend that the use of fertilizer would be more promoted by the sending of financial experts than by the sending of technical and agronomic experts.

It will have to be ascertained whether there is sufficient co-ordination between the production of fertilizer and other provisions necessary to obtain an optimum effect of the use of fertilizer.

19. Evidently, this point too should receive proper attention. The simple use of fertilizer can in many instances result in a valuable increase of output. Frequently, however, the useful effect will show only if adequate provisions have also been made with respect to other points, among which:

- (a) seed selection;
- (b) application of insecticides and pesticides;
- (c) irrigation;
- (d) crop rotation;
- (e) improved tillage, etc.

Summary

20. If in the realization of a fertilizer project the infrastructure does not receive the necessary attention, there is a fair chance that part of the production will for a long time find no sale. Apart from the large technical difficulties that can arise due to a plant having to produce at high capacity, the earning-power of the project can be seriously endangered.

21. It is recommendable, therefore, to build up the market gradually before entering on an internal fertilizer project.





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