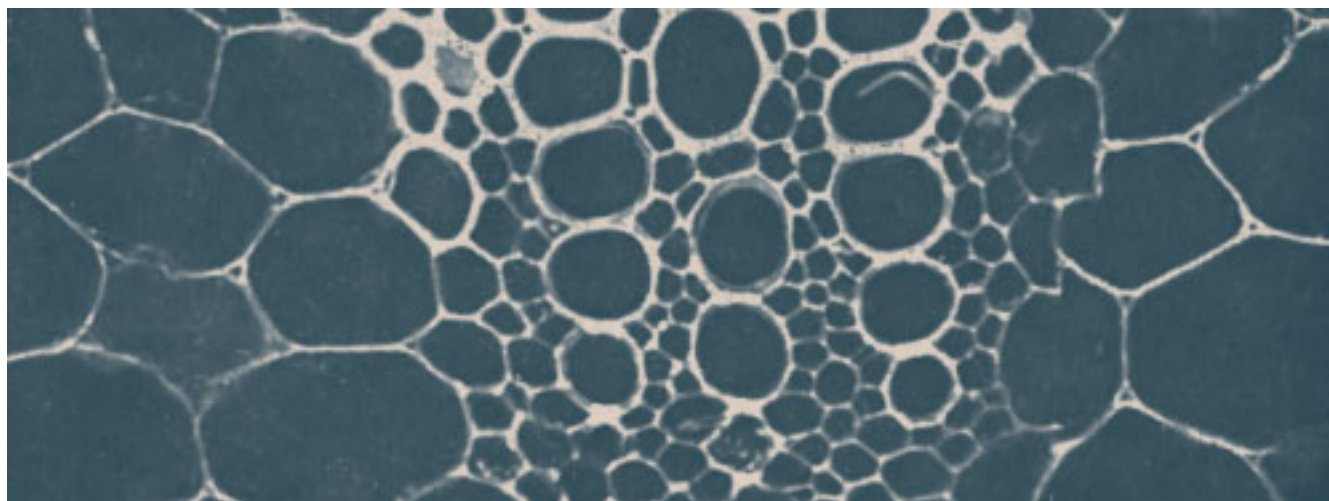




## Use of Fertilizers and its Effect in Increasing Yield with Particular Attention to Quality and Economy



The problem of hunger in the world is closely linked to the rational use of fertilisers. However, it is precisely in the less developed countries, where the population is poorest, that fertilisers are not used or are used inappropriately.

This problem has become so intractable that it is getting the attention of all those who can contribute in some way to finding a solution.

The Pontifical Academy of Sciences organised a study week on the theme: "The use of fertilisers and their effect on the growth of crops, especially in relation to quality and economy". The participants endeavored to reach conclusions that could contribute to a better use of fertilisers, both in their technical application and from the economic point of view, with a view to extending the results of the discussions and the confrontation of the various opinions to the whole world and especially to the conditions of the less developed countries.

Thus oriented, this Study Week had a programme divided into six sections in order to facilitate the discussion of the whole issue through an analysis of its particular aspects.

For each subject, it called upon universally known specialists from various parts of the world with different points of view on the subject, seeking as far as possible to invite nationals of countries belonging to geographical areas which present a particular problem with regard to the theme of the Week.

Here, in the order of their discussion, are the six arguments taken into consideration:

1. «The application of different types of techniques in the analysis of soil and plants to determine their need for fertilisers»

The best use of fertilisers and the use of the most modern techniques were examined here by specialists who discussed the advantages and disadvantages of each technique and the framework of the problem to give it the best solution in the immediate future.

2. «Use of fertilisers in regions of the world with different climatic conditions»

The aspects dealt with were those relating to the humid tropical and subtropical regions as a whole, the particular aspects of Latin America, Africa, semi-arid and semi-humid regions, as well as all the problems of fertilisation in temperate zones.

At the end, the work that FAO has undertaken in general to improve the use of fertilisers and to intensify food crop production was presented.

The discussions that followed led to some very interesting considerations.

3. «Aspects of ecology and growing conditions»

The consideration of ecological conditions as factors in the performance of fertilisers and limits to their application is of great importance today and will become increasingly so.

The reports presented on the subject and the discussions that followed have highlighted the importance of limiting ecological factors and their effect on the potential of fertilisers.

The experience gained so far can and should be used to make the results obtained in very limited areas of developed countries available to the rest of the world as much as possible.

4. «Effect of fertilisers on crop quality»

This aspect is very important because it includes a subject that, even recently, has not yet been given the consideration it deserves and that will certainly acquire greater importance in the near future.

An important factor was the need to use more nutrients than the conventional (NPK) composition, because the consequences of using only NPK on nutrient balance and crop quality are becoming increasingly apparent.

As production increases due to new hybrid varieties, more appropriate tillage, seeding and fertiliser application methods, the need for a wider range of nutrients becomes more acute, so that the application of manure and other organic fertilisers has decreased dramatically.

To solve these problems, new techniques have been used and balanced fertilisation processes have been developed.

The possibilities of generalisation and the procedures to be followed in the near future were discussed.

The importance of countries encouraging crop quality by setting remunerative prices was stressed, if the farmer is to strive for higher quality, which will lead to better health conditions for the people.

5. «New fertilisers and special and future aspects in their use»

The prospects for the use of new fertilisers and their probable economic importance in the future,

as well as the possible results and forecasts of the so-called "green revolution" were examined here; the prospects for future means are such that no problems arise in this sector.

The economic aspects were brought to the forefront and were given the most importance in the discussion.

It was clearly established that it is basically an economic problem (purchase and transport of fertilisers) that actually limits the possibility of increasing crops in underdeveloped countries.

On the other hand, there is no immediate limitation in the possibility of manufacturing fertilisers, but this manufacturing is mainly concentrated in developed countries, which are exporters; hence the economic problem cited above as limiting.

#### 6. «Use of calculation techniques and new systems to determine the need for fertilisers»

The use of radioactive isotopes in fertilisers and the results obtained in order to determine their effectiveness in greenhouses or experimental fields.

Future possibilities in the use of these special methods were noted, from the point of view of inorganic and organic fertilization.

The most important aspect of this sixth argument was the possibilities offered by the use of modern computers to study the influence of the quantity of factors involved in plant production.

Without these modern calculators it would be absolutely impossible to take into account in experiments, let alone in normal cultivation, the large number of factors likely to influence harvests, since it is practically impossible to obtain a good correlation between fertilisation and yield. This problem can now be considered to have been solved in an acceptable way because of the possibility of formulating a yield prediction based on fertilisation, which offers every guarantee of good accuracy.

All the topics were taken up in an intense final discussion that was to prepare the "Conclusions".

These retained the most important points on which the participants reached an agreement: those that refer to the need for further investigations into the various aspects of the environment, crops, soils, human and animal health, with a view to increasing the efficiency of the use of fertilisers in each case and reducing the loss of the world's natural resources to a minimum.

With regard to the control of the need for fertilisers, the importance of achieving a good correlation between field and crop analyses and the results of experiments in the cultivated field and especially in the greenhouse was highlighted.

It was noted that the effectiveness of all the above points depends on the dissemination of scientific knowledge so that it reaches farmers and convinces them of its economic and social benefits.

Let us not fail to mention the optimism with which scientists view the future of agricultural production in the world. This is because the problem of hunger can only be overcome by a better distribution of the means of production, especially fertilisers, or, what amounts to the same thing, by economic aid to the underdeveloped countries granted by international organisations or by more developed and economically stronger countries, allowing them to have the necessary means to properly fertilise their crops.

We hope that common sense will prevail and that the equitable distribution we have proposed will be achieved in the near future.

May we have contributed, in accordance with the desire of the Holy Father, to presenting guidelines for solving the problem of hunger that so cruelly confronts humanity. In essence, these guidelines are also possible solutions.

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