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RESEARCH ON FIELD AND HORTICULTURAL CROPS IN THE NETHERLANDS [1])

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HISTORICAL INTRODUCTION

Following the development of physics and chemistry during the nineteenth century, agriculture also became a subject of systematic study. In the beginning this study was made by people who were neither farmers nor landowners. In this way agricultural practice and research became two different fields which though closely related were more or less independent of each other.

The medical profession was the first to receive an education in natural science. It so happened that they were interested in plants, especially in such as could be used for medicinal purposes. Hence they came to lead the way in agricultural science, and most probably they were also the first to advise farmers on new possibilities.

Agricultural research in the Netherlands is more recent than in some other countries, for instance England and Germany. When the famous Rothamsted Experimental Station was opened at Harpenden in England in 1843 and experimental stations were also founded in Germany, interest in agricultural research increased in the Netherlands as well, although for the time being it was limited to very small circles.

Probably it was the well-known agricultural crisis of the seventies and eighties that gave the direct impetus to the foundation of the first experimental station in the Netherlands in 1877. The first director was a German scientist named Dr. ADOLF MAYER who was also a Professor at Heidelberg.

At that time the leading people believed that the function of these stations was to carry out research work on the one hand, and to supply information to the farmers on the other. This was why the stations established some years after the founding of the first station at Wageningen, were scattered throughout the country, each station having its own district to work in.

The experiment with this type of station was more or less a failure. The research workers did not know enough about the difficulties of agriculture, and the farmers were not sufficiently trained to see the problems, and in particular to bring them to the attention of the stations.

As a result of this situation, the contact between the stations and the farmers was far from satisfactory. This led to a change in the organisation of the stations some years later. Each station was now allotted its own task; this marked the beginning of specialization in agricultural research in the Netherlands. An attempt was made to bring agricultural research and agri-

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cultural practice nearer to one another by setting up advisory committees to the experimental stations.

In the meantime both agricultural schools and a governmental advisory service had made considerable progress. Both institutions felt the need of having available the results of experiments which would help them to persuade farmers to act in accordance with their views. It was therefore necessary to begin simple experiments in which farmers could see for themselves the results of such operations as manuring with fertilizer, planting new varieties, etc. These simple experiments have had a great influence on farming, as well as on the development of agricultural research in the Netherlands, since they helped both teachers and the advisory service staff to a better understanding of the problems to be faced in agricultural practice.

However useful these trials may have been, and however useful may have been the work of the teachers and the advisory staff at the end of the nineteenth and beginning of the twentieth century, the real basis for agricultural research was lacking. We may say that three things were wanting to develop agricultural research in the Netherlands to the extent required to raise national agriculture to a really high level.

These three factors were :

1 the continued lack of contact between research workers and farmers ;
2 the lack of an institute for more fundamental research in agriculture ;
3 the lack of an agricultural school where students could be trained as research workers at a university level.

A considerable improvement was made in this rather unhappy state of affairs by the opening of the Agricultural University at Wageningen at the end of the first World War in 1918. An agricultural high school had been in existence at Wageningen from as early as 1876, but up to 1918 the tuition, though of a fairly high standard had not been up to university level.

"Object associations"

Prof. C. Broekema, one of the professors of this university, realized that it was not enough to develop agricultural research, but also very important, to guide this research in the right direction and to see that the results reached the farmers as quickly as possible.

As Prof. Broekema was a first-class organizer, a man who made a ready appeal to the ordinary farmer, he was very successful in promoting what he called "Object Associations".

His idea was that an attempt should be made to unite farmers and other interested people who were concerned with a certain crop or group of crops. The first institute stemming from this idea was the "Instituut voor Rationele Suikerproductie" ("Institute for Sugar Production") at Bergen op Zoom. This institute for research on sugar beet is a private enterprise, all the expenses of which have been defrayed from the beginning by sugar beet-growers and the sugar industry.

Another object-association which was very flourishing at the time was the "Nationaal Comité voor Groenvoederbouw" (Nacovo) (National Committee for the Cultivation of Fodder Crops). This Nacovo did not actually have the character of an association in the normal sense : it was more a tie, of a fairly

strong kind, between Prof. BROEKEMA who had taken the initiative on the one hand, and on the other the interested persons he had gathered around him at the numerous meetings he organised in different parts of the country. Prof. BROEKEMA aroused great enthusiasm in research workers, teachers, the staff of the advisory service and the agricultural organizations, and the farmers themselves, on the subject of promoting the cultivation of fodder crops. This was during the difficult years of the economic crisis that gripped Europe at the end of the nineteen-twenties and beginning of the nineteen-thirties. It was a time in which almost everyone, after recovering somewhat from the heavy blows they had received, showed willingness to undertake new ventures in an attempt to overcome their economic difficulties.

A third object-association, though quite different in character, was the "Technische Tarwecommissie" (Technical Wheat Commission), which was a direct result of the steps taken by the government to promote the cultivation and consumption of home-grown wheat. Growers, millers, bakers and everyone else who was in any way concerned with wheat in any form were affiliated to this "Technische Tarwecommissie" and met at regular intervals. A graduate of Wageningen University was put in charge of the research to be undertaken and the manner in which this was performed by Dr. FEEKES, the scientist in question, was an outstanding example for many years to come of how to undertake research on a certain crop.

This "Technische Tarwecommissie" was not founded by Prof. BROEKEMA, but by his friend Dr. S. L. LOUWES, who was a prominent Dutch agriculturist during the thirties.

A fourth object-association that greatly influenced both research and the actual cultivation of the crop concerned was the "Nationaal Comité voor Brouwgerst" (Nacobrouw) (National Committee for Malt barley). In this association as well, all those who are in any way concerned with malt barley, the product in question, meet regularly and discuss their mutual problems. Together they have laid the foundation for a type of research which also, became an example of what can be achieved by co-operation between interested groups of individuals.

The fifth object-association I should like to mention was also founded by Prof. BROEKEMA. This is the "Peulvruchten-studiecombinatie" (P.S.C.) (Pulse Study-Group). This P.S.C. is more or less similar in character to the Nacobrouw, except that the research on pulses is not performed by the P.S.C. itself, but only promoted by it (the actual work is carried out by the institutes already existing). A special feature of this object association is that it tries to promote the consumption of more pulses in their various forms.

TYPES OF RESEARCH

In his speech at the first meeting of the Sub-committee on agricultural research of the European Committee on Agriculture of the F.A.O., held in London in November 1954, FRANK YATES of Rothamsted Experimental Station divided agricultural research into three types:

1 Fundamental research;
2 Work on specific problems;
3 Developmental research.

YATES says that these types are not sharply defined and that many research-projects involve all types of research in varying degrees.

FUNDAMENTAL RESEARCH

In YATES' opinion the choice of lines of work in the fundamental field is best left to the scientists who are capable of carrying out this type of work, and who are, or should be, in the best position to judge what are the problems to which it is worth-while devoting research efforts. I would like to emphasize YATES' opinion on this matter and I have a feeling that this is also the prevailing opinion in the Netherlands. YATES adds, however, that the people in charge of organizing research can help to a certain extent by keeping these scientists informed of the problems in their field that appear to be of immediate practical importance. My opinion on this point also lies in the same direction, and my experience is that scientists engaged on fundamental research are usually very grateful for hints on problems which in the opinion of the research organizers need their special attention.

In the Netherlands fundamental research on agricultural and horticultural crops is chiefly concentrated at the Agricultural University and at some institutes at Wageningen. At the same time, however, there is a growing contact between the scientists at Wageningen and at the other universities in Holland, and also with those responsible for the organization of research for practical application in agriculture and horticulture.

In my opinion regular contact between all scientists working on fundamental problems is of the utmost importance. As far as I can see, the fundamental problems in agriculture and horticulture are not specific ones.

Nor are these fundamental problems specifically national problems. They have an international character so that it is essential for all nations to collaborate as far as possible in solving the fundamental problems. I see a special task in this respect for the research workers of the smaller countries. The larger countries are able to carry out their own fundamental research, but in the case of smaller countries such as Denmark and the Netherlands this is hardly possible. I should therefore like to make a plea for very close collaboration in this respect.

RESEARCH WORK ON SPECIFIC PROBLEMS

Whereas most fundamental research has to be based on the different branches of science, research work on specific problems can be partly done on the basis of different crops. Field crops and horticultural crops form one of the centres around which this type of research is actually concentrated.

In the Netherlands experts have been discussing the problem for many years, as to whether it would be more advisable to have a separate institute for every crop or group of crops, or to carry out research on all field crops at one larger institute.

In the case of agriculture, not so long ago a decision was made in favour of a single station where the research on all field crops will be concentrated, with a few exceptions. This station will be called "Proefstation voor Akker- en Weidebouw" (Experimental Station for Field Crops and Grassland). It will deal not only with technical problems but also economic ones. It is intended

also to include the problems of the farm, including those of the farm household as a whole, from the technical and economic points of view.

When this decision was taken, there were already in existence a number of individual stations for each type of crop. I mentioned the Institute for Sugarbeets at Bergen op Zoom, but there is also the Flax Institute at Wageningen and the Institute for Potato Storage, also at Wageningen.

The first-mentioned institute is quite independent, and it is also intended to leave the two other institutes in the more or less independent position they now enjoy.

In order to overcome the disadvantage of being at a great distance from the products one has to carry out research on, a form which is peculiar to agriculture, most agricultural institutes have regional experimental stations in the country. These sub-stations are of various types, depending on the specific situation with regard to the product in question, but their aim is always to enter into closer contact with actual practice, and to get a better idea of the problems which practical farming has to face.

In the case of horticulture, which in Holland is characterised by several highly localised crops, the obvious course was to have this investigation of plants carried out by smaller groups of research workers at a number of scattered experimental stations lying in the centre of the crop areas concerned.

Not all problems relating to the crops are tackled from the point of view of the crop itself. Especially in the field of breeding and variety testing, the work is not done for every crop separately, but for the combined agricultural crops on the one hand, and for the combined horticultural crops on the other. These institutes called "Stichting voor Plantenveredeling" (Institute for Agricultural Plant Breeding), "Instituut voor Rassenonderzoek van Landbouwgewassen" (Institute for Research on Varieties of Field Crops) and "Instituut voor de Veredeling van Tuinbouwgewassen" (Institute for Horticultural Plant Breeding) are all situated at Wageningen. The Institute of Horticultural Plant Breeding also acts as the station for the variety testing of horticultural crops.

It is interesting to note how the institutes mentioned are organized. The persons in charge of this organization are becoming increasingly convinced that it is absolutely necessary for these institutes and the leading people in practical farming and gardening to be in the closest possible contact with each other. After several experiments the solution has now been arrived at whereby every institute will reach the status of what we call a "stichting" (foundation), or will do so shortly; the "stichting" is not an association, but a juridical form without members, i.e. only a board. Most of the members of this board will be recruited from the various branches of farming and horticultural practice.

It is very difficult to interest the people engaged in practical work in the organisational problems of such an institute, but they take a very great interest in the technical and economic problems. Consequently, the system followed for some years at a number of institutes such as the Flax Institute, the Institute for Potato Storage and some Horticultural Institutes, is very beneficial.

It is here that the representatives of the practical side made their decisions, usually together, and, of course, in consultation with government representatives and research workers, on which problems to tackle.

Developmental research

This type of research might be described as an effort made to discover which of the results obtained from fundamental research and research into specific problems can be utilised in agriculture or horticulture. It is the last step from scientific research to practical application of the results. This is the type of research that directly interests almost all farmers and gardeners. The agricultural and horticultural schools, the advisory service, farmers' and gardeners' organisations for young people and adults and the professional journals, are the most important links between this research and the practical farmer or gardener. This research work is usually carried out on trial fields, experimental farms or regional experimental stations. It is here that education, advisory service and research meet at regular intervals.

The promotion of research

In every country the government has taken an interest in agricultural and horticultural research. We may well ask why this is so.

I think the answer is that this interest shows that every government considers agriculture and horticulture so important to the welfare of the nation that it wishes to promote the development of a rationalised production in these very ancient forms of human prosperity.

On studying the organisation of agricultural and horticultural research in various countries one will find that the main features are everywhere alike. One country, however, lays more stress on the promotion of fundamental research, another on the study of specific problems.

In every country special attention is paid to developmental research. This situation is very logical: every country must perform its own developmental research, as this type of research must be fully adapted to the specific circumstances of the country or region in question.

As far as concerns research into specific problems, the latter are partly local or regional in character, but mostly national or even international in character. This has two consequences:

1 both national and international discussion of these problems is desirable, and

2 it is possible for a certain country to try to leave the solution of these problems to other countries to a great extent.

The latter was the prevailing attitude in the Netherlands until about the end of the first World War (1918).

When during the 1880's the interest of the Dutch Government had been aroused in the development of agriculture, the professional education of young farmers and the advisory service were promoted in particular. Scientific research attracted relatively little attention, mainly, perhaps, because scientifically-trained agricultural research workers were hardly available, but also because one could find the results of this costly research in the numerous professional journals and handbooks that appeared regularly in both Germany and Great-Britain.

Since 1918, the year in which the Wageningen Agricultural University was opened, this attitude has gradually changed. At present the interest and

attention aroused by research in all circles concerned is no less than that devoted to professional education and advisory work.

In these changed circumstances favourable conditions were created for the rise of the above-mentioned "object-associations" which developed into important institutions for the study of field and horticultural crops in the Netherlands.

The Second World War lent a hand in this respect by furthering the legal organisation of all groups concerned in some way of other with a certain product, or group of products, into so-called "bedrijfschappen" (industrial boards); for this a better term "productschappen" (commodity boards) has now been substituted. The existence of these „bedrijfschappen" made it possible to place the handling of certain agricultural and horticultural products on a firm basis and to give a purpose to the money thus collected. Some years later it was possible to convince more and more industrial boards of the enormous value to be derived from well-directed and accelerated research into various field crops.

This attitude of these industrial boards and their directors has created new possibilities for a more rapid development of research into field and horticultural crops in the Netherlands.

Recently the government facilitated to an even greater degree this co-operation in crop research by representative organisations of breeders, growers, dealers, co-operatives, etc.: every amount provided for research purposes by agriculture, trade and industry is now doubled by the government.

Conclusions

1 Agricultural and horticultural research in the Netherlands developed fairly rapidly during the last twenty-five years and especially during the last ten years.

2 This rapid growth is mainly due to the following six factors:
   a the opening of the Agricultural University at Wageningen as a national centre for professional training and the promotion of fundamental research at University level;
   b the sudden growth of interest in research in all circles after the Second World War, promoted by numerous study trips to the U.S.A. and generous Marshall Aid;
   c the improved organisation of agricultural and horticultural research after the Second World War by the appointment of specialised heads of divisions with a well-trained staff at their disposal;
   d the organisation of all people concerned in a certain agricultural or horticultural product, or group of these products, into organisations with legal status enabling them to levy contributions and apply part of the money thus collected to research work;
   e the decision of the Netherlands' Government to double every amount provided for research purposes by agriculture, horticulture, trade and industry, this decision being in pursuance of the law relating to applied scientific research, dating from 1930;
   f a growing appreciation in all circles concerned of the great value of scientific research for the economy of farming, gardening and their allied trades and industries.