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# National System of Agricultural Research: The case of Spain

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**Abstract.** Three Institutes founded in the 1940s were the basis of the present agricultural research structure at the Ministry of Agriculture, Fisheries and Food (MAPA). One of them, the “Instituto Nacional de Investigaciones Agronómicas”, was already functioning in 1926 under the name of “Instituto Nacional de Investigación y Experiencias Agronómicas y Forestales”. The combining of the three Institutes of Agriculture, Animal Husbandry and Forestry was the origin of the present “Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria” (INIA), which is the organisation that manages the Agriculture Research and Development sectorial programme at MAPA.

At a national level, INIA was structured in 11 regional centres all reporting to the central organisation. At the beginning of the 1980s, the decentralisation of INIA began with the setting up of a research and development service in each of the 17 Autonomous Communities using as a basis in most cases the INIA centres that then reported to the Autonomous Governments.

The MAPA Sectorial Research and Development Programme is managed jointly by the General Directorate of INIA and the General Directorate of Agricultural Research of each of the Autonomous Governments by the Co-ordination Commission of Agricultural Research.

These Services are economically sustained, moreover, by the budget of the Autonomous Governments, through participation in calls for proposals different to those of INIA and through agreements with the private sector.

Besides the MAPA Programme, Spain has other research programmes such as the National Agriculture Programme, the Plans of the Autonomous Communities and the National Programme for Training Researchers, all of which form part of the “Plan Nacional de I+D” (National Plan for Research and Development) co-ordinated by the “Comisión Interministerial de Ciencia y Tecnología” (Interministerial Commission for Science and Technology) CICYT which reports to the Department of Education and Culture.

There are also agro-food research and development activities in other public research organisations such as the “Consejo Superior de Investigaciones Científicas” and the Universities.

The relations between INIA and the Services of the Autonomous Communities by means of the “Comisión Coordinadora de Investigación Agraria” (Co-ordinating Commission for Agriculture Research) and the links set up to support a network as well as useful documentation for the entire system, making possible proper performance for the benefit of the agro-food system.

**Key Words.** Regionalisation – Agricultural research – INIA – Sectorial Programme on Research and Development – agro-food.

**Résumé.** Dans les années 1940, trois instituts ont été créés, constituant l'embryon de la structure de l'actuelle recherche agronomique au sein du Ministère de l'Agriculture, la Pêche et l'Alimentation (MAPA). Un de ces instituts, l'Institut National des Recherches Agronomiques, fonctionnait depuis 1926 sous le nom d'Institut National de Recherche et Expérimentation Agronomique et Forestière. La fusion de ces trois Instituts d'Agriculture, Elevage et Forêts a abouti à la création de l'actuel Institut National de la Recherche et la Technologie Agroalimentaire (INIA), organisme chargé de la gestion du Programme Sectoriel de R+D agroalimentaire du MAPA.

Dans une structure antérieure, l'INIA comptait 11 centres régionaux, dépendants de l'organisation centrale. Au début des années 1980, la décentralisation de l'INIA a été entamée. Chacune des 17 Communautés Autonomes a établi ses propres services de R+D, dans la plupart des cas à partir des centres régionaux INIA dont la dépendance organique a été transférée aux Gouvernements Autonomes.

La gestion du Programme Sectoriel de R+D du MAPA s'exécute d'une manière collective entre la Direction Générale de l'INIA et les Directeurs Généraux de Recherche Agronomique de tous les Gouvernements Autonomes, par le biais d'une Commission de Coordination de la Recherche Agronomique.

Ces Services sont également financés par les budgets des Gouvernements Autonomes, par la participation à des appels d'offre différents de ceux de l'INIA, ainsi que par des accords avec le secteur privé.

De plus, il existe en Espagne un Programme National de Sciences Agraires, des Plans de Recherche propres aux Communautés Autonomes et un Programme National de Formation de Chercheurs, dans le contexte global du Plan National de R+D ; la coordination de celui-ci correspond à la Commission Interministérielle de Science et Technologie (CICYT), dépendante du Ministère de l'Education et de la Culture.

D'autres organismes publics de recherche, tels que le Conseil Supérieur de la Recherche Scientifique et l'Université, réalisent également des activités de recherche agroalimentaire.

Les relations entre l'INIA et les Services des Communautés Autonomes, à travers la Commission de Coordination de la Recherche Agronomique, ainsi que les liens établis afin de maintenir un réseau d'équipes et de documenta-

*tion qui soit utile à tout le système espagnol, permet un fonctionnement correct au profit du secteur agroalimentaire.*

**Mots-clés.** Régionalisation – Recherche agronomique – INIA – Programme Sectoriel de Recherche et Développement – Agroalimentaire.

## I – Historical background

Agricultural research in Spain in the first part of the twentieth century was bound to the senior Schools of Agriculture and Forestry Engineering and Veterinary Science. After the Spanish Civil War and in an administratively centralised State, three Institutes were established that were the origin of the present agricultural research structure in Spain.

These three Institutes, “Instituto Nacional de Investigaciones Agronómicas”, “Instituto de Investigaciones y Experiencias Forestales and the “Patronato de Biología Animal”, merged to form the “Instituto Nacional de Investigaciones Agrarias”. Thus, all research in agriculture, animal husbandry and forestry were under the same management.

Once this Institute had been established, a national structure was formed dividing the country into eleven regional centres with services in different spheres and, when certain species were very important in the Spanish framework, specific product departments were created. This formed the first regionalisation in a technical sense but not administratively. The reason was that management still depended on the central administration in Madrid.

When the regional centres were created, which were also the merging of several units or experimental stations located in the regions, the result was a very heterogeneous research structure with regard to both human and material resources.

Two years after the creation of the new institute, Spain obtained funding from the World Bank to structure and promote agricultural research in general. This concerned only 6 regional centres; the remaining 5 were divided into two groups, one of them with not much background and the other consisting of 2 centres which, although they existed, did not function in practice. This help from the World Bank did in fact increase the differences in the possibilities of the above-mentioned regional centres.

A political change took place in Spain at the end of the 1970s resulting in what is still known today as the “Estado de las Autonomías” consisting of 17 autonomous communities with their own governments and parliaments. As a result, there was a transfer from 1980 and 1983 between the former regional centres to the corresponding autonomous governments. This transfer included the infrastructure of the centres as well as the personnel who worked in them. This was the second decentralisation process and was not only technical but also political.

In this process, not all the units of research were transferred to the autonomous governments; some of the activities still reported to the “Instituto Nacional de Investigaciones Agrarias” which maintained some central administrative services. This is due to the fact that in the transfer process, the State kept for itself the general co-ordination of research and the distribution of the funds that the Ministry of Agriculture awards to it.

Later, the “Instituto Nacional de Investigaciones Agrarias” changed its name to “Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria” (INIA) which has four executive centres all located in Madrid.

This structure, which is the result of the political transfer to the autonomous Governments, has been operating for 14 years and is the one maintained at present for the Sectorial Programme of Research and Development of the Ministry of Agriculture, Fisheries and Food.

The programme is managed jointly by the General Direction of INIA and the General Directorate for Agriculture Research of each of the autonomous governments by means of the above-mentioned “Comisión Coordinadora de Investigación Agraria”.

## II – Brief description of the structure of the National System of Agriculture Research and Regionalisation

In Spain, in addition to what is mentioned above in the “Agriculture and Agro-Food Sectorial Programme” of MAPA, there are other agriculture research activities which have suffered modifications with the passage of time.

Firstly, in the agricultural research services of the autonomous regions, apart from the funding from the Sectorial Programme, the autonomous governments have the possibility of dedicating funds for the fulfilment of regional research projects and occasionally within very local limits.

Secondly, both teaching and research activities have always coexisted in those Spanish universities where there is a Faculty of Science. After the Civil War, the number of universities in Spain was very small, but as the years passed it increased considerably to the point at which there are now universities in all the Spanish provinces belonging to an autonomous community.

Thirdly, there were also other Public Research Centres in Spain depending on other ministry departments, and especially on the Ministry of Education, where research activity was carried out.

With the huge development of universities and also of Public Research Centres, the Law on Science was promulgated by means of which the “Comisión Asesora de Investigación Científica y Técnica” was created with the Minister of Education its chairman; at the same time, the characteristics of the OPIS (Public Research Organisms) were defined. Simultaneously, the universities came under another law called the Law for University Reform allowing them autonomous development of research activities for the benefit of society. As the number of OPIS and Universities was increasing greatly, at the end of the 1980s the “Comisión Asesora” was modified and called the “Comisión Interministerial de Ciencia y Tecnología” (Interministerial Commission for Science and Technology) with the Minister of Education as chairman and on which was represented every Public Research Organism.

From the point of view of its performance and in order to be more functional, the so-called National Research Plans were created under the functional dependency of a Secretary of State; one of them is the National Agriculture Plan.

These National Plans, including the Sectorial Programme for Food and Agriculture, have annual calls for proposals to carry out Research Projects, in which all the universities, all the Public Research Organisms, as well as the Services of Agriculture Research of all the autonomous regions can participate.

Everything was now done at a competitive level in order to obtain the funds devoted to it and the “Agencia Nacional de Evaluación y Prospectiva” (ANEP) was created to obtain the objectivity and the quality required in the research projects.

Therefore, the so-called National System of Agriculture Research “Plan Nacional” co-ordinated by the “Comisión Internacional de Ciencia y Tecnología” (CICYT) is sustained by 4 basic pillars:

1. The Sectorial Programme of Agriculture and Food Research and Development of the Ministry of Agriculture.
2. The National Agriculture Programme of the “Comisión Interministerial de Ciencia y Tecnología” (CICYT).
3. The Plans of the Autonomous Regions.
4. The National Programme of Researcher Training.

We shall now examine the first aspect, which is the most important from an economic point of view.

It must be said that apart from the Plans already mentioned at a national level, there are also in Spain specific or strategic programmes for a subject which may be considered to have priority at a given moment. These are managed by the CICYT or the INIA or jointly by both.

### III – Effects of the regionalisation process

#### 1. Effects on human and material resources allocation and management

We have already mentioned the differences that existed as a consequence of the activities carried out with the World Bank in the regional centres, which were inherited when the political transfer was performed.

This is the reason why in the Co-ordinating Commission of the Sectorial Programme for Agriculture and Food of MAPA a formula for the distribution of the funds available for research was achieved that, although it was a little complicated, has had a positive result by being accepted by all the regional governments and it has also been useful in partially avoiding the differences inherited from the previous situation.

We shall now give a brief description of the formula now being used in Spain.

Firstly, the index of potentiality of each autonomous region is calculated taking into consideration the total agriculture production of the autonomous region, the working population and finally the number of researchers in the region capable of carrying out research projects. The value given to each of these features is as follows: 0.5 for total agricultural production and 0.25 for each of the other factors. With this index multiplied by the annual funds available, the so called “potential utilisation of the funds of each autonomous region” is defined.

This potential is split into three sums called initial assignment, horizontal fund and reserve fund.

The initial assignment is the sum of three figures called historical fund, equality fund and harmonisation fund.

The historical fund is 24% of the total annual amount dedicated each year to research and it is distributed in each autonomous region in proportional shares to the average of the economic resources allocated in the past three years. The equality fund is the 18% of the total annual amount, distributed in equal parts for all the autonomous regions. The harmonisation fund is 15% of the total annual amount distributed in proportional shares to the difference between the potentiality of the autonomous region and the sum of the assignment in the historical and equality funds.

On the other hand, the horizontal fund corresponds to the 33% of the total annual amount and the reserve fund corresponds to the 10% of the total annual potential, and which as its name shows, corresponds to the media dedicated to juncture situations that arise in the Sectorial Programme.

Once those projects that are functioning in each of the autonomous regions have already covered the initial budget assignment, they compete freely for the funds available in the horizontal fund after a scientific-technical evaluation of the projects.

With the application of this formula and as both material and human means increase, the differences in origin in the autonomous regions are gradually adjusted. Certainly, besides the annual call for proposals of research projects, there are also call for proposals for scientific infrastructure, in order to provide all the centres depending on the Regional Programme with the appropriate means in order to be competitive in the performance of research projects.

#### 2. Effects on the setting of priorities

The setting of research priorities has also evolved over the years as the existence of small research stations spread throughout the whole country with the priorities of performance guided by the director of the station until the priorities were assigned by the central services of INIA and until the Sectorial Programme for Research of MAPA was created. Priorities are established for four years by a ministerial order although they are subject to annual modification depending on the situation of the moment.

In the process of establishment of priorities, there was a very high participation of all the sectors involved with the setting-up of round tables for general subjects such as agriculture, animal husbandry, forestry and food technology, in which well-known and reputed researchers from the different autonomous regions participate together with representatives of other General Directorates of MAPA, representatives of CICYT, representatives of the agricultural crop associations and agriculture industry representatives. After in-depth examination of all the proposals, the main priority lines corresponding to the sectorial programme are established, leading to the presentation of the corresponding research projects.

On the other hand, in the old discussion between fundamental and applied research it can be said that in our case the problem has been solved as with the passage of time and the changes made. We have achieved research activities that solve real problems. In some cases this uses fundamental research and in others a more applied approach is used, depending on the problem addressed.

Nevertheless, besides the call for proposals for research projects, there are other calls every year which complete the research structure in general. In particular, there are calls for proposals for demonstration projects with the purpose of verifying local conditions and the response of technology derived from research. An effort is also made in these projects to transfer to the sectors concerned the technological innovations derived from research, with the aim being diffusion. Work is also performed on the economic quantification of the results of the project enabling extrapolation in economic terms.

### **3. Effects on the contribution of the private sector to research funding at both national and regional levels**

Here, the decentralisation of research has had a clear influence in such a way that in the first years of the process the participation of the private sector was almost zero. Today there are two specific arrangements called research agreements and contracts, and the number of companies which contribute to financing technological innovation is increasing all the time.

In the first case, both parties, public and private, agree to provide the means to attain the desired objective. In a contract, specific work is performed at a Public Centre for a company in exchange for a previously determined sum. These agreements or contracts can be—and are—performed both by the centres depending on the INIA and therefore on the MAPA and by research centres depending on the autonomous governments.

In fact, the process of decentralisation and approach by the autonomous centres to the companies located in the regions has resulted in the private sector sometimes being the partner in research activities carried out by the public centres, and in other just the provider of a specific job. However, in both cases this has resulted in a closer relationship between research and real demand from society.

Offices for Research Results Transfer (OTRIS) have been set up at many autonomous centres, and of course also in those of the INIA. They are in charge of the performance of both research agreements and contracts.

### **4. Effects on structural and thematic complementarity at national level**

As mentioned before, there is a very close relation between regional structure and research programmes at a national level. The reason for this is that research centres of the autonomous regions can apply to participate in various state programmes and also to international ones, such as the competitive programmes of the European Union. The decentralisation in public research centres and the autonomy of universities thanks to the Law of University Reform has made it possible for not only public centres to compete in these programmes but also for them to co-ordinate with universities in their region or with universities in other autonomous regions that have research experts in very specific subjects.

What has really happened is that the potential of the autonomous research centres is added to all the scientific and instrumental media of the Spanish universities in specific subjects. The result is a very high scientific quality in research projects and also better results for the private sector.

With the decentralisation of the activity, clear subject complementarity at a Spanish level has been achieved, avoiding duplication that sometimes wasted research resources. There are centres located in specific productive agriculture zones that are specialised in a specific subject that is not studied in other parts of the country, except in the case when the researchers in that centre consider that they need some equipment from other centres—either public or private—in order to complement their activities.

This has been, without a doubt, a great success in decentralisation and has contributed together with the avoidance of duplication mentioned above to reduce expenditure of the always limited resources that the State can offer to researchers in agriculture.

## **5. Effects on the National Agriculture Research System relations with extension and development services**

In Spain, when the state was centralised, there was a "Servicio Nacional de Extensión Agraria" (National Extension Agriculture Service) with the task of spreading at a practical level the research work carried out in the country.

This Service was very powerful as it had agents in practically all the agricultural towns in the country, with a very powerful documentation service, using information sheets to disseminate all the news concerning agriculture throughout the whole country. During the process of political transference to the State of Autonomous Regions, this National Extension Service was also transferred to the autonomous governments, with almost the same functions as before but only at a regional level.

In this case, the process of decentralisation has not been as positive as in the previously mentioned sections for two main reasons:

Firstly, as documentation is not centralised, it may occur that the transfer of results to the farmer in a specific autonomous region is not possible because the results are obtained in another autonomous region and the Agent is not sufficiently informed.

Secondly, many of the officers transferred to the autonomous regions have been in charge of bureaucratic matters due to the difficulty of EU agricultural policy which is not easily accessible to the farmer.

In order to improve this situation, INIA publishes every year the results of research projects performed in the Sectorial Programme, and seminars, conferences or meetings are organised to disseminate the results.

However, this has not yet been absolutely satisfactory and is a question to be handled in the future.

## **IV – Future prospects**

Of all the above mentioned we can come to the conclusion that the decentralisation or regionalisation system of agriculture research is already consolidated in Spain, and what must be done in the future is to make the necessary adjustments in order to make it a more efficient system.

First of all, research priorities must adjust even more to specific problems resulting from the situations created by EU agriculture policy and the GATT. That is to say, we intend to make an effort to sum up the activities researchers carry out.

More specifically, instead of waiting for research projects prepared by researchers within the prevailing priorities of the sectorial programmes to carry out what we can call "request projects", that is to say that when the prospective units detect a very specific problem, they will turn to the more specialised researchers of the country for the presentation of a project protocol at the request of the MAPA with a precise final character and that is strictly related to the agriculture and food policy of the Spanish Ministry.

On the other hand, through calls for proposals for aids for scientific infrastructure or other calls for proposals not mentioned before, such as for bibliographical funding and for special operations, less favoured agricultural research centres in the country are gaining more importance because there are still great differences in the number of researchers.

Apart from the infrastructure already mentioned, there is another difference today between the different autonomous research centres. This lies in the number of personnel trained to work in research. There are calls for proposals for research initiation, pre-doctoral and postdoctoral research and researcher training scholarships in both the Sectorial Programme of the MAPA and in the National Agriculture Programme of CICYT.

In the future, the system requires the reinforcement of this type of scholarships and an improvement of their national distribution.

As mentioned before, an ongoing question is that of agricultural extension whose problems are known clearly today and which should be solved in the near future using computer documentation systems. In fact, there is the "Red de la Información de la Documentación Agraria" (RIDA) (Information Network of Agricultural Documentation) which was very useful and very well organised when the activity was first centralised.

The main objective is to promote the RIDA by linking computer information equipment in all the autonomous regions and placing putting all the existing documentation at the disposal of researchers and also to approach it to the agricultural extension systems so that it is spread among all the economic agents of Spanish agriculture.

Finally, it can be stated that although the decentralisation of the system of Research and Development of the Ministry of Agriculture, Fisheries and Food in Spain can be improved, it has positive results for the agrofood sector

