

Demand for Institutional Innovation in the Spanish National Agricultural Research Model (NARM): The Need for a System-based Approach

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Introduction

The modernisation process of the Spanish agriculture was initiated at the beginning of the 1950s and consolidated with the currency stabilisation plan at the end of that decade. Strangely, the important technological changes, which occurred in barely three decades, have seldom been accompanied by, and even then only at a somewhat later stage, corresponding institutional changes. One of these delayed institutional changes was the adoption of a standard model for agrarian R + D, which was not implemented until the beginning of the 1970s as regards its sectorial component (dependent on the Ministry of Agriculture), and until the mid-1980s as regards its university component. Currently, at a time when the Spanish NARM is just reaching a certain degree of maturity and modernity, new challenges resulting from new approaches to agrarian production and the new role of agriculture in the context of the economic system, are demanding further institutional changes, among them, that of adapting its structure, at least in part, to a system-based approach of the agrarian scientific activity.

Following some brief critical comments on the current structure of the Spanish NARM, the circumstances which currently generate demand for institutional changes in the system will be outlined, and the possibilities these changes have of occurring will be analysed, by studying the existing factors of demand for institutional innovation, according to the theory of induced institutional innovation.

Structure of the Agrarian R+D Model in Spain

The current organisational structure of agrarian research in Spain has both a public and private component. The private component accounts for approximately a quarter of the scientific personnel and a quarter of the total budget spent in Spain in agrarian R+D activities. The companies which carry out research are mainly either input producers or agro- industries. The relative importance of private R+D is growing (see Figure 2).

There exist some studies on the public component: INIA (1981), TITOS (1987), MORENO (1988), HERRUZO and ECHEVARRIA (1993), HERRUZO et al (1993), CALATRAVA (1995 y 1996), among others. The latter study offers a historic perspective of the evolution of the agrarian R+D model in Spain, from the various sporadic pioneering activities, which began to appear at the end of the 18th century, to the present-day situation.

Figure 1 includes a diagram of the current structure of agrarian R+D activity in Spain (the % of scientists is stated in brackets). The public sector has, in turn, three components:

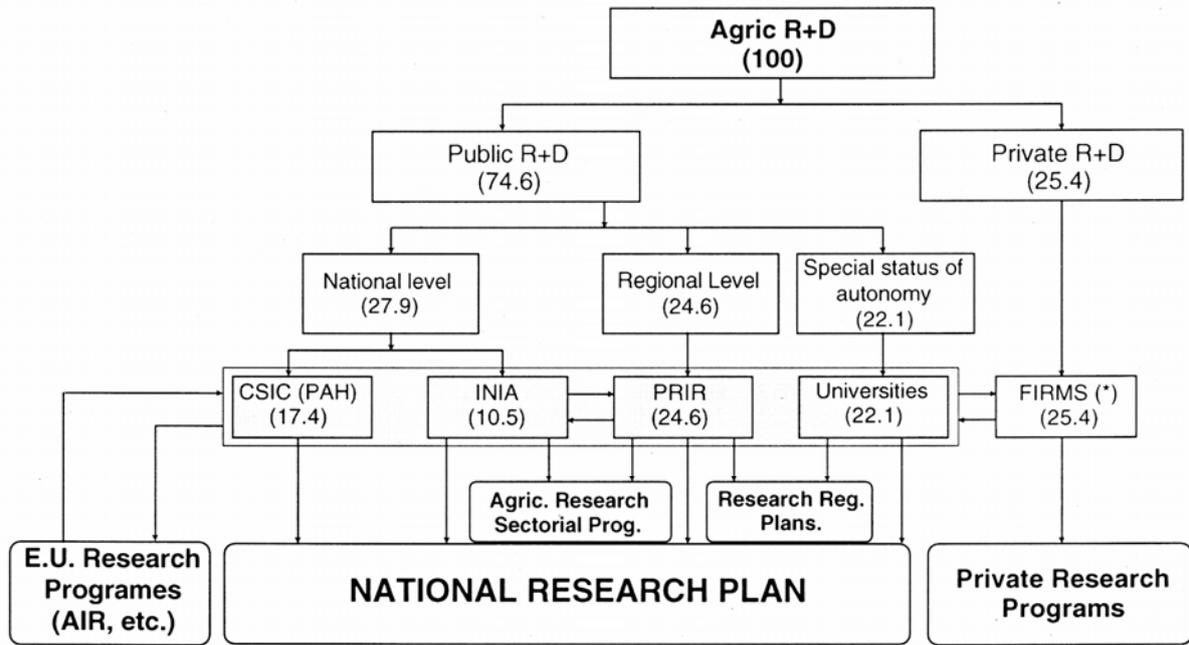
- (a) *A sectorial component* which is dependent on the Ministry of Agriculture: the "Instituto Nacional de Investigaciones Agrarias (INIA) [National Institute of Agrarian Research], created in 1971 by the amalgamation of pre-existing bodies (CALATRAVA, 1995). The INIA was set up between 1971 and 1979 with the help of a loan from the World Bank, and for the next five years operated through Regional Centres and National Research Programmes structured according to disciplines. By 1984, the INIA, together with some CSIC stations, were carrying out the majority of applied agrarian research in Spain, and continue to do so. In 1984, the INIA was split up as a result of the transfer of the Centres to the regional governments. Since then, research investment has become increasingly unbalanced, in the sense that the more developed regions have been institutionally and materially better-equipped to carry out agrarian research than the more backward ones, where, moreover, the regional governments are less willing to back medium to long-term investments such as those required by agrarian research.
- (b) *A multi-sectorial component*: the "Consejo Superior de Investigaciones Científicas" (CSIC) [The High Council for Scientific Research] is a multi-sectorial organisation which is made up of structured agrarian research units within the so-called "Patronato Alonso de Herrera". The CSIC mainly carries out basic research, although some of its experimental stations, situated in rural areas with very specific agrarian systems, do undertake applied research.
- (c) *A university component*: This is very important in the field of general research, but is less so in the field of agrarian research, where currently it barely forms 13% of the system as regards volume of project funding. It mainly carries out basic research. However, its relative importance has been growing (see Figure 2) particularly since the "Ley de Reforma Universitaria" [University Reform Act] of 1983 and the so called "Ley de la Ciencia" [Science Act] of 1986.

The Science Act centred Spanish scientific activity in the National Research Plan, which is presented every 4 years and is managed by the "Comisión Interministerial de Ciencia y Tecnología" (CICYT) [Interministerial Science and Technology Commission]. The Plan is made up of various Programmes and there is a specific Programme for Agrarian Sciences. The call for the submission of projects is public, open and competitive - any research organisation may apply for funds. Additionally, there is a Sectorial Programme for Agrarian Research, related to the National Plan, which is managed by the Ministry of Agriculture through the INIA, and whose access is limited to the sectorial units (INIA and regional). There also exist European Research Programmes and company funds dedicated to research (see Figure 1).

Need for system-based approach

The existing agrarian R+D model, aims to provide an answer, albeit only partially successful, to conventional agrarian research in terms of agrarian modernisation and industrialisation. But is the model oriented towards the challenges faced by agrarian research in the immediate future? Does the system contain sufficient flexibility to produce the fundamental institutional changes that will be (and are already) demanded by an agriculture which is changing in its socio-economic function and its objectives? Only some aspects of this change will be mentioned here:

- (i) The principal objective tends to be that of achieving sustainability, within a context of productive efficiency, as a replacement of the productivity-based paradigm, which was prevalent in agriculture until very recently.
- (ii) There is a need to be highly competitive in agrarian and agro-food markets, which are increasingly more open and transnational. In many agrarian systems this may contradict the previous point.
- (iii) There is a growing demand for quality foods, and a new appreciation of natural products.
- (iv) The challenges offered in scientific activity by biotechnology and genetic engineering will require increasingly more qualified scientific teams, and at the same time will demand the identification and resolution of specific problems.
- (v) These days the environment must be considered as a priority and objective of agrarian research. It should be remembered that between agriculture and its environmental impact there lies a series of natural "filters" (soil, climate, topography, etc.) which, to some extent necessitate a "localisation" of applied scientific activity.
- (vi) Related to the above, the application of agro-environmental political measures, which are of growing importance within the European Union, can only achieve optimum advantages for a country which invests considerable effort in research.
- (vii) The consideration of the new role of agriculture in local development of rural areas means that agrarian systems considered up until now of little or marginal interest, to which conventional agrarian research has paid little attention, are necessarily going to become a focus for research.



(*) Including NGO and similar

Figure 1: Spanish Agricultural R+D Model Scheme

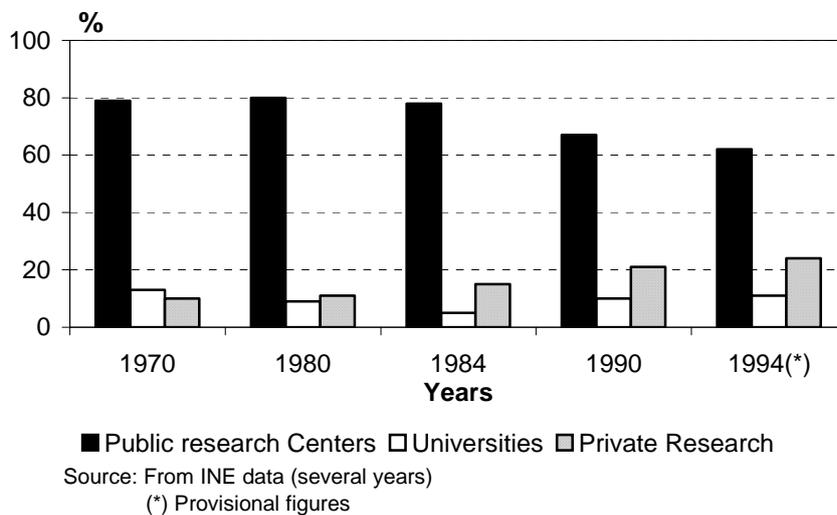


Figure 2 : Percentage Evolution of Expenditure on Agricultural Research

Perspectives for the future and limitations in institutional change

The previous considerations, especially the last three, will undoubtedly generate a demand for a system-based approach to agrarian research, which will require not only the existence of highly qualified scientific task forces concentrated in certain points, but also local teams of

researchers, working in a multidisciplinary way and connected with people from the agrarian sector who are suitably qualified. In my view, if the current Spanish NARM does not adapt, by correcting the regional imbalances in applied research, and by developing the interdisciplinary teams with the system-based approach mentioned, it may be that the need for scientific material in the agrarian sector will be left increasingly unsatisfied.

There is a series of obstructive factors which tend to impede institutional change from heading in the right direction. According to Ruttan and Hayami (1984) and Ruttan (1985), the demand factors for a particular institutional innovation are the following:

- (i) the nature of the innovation and its requisites in terms of mobilisation of resources.
- (ii) the power structure of the "groups of interest" involved.
- (iii) the cultural environment in which the demand for innovation must arise.
- (iv) the existing research and level of know-how on the subject of the innovation.

We shall go on to make some brief comments on each of these:

- (i) As regards the nature of the innovation which a system-based approach in agrarian research would involve, this would require a complete change in the way in which the R+D model adopted since 1986 has evolved. It would evidently call for a considerable mobilisation of human resources and a readjustment of the entire model.
- (ii) The main groups of interest involved in the matter are basically the existing agrarian research organisations, the agro-food sector, the rural development bodies and agencies, the public administrations and the national and regional politicians. Even if the agro-food sector and the rural development entities and agencies should demand an institutional change, in the sense of a more system-based approach, the current agrarian research organisations would offer a strong resistance to this change, and politicians would be unlikely to take on such a long-term investment: in the case of regional governments, the matter would be even more serious, particularly in some regions, due to their somewhat narrow-minded attitudes towards an adequate organisation of applied scientific research.
- (iii) As regards cultural environment, which is traditionally not very supportive of scientific development in Spain, this is more favourable in some regions than in others in inducing and assuming institutional adjustments in scientific activities. This can be clearly seen by the extent to which the opportunities offered by the current model are taken up in various regions.
- (iv) Research into management and organisation of system-based agrarian research in Spain is scarce, although it has recently become of greater interest particularly to those scientists involved in rural development.

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