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Decentralization at NARS level: The case of Italy

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Abstract. The national agricultural research system (NARS) in Italy is slowly evolving from a centralised model to a regionalised model under the stimulus of a growing general trend towards decentralisation in the country. Currently, the principal problems are constituted by the large number of government bodies involved in agricultural research. The most important of these is the Ministry for the University and Research (MURST) which has two networks, one constituted by the Universities and the other by the centres of the National Research Council (N.R.C.). Then there is the Ministry of Agricultural, Food and Forestry Resources (MiRAAF) which has its own network of research institutes (IRSA). Other ministries operate side-by-side with this structure, together with a network of research institutes controlled by the Regions.
In spite of the large number of these institutions, they are not uniformly distributed, either geographically or in terms of research subjects.
The situation of the NARS does not appear to be clearly defined with regard to institutional tasks and the type of research to be carried out and this constitutes an obstacle to more efficient organisation of the system, including in relation to its regionalisation.

Key words. Research – Regionalisation – Experimentation – Divulgation.

Résumé. *En Italie, le système de la recherche agricole nationale (NARS) évolue lentement d'un modèle centralisé à une régionalisation, sous la poussée d'une tendance grandissante du pays vers la décentralisation. Actuellement ses principaux problèmes sont constitués par le nombre élevé de sujets publics qui s'intéressent à la recherche agricole. Le plus important est le Ministère de l'Université et de la Recherche (MURST) qui dispose de deux réseaux, le premier constitué par les universités, le second par les centres du Conseil National des Recherches (CNR). Il est suivi par le Ministère des Ressources Agricoles, Alimentaires et Forestières (MiRAAF) qui peut compter sur son propre réseau d'instituts de recherches (IRSA). Auprès de ceux-ci opèrent également d'autres Ministères et un réseau d'Instituts de recherche contrôlés par les Régions.*
Malgré le grand nombre d'Institutions il n'y a pas de distribution uniforme de celles-ci, ni sur le territoire ni sur les thèmes de recherches.
La situation du NARS apparaît mal définie en ce qui concerne les tâches des institutions et le type de recherches auxquelles celles-ci se consacrent, et cela empêche une organisation plus efficace du système, également par rapport à sa régionalisation.

Mots-clés. *Recherche – Régionalisation – Expérimentation – Divulgation.*

I – The various paths taken by regionalisation

In a nation-state whose unity is the result of a very long historical process but which only took concrete shape in the second half of the last century, the temptation and the pressure towards centralisation or, in the opposite sense, towards decentralisation, emerge over the years as phenomena which alternate in different periods. In the case of Italy, after periods in which the weight and the role of central government have been extremely strong, we are currently passing through a stage in which local autonomies are acquiring increasing importance. We are probably faced with a crisis of the model of the State that is affecting Italian society as whole and which is being expressed in a political form at all levels, in some cases arriving at the point of support for the actions of substantial movements tending to favour a radical change in the present form of the State, either by the secession of parts of the existing State or by the transformation of the country into a Federal State. Consequently, if the whole country is, at this stage of its history, raising questions about the future result of these pressures, it is hardly surprising that there have been substantial pressures in the past and also at this moment in the direction of greater regionalisation in a sector like agricultural research which is certainly very modest in the general context of the country as a whole.

In the case of competence in agricultural matters, it must be remembered that the process of regionalisation has been in progress for some time in Italy and cannot yet be considered to be concluded. As proof of this fact, a referendum should take place in the first half of 1997 on the question of the abolition of the Ministry of Agricultural, Food and Forestry resources which had only been set up in 1993 after a referendum held in April 1993 had abolished the Ministry of Agriculture and Forestry. The request for the new referendum in 1997 was put forward by a group of Regions that consider that all types of competence should be transferred to the Regions themselves and, consequently, taken away from the State. Regardless of the result of this referendum, it is obvious that the difficulty of the relationship between the State and the Regions has not been resolved and, therefore, that no solution to the problem has yet been found.

The regionalisation of powers in agricultural matters was launched by a decree of the President of the Republic (D.P.R. no. 11 of 15 January 1972) followed by D.P.R. no. 616 and 617 of 24 July 1977. However, the process was considered to be incomplete, particularly by the Regions. Thus a long and bitter contest opened up between the Regions and the State which seemed to have been temporarily resolved by Law no. 491 of 4 December 1993 which defined the respective areas of competence and the allocation of the extraordinary funding assigned to agriculture, reserving 20% to the new Ministry of Agricultural Resources and the remaining 80% to the Regions. In spite of this precise delimitation of the areas of competence, as we have said, the conflict between the State and the Regions continued and, in fact, tensions will become more acute in the first few months of 1997 at the time of the referendum on the abolition of the Ministry of Agricultural Resources.

As regards agricultural research, it is obvious that it was subject to the same stresses as the rest of the agricultural matters governed by the law i.e. regionalisation of the competences, implemented firstly by D.P.R.s 616 and 617 and then by the subsequent laws passed in Parliament.

From this point of view, one can predict a first response relating to agricultural research by saying that its regionalisation is not linked to a strictly specific requirement but forms part of a more general phenomenon regarding the process of decentralisation of the powers of the State in all sectors and, in particular, those sectors like agriculture that were already indicated in Article 117 of the Constitution of the Republic. However, this did not start until the 1970s, when a greater pressure for decentralisation began to be expressed in all sectors of society.

It was in this way that the regionalisation of the country began to take shape, at two successive moments, at the beginning of the decade and halfway through it, initiating a process which has not yet finished and which now seems to be directed towards a reform of the State in the sense of a federation.

In the case of agriculture, the intention of the Constitution was based on taking into consideration the differences between the various agricultural regions of Italy and the types of agriculture practiced in each of them in order to reach the conclusion of the need to have instruments of governance that were differentiated and adapted to the individual situations and requirements existing in the whole country.

This appeared to be totally justified in the economic, social and agricultural situation at the end of the Forties when the Constitution was written but it certainly needs appropriate adaptation following the creation of first the European Community and now the European Union which, with the Common Agricultural Policy have created a single system of governance for the whole of European agriculture based not only on the opening of a single common market for agricultural produce but also on the setting up of homogeneous regulations for all the member countries. Today, the greatest objections to the regionalisation of agricultural policy come from aspects relating to the CAP and the need to ensure that agriculture as a whole is adequately represented in its dealings with EU bodies and other member States.

All this does not exclude the fact that many aspects of agricultural policy and agricultural activities can be dealt with at local level where the attention paid to these problems is certainly greater and, consequently, the chances of a successful solution are greater.

Agricultural research activities fit particularly well into this context. Historically speaking, agricultural research in Italy started halfway through the nineteenth century, the logical primary reference being the needs of local agriculture.

At a later date, after promotion and support by central government, an attempt was made to coordinate this research at national level and to encourage the formation of a single national system of agricultural research which, as we shall see later, is principally coordinated by two ministries, the Ministry for the University and Scientific and Technical Research and the Ministry of Agricultural, Food and Forestry Resources. Thus, the next stage of regionalisation has to operate basically on this type of structure which, in a way that is not clearly defined, has to be more open-minded with regard to the demand for research coming from the territory in which the research facilities are physically located.

However, there are a large number of research institutes in almost all regions of the country and, in particular, in those in which agriculture is a major activity, that remained outside the process of national aggregation. These institutes were primarily orientated towards experimentation and disclosure of their results and the research they carried out was closely linked to the local demand. Thus, their nature was basically to operate as problem-solvers and this linked them closely with the territory. When the process of regionalisation started in the 1970s, these structures were almost all taken over by the Regions since they wanted to demonstrate their interest in the specific problems of a productive sector which had just fallen within their jurisdiction. This phenomenon was reproduced in almost every Italian Region and this was the moment of growth in recent years of agricultural research at regional level. This was made possible by D.P.R. 616/77 which assigned to the Regions powers in matters of agricultural research and experimentation of “regional interest”. This created the premise for the regionalisation of this activity which has no clearly-defined base of implementation in previous structures since the D.P.R. 616/77 was not clear regarding the state network. This decree in fact provided the possibility for the Regions to make use of the State structures which carried out agricultural experimentation on the basis of special agreements but, at the same time, assigned to the State the task of carrying out scientific research and experimentation of national interest. This laid the groundwork for the maintenance of a double system of research whose cohesion depended on the goodwill of the persons involved.

The real problem that was not solved was the delimitation of the respective spheres of activity of the two levels since it is exceedingly difficult to identify the boundaries between regional interest and national interest in matters of agricultural research and experimentation.

The situation was not improved by law 491/93 which, as far as research is concerned, provides for a general reorganisation of the system of the Institutes under the control of the Ministry of Agricultural Resources, indicating that the Regions must participate in the governing bodies of the new single research organisation that has to be set up. In this way the law, which also provided for the reform of agricultural research and experimentation by March 1994, intended to guarantee that the Regions also played a role in this field. Halfway through 1997, this reform has still not been implemented and this constitutes a further factor of conflict between the State and the Regions.

II – The National Agricultural Research System (NARS) and its regional distribution

The Italian national agricultural research system has been built up over a century and a half, starting from the spread of information regarding what was happening at the same time in the principal countries of Europe. It developed thanks to the action of a certain number of people who operated in certain places in Italy and attempted to implement local initiatives that could to a certain extent constitute factors of growth and improvement of agricultural activities.

This explains certain basic characteristics of the Italian NARS which have been conserved over the years and have, in fact, given it the aspect and structure that still exists today. These characteristics include the highly uneven territorial distribution, the relationship with the production peculiarities of the areas in which the research institutes are located, the conspicuous presence of the system of university training in the field of research, the persistent confusion of roles and functions and the lack of coordinated and coherent working guidelines. Agricultural research in Italy revolves around a series of unsolved questions that have played a substantial role in creating the widespread climate of dissatisfaction with regard to agricultural research, culminating in its rejection and continuous protests.

Generally speaking, the centres for the diffusion of agricultural research and culture were created as the result of the urgings of certain illustrious figures who were aware of the difficulties encountered by agriculture in a given area and tried to remedy this by the diffusion of agricultural information obtained from research activities carried out in the place itself and of knowledge obtained from the study of work carried out in other countries and contact with the researchers and experts of these countries.

This model achieved its greatest successes in the period spanning the end of the nineteenth and the beginning of the twentieth centuries with the institution of the Visiting Professors of Agriculture, something that later disappeared but has left a positive memory throughout the agricultural world in Italy. When these Visiting Professors disappeared as a result of the creation of a supporting network based on research, experimentation and information constituted by a peripheral network of the Ministry of Agriculture, the flow of exchange between demand and supply seemed to dry up, giving place to a more bureaucratic, less spontaneous relationship. From that time, more or less coinciding with the period between the two world wars, the State has been strongly present in the research organisations and they have become increasingly divorced from the end-users of their work, represented by the farmers. During that period, the research system began to assume certain more precisely institutional characteristics, basically reporting to the Ministry of Agriculture which was also responsible for the Higher Institutes of Agriculture which then became universities and passed under the control of the Ministry of Education. The links were further reduced in 1967, when the Agricultural Research and Experimentation Institutes of the Ministry of Agriculture were completely detached from the Faculty of Agriculture, where important links had been maintained up to that time.

These research institutes constitute an important characteristic of the Italian NARS because of the relationship they maintain with the production sector and because they are at the centre of the problem of regionalisation since their reform is one of the main bones of contention in the controversy between the State and the Regions.

The Regions, in fact, intend to couple part of the national system to these research institutes, once they come directly under their control, in accordance with criteria of location and of the interest of the research studies carried out.

1. The structure of the Italian NARS

The Italian agricultural research system is, in fact, almost exclusively under public control. Research carried out directly by private institutions is, by its very nature, difficult to quantify and identify and this is even more true in the case of agriculture since, in all countries and not only Italy, this research depends on public funding. The Italian agricultural system is confirmation of this and this is the reason why our analysis deals exclusively with the public research system.

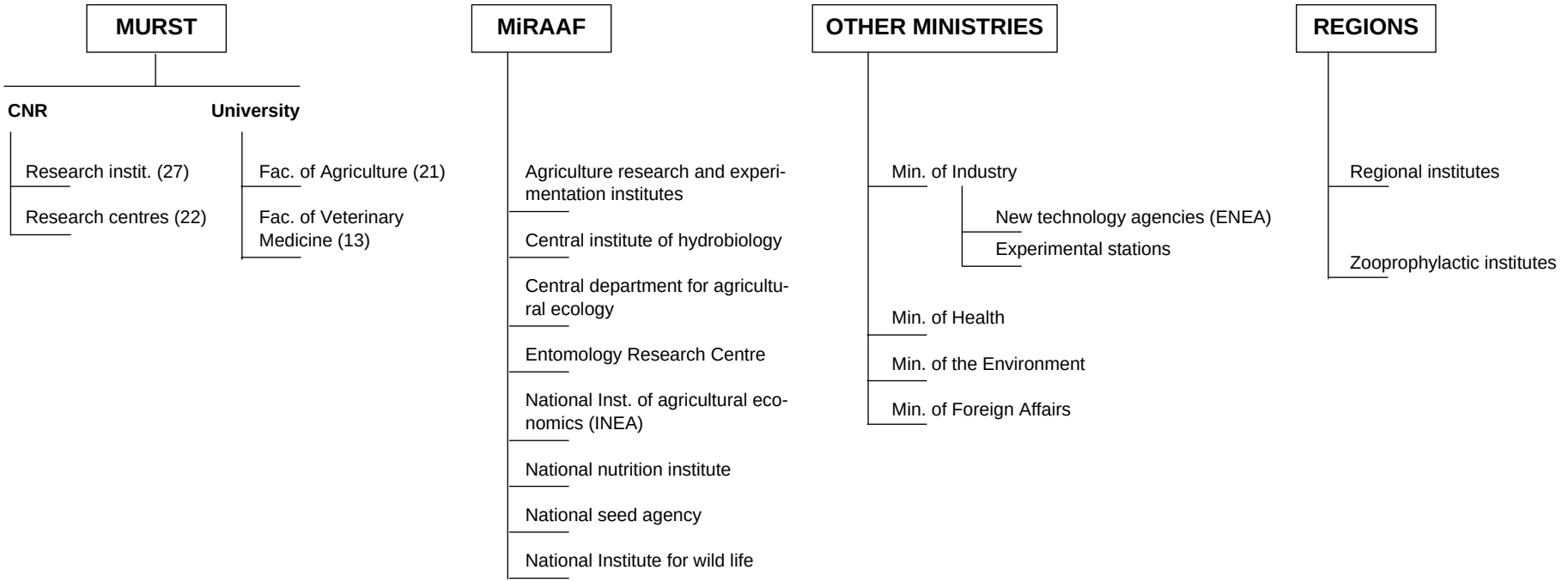
The structure of the Italian NARS is made up of a number of components that can be grouped into four categories: (i) research financed by the Ministry for the University and Scientific and Technical Research (MURST); (ii) research financed by the Ministry of Agricultural, Food and Forestry Resources (MiRAAF); (iii) research financed by other ministries like Industry or Health; (iv) research financed by the Regions.

In reality, this subdivision does not define homogeneous groups either from the point of view of structures or from that of the amount of funding allocated, but it does permit an examination of the various components of the whole that can be sufficient to deal with the overall problem, in particular with regard to the nature of the institutions involved, the amount of the funding and the number of people employed.

A schematic representation of the overall structure of the NARS is shown in Fig. 1. From this, one can see that there is a level of coordination and orientation of the entire NARS that is entrusted to the Interministerial Committee for Economic Planning (CIPE) at MURST. The latter should, in theory, supervise all the research carried out by the other bodies but, in reality, this does not happen because of resistance on the part of the various institutions who cling to a long tradition of working independently from one another.

The funding made available to the NARS is currently of the order of some 600 billion lire which, at an exchange rate of 1650 lire to the US dollar corresponds to around 364 million dollars (Table 1, Figure 2).

Figure 1. Principal research networks of the Italian N.A.R.S.



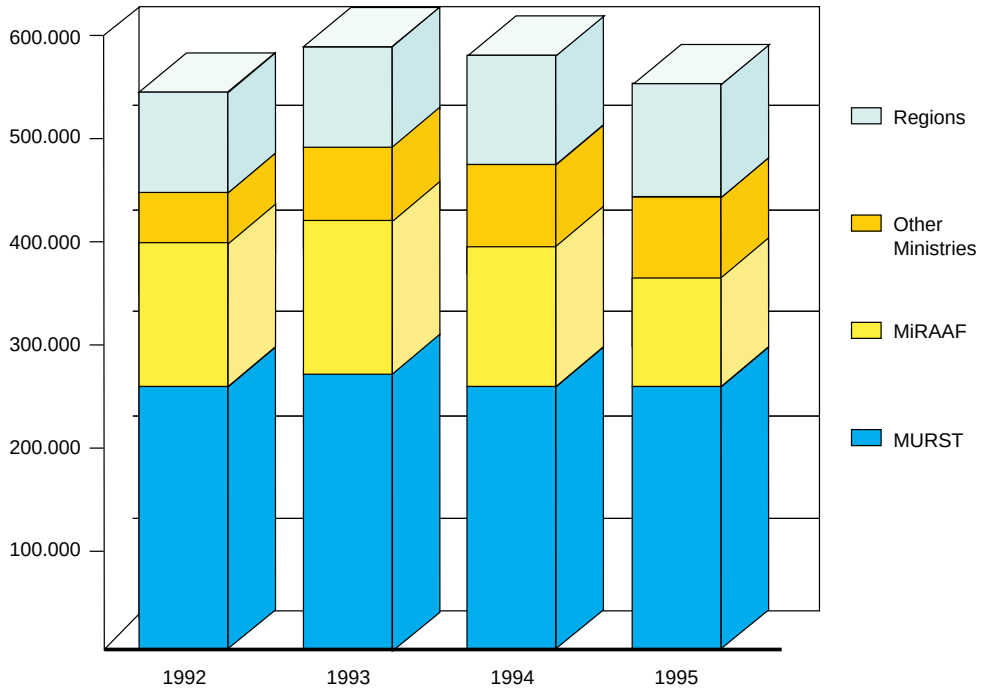
The amount of the funding increased up to 1993 and then dropped in 1994. In the same time, it is compared with the added value of agriculture and it represents about 1.5% of the added value and between 0.8 and 1% of the value of final output (Table 2). There is very little variation in the ratio between research funding and output value in the years considered and it seems to hover around the values given above. However, the continuous contraction in the public funding made available by the State, due to the attempt to improve the ratio between public spending and G.N.P., leads us to believe that an improvement in these indices is improbable in the future.

Table 1. Funding for agricultural research and experimentation (NARS) (millions of current lire)

Institution	1992	1993	1994	1995
Min. University, Scientific and Technological Research, MURST	256 942	268 295	252 835	247 250
Universities	*120 012*	*145 883*	*127 260*	*127 260*
National Research Council, CNR	*136 930*	*122 412*	*125 575*	*119 990*
Min. Agricultural, Food and Forestry Resources, MiRAAF	144 627	153 562	140 873	118 277
Agricultural research and experimentation Inst., IRSA	*111 123*	*120 614*	*110 284*	*88 386*
National agricultural economics institute, INEA	*24 000*	*23 258*	*23 018*	*17 943*
National nutrition institute, INN	*6 826*	*6 826*	*4 810*	*8 960*
National selected seeds agency, ENSE	*352*	*658*	*385*	*290*
National wild life institute, INFS	*2 326*	*2 206*	*2 376*	*2 698*
Other Ministries	43 050	64 878	79 261	75 677
Agency for new technologies, energy and the environment, ENEA	*13 288*	*27 877*	*24 924*	*19 628*
Experimental stations for industry, MICA	*11 187*	*14 911*	*16 820*	*19 068*
Higher Institute of Health, ISS	*-*	*-*	*10 835*	*11 222*
Experimental zooprophylactic institutes	*n.d.*	*3 453*	*9 800*	*10 658*
Central applied marine research institute, ICRAM	*7 041*	*6 217*	*5 782*	*4 001*
Ministry for Foreign Affairs	*11 534*	*12 420*	*11 100*	*11 100*
Regions	100 114	112 213	112 982	115 067
Regional institutions	*100 114*	*112 213*	*112 982*	*115 067*
Total	**544 733**	**598 948**	**585 951**	**556 271**

Source: Inea, Italian Agriculture Yearbook, various editions

Figure 2. Funding for agricultural research and experimentation (million of current lire)



Source: Inea, Italian Agriculture Yearbook, various editions

Table 2. Agricultural research and development activities and incidence on the added value and value of final output (millions of current lire)

	R&D	AV (1)	R&D/AV (%)	VFO (2)	R&D/VFO (%)
1992	544,7	44 732,4	1,218	60 620,7	0,899
1993	598,9	43 233,9	1,385	59 254,9	1,011
1994	586,0	44 768,6	1,309	59 895,5	0,978
1995	556,3	47 899,3	1,161	66 641,8	0,835
VAR. % 95/92	**2,1**	**7,1**	**-4,634**	**9,9**	**-7,108**

1 Added Value ; 2 Value of final output
Source: Inea, Italian Agriculture Yearbook, various editionS

It is difficult to estimate the human resources employed in the NARS According to valuations obtained from several sources, the total number of persons engaged in research activities is around 7,600 of which, however, only 4,500 are genuine researchers, the others being mainly employed in administrative functions. The “corpus” of the researchers is basically constituted by 2,850 university researchers, 300 belonging to the National Research Council (CNR) and other Ministries, 600 to MiRAAF and 750 to the various regional bodies (Nomisma 1996). On the basis of these data and with reference to some 1.7 million agricultural workers, research workers represent 0.45% of the total number employed in agriculture. If we compare this with the figures for other European countries, we find that the human resources engaged in this activity in Italy are much lower than those in situations comparable with ours.

One further observation relates to the high weight of the component of university professors in total research personnel. It is well-known that these professors dedicate only part of their time to this activity and this means that the effective number of full-time researchers becomes even lower.

For example, according to an estimate by Galante and Sala (Nomisma 1996), the number would be reduced to only 1,684 full-time workers applying a coefficient of 60% (Table 3).

Table 3. Personnel employed in public sector agricultural research (1994)

Institutions	Researchers	Technicians	Admin.	Other	Totals
Min. University, Scientific and Technological Research, MURST	1 951	300	42	51	2 344
Faculty of Agriculture and Veterinary Sciences	*1 684*	*n.d.*	*n.d.*	*n.d.*	*1684*
CNR institutes and centres	*267*	*300*	*42*	*51*	*660*
Min. Agricultural, Food and Forestry Resources, MiRAAF	489	495	274	91	1 349
Agricultural research and experimentation Inst., IRSA	*414*	*311*	*204*	*30*	*959*
National agricultural economics institute, INEA	*22*	*59*	*16*	*20*	*117*
National nutrition institute, INN	*31*	*59*	*39*	*22*	*151*
National selected seeds agency, ENSE	*15*	*60*	*10*	*9*	*94*
National wild life institute, INFS	*7*	*6*	*5*	*10*	*28*
Other Ministries	146	128	51	60	385
Agency for new technologies, energy and the environment, ENEA	*74*	*35*	*n.d.*	*46*	*155*
Experimental stations for industry, MICA	*51*	*79*	*35*	*5*	*170*
Higher Institute of Health, ISS	*n.d.*	*n.d.*	*n.d.*	*n.d.*	*n.d.*
Experimental zooprophylactic institutes	*n.d.*	*n.d.*	*n.d.*	*n.d.*	*n.d.*
Central applied marine research institute, ICRAM	*21*	*14*	*16*	*9*	*60*
Ministry for Foreign Affairs	*n.d.*	*n.d.*	*n.d.*	*n.d.*	*n.d.*
Regions	361	651	0	271	1 283
Regional institutions	*361*	*651*	*0*	*271*	*1 283*
Total	**2 947**	**1 574**	**367**	**473**	**5 361**

1 Full-time equivalent
Source: Nomisma, 1996

Independently of these calculations, it is obvious that the number of people employed in research is relatively low, confirming a lack of interest in the sector which the world of agriculture has frequently pointed out.

In the part that follows we will examine in detail the components of the Italian NARS using the classification utilised with reference to sources of funding, for the sake of brevity.

A. Ministry for the University and Scientific and Technological Research (MURST)

The technological evolution currently taking place in all sectors and the consequent increased need for scientific research has, in comparatively recent times, led Italy to concentrate under a single authority the activity of research planning and coordination, which was previously extremely fragmented. The MURST was set up under law no. 168 of 9 May 1989 and was made responsible for all the university activities that were previously under the control of the Ministry of Education together with the research activities for which the Ministry of Scientific and Technological Research had previously been responsible.

This law also assigned to the MURST the tasks of "annual and multi-annual, general, sectoral and special programming of scientific and technological research, coordination of international collaboration in the sector, provision of proposals for incentivation and support of private sector research, definition of initiatives of common interest whose implementation is to be promoted, jointly with other State organisations and the universities."

The objective was to lay the foundations for the creation of a single research system which would embrace all the activities carried out in the country. The solution adopted meant that the Ministry also became responsible for the National Research Council (CNR), an organisation which, up to that time, had directly performed the functions of programming and orientation which were now entrusted to the MURST. The allocation of the universities to the MURST endorses the conviction that the university constitutes the primary source of research, an activity carried out in parallel with teaching, ensuring that it becomes the most important nucleus on the basis of the funding that is allocated.

The figures already presented demonstrate that 44% of the funds for the agricultural sector are provided by the MURST and this is divided almost equally between the universities and the CNR, with the first having a slightly larger share. In the case of Italy, the university system occupies a very important position both from the point of view of the resources utilised and from the point of view of territorial distribution. There are 21 Faculties of Agriculture spread over almost the whole country. The oldest Faculty of Agriculture, in Pisa, was founded in 1840, followed in the second half of the century by those of Milan and Naples, around 1870. At the beginning of this century, the number increased to 5 and then to 8 in the period before the second World War. A further five faculties were created in the period 1942-51, one of them private. The number remained the same up to the end of the 1970s, when eight more faculties were added between 1979 and 1991, bringing the total up to 21. The territorial distribution of the Faculties of Agriculture is shown in Fig. 3, where it can be seen to be extremely uneven, accentuated by the fact that, in some cases, the Faculties are concentrated within a very restricted area. For example, the fact that over a distance of around 300 kilometres there are Faculties and degree courses in Milan, Piacenza, Parma, Reggio Emilia, Bologna and Cesena while it has been announced that a degree course in Animal Production Science will be introduced by the Faculty of Veterinary Medicine of Milan in Lodi, half-way between Milan and Piacenza, had been christened the paradox of Via Emilia. While all these establishments are located in the only great plain existing in Italy, the area where agriculture is most up-to-date and productive, it is obvious that it creates duplications and overlapping in a restricted area where communication is very easy since it is served by roads, motorways and railway lines. Territorial location does not comply with criteria of fair distribution but with another rationale, which is partly historical and partly due to the ability to bring political pressure on the central government that grants the relative authorisations. All this has produced a territorial distribution that is almost totally irrational and a use of available resources that cannot be shared. Consequently, from the very beginning, there were strong reservations regarding the real research potential of these institutes and since they constitute the largest component of the Italian NARS this raises considerable doubts about their effective action in the context of a more rational research system. There are similar problems with regard to the research network of the N.C.R. which is divided into research institutes and study centres. 29 research institutes and 23 study centres operate in the agricultural sector and these, too, are distributed very unevenly over the country (see Fig. 4). Very often, their locations are in some way linked to the presence of a university which has a Faculty of Agriculture but, once again, in other cases, there seems to be no logical criterion for their presence.

Figure 3. Territorial distribution of Faculties of Agriculture and Degree Courses in Agriculture and Veterinary Sciences, 1994

Source: Nomisma, 1996

The distribution shown in Fig. 4 demonstrates the high concentration of the institutes and centres in some cases and, in others, isolated presence or total absence of these institutions. Thus, in the case of the CNR too, the distribution seems to take no account of the need for regionalisation of research. From this point of view, one can see that they are entities that belong to a national organisation and, therefore, criteria of aggregation and synergy between research centres has been given priority rather than criteria of balanced distribution over the country.

B. Ministry of Agricultural, Food and Forestry Resources (MiRAAF)

The second research network in terms of importance, after that of the MURST, is that of the MiRAAF. Historically, the first research institutes were created at the time of the first Faculties of Agriculture and are spread over the country in an extremely irregular manner, following a non-uniform logic. They sprang up in places where there was a nucleus of farmers and entrepreneurs who were aware of the need for an agriculture system that was open to innovation and the results of research or where there were people who could encourage the setting up of research groups and also procure the necessary human and financial resources. The first research institutions adopted the name of “Visiting Professors” to symbolise the double link between the scientific and academic world and the agricultural sector to which they brought their research results. Their number grew rapidly until, in 1914, there were 232 of these organisations spread throughout Italy. They constituted a very important stage in the development of Italian agriculture and, above all, a model that was sorely regretted for many years because of its ability to meet the requirements of the production sector.

During the same period, that is to say around 1870, the central government created the first three research institutes, known as research stations, a term also used in other countries. Over the years, their number gradually increased in response to the needs that emerged or because the various localities presenting themselves as candidates for their presence brought pressure to bear since it was considered a point of prestige to have a research institute installed in their area. Subsequently, the path of the Visiting Professors crossed that of the Ministry of Agriculture and the research institutes for which it was responsible; but this happened in two very different ways.

The Visiting Professors were inserted into the organisation of the Ministry’s peripheral structures and, therefore, they gradually lost their role of a meeting point between the demand for and the supply of research and experimentation.

Consequently, while the peripheral structures maintained a certain propensity to carry out experiments and divulge the results, as time went by, this became gradually weaker because of the progressive accentuation of the bureaucratic aspects of these structures. Instead, the experimental and research system which, at the beginning of the Sixties, included a considerable number of units taking together institutes and research laboratories, now came under the purview of the Ministry but with a special mandate which reserved the task of research to these units.

The system was reorganised in 1967 by means of a specific ordinance. It currently has three central bases and 53 peripheral branches distributed unevenly over the country (cf. Fig. 5). However, the process of reorganisation launched in 1967 had effects only at administrative level, since it limited itself to combining together institutions that operated in similar fields without intervening in either the contents of the research or the location of the various units. The system thus constituted again became the subject of discussion when the Ministry of Agriculture was set up once again.

In Art. 6, clause 2, letters c) and d) of Law 491/93 it is established that agricultural research and experimentation institutes were to be reorganised into a single body for agro-food and forestry research and that a National Consultative body for agro-food research was to be set up in order to ensure greater practical applicability of the research activities. This body has not yet been created because the law in question has not yet been approved.

The various alternatives are currently being discussed but it has not yet been possible to find a proposal that manages to provide a reasonable composition of two requirements: (i) the need for coordination between institutes that operate in the same sector; (ii) the need for the relationship with the regions. The various locations of these institutes means that they are closely linked to a given territory while the definition of the research activities is still centralised. This creates a further problem because the various proposals include those of the Regions who are demanding a regional research system which includes and completes the MiRAAF network.

Figure 4. Territorial distribution of CNR Research Institutes and Study Centres, 1994

Source: Nomisma, 1996

Figure 5. Territorial distribution of Agricultural Experimental Research Institutes (IRSA), 1994

Source: Nomisma, 1996

The question has still not been resolved more than three years after the approval of Law 491/93 and it represents the most important critical point in the whole problem of the regionalisation of the Italian NARS.

C. Other Ministries

In addition to the research carried out under the control of these two Ministries, research which has some connection with the agricultural sector is also funded by other Ministries. From the point of view of financial resources employed the most important is the Ministry of Industry, Trade and Crafts (MICA) which controls a certain number of Research Stations in the various branches of industry. As regards the agricultural sector, we can include in the list the experimental stations for the tinned food industry in Parma, the Naples unit for skins and tanning materials, the oils and fats station in Milan, the unit that deals with citrus fruits in Reggio Calabria, the silk research station and the cellulose, paper and textile fibre unit in Milan. These institutions are only partially financed by the Ministry, the rest is provided by the industries concerned themselves.

The Organisation for new Technologies, Energy and the Environment (ENEA) also operates under the aegis of the Ministry of Industry, initially set up to concentrate principally on the nuclear power sector. However, subsequently, it transferred its attention to alternative energy sources and the environment. In the context of its new “business mission”, ENEA carried out research into genetic engineering, renewable energy sources and biotechnology. Its tasks are, however, not sufficiently clearly defined as a result of the troubled evolution of this organisation but it is endowed with an extremely valid staff of researchers and substantial financial resources.

The Ministry of Health also operates in the field of agriculture through the activities of the Higher Institute of Health (ISS) one of whose institutional tasks is to monitor food products, the use of chemical products in agriculture, animal health, etc.

This Ministry is also responsible for the supervision of the zooprophylactic institutes described in the next paragraph.

The Ministry of the Environment operates through its Central Research Institute applied to marine matters (ICRAM) which was initially under the supervision of the Ministry of the Merchant Navy and then that of Agricultural Resources.

ICRAM studies marine resources, water pollution and the protection of ichthyofauna.

This brief summary clearly demonstrates the dispersive nature of these initiatives, which seems to be one of the key elements in the situation of the Italian NARS

D. Regional structures

As we have already seen, the regionalisation of competences in agricultural matters has commenced by assigning research of regional interest to the regions, in a generic manner, without really clarifying what is to be understood by this definition. In addition, this task was assigned without any transfer of either human or financial resources. In the period between the two stages of regionalisation corresponding to the interval between the first DPR in 1972 and the second in 1977, the Regions attempted to conquer their own sphere of action by intervening in two directions: (i) by acquiring a series of local research institutions that did not form part of the principal research networks already described; (ii) by passing regional laws providing themselves with technical assistance services that engaged in agricultural experimentation and, above all, divulgation of the results. During the Seventies, almost all the Regions took this form of action and began to construct the foundations for a more massive presence in matters of agricultural research. In a sense, they chose the path of the creation or adaptation of a specific body delegated to carry out research while, in other cases, they made use of development agencies or operated with a plurality of instruments.

Over the years the requirements of the individual regions have become more clearly defined and, consequently, the systems adopted have adapted themselves to the real local situation, giving priority to a certain specialisation in the most important productive activities carried out in their particular regions.

Figure 6. Territorial distribution of regional institutions and zooprophylactic institutes, 1994

Source: Nomisma, 1996

A recent survey (Nomisma 1996) established that there are currently 41 Regional Research institutions (Fig. 6), 51% located in the north of Italy and 49% in the centre and south; for example, 6 in Emilia Romagna, 5 in Sardinia and Sicily, 4 in the Veneto and Lombardy. In those regions in which specific institutions exist, financing is mainly dedicated to research carried out in these units while, in the other regions, it is allocated to support research carried out by other institutions. This situation demonstrates that numerous regions have provided themselves with their own autonomous research structures in the period since the start of the process of regionalisation and that these structures are primarily orientated towards applied research in order to respond to the needs expressed by local producers. The data provided by this Nomisma survey demonstrate that there is a high degree of disparity accompanied by unusual aspects like the weak relationship between investment in research and the value of agricultural production. The production panorama is, thus, highly fragmented and seems to reflect a situation that is still fluid. Finally, we will mention the zooprophylactic institutes. Initially, these were private institutions but they were gradually transformed into public agencies in 1970. Currently, they are under the supervision of the Ministry of Health but control has been transferred to the Regions. Generally, they are inter-regional in the sense that they serve more than one region and, thus, there are 10 of them for the whole of Italy. In the field of research, their task is to carry out "veterinary scientific experimental activity and examination of the state of health of animals and the wholesomeness of products of animal origin".

The most significant data on the zooprophylactic institutes are shown in Table 4 and permit an evaluation of the scope of their activities.

Table 4. Public funding for Experimental Zooprophylactic Institutes

Institutes	Expenditure (millions of lire)			Personnel				
		Research		Researchers	Technicians	Auxiliary	Admin.	Total
	current	*applied*	*total*					
Piemonte/Liguria/Valle d'Aosta	347	595	942	39	67	29	23	158
Lombardia/Emilia Romagna	607	979	1 586	89	126	211	56	482
Veneto	405	887	1 292	45	50	74	30	199
Lazio/Toscana	194	591	785	47	56	38	24	165
Umbria/Marche	400	302	702	35	50	30	28	143
Abruzzo/Molise	1 165	1 165	54	52	55	23	184	
Puglia/Basilicata	200	250	450	32	18	50	22	122
Mezzogiorno	221	1 084	1 305	26	23	52	20	121
Sicilia	497	497	23	34	16	11	84	
Sardegna	458	618	1 076	46	62	52	30	190
Italy	**3 997**	**5 803**	**9 800**	**436**	**538**	**607**	**267**	**1 848**

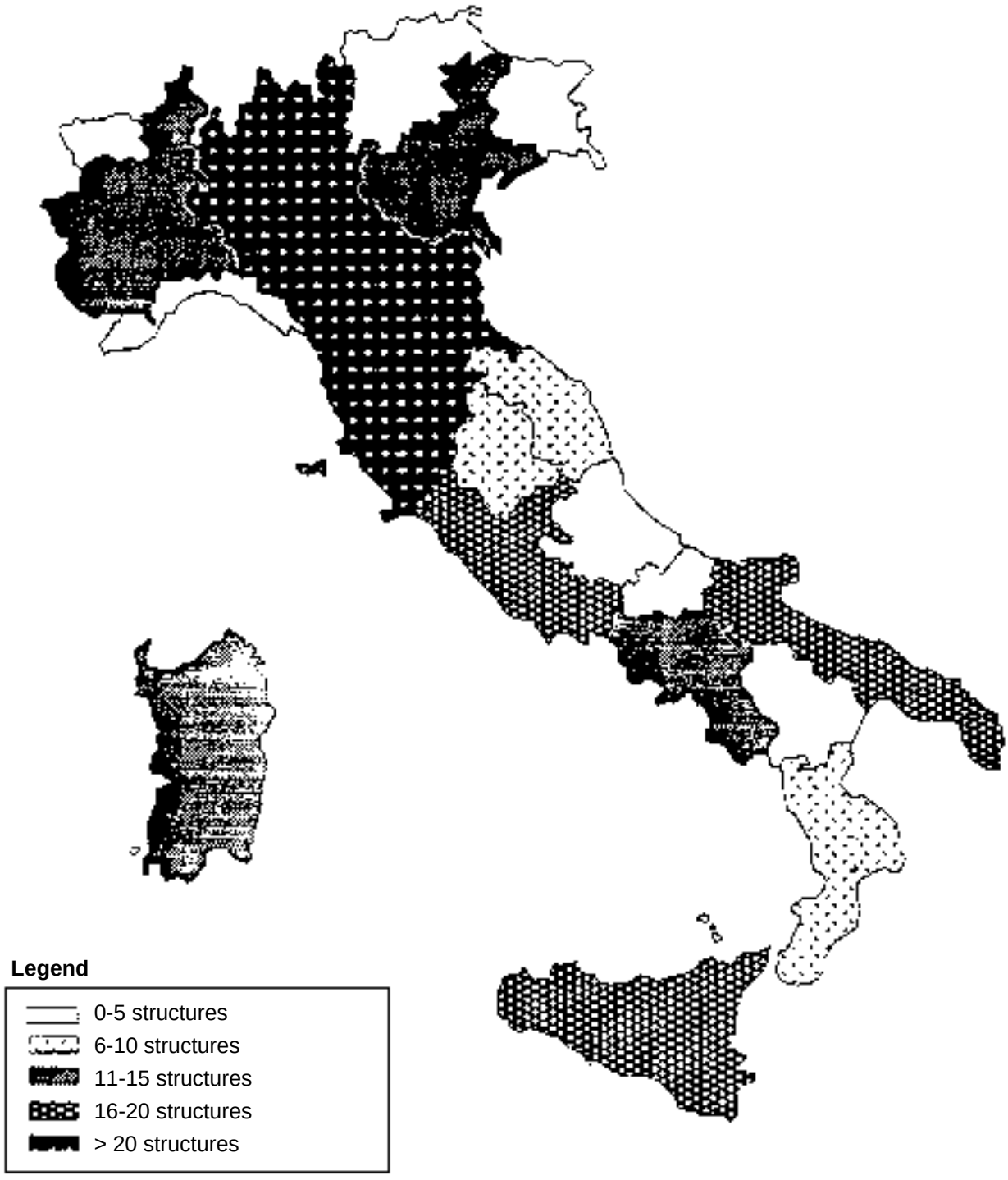
Source: Nomisma, 1996

One conclusion that can be drawn from what has been said in this paragraph is that a regional research system already exists side-by-side with the national system but without any form of precise coordination. The most obvious proof of this is contained in Fig. 7 which shows how research structures of every type tend to congregate in certain areas of the country, leaving other areas uncovered.

III – Effects of the regionalisation process

The process of regionalisation of the NARS system in Italy has developed along two different lines. The first is constituted by the gradual construction of regional research on the part of the Regions which started half-way through the 1970s and was based, in the first stage, on the utilisation of research structures that already existed in the Region and, in the second stage, by the creation of genuine regional bodies with the task of directing and coordinating the research carried out at local level. This is still fundamentally based on the function of problem solving for the farmers of that particular area and is highly orientated towards applied research. In fact, it is almost always a case of experimentation combined with direct divulgation. The second line is implemented at institutional level and consists of the constant demands on the part of the Regions to be allowed access to higher levels of research and to gradually expand

Figure 7. Geographical concentration of agro-food institutions and research structures, 1994



Source: Nomisma, 1996

their fields of competence. Over the years, the Regions have used this line to increase their powers in matters of research and count on the fact that, in the future, they will be able to have a guiding role in research activities which are currently still under State control by way of the network of institutes that fall within the purview of the MiRAAF.

1. The resources

The data available on funding for agricultural research in the last five years do not permit an accurate evaluation of the effects of this process of regionalisation (Table 5). During the period considered, global financing first increased and then fell, due to the general phenomenon of the reduction in public spending which also hit this segment. The index relating to the ratio between funding for agricultural research and added value in this period worsened and, thus, the analysis must be conducted in this perspective which is destined to continue in the next few years.

In spite of this, regional financing grew in the period considered, increasing from 100 billion lire in 1992 to 115 in 1995, i.e. at an exchange rate of 1650 lire to the US dollar, from US $ 60.6 million to 69.7 million. In relative terms, this financing passed from 18% to 20% of total funding for research due to the simultaneous reduction in State funding. Within the total spending, research carried out inside regional structures increased from 4.2 billion lire (US $ 25.6 million) to 48.7 billion in 1993 (US $ 29.5 million) and fell to 46.9 billion (US $ 28.4 million) in 1994. The incidence of this category of research increased from 42% of total funding in 1992 to 43.4% and then dropped to 41% in 1994.

Table 5. Evolution and structure of regional spending for agricultural research and experimentation (millions of current lire)

	1992	1993	1994
Research	58 103	64 246	64 525
of which: direct	42 188	48 729	46 943
entrusted to others	15 915	15 517	17 582
Personnel	42 011	47 967	50 014
Total	**100 114**	**112 213**	**114 539**

Source: Nomisma, 1996

Research financed by the Regions but carried out by others increased from just under 16 billion lire (US $ 9.6 million) to 17.6 billion (10.7 million) in 1994 and, in terms of percentages, passed from 15.9% to 13.8% and, finally, rose again to 15.4%. Expenditure for personnel increased from 42 billion lire in 1992 to 48 billion in 1993 and 50 in 1994, equal respectively to 22.5, 29 and 30 million dollars. In terms of percentages, this cost item passes from 42% to 42.7% to 43.7%, the only item that increased in this period during which it absorbed just under 60% of the increase in the funding. The different dynamics of the cost items demonstrate that, at least in the period considered, the support accorded to the existing structures absorbed a growing portion of the funds which however did not increase in a significant manner. This factor becomes increasingly important if we consider that, in the first cost item relating to research carried out directly, it is not possible to distinguish between the amount spent on the operation of the structure and the amount specifically dedicated to research. Then, taking a global view, there are enormous disparities between the regions in terms of both the amount of the expenditure and its breakdown (Table 6). This confirms the fact that each region has approached the subject of research in a different way.

Table 6. The agricultural research and experimentation system of the Regions in 1994

Region	Research Institution	Expenditure (millions of lire)				Personnel		
		Research		Personnel	Total	Researchers and tech.	Admin.	Total
		direct	*third party*					
Valle d'Aosta	1	981	125	1 579	2 685	20	2	22
Piemonte	2	1 570	1 097	1 650	4 317	42	24	66
Lombardia	4	1 254	1 175	2 429	30	14	44	
Veneto	4	3 500	1 500	3 650	8 650	63	10	73
Trento	1	1 531	220	4 365	6 116	104	9	113
Bolzano	1	3 600	100	3 600	7 300	70	9	79
Friuli Venezia Giulia	1	1 964	468	3 000	5 432	32	7	39
Emilia Romagna	6	6 100	4 350	3 850	14 300	116	22	138
Liguria	1	352	289	1 000	1 641	13	2	15
Toscana	1	1 751	4 437	1 500	7 688	36	1	37
Umbria	1	238	238	180	656	2	1	3
Marche	3	855	650	1 400	2 905	27	6	33
Lazio	1	410	410			-		
Abruzzo	1	-	-	1 080	1 080	15	3	18
Molise	-	82	82			-		
Campania	1	187	1 172		1 359			-
Puglia	-		-	180	180	3	-	3
Calabria	1	3 243	284	1 340	4 867	23	8	31
Basilicata	1	722	1 160	1 000	2 882	16	5	21
Sicilia	5	3 616	500	4 000	8 116	53	21	74
Sardegna	5	15 479	500	15 465	31 444	124	140	264
Italy	**41**	**46 943**	**17 582**	**50 014**	**114 539**	**789**	**284**	**1 073**

Source: Nomisma, 1996

2. Priority setting

According to the plan laid down in Law 168/89, all public research activity in Italy must be coordinated by the MURST which, in turn, must follow the general guidelines supplied by the Interministerial Committee for Economic Planning (CIPE), a body formed by the Ministers with responsibilities of an economic nature who provide for the allocation of public funds. Thus, from a general viewpoint, the conditions have been created to enable the NARS to function efficiently, in accordance with the needs of the country, The MURST identifies the subjects of greatest interest for the agricultural system and provides the orientation criteria that are then translated into programmes of applied research that are approved by the CIPE, at least in recent times. Both the MURST, which manages its applied research programmes through the National Research Council, and the MiRAAF utilise this system. However, effective coordination of the system still does not appear to have been achieved because the other agencies and, in particular, the Regions normally proceed on the basis of lines of action that are decided independently as a function of their own specific objectives. This is also true for the relationship between the various types of research which, generally speaking, is a problem that has not yet been tackled. If we refer to the contents of the Frascati Manual (OECD 1981) it should be relatively simple to identify and define because agricultural research is inherently of the applied type. In spite of this, we believe that this distinction could and must be utilised at the time of discussion of the NARS system in order to operate with the clarity that is necessary.

Instead, the impression one receives when the problems of the NARS are raised is that there is an enormous confusion of roles and activities. Each institution seems to want to conserve tasks in the three categories of activity referred to above without being ready to accept precise responsibilities.

Thus, all the various organisations attempt to a certain extent, to occupy themselves with everything without having acquired the necessary specialised skills. In particular, one can see that, at least in theory, it would be possible to subdivide the three research areas into three levels. Of these three levels, the first would comprise basic research and part of the applied research and could be the responsibility of the MURST, via the university and the National Research Council; the second level would mainly concentrate

on applied research and could be covered by the MiRAAF and the third, comprising experimentation and divulgation could be carried out by the regional network. However, the reality is completely different. This is, perhaps, due to the fact that, in many cases, there is a shift of the entire NARS towards themes that are considered to have greater status and a progressive abandonment of those like divulgation, which are considered to be of a lower level and are thus neglected. Very often, even the regional development services do not carry out this function but concentrate on the execution of tasks that are almost exclusively bureaucratic, abandoning the function of providing assistance to the producers.

This happens in spite of the fact that almost all the institutions described make use of coordination and evaluation structures in which agricultural producers, processing industries and all possible users of research output are represented. For example, special user committees have been introduced in the applied research programmes of the CNR for the purpose of evaluating the results obtained. This is also theoretically possible at regional level since all the regional structures have decisional bodies on which farmers and other interested parties are represented, but with negligible results.

3. Contribution of the private sector

In the case of the Italian NARS, this contribution does not exist in practice, either at national level or at regional level. In some cases, particularly with university research, private parties directly finance research on subjects of immediate interest, but this is not very frequent because of the problems created in terms of confidentiality regarding the results obtained, the methodology and company situations. Taking into account this type of commission which is normally a matter of finding solutions to the customer's contingent problems, the global contribution provided is extremely modest and difficult to quantify. One exception to this general scenario could be represented by the experimental stations of the MICA which provide consultancy and receive a contribution from private parties that is higher than the funding supplied by the Ministry. It must be remembered that, in this particular case, the activity is highly applied and, especially, is not linked to the production stage but the food processing stage where it is possible to create a direct relationship with the users.

4. Structural and thematic complementarity at the national level

From this point of view too, relations between the national networks under Ministry control and the regional network are extremely fragmented and patchy. In spite of the official coordination that exists and has been described, in reality complementarity is not achieved. For example, there are overlaps between the applied programmes of the N.C.R. and those of the MiRAAF which are certainly negative both because they create duplications and because they lead to dispersion of existing resources which are already small and being still further reduced and, finally, because they impede the achievement of the critical mass required to ensure some hope of success. But there is also no real complementarity in the relationship between research at national and regional level. There is a lack of coordination between the guidelines of the two levels and the only effective possibility of links between the two still depends on the personal relationships within the scientific community that permit direct communication without recourse to the official channels, a lengthy and, more importantly, inefficient procedure. Researchers consider it to be a waste of time that is only partially compensated by the results. The problem does not end there; it continues if we consider the aspect of complementarity not solely in terms of research themes but also in terms of effective assignment to different levels, since, as we have already seen, certain stages are excessively crowded while there are large free spaces in others which need to be occupied.

5. NARS's relations with extension and development services

These comments are even more true with regard to the extension and development activities, the most neglected sector in the Italian NARS In spite of the stratification of the NARS in different levels, these services are left to sporadic interventions, with very little interconnection between them, implemented in a discontinuous and unorganic manner.

The activities of research, development and extension are not coordinated and the regional research institutions, who are in the closest touch with the demand and should logically assume responsibility for these types of tasks, do not demonstrate that they can carry them out in an adequate manner. Personnel are mainly used for bureaucratic purposes, leaving very little room for development services for farmers.

There are great shortcomings even in the Regions where the regional research and experimentation system is well-organised. Thus, in our opinion, the greatest limitation of the Italian NARS is the fact that the results obtained by the research fail to reach the end-users. The fall-out is much lower than it could be because the function of divulgation is neglected, perhaps because the people involved consider it to be less noble and less gratifying than the activity of research itself. Even the attempts to create divulgers made at EC level have proved to be ineffective since, once their training has been completed, these people become part of the Regional administrations and are then mainly employed in sedentary office jobs of a bureaucratic kind. Thus, a key link in the research system is removed and the final result is that innovation and research results are brought into contact with the agricultural world through the marketing activities of the industries that supply the means of production for agriculture and not by the public services.

IV – Future perspectives

In the case of Italy, the future perspectives for the NARS are all linked to the system's ability to provide a satisfactory response to two basic problems: (i) the subdivision of the tasks of the various research institutions operating at the various levels; (ii) the transfer and circulation of the research results.

The first problem can be partially addressed by the current discussion regarding the reorganisation of the system controlled by the MiRAAF but one extremely simple concept has to be clarified i.e. who carries out the different tasks? If this is simple in theory for the institutions controlled by the State administration, it is much less so in the case of Regional organisations. And the question could become even more complicated if the Regions acquire new and increased powers in matters of agricultural research.

Consequently, in parallel with the process of regionalisation that is in progress, the principal political orientation should be to guarantee mechanisms of coordination of the activities of the various research networks that take into account: (i) the requirements of the individual research sectors; (ii) the territory, in other words the needs expressed by the territory and the structures present and operating there.

This means taking a global view of the lines of development of agricultural research and, at the same time, taking action to optimise its organisation in relation to the needs expressed by the research demand.

1. Role of the national and sectoral development plans in promoting fundamental and applied agricultural research

To obtain these results, a genuine and coherent research policy will have to be developed in Italy, something which will be difficult because of entrenched resistance on the part of the organisations involved and because, at this stage, it will probably be impossible to find the financing to reorganise and relaunch agricultural research.

But, perhaps, the thing that is really lacking is a coherent plan that can succeed in overcoming the egoism of the individual institutions and the inertia of habit. Such a plan could provide an answer to the fundamental problems of the NARS but due account must also be taken of the institutional conflict between the State and the Regions which could induce the Regions to oppose all new attempts at coordination.

In its essentials, this global plan is very simple. It should define more clearly the three levels of research and who should carry them out, paying particular attention to the problems of highlighting the role of applied research and then, that of extension. But here, once again, we are faced with ingrained habits which are a barrier to the necessary clarity.

This is also partly the fault of the world of agriculture which is, in turn, accustomed to receiving the fruits of this work without sustaining costs and will, thus, probably demonstrate very little interest in the overall efficiency of the research system. Consequently, one possible hypothesis would be to closely link the research demand and the supply by asking farmers to pay a financial contribution and giving them in return the possibility of intervening at the stage when the research is defined and then at the stage when the results are evaluated. A tiny privatisation of public research that could have enormous consequences in terms of the efficiency of the system.

2. Consequences of the development of more powerful communication and documentation exchange technologies

Today, this seems to be one of the most interesting aspects for the development of the NARS system. Members of the scientific community have always communicated with one another and, consequently, the new instruments and new technologies constitute only a means to accelerate the transmission times of knowledge. So, in this sense, the consequences can seem to be certain for the NARS but not decisive; but, on the contrary, they will permit an immediate increase in the efficiency of the extension stages because they provide a link between the individual farmers and the entire research system so that solutions can be found to problems that emerge very quickly and in a much larger sphere than the normal one. If this really came to pass, it would change the framework within which the regionalisation process is taking place since most of the advantage of proximity to the research structures would disappear and be replaced by the greater efficacy of the results proposed. Consequently, a very interesting path would open up towards the creation of competition between the research institutions.

This would once again transpose the emphasis on the basic theme, that is to say on a genuine and in-depth organisation of the NARS which could then be broken down by sectors and geographical areas but still with the central objective being the efficiency of the work carried out at all stages of research activity and not merely in some of them.

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