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## **Science, Technology and Governance in Portugal**

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## 1. Introduction: Setting the Stage

1986 may be regarded as a turning point in the relationship between science, technology and Government in Portugal. This does not mean that there were no previous links between science and policy-making. But joining the EC meant for Portugal starting to move away – even within limits, as we shall see – from living for almost half a century under a dictatorship hostile to science, towards a generalization of access to education and the promotion of critical thinking.<sup>1</sup> Before the collapse of the dictatorship in 1974, areas like the social sciences – with the exception of those disciplines directly linked to the legitimation of the regime and its social engineering, such as law, history and economics, or to colonial administration, like anthropology – were non-existent as scientific domains.

The weakness of the scientific community and of organized civil society, the non-existence of a science and technology policy and the absence of institutionalized modes of scientific and technological advice to Government were conspicuous even after 1974, when democracy was restored (Gonçalves, 1996a, b).<sup>2</sup> Institutionalized scientific activity was carried out either at the Government-dependent State laboratories, or, in a fragile organizational environment, by individual researchers or, in some cases, informally and loosely-organized small teams at Universities. The exception was the Calouste Gulbenkian Foundation-run Institute for Advanced Studies, which allowed some innovative scientific

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<sup>1</sup> From the late 1960's on, the influence of a "modernizing" and "developmentalist" faction within the regime pointed towards some changes which, however, had to wait for their full enactment after the establishment of the democratic regime.

<sup>2</sup> Two OCDE reports on R&D in Portugal, published in 1984 and 1986, were commissioned by the Portuguese government. The diagnosis pointed towards the weakness of the country in human and financial resources in this area, the scarcity of investment in R&D, strong technological dependence, the inexistence of University-industry links, the absence of inter-ministerial structures and the absence of planning or programming for R&D activities (quoted in Gonçalves, 1996b). The 1986 report led to some initiatives in institutional reform of the R&D sector, namely

work and training of scientists. In most areas, graduate training required the enrolment at Universities abroad, and even when advanced degrees were awarded by national universities, this tended to be restricted to university lecturers.

In spite of science and technology policy being defined in the 1976 Constitution as one of the main tasks of the State, it took another decade for the first significant changes in this field to take place.

After 1986, both the flow of funding for science and technology research and the need to incorporate in national legislation European directives in areas like the environment meant that things were starting to change. By 1988, the reorganization of the National Office for Scientific and Technological Research (JNICT), under the leadership of José Mariano Gago, a physicist who was later to become - with the exception of a short-lived experience in the late 1970's - the first Minister of Science , the launching of programs for funding scientific infrastructures, the training of young scientists and the funding of research projects in all scientific areas - including the natural and social sciences and the humanities - paved the way to broader changes which took place, mostly, after November 1995, when the new socialist government came to power and the Ministry of Science and Technology was created.

## **2. 1995-2002: The dominance of policy for science**

From its onset, the Ministry of Science defined several priority areas:

- The creation and consolidation of a national system of scientific and technological research, building on the - still limited and fragile - achievements of the previous decade. This involved a considerable effort of structural funding of research institutions, of funding graduate training of

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the creation of a Government department in charge of science and technology policy and several

young scientists, of competitive funding of research projects and of setting up an independent evaluation of research institutions and research projects based on international panels.

- The internationalisation of Portuguese science and technology, through the encouragement of participation in international organizations, initiatives and projects, particularly within the EC/EU space, of international publication and of international evaluation.
- The promotion of scientific culture and of scientific education, through specific programs aimed at the development of experimental teaching of the sciences or, more generally, of teaching the sciences "as they are actually done";
- The reform of the existing State laboratories - defining new conditions for scientific work and evaluation procedures - was also defined as a priority.

The outcome of these policy initiatives was a shift from the old, State-laboratory centered system to a University-based system, though with some specificities - most research units were created as independent, non-profit organizations affiliated with Universities.<sup>3</sup>

The Ministry of Science and Technology itself was organized as a set of institutions with specific tasks:

- The Observatory of Science and Technology, in charge of the production of information and of the monitoring of the R&D system;
- The Foundation for Science and Technology, in charge of the funding and evaluation of research units and research programs;

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advisory bodies.

<sup>3</sup> An useful compilation of information on this period can be found in Ministério da Ciência, 2002. For detailed comments, see Nunes, 2002 and Pereira, 2002. For detailed analyses and cases studies of scientific activity, scientific policy and technology and innovation policies, see the contributions to Nunes and Gonçalves, 2001, and Godinho and Caraça, 1999.

- The Institute for International Scientific and Technological Cooperation, in charge of promoting the internationalisation of Portuguese science and technology;
- The Innovation Agency, in charge of facilitating and promoting initiatives for technological innovation in industry and business;
- “Ciência Viva” (Live Science) - National Agency for Scientific and Technological Culture, in charge of programs for the promotion of scientific education and, more generally, of scientific culture - the Portuguese version of Public Understanding of Science.

In addition to these, several other units of the Ministry were linked to specific areas of intervention, such as the Institute for Tropical Scientific Research, the Nuclear and Technological Institute and the National Foundation for Scientific Computing.

Several features of these policy initiatives are worth stressing, here.

The first was the concern with making the funding of research available across all scientific and knowledge domains. Funding was awarded in a balanced way across the natural sciences, the social sciences and the humanities.

Secondly, the science and technology system was mostly based on new institutions, autonomous from the legal, administrative and financial point of view, with the legal status of non-profit organizations. These were associated with Universities in different ways, staffed mostly by members of universities, but free of the bureaucratic restraints of the latter. This led to the peculiar situation of research being developed - with some exceptions - outside the existing organic units of Universities (faculties, schools or departments).

A third feature was that, in spite of the transversality of funding, scientific culture and science education were framed in terms which privileged the epistemological models of laboratory sciences. This meant that these programs

ended up being easier to implement in the physical and biological sciences than in the social sciences and the humanities.

Fourthly, the broad political orientations of the new Ministry of Science and Technology were defined in consultation with scientists and scholars from the whole range of scientific domains, and the first drafts of the basic policy documents were produced by groups of scientists.

The fifth feature, contrasting with the previous one, was the absence of initiatives aimed at promoting public debate on controversial issues involving science and technology, or of any experiment with participatory procedures.

Finally, due to the weakness of research in the private sector, most of the efforts were directed, during a first phase, towards the building and consolidation of the public/non-profit sector, with the creation of a special agency to encourage research and innovation in private, for-profit organizations. At a later stage, a specific program for the Information Society was launched, but it was mostly based on the promotion of Information Technology in Administration and Education, with little involvement in more controversial issues concerning the social dynamics of appropriating new technologies or their articulation with changes in citizen participation and democracy.

By and large, one can describe this policy as a science-oriented or science-led science policy, with little involvement in issues related to public policies and public controversies involving science and technology. As for the latter, these would be formally taken up by different Ministries, namely the Ministries of Environment, Health and Agriculture. They will be dealt with later.

It is important to signal some of the achievements and failures of this policy. First the achievements:

- The institutionalization of a Ministry of Science and Technology, thus endowing the sector with a visibility and legitimacy it had lacked for decades;

- The creation and consolidation of a research system, with a number of institutions of excellence in several areas and a credible, independent and international system of evaluation. Researchers who had been living abroad, in some cases for decades, returned to Portugal to take over the leadership as senior scientists of many of these new units. At a later stage, reference institutions in all scientific areas assessed as “excellent” by international panels were awarded specific long-term funding (up to 10 years) through special contracts of association with the Ministry of Science. These Associate Laboratories (twelve in all, in 2004) were thus awarded the resources to hire full-time researchers for renewable periods of five years and to develop areas of intervention of public interest, fulfilling functions similar to those of the State Laboratories;
- A considerable increase in the number of young MA's and PhD's. In fact, by 2002, more PhD's were being awarded in one single year than the sum of all active PhD's in Portugal in the thirty previous years.
- An effective, though unequal, improvement in the internationalization of scientific activity, institutions and scientists;
- Some successful experiences in science education and the promotion of scientific culture, including the emergence of a small but very active group of researchers in science studies;
- An overall improvement in research and publication in all areas;
- A limited but real increase in the participation of the private sector in the performance of R&D – from 21% of GERD (General Expenditures in Research and Development) in 1995 to 23% in 1999, and 32% in 2001.<sup>4</sup>

The limitations or failures include:

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<sup>4</sup> Source: Observatory of Science and Technology (<http://www3.oces.mces.pt/index.php>).

- The failure to reach the aim of assigning 2.5% of the GDP to R&D by the year 2000 (as stated in the framework law for scientific research and technological development of 1988). This figure was later revised, more realistically, to 1%. The actual figure, by 2002, was 0.7%<sup>5</sup>. In fact, the system is still basically dependent on the flow of European funds, with little capacity to generate or attract domestic resources for R&D;
- The difficulty in turning the increase in qualified scientists into stable job and career opportunities in research and development;
- The difficulty in finding appropriate organizational models for reintegrating research into universities;
- The weak links between institutionalized scientific advice and policy-making;
- The lack of initiatives for public debate and participation in problematic issues of public policy.

### **3. Conspicuous absences: science for policy**

There seems to be a peculiar contrast between the emphasis on promoting and consolidating research and scientific education and culture, on the one hand, and the conspicuous absence of the Ministry of Science and Technology from most situations of public controversy involving scientific and technological issues. Standard accounts of State/society relationships in Portugal have stressed the tendency to an authoritarian mode of exercising power, with little interaction with civil society or participation by, and a weak input from scientific and technical advice. Joining the EC should have led to a change in this picture, in particular through the need to transpose legal devices and a range of frameworks

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<sup>5</sup> Source: Observatory of Science and Technology (<http://www3.oces.mces.pt/index.php>).

for public debate and participation, as well as a push towards a more integrated management of issues related to science and technology at the European level.<sup>6</sup>

The picture coming out of the transformations of the late 1980's and 1990 is somewhat more complex than this opposition between the "before" and the "after"-EC. If we look at a diversity of issues, most of which have been the object of detailed STS case studies, such as environmental policy (especially waste management), genetics and biotechnology, the case of the paleolithical engravings of Foz Coa, the case of BSE and the case of depleted uranium – the contradictions of the situation become more visible.

These cases display divergent patterns of how science, technology, government and public debate and participation are related.

Environmental policy is a field where the existence of a legal framework which contains some potential for promoting participation (Law 69/2000 on Environmental Impact Assessment) is progressively emptied out, even – if not mainly – when the social dynamics of controversy arises, either through their uptake by the media, the public intervention of environmental organizations or through local-level citizen movements and protests. It is worth noticing, however, that the reference to a European framework of environmental rights, to European regulations and the transposition of European directives to national law opened up new areas for civic participation and for the intervention and legitimacy of environmental movements and associations. In fact, in some cases, social movements are taking advantage of the opportunities created by European legislation to reinforce and promote environmental citizenship, thus becoming a potentially important factor for new and more effective forms of citizen participation. It is noteworthy, however, that the government and – to a lesser extent – Parliament failed to respond to public and civic mobilization. Initiatives

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<sup>6</sup> An interesting experience was that of the committee on the reform of the social welfare system, which allowed social scientists with contrasting views to meet, discuss and produce two different reports, with divergent policy recommendations.

within Local Agenda 21 are practically non-existent; the Aarhus convention took a long time to be ratified by Portugal, and it is not uncommon to find contradictions between the positions of the Portuguese government in international fora and its domestic actions.

A telling example of how participation is actually taken into account by formal political institutions is what happened during the controversy surrounding the creation of a facility for the co-incineration of hazardous waste in the neighbourhood of Coimbra, in Central Portugal. A petition signed by over 50,000 citizens (almost half the population of the municipality of Coimbra) against the siting of the facility took about a year to be discussed in Parliament. And the 11,650 contributions to the public consultation on the impacts of the facility on public health - including detailed assessments of the reports of the official expert committee by counter-experts of environmental associations - were regarded by the division of the Ministry of Environment in charge of the process as not having contributed in any substantial way to the discussion.

The case of biotechnology is that of a non-issue, whose discussion was circumscribed, and where the government had neither a consistent position nor introduced any initiative to frame it. An attempt by an advisory committee, the National Council for Environment and Sustainable Development, to launch a debate on GMO's based on a very thorough report on the state of the art and including a set of policy recommendations hardly had any consequences, despite a very lively session with stakeholders held at Parliament for a discussion of the report (CNADS, 2001).

The case of human genetics, and what has been recently labelled "reprogenetics", is that of a debate involving Parliament and a range of actors mostly linked to expert discourses, but with attempts at widening the debate. It is illustrative of potentials and limits of public debate and participation in Portugal, and is

currently the object of several studies by STS researchers, including the authors' (STAGE discussion paper 21).

The case of BSE went through two episodes of difficult relationships between science and politics. In 1993, as the suspicion arose of the existence of BSE cases in the country, Portuguese authorities invoked scientific uncertainty on how to diagnose the disease as an argument to declare its non-existence. In 1996, however, as a consequence of the europeanization of the BSE controversy, Portuguese political authorities were forced to accept the existence of the BSE risk and of cases in the country. In the aftermath of this second moment, a system of surveillance was set up which was largely based on a precautionary approach, with some success in containing the spread of the disease (Gonçalves, 2000).

Depleted uranium, in turn, involved a State laboratory, under the guidance of the Ministry of Science. The specificity of the problem as linked to the uses in the field and in a situation of armed conflict of a specific kind using a given type of ammunition and of assessing its differentiated impacts over a period of time was reduced to a purely technical matter of measuring the levels of radiation in Kosovo and Bosnia against those in Lisbon. This had the result of effectively containing the debate.

The final example is related to the case of the finding of a set of paleolithic engravings in Foz Coa, in North-eastern Portugal, an area where a big dam was planned that would flood the area. The Socialist party in opposition and later, from November 1995 on, its Ministry of Culture, archaeologists, the media and intellectuals and citizens mobilized against the priority assigned to the building of the dam and to considerations of energy policies. For the first time, a convergence of governmental policies, media campaigns and the organized intervention of scientists - in this case, archaeologists - succeeded in imposing a

non-technocratic solution to a conflict between technological and historical-cultural considerations. This led to a local integrated development scheme which, however, failed to materialize as planned, and thus had the effect of disappointing the expectations of local populations. This, in turn, may be linked to the low priority given to the implementation of participatory initiatives. In spite of this example as pointing towards new paths of science/society/government relationships, subsequent episodes of public controversy appeared as steps back in comparison with this case (Gonçalves, 2001).

In summary, all these cases display, if not a total lack of engagement of the Ministry of Science and Technology in public controversies, at least a conspicuous lack of visibility, which has de-emphasized the relevance of science and technology controversies in these wider public controversies. It has been suggested that the official line was one of sheltering science from being subject to public controversy and scrutiny, on the basis of a deficit model of scientific culture and of the need to educate people first and engage them in discussion later. Thus, although it has been recognized, on several occasions by the minister himself, that controversies are an entry point to more information and more debate on scientific and technological issues, it has been assumed that scientific debate could be insulated in "legitimate" settings and that public debate could be postponed to the moment when citizens would be "prepared" to engage in it.

This raises three different kinds of issues:

- a) The issue of how scientific controversies are staged;
- b) The issue of scientific advice to government;
- c) The issue of citizen involvement and participation in public debate involving science and technology.

The cases mentioned display divergent paths, but they also converge on the tendential exclusion of "lay" citizens from being accepted as legitimate participants in public controversies involving science and technology.<sup>7</sup> The trend towards narrowing the spaces and mechanisms of participation and the sheer dismissal of the views of citizens or of scientists dissenting from "official" views, particularly in the environmental field, as well as the trend towards the confinement of public debate in some fields to experts (in different areas, to be sure, but nonetheless experts) is a symptom of a more general failure to recognise "publics" and their right and capacity to participate in debate and deliberation. But it is also a symptom of a well-known feature of Portuguese society in the post-1976 period: the difficulty of civil society to organize and mobilize in ways which would make them obligatory points of passage for political decision-making. Some recent experiences, like the already mentioned struggle of the population of Coimbra against co-incineration of hazardous waste, may well point the way towards a more active capacity for articulating public debate, participatory initiatives and representative democracy (Nunes and Matias, 2003, 2004).

#### **4. 2002-...: Whither S&T governance?**

Following the resignation of the socialist government and the victory of a conservative coalition in the general election held in March 2002, the Portuguese scientific and technological system underwent some changes whose consequences are still far from clear. The Ministry of Science and Technology was reorganized after the fusion with the Higher Education Sector of the Ministry of Education, to form the new Ministry of Science and Higher Education. Since its creation, the activity of the new Ministry has been mostly aimed at policies and reform initiatives for higher education. The scientific system seems to be generally stalled for the last two years: since 2002, there

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<sup>7</sup> On this, see the contributions to Gonçalves, 2002.

have been no calls for competitive funding, except in specific thematic areas corresponding to some notion of “priority areas”. The criteria for defining these areas were far from clear. The withholding of contractual funding of research units has generated severe financial constraints for many of these units. This was justified by the Ministry by the need to promote financial accountability and to define more rigorous financial constraints. This financial squeeze affected the State Laboratories and several agencies of the Ministry as well, particularly those associated with internationalisation and the promotion of scientific education and culture. There is a sense of lack of a strategy for the sector, and of a loss of visibility and political relevance of science and technology. Recent documents of the Ministry, where new strategic orientations are sketched out, have no significant reference to research, but a lot of references to the promotion of innovation and competitiveness and to the need to reorient R&D to the collaboration with business. Scientific education and the promotion of scientific culture are moving away from the model established by “Ciência Viva”, which is threatened by a financial squeeze. The orientation now being promoted is based on the deficit model of the public and of a traditional conception of science popularisation.

The major research units, such as the Associate Laboratories, have organized themselves in structures such as the Council of Associate Laboratories and the Council for Research Units in the Social and Human Sciences. They have been active in advocating public funding of research, in defending initiatives like “Ciência Viva” and in contributing to the production, dissemination and debate of information on the R&D system and science policy.

It is premature to draw any conclusions as to where science and technology policy in Portugal will be heading in the near future. The current situation, however, suggests that changes may be underway that are likely to threaten some of the achievements of the period 1995-2002. The official rhetoric of

innovation-oriented research does not match the actual capacities of a R&D system which is still characterized by fragilities that would be overcome only through an expansion and consolidation of previous trends and of the correction of the failures and shortcomings that have been diagnosed. It is clear that over the next few years the R&D system will maintain its strong dependence on European funds, and that a considerable effort will be required to increase the share of the national budget in the funding of science and technology. In the current situation of budgetary constraints, this is not likely to happen in the near future. The Portuguese government has announced an increase in the overall amount of funding for R&D. In fact, this increase is apparent rather than real, and is the result of the putting together sources of funding that were assigned to a range of different programs, including some programs for in-job training or grants for the training of graduates in public and private institutions.

As far as “science for policy” is concerned, no significant changes have arisen. A National Council for Science, Technology and Innovation was created, but the representation of researchers and research institutions in it is very limited. Rather than providing a forum for the promotion of and advice on science-society relations, the Council seems to be, above all, a forum for business representatives.

Drawing on the framework proposed by Hagendijk and Kallerud (2003), we may describe the current trends in the governance of science and technology in Portugal as based on a strong discretionary orientation, with minor contributions from educational and corporatist approaches. It is likely that, in the wake of the strong commitment to the privatisation of both public companies and services and of the management and provision of public services, market and agonistic modes of governance will be increasingly significant. Agonistic governance, however, depends on the capacity of citizens and civil society organizations and movements to mobilize and intervene to respond to the effects and consequences

of the dynamics of privatisation and marketization. It remains to be seen how this will shape the future of S&T governance.

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