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# Democracy and the governance of uncertainty The case of agricultural gene technologies

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## Abstract

The use of genetically modified organisms (GMOs) in agriculture and food production is the object of an intense and divisive debate. Drawing on a study on the public perception of agricultural gene technologies carried out in five European countries, the article deals with the policy aspects of the issue, and more precisely on the relation between institutions, experts and the public in a context of deep uncertainty. A theoretical framework is developed and compared with the study findings, suggesting that issues like the GMOs one represent a strong case for a more participatory policy-making. My conclusions suggest a style of governance based on the principles of deliberative democracy, as a suitable approach to the confrontation of different viewpoints and forms of knowledge. This appears to be the best way to improve the overall quality of policy-making: in this I include its legitimacy, the degree of public trust, and also the actual quality of its products. Strengthening the role of the public sphere seems more effective than simply increasing direct decision-making by the populace, and it offers an alternative to the ‘elitist’ solutions to the crisis of representative democracy. © 2001 Elsevier Science B.V. All rights reserved.

*Keywords:* Uncertainty; Democracy; Governance; Participation; GMOs

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## 1. Introduction

The use of genetically modified organisms (GMOs) in agriculture and food production is the object of an intense and divisive debate. The uncertainties inherent to these technologies, the contrasting assessments of the risks for the environment and health, and the strong and conflicting interests involved, make policy-making and implementation very problematic.

This article focuses on one of the most debated aspects of the GMOs issue: the relation between institutions, experts and the public. Its aim is mainly theoretical — to provide a framework for reflecting upon the implications of uncertainty for the democratic governance

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of science and technology — but it benefits from insight provided by a study carried out between June 1998 and August 2000 in five European countries (France, Germany, Italy, Spain, and the United Kingdom).<sup>1</sup> This study explored the factors that influence the public's perceptions and opinions on agricultural gene technologies, and aimed at contributing to the identification of their implications for European policies. It included in-depth interviews with key informants and workshops with stakeholders, but its core consisted of two rounds of focus groups with lay citizens.

Given the purpose of this article, a relatively small part of the study is considered and what is accounted for is only the line of argument consistently emerged in the group discussions, although a direct reference is sometimes provided to statements and expressions actually used by participants.<sup>2</sup> The Italian case is given special consideration, but it must be stressed that its results are consistent with those of the other countries. The article is organised so as to provide a constant interplay of theoretical reflection and empirical findings. The latter are meant to offer support to the former but at the same time the framework developed should help to interpret the results of the study.

## **2. Uncertainty and policy-making**

It has been remarked that the original conception of the European integration and its subsequent implementation in the EC and EU are inherently technocratic (see, for example, [2]), with experts enjoying a privileged position in the formulation of public policies. According to Andersen and Burns [3], the main forms of representation in the EU are those of the experts, of the interest groups and of the single countries. From its inception, the EU has focused on regulatory (rather than on distributive or re-distributive) policies; this may have been a result of its limited resources [4]. Regulatory policies strengthen the first two forms of representation, with consequent de-politicisation and lack of transparency of policy-making. Regulatory policies point to efficiency; their main resource is knowledge. Hence, the prevailing position given to experts and technical negotiations, to the detriment of political debate and public accountability of EU policy-making. The legitimacy of the EU then depends increasingly on that of the experts; and when they are distrusted the EU itself is threatened.

To reflect upon this point, I will discuss a model of the policy-making logic proposed by Radaelli, here presented in a reworked version [5] (Fig. 1). The first dimension is the saliency of an issue, the intensity of public debate. The second one is the level of uncertainty. Low

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<sup>1</sup> The study, identified by the acronym PABE (Public Perception of Agricultural Biotechnology in Europe) was funded within the European Commission 4th Framework research programme, FAIR (Fisheries and Agricultural Research) and ELSA (Ethical, Legal and Social Aspects of the Life Sciences) Programmes. The research groups were: Centre for the Study of Environmental Change, Lancaster University, UK (project co-ordinator); Centre d'Economie et d'Ethique pour l'Environnement et le Développement, Université de Versailles-St Quentin en Yvelines, France; Akademie für Technikfolgenabschätzung in Baden-Württemberg, Stuttgart, Germany; Departament de Sociologia i Centre y Estudis Ambientals, Universitat Autònoma de Barcelona, Spain; Istituto di Sociologia Internazionale di Gorizia, Italy.

<sup>2</sup> For more details, see The PABE Group, Public Perceptions of Agricultural Biotechnology in Europe (PABE), Commission of the European Communities, contract FAIR CT98-3844, Final Report, 2001. See also the articles published in [1].



often due to striking events or stakeholder pressure. Sometimes expert groups themselves may pursue a strategy of public involvement in the controversy.<sup>4</sup> Interpreting the issue — defining what it consists of and how it should be approached — thus becomes also a political matter. The involved actors' specification of their own interests and strategies actually depends on that interpretation. According to Radaelli, in these cases, epistemic communities and policy entrepreneurs play a major role. The first ones are networks of 'professionals with recognised expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within that domain or issue-area' ([7], p. 3). They are defined by shared normative and causal beliefs, shared criteria for weighting and validating knowledge and common practices associated with a policy area. Of course, their influence is proportional to their institutionalisation and the support obtained by some organised interests. Policy entrepreneurs are individual or collective subjects able to exert major influence in a policy area [8]. They create new coalitions around policy discourses, that is, they re-frame a policy issue by working out and connecting concepts and arguments in a 'narration' shareable by different actors.<sup>5</sup> Therefore, if the definition of a policy issue is unsettled because of deep uncertainty, epistemic communities and policy entrepreneurs can succeed in imposing their own interpretation in the political arena.

Some studies provide evidence that the EU policy-making is increasingly politicised [5,11,12]. In other words, the problem of technical feasibility is increasingly distinguished from, and confronted with, the problem of political acceptability. Different reasons for that may be singled out within each policy sector, but there are some issues characterised by radical uncertainty — a situation which, according to the model, should emphasise the role of epistemic communities and policy entrepreneurs. However, expert controversy may be so deep, and stakeholder initiatives or striking events may render it so politically relevant, that it leads to a crumbling of consensus on technical feasibility, a crisis of the legitimacy of scientific expertise. In those cases, expert issue-reframing may not be successful, because it is not the acceptability of technical options that is politically salient but precisely the increasing evidence of the inability of expert-based policy approaches to cope with the problem at stake. The issue of GMOs offers a test case of such a shift from technical to political framing, from a question entrusted to expert advisory bodies to a highly politicised controversy that involves many actors claiming the relevance of a number of neglected aspects [13].

Thus, the model does not clarify enough the consequences of radical uncertainty. Such uncertainty may give room to expert reworking of an issue, but they may also seriously undermine the experts' credibility and legitimacy. This observation sheds light to another question the model does not resolve. What happens after a controversy initially restricted to experts acquires political saliency? According to the model, it becomes 'politicised'. But what kind of politicisation is it? A traditional political conflict should be obstructed by the

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<sup>4</sup> In other words, public communication of science may be used to influence scientific debate itself. This seems to happen in case of particularly deep crises, which cannot be managed within the boundaries of the scientific community. Some interesting case studies are discussed in [6].

<sup>5</sup> In modern democracies policy approaches and choices must be justified. They find support in concepts and arguments (including those concerning the division of labour among experts, bureaucrats, representative bodies, NGOs, corporations, lay citizens), developed in the institutional and public spheres. These ideas and arguments constitute a policy discourse [9,10].

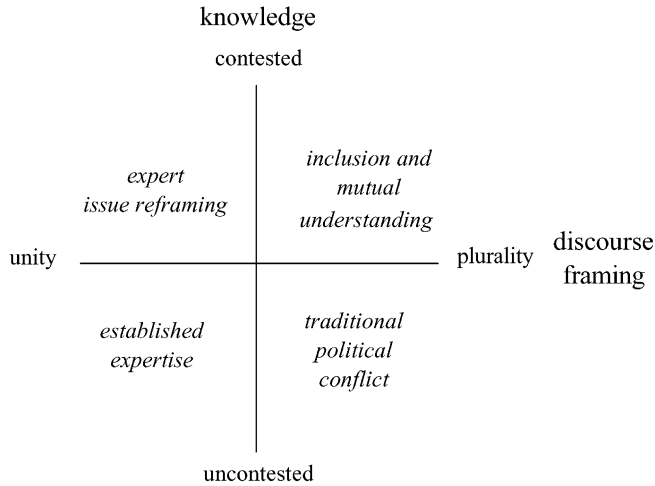


Fig. 2. Uncertainty, policy discourse and policy-making.

fact that strategic negotiation, which characterises it, would have to take place within a context of enduring and deep cognitive controversy. It is likely, therefore, that the public evidence of the interweaving of scientific and political, ethical and economic aspects of an issue entails a change in the dominant policy discourse.

Typical technocratic framing is: 'single problem definition and single best solution for the common good'. Typical framing of traditional politics is: 'negotiation among different legitimate goals and interests'. The former is a discourse of unity and consensus; the latter of plurality and dissent. In both cases, knowledge is assumed as uncontested. But knowledge may sometimes be contested. If the dimensions of knowledge and discourse framing are combined four kinds of policy-making result (Fig. 2).

As long as the discourse of unity, efficiency and technicality holds in the institutional and public spheres, the policy-making can follow established bureaucratic and expert arrangements. This may be true also when 'rational choice' uncertainty is high because, although not easily available, knowledge is still essentially uncontested. A shift of the discourse framing to traditional politics, however, may be fostered by stakeholder pressure or other reasons.

When knowledge is contested some expert community may succeed in imposing its own reinterpretation of the issue. But this is not warranted. If the multidimensional, scientifically controversial, nature of a problem has attracted attention outside specialist circles, if radical uncertainty and the possibly very high decision stakes implied in the issue have been publicly unfolded, both the discourse of traditional politics and the discourse of expertise may encounter serious difficulties. Widespread public awareness of the entanglement of facts and values, means and goals, could make untenable a policy approach grounded in the idea of 'single problem definition and one best solution for the common good', even according to the new frame proposed by some epistemic community or policy entrepreneur. Furthermore, widespread public awareness of the scientific uncertainty and high risks linked to the issue at stake could render a discourse of pure strategic negotiation unacceptable.

Public legitimacy may be in this case dependent upon an explicit acknowledgement and consideration of a variety of normative and cognitive viewpoints. Public choice should thus benefit from becoming more flexible and ‘inclusive’, from at least three viewpoints. First of all as regards the problem definition: knowledge and insight may come from a number of disciplinary fields and even from lay citizens [14,34]. Secondly, as regards the entitlement to take a stance in the issue: deep controversy makes it difficult to define a priori which are the relevant interests and concerns (for example, whether questions of technical efficiency can overshadow distributive ones). Thirdly, as regards the style of policy-making: an orientation to mutual understanding is likely to be more suitable than technocratic authoritarianism or strategic negotiation.

### **3. The study**

Before looking for empirical support to these theoretical reflections, it is necessary to provide some details on the study. When the task is of exploring new and complex issues, the focus groups technique often proves particularly effective. Group discussions allow a very rich and detailed picture of opinions and views on a problem, of its perceived dimensions and the connections among them — one which is almost impossible to obtain by using structured questionnaires. However, the limited number of participants implies that the results cannot statistically represent the opinions of the population as a whole, or of particular categories. Thus, focus groups play a complementary role to surveys like the Eurobarometers.

A total of 14 focus groups were carried out in each country: 2 pilot focus groups in Autumn 1998; a first round of 6 focus groups, in Winter 1998; a second round of 6 focus groups (3 groups meeting twice) in Autumn 1999. The participants were ‘lay’ citizens — individuals lacking a specific competence on GMOs and their applications in the agriculture and food sector. The invitation did not refer to food gene technologies but hinted that the subject of the discussion were the changes in food production, distribution and consumption. Each group was formed according to different criteria: people with high or low level of income or education, church goers, parents of small children, urban or rural dwellers, and so on. Obviously, there was not any attempt at properly ‘controlling’ these variables. The goal of applying different selection criteria was mainly to ensure a sufficient variety among the subjects involved in the study. Moreover, any marked difference in the results of the focus groups would have suggested that a given variable is likely to play a relevant role, providing useful indications for further research.

The protocol for the group discussions was outlined according to previous research carried out by the British team. It was tested and modified according to the results of the pilot focus groups. In the second round it was modified again according to the results of the first round, which showed that some themes deserved more attention and that more time for discussion was advisable: this is why in the second round the groups met twice. Discussion started by addressing current changes in food production, retailing and consumption and analysing their reasons, their pros and cons, their speed, and their relation to the broader changes in lifestyles. The GM food topic was often spontaneously addressed by the participants themselves. Otherwise it was introduced by the facilitators. After people’s own description of gene technologies, a standard definition was proposed and commented. Subsequent

explorations covered many aspects. These ranged from the source of the participants' information to their evaluation of different applications of gene technologies; from people's view of the problems of long-term effects and uncertainty to their opinion of some key actors (regulators, scientists, corporations, the media) and institutional performances; from the participants' position about much debated issues such as labelling to their sense of agency as consumers and citizens and their views of possible improvements of the policy-making. Some statements, concerning different applications of gene technologies and their potential risks and benefits, were used as prompts for discussion.

#### 4. GMOs and institutions

Let us look, now, at the focus groups participants' perceived role of the regulatory institutions. Knowledge of the existing regulatory and control system in the GMOs field is very low. This is a common result in the five countries, thus independent from national differences in the timing and intensity of public debate.<sup>6</sup> Most people are unable to describe the institutional arrangements; nor does this appear to be their main concern. However, scepticism and distrust towards institutions are generalised and significant. Regulators and policy-makers are perceived as self-interested or too dependent on expert advice. Regulations are judged as confusing, weakly implemented, or tailored to 'strong' interests. The public regulatory system is perceived as being 'overtaken' by the combined forces of scientific advance and economic interests.

Past experiences of bad institutional performance concerning the regulation and control of technological innovation play a major role in shaping this attitude. A paradigmatic case, often mentioned, is the BSE issue. People drew 'lessons' from that case. Institutional untrustworthiness and sensitivity to organised interests is an important feature that the GMOs and the BSE issues share, although their differences are cleanly grasped by the participants in the focus groups.

In Italy, the feeling emerges with particular evidence of an increasing level of bureaucratisation of the European regulatory system: that formal procedures prevail over actual safety and quality controls. The consequence drawn is that the effectiveness of the regulatory system is low, while it may impose severe constraints to traditional ways of food production and consumption,<sup>7</sup> favouring the big corporations to the detriment of small firms. Moreover, Italian sanitary regulations are felt as more stringent and effective. Thus, the EU's increasing influence on the national regulatory level is considered as entailing possible negative effects.<sup>8</sup>

Another remarkable point is the focus groups participants' view of the role of science applied to public policies. They do not have a naive illusion of an easy and ready technical fix of technology-derived problems. On the contrary, there is widespread awareness and

<sup>6</sup> In Italy the debate gained actual public resonance only in 1999, later than in other countries.

<sup>7</sup> The role assigned to tradition is particularly prominent in Italy, assuming both cultural and economic connotations.

<sup>8</sup> This is remarkable because, according to surveys like the Eurobarometer, the Italians' orientations are usually among the most 'pro-Europe'.

acceptance of scientific uncertainty and the ‘zero risk’ option is not called for. Rather, it is stressed that uncertainty is often denied, instead of being publicly admitted and debated in its implications as regards, for example, liability, the limits of laboratory testing or the meaning of knowledge built in traditional forms of food production and consumption. A frequent complaint concerns the excessive specialisation of scientific research, which can affect a comprehensive view of the interrelations of the many aspects of the issue of GM plants and food. The image of scientists is rather ‘disenchanted’ and the basic attitude towards science is ambivalent, aware both of its promises and its shortcomings. An attitude of ‘hope’ rather than trust, mistrust being based on the perceived strong connection between research and industry, science and profit, as well as by scientists’ possible selfishness or over-ambition.

To sum up, the prevailing attitude is of generalised mistrust and scepticism towards experts, regulators, and the current policy management of risk and uncertainty.<sup>9</sup> The reasons people offered provide initial support to the hypothesis that, when publicly unfolded, the interweaving of the cognitive and normative (ethical–political) levels of an issue characterised by radical uncertainty may lead to delegitimation of both the discourses of expertise and traditional politics, and to call for a more ‘inclusive’ policy-making.

## **5. Inclusion and policy-making**

But what is implied here? Every approach is at the same time inclusive and exclusionary. By stating who is entitled to have a say, it implicitly defines who is not. The same selectivity applies to arguments and concerns [15]. However, selection criteria can be more or less stringent, and can be analytically distinguished in normative or cognitive, according to their stress of whatever kind of concerns, or knowledge. According to these dimensions, four models of policy-making may be distinguished (Fig. 3). The technocratic one is based on a double restriction, or exclusion. A discourse of ‘single problem definition and one best solution for the common good’ implies that expert knowledge and problem-definition are deemed the only valid; no negotiation among conflicting interest or laypersons’ deliberation are officially allowed. Traditional politics is inclusive as regards values and concerns, but exclusionary as regards the cognitive dimension. That is, the confrontation is based on a shared or at least unquestioned framing of the issue at stake.

A different approach is that of neo-corporatist practices. Here the regulatory capacity relies on debate and negotiation among a limited number of actors, representative of organised interests [16,17]. The concept of ‘co-operative management regime’ has been proposed for describing kinds of environmental governance where interest groups and organisations take a major role. They are provided with some continuity over time and based on dialogue and negotiation among a limited number of representatives of organised interests (possibly headed by some public agency), recognising each other’s legitimacy and assuming responsibilities for the implementation of the agreed solution. Such experiences may look new and promising [18], but they actually follow the usual neo-corporatist logic. They are politically exclusionary: not every position is represented (participants can actually be self-selected) and resources may be very unequally distributed among the involved ones. However, they

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<sup>9</sup> Mistrust involves also corporations and more in general the economic actors. I cannot draw on this point here.



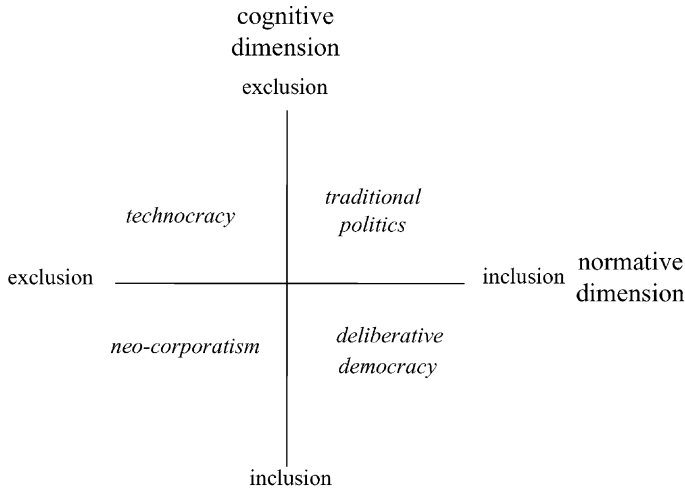


Fig. 3. Inclusion, exclusion and policy-making.

are inclusive from the cognitive viewpoint, because each participant is supposed to provide specific insight, thanks to his or her own knowledge and experience of the problem at stake, and because confrontation is supposed to lead to a reassessment of the issue.

The fourth approach draws on the idea of deliberative democracy.<sup>10</sup> It is inclusive according to both dimensions. It acknowledges that relevant insight into a complex matter is likely to be found across the whole of society and that organised interests represent only a part of the whole range of concerns at stake. Thus, it acknowledges that the deliberative process should address first of all the rules for inclusion: who is entitled to take part, what kinds of arguments are allowed, which aspects of the issue at stake must enter the agenda.

Do the focus groups provide any indications on this point? Participants often talk of the necessity of ‘prudence’, ‘caution’, ‘slowness’ in the implementation of technology, thus indirectly referring to the precautionary principle. They have also an ambivalent attitude towards ‘core’ scientific research. Freedom of research is highly considered. However, as stated before, scientists are not considered immune to human vices, which may spoil their work. Above all, assumptions underlying research choices — concerning the nature and relevant aspects of an issue, the social impacts of innovation and their desirability, the acceptability of risks and their distribution — are not necessarily shareable by everyone. Publicity, rather than raising ‘boundaries’ to research, is frequently advocated as a remedy. Public discussion, many participants say, should address the whole innovation process and not only its final applications. To this purpose, all the dimensions of an issue should be made public and understandable to the lay citizens. Values and factual assumptions should be acknowledged and justified, and information should be provided on the sources of funds,

<sup>10</sup> The concept of deliberative democracy has attracted increasing attention in recent years as an alternative to the predominant ‘strategic’ forms of democracy, based on the aggregation of preferences or negotiation among conflicting interests, and to ‘elitist’ notions of democracy, where the discussion of public issues is deemed to be the exclusive province of small groups (see, [19–21]; for specific reference to environmental and technological issues [22]).

the reasons for pursuing a certain line of research, the expected applications and their societal implications, the aspects wrapped by uncertainty or ignorance, and so on.

Thus, the publicity of the risk assessment represents a major concern. People believe that science and technology should be submitted to a public review, which is lacking at present. Their vision that risk assessment cannot be carried out in an objective, interest- and value-free way, that is, independently from the social and institutional context, sheds also light on their frequent complaint for the insufficient communication between scientists and the public. Risk assessment, they often say, should be ‘enlarged’, encompassing a broader range of views and concerns than those deemed relevant by scientists, regulators and private corporations. Risk assessment, is not a job for experts alone. Their input is necessary, but it cannot provide the only basis for policy decisions. Public assessment should include an evaluation of research and development alternatives. For example, many participants observe that discussion should address the real need of ‘hyper-technology’ in the food sector, while resources could be devoted to nutritional education, promotion of healthier lifestyles, and recovery of traditional knowledge and practices.

In the light of these results, opposition against GMOs seems not so much a matter of inadequate public understanding of science, as some researchers maintain (on the ‘deficit’ model of the public understanding of science see, [23]) as of poor feed-back between institutions and citizens. People’s insistence on the importance of the public review of science and technology emphasises the role of the public sphere: the communicative arena — or better, the network of arenas functionally and thematically differentiated, often spatially fragmented, but accessible to lay publics [24] — where citizens, groups and members of political, business and voluntary organisations present and debate their positions on public matters. If, as theorists of deliberative democracy insist, the public sphere has to play an effective intermediary role between political system, everyday-life and sectors of specialised activity (science, business etc.), free and open discussion must not only be formally allowed, but also actually possible. To this purpose, a crucial factor is public access to information.

The lack of information on gene technologies and their applications in the food sector actually emerges in the study as a major concern, linked to the focus groups participants’ perceived lack of institutional responsiveness. The persuasion is widespread that the information that has been made available is inadequate both in quantity and quality, either because biased or because deliberately concealed or delayed by public authorities, scientists, corporations, media. Information reaches the public too late, when decisions are taken. GM food, many say, has probably been on shop shelves for years, with people treated as guinea pigs.

The media are criticised and mistrusted also because their coverage of the GMOs issue is seen as little usable for fostering a true public debate. Their ‘sensational’ approach, their selective attention to eye-catching events, is criticised because it hinders correct and clear information.<sup>11</sup> The media should instead provide a fair overview of the different arguments, taking a wide variety of aspects into account. Discussion should address, and connect, the ‘technicalities’ of genetic manipulation and the related R&D choices and their

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<sup>11</sup> Again about the Italian case, it is interesting that the level of information of the participants in the second round of focus groups looks similar to that which emerged from the first round. The remarkable increase in the level of on Italian media during 1999 seems to have produced little effect on the public.

societal implications. A major complaint about media debates is that the different positions are presented as ‘given’ with no explanation on how conclusions have been reached. What is disconcerting, in other words, is not so much the presence of conflicting opinions among experts and stakeholders: uncertainties and contrasting approaches are seen as legitimate and understandable. What looks unacceptable is that positions are expressed without any attempt to justify them or clarify the reasons for them.

Thus, it can be seen that the model of policy-making which best fits the positions emerging from the focus groups is the ‘deliberative’ one. For participants, dealing more effectively and legitimately with such an issue as the GMOs one requires giving more room to public deliberation. This is obviously difficult to realise. A case described by Hajer and Kesselring [25] is illuminating in this sense. Their analysis of the innovative forms of debate developed in Munich on the town transport policy shows that a BMW-promoted ‘neo-corporatist’ initiative succeeded in imposing its own discourse, with lay citizen dialogical activities, although strongly supported by public authorities, relegated to a marginal role.

However, one may wonder whether ‘enlightened’ neo-corporatist approaches such as the one described by Hajer and Kesselring would be able to re-establish public confidence in the European policy-making. Doubts raised by the focus groups participants’ deep and generalised mistrust are strengthened by the observation that consumer and environmental groups’ action — they are obvious lay citizens’ ‘representatives’ within neo-corporatist regimes — has produced no apparent effect on people’s sense of agency which, as it will be shown, is very low.

One may also wonder whether the approach of the European Commission’s White Book on Food Safety is able to answer people’s concerns. It focuses on the creation of a new authority, whose jurisdiction ranges from scientific advising to communicating with consumers and managing a warning system. Moreover, it assumes that a politics of food safety can be developed independently from a debate on the suitability of the current models of production and consumption. However, the study shows that people are critical towards such a narrow framing of the issue, and that while they may be unable to distinguish between different institutions, they are very sensitive to their own experiences. The White Book fails to recognise that the problem of trust is first of all linked to how institutions define the issues and how they behave in practice, rather than which bodies are in charge of what and how they communicate with the public.

## **6. What kind of participation?**

There have been many attempts at strengthening people’s participation, in the effort to achieve a more cognitively and normatively inclusive process of public choice. Many ‘participatory’ approaches have been implemented in recent years. Formalised and detailed classifications have also been proposed [26,27]. For my purposes, two dimensions are enough (Fig. 4). The first one is purpose of participation: inclusion may be deliberation- or decision-oriented. The second one distinguishes between top-down or bottom-up issue definition, that is, whether the agenda — topics, questions and concerns — is set up and controlled by the promoters or by the participants in the process. Of course, this is nothing more than a schema: models and experiences fit somewhere in between the decision/deliberation

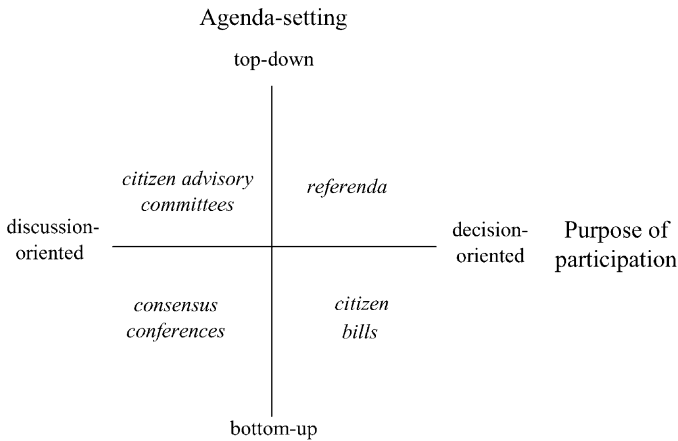


Fig. 4. Approaches to participatory policy-making.

poles, as well as they mix up in various forms top–down and bottom–up approaches to the agenda-setting.

Referenda may be taken as example of decision-oriented, top–down approach. The primary scope of referenda, also of consultative ones, is the expression of a preference (although public discussion may be enhanced as a side effect). Even if the initiative is promoted by the citizens, voting options are typically defined by the authorities. But if, and to the extent that, the former are able to influence the terms of the issue at stake, referenda move towards the 'bottom–up' side of the figure, where other kinds of citizen initiatives can be placed, such as the 'citizen bills' provided by some constitutional systems.<sup>12</sup>

Citizen advisory committees [26–28], as usually applied in the US, can be mentioned as examples of top–down, discussion-oriented approaches to participatory policy-making. They are small groups, selected by promoters in order to represent major interests involved in the issue at stake. Committee members have normally few possibilities to influence the agenda and discuss issues outside the predefined task. Moreover, these committees can work outside the public sphere, behind closed doors. Actually, top–down approaches often use participation as a means for collecting information rather than enlarging deliberation.<sup>13</sup>

Finally, there are the discussion-oriented, bottom–up approaches. An example, although not without reservations<sup>14</sup> (for some critical considerations see [30]) is the Danish

<sup>12</sup> This is the case of Italy, where, however, citizens rarely profit of this possibility. This is so because of the relatively high number of signatures (50,000) that the promoters have to collect, but mainly because there is no assurance that the bill will be discussed by the Parliament within a reasonable time. Moreover, without support from political parties, there are obviously few possibilities for a bill to be approved.

<sup>13</sup> This happens, for example, with some experiences of 'constructive' technology assessment, where technology developers and different categories of users are brought together, the latter providing insight to the former in order to make innovation more responsive to social needs and interests [29].

<sup>14</sup> Reservations concern in particular the fact that the initial briefing, entrusted by the promoters to some experts, obviously influences the participants' subsequent definition of themes and questions.

‘consensus conference’ model, implemented in various countries also to the GMOs issue<sup>15</sup> (on the consensus conference model of public deliberation see [31]). A group is formed of about 15 lay people, selected from a random sample in such a way that they are sufficiently mixed as regards age, gender, education, profession and place of residence. They receive a thorough briefing in the subject, formulate questions and participate in choosing experts, with which they discuss in a conference open to the public. The final outcome is a document containing a position and recommendations on the issue at stake.

The opinion prevailing in the focus groups about which kind of participatory approach should be fostered emerges with clarity, although it is expressed in terms of general aspirations and descriptions rather than detailed indications (after all, the groups were not composed of political scientists). This point can be grasped by considering people’s sense of agency. As already hinted, it is very low. A sense of loss of personal control of one’s own life overlaps with the feeling, described above, of a reduced public ability to handle technological innovation. Current scientific, technological and economic trends are seen as ‘inevitable’, too powerful to ‘resist’. The prevailing sensation is of individual insecurity and loneliness.

This is reflected in the view of the consumer’s situation. Consumer right to be informed is strongly supported. Useful information is comprehensible, timely, complete and transparent as regards its source. Strong information campaigns are requested, but there is not much confidence in their completeness and trustworthiness. The labelling of GM products is seen as a basic right, a kind of minimal requirement, but does not answer the problem of the declining individual agency, for various reasons. If the regulatory system is weak there is no guarantee that what is claimed on labels corresponds to the products’ characteristics. Another point is that labels usually do not provide understanding on process, but only on final product. Moreover, the usefulness of labels is undermined by the fact that few people read them. Labels are often incomprehensible, and modern lifestyles restrict the time for shopping. In any event, the choice between GM and GM-free food is likely to be mainly affected by pricing policies rather than labels. For many participants in the focus groups, the market will be split into two segments, with GM-free and organic food bought by wealthier families and low-price (and low-quality) GM food consumed by less affluent ones.

However, participants also believe that their agency, limited as it is, essentially concerns consumer choice: citizen agency is felt as much weaker. Citizens may be insufficiently committed to public matters, but their possibility to influence decisions is almost non-existent. Most people, in the focus groups, feel uneasy with that. They remark that before and above being consumers they are citizens. And if labels do not entirely meet consumer needs, they are even more unsatisfying for fostering citizen agency, because even the most carefully designed and informative labels do not address the reasons justifying the introduction of a product in the market.

In the terms used here, it can be said that people maintain that the market cannot substitute the public sphere. Theorists of deliberative democracy emphasise that the boundaries between private and public matters — that is between questions pertaining to individual free

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<sup>15</sup> Apart from Denmark, 1999, consensus conferences were carried out on this issue, among the others, in UK, 1994 and France, 1998.

determination and questions to be collectively settled — should be subject to discussion. For example, the dominant boundary between public and private aspects of family life is often challenged by feminist thinking [32]. Similarly, for the GMOs issue, saying that the essential policy problem is to ensure consumer information and possibility of choice entails saying that the decisions on food and agriculture fundamentally pertain to the autonomous, private sphere of each farmer, food producer, and user. Focus groups discussions highlight what can be seen as a reaction against this assumption: people maintain that there is a relevant public dimension of the issue, and that it lies in the assessment of the social costs and benefits of the introduction of genetically modified food.

In such a way, people challenge a public/private divide dominant in the GMOs issue, stressing that citizen agency should be strengthened. This would require extended forms of public deliberation, of the kind experienced by themselves in the focus groups. Participants appreciated them as a first and unique opportunity to obtain information, compare different viewpoints and discuss freely in a non-confrontational-setting. In other words, they think that citizen agency should be enhanced not so much through the usual means of today's democratic systems (improving selection procedures for institutional bodies or extending direct participation in decision-making), but through an 'enlargement' of the review of public policies of science and technology. This is the same argument emerged in relation to the assessment of risk: people's empowerment primarily depends on the effectiveness of the public sphere, the extent to which it is able to influence and make accountable the institutional behaviour.

To sum up, participants in the focus groups assign particular relevance to bottom-up, discussion-oriented forms of participatory policy-making although they believe these forms of participation have little, if any, chances to be actually developed. They are also aware of their shortcomings, such as the slowing down of the policy-making, but consider them as minor drawbacks in comparison with the possibility that irreversible decisions be taken in a hurry and behind closed doors.<sup>16</sup>

## 7. Conclusions

According to Funtowicz and Ravetz [34], science has entered a new, 'post-normal' age. Scientists must face a growing number of problems characterised by high levels of uncertainty — the relevant variables are poorly controllable or largely unknown — and at the same time by high decision stakes — science cannot play with mere speculation because expectations from society are more and more pressing. Some environmental and technological questions are thus considered as radically different from traditional scientific problems. This entails an enlargement of the terms of and participants in scientific debates: the 'extended peer communities' and 'extended facts' to which Funtowicz and Ravetz refer, often include not only very different disciplinary competences, but also the 'lay' knowledge of citizens, social groups and local communities (see, for example, [35,36]).

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<sup>16</sup> The perception of a trade-off, within the decision making, between democracy and efficiency, timeliness and careful consideration, emerges also from other research on technological risks [33].

If one accepts such theoretical framework<sup>17</sup> (a good overview of the post-modern perspective is provided by Kumar [37]), agricultural gene technologies appear as a typical post-normal issue [38]. The strong scientific, political and economic interest involved and the possibility of irreversible consequences make decision-stakes very high. Uncertainty is radical: facts and methods of investigation are controversial, as well as the extension of non-knowledge — and how to cope with it. Sub-politics (the concept of sub-politics has been proposed by Ulrich Beck; see, for example [39]) — politically relevant actions taking place outside the official sources of power and using different means from the canonical ones — is gaining relevance: think, for example, of the sensational ban on genetically modified products decided by several large retailers on the basis of feedback from customers.

Much of the focus groups participants' discussion fits quite neatly in a post-normal science account of the GMOs issue. But even if one rejects such an account, the issue undeniably offers a good example of the novel kind of policy problems raised by science and technology. The study highlights a widespread uneasiness for the European policies of gene technologies in the food sector, for the way risks have been assessed and uncertainty has been managed, for the unsatisfactory institutional responsiveness to citizens' concerns, which are not mere expression of emotionalism or prejudice. The theoretical perspective developed in this article is only a provisional attempt, but it helps, I believe, to draw some 'lessons' for the governance of science and technology, which I would like to summarise.

1. It is very important how an issue is institutionally approached from the outset, and the place it finds within the broader policy context and institutional record. In a situation of deep and widespread mistrust it seems not fruitful to rely on the usual management of public affairs. Even an innovative, but still purely expert-based, policy approach possibly forwarded by some epistemic community may find acceptance difficult.
2. How and by whom risk is assessed is crucial. Once scientific uncertainty and the biases underlying official wisdom have reached public saliency, technocratic and strategic policy approaches suffer from a loss of legitimacy, which it is difficult to redeem by the only means of 'improving' institutional and corporate communication, or the public understanding of science and technology. New regulatory designs are probably not enough as well, if the policy approach remains unchanged.
3. A style of governance based on the principles of deliberative democracy appears the most suitable for improving the legitimacy of policy-making and also the quality of its products.<sup>18</sup> Its cognitive advantage represents one of the most frequently claimed merits of deliberative democracy,<sup>19</sup> and a similar view emerges also from the study. The public review of science and technology should be based on the recognition that there is no purely 'technical' definition of risks, in the sense of isolated from any descriptive

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<sup>17</sup> Funtowicz and Ravetz do not regard themselves as post-modernist thinkers, but it is easy to look at post-normal science as one of the most remarkable manifestations of the post-modern condition. A condition often described in terms of fragmentation of identities and languages, of incommensurability of worldviews, of crisis of the 'grand narratives' — the unifying accounts of History, human beings, reality (from Marxism to psychoanalysis, to neo-positivism).

<sup>18</sup> Of course more inclusion, that is, considering a broader range of viewpoints, concerns, and alternative solutions to a problem, does not necessarily lead to better choices, whatever specification one gives to the word 'better' (from more efficient to fairer or wiser).

<sup>19</sup> This aspect has been extensively addressed in Pellizzoni [22].

and normative assumptions, that knowledge and concerns are wide-ranging, and that therefore lay people have the right and ability to debate the whole range of premises and consequences of R&D choices.

The extent to which these ‘lessons’ are to be taken seriously beyond the case of GMOs is a matter of discussion. More research is needed as regards the effects of the public unveiling of scientific uncertainty and the parallel growth of public mistrust in institutions. More research is needed also as regards the role of, and balance between, forms of ‘deliberative’ and ‘elitist’ policy-making. One should treat carefully the results of single research studies. This is true for PABE but also, for example, for the study by Hajer and Kesselring [25], which arrives at partially different conclusions from those outlined above and seems to challenge the presumption that deliberative democracy enjoys a cognitive advantage. The ability to produce new knowledge, to re-frame an issue, would be an attribute of neo-corporatist regimes more than of the forms of citizen deliberation. But one might argue that the case of transport policy is very different from that of GMOs for at least two reasons. First, the kind of uncertainty involved in the decision-making is very different. For the transport policy of a town the task is finding a suitable solution by choosing among, or combining, well-known technical options. This may well be difficult in its own terms, but this kind of decisional uncertainty, as already stressed (see Section 2), is similar to that addressed by rational choice theory. That is, the necessary information is available, though time-consuming and costly to collect. For the GMOs, instead, what makes difficult to take decisions is epistemological uncertainty. Controversy or ignorance surround crucial descriptive aspects of the issue as well as the methods to ascertain them.

Moreover, for the transport policy it is hardly surprising that BMW and the like provide more insight than lay individuals. Their level of knowledge and information on such a well-established matter is obviously far higher. But when knowledge is controversial, relevant insight — as a number of studies testifies (see e.g. [35,40,41]) — may come from sources provided with little ‘authoritativeness’.

A crucial question, as Hajer and Kesselring [25] ultimately acknowledge, might therefore be whether, and if so how, deliberative, citizen-empowering, approaches can find a place alongside neo-corporatist forms of governance, which are probably destined to spread. The latter are perhaps more efficient than traditional policy-making, but they really do not scratch the surface of the logic of technocracy, the shortcomings of which have by now widely proven.

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