



European Commission



SIXTH FRAMEWORK
PROGRAMME



**Participatory Science
and Scientific Participation**
The role of Civil Society Organizations
in decision-making about novel
developments in biotechnologies

FINAL REPORT



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1. Key Message

Setting the scene:

The idea of science as a driver of growth and economic development is a recurring one in several documents of the European Commission for instance in the 2000 Lisbon agenda and in the 2005 revised version (EC 2005). Within this view, the cooperation between economic and scientific actors has always been actively supported but the role of civil society organisations (CSOs) is often perceived as anti-innovation. Although recent participatory processes have tried to build better relationships, CSOs' participation has not improved as originally hoped.

Our approach:

In this project we have worked as a team with a range of highly diverse actors (CSOs, academics from the social and natural sciences and representatives from national and EU institutions). The challenge of working together has been to go through a process of mutual learning, considering different ways of approaching problems and expectations about our own work. For instance, for scientific partners the main point was to map CSOs participation in science, mainly from an institutional perspective, but for the CSOs involved the point was to establish an effective dialogue that could be really 'useful' to improve the relationship between scientists, institutions and civil society. The added value of the project has been to do a bit of both. We have collected information that may have not been reached without the insight provided by CSOs, and thus deepened the knowledge and understanding of CSOs' perspectives on participation in sciences. Moreover we have established an ongoing platform of dialogue and collaboration between partners to understand better the perspectives of other actors. The focus of our study has been guided throughout by feedback we received from these various actors and from a wider group of advisers. Our methodology was adjusted accordingly. This approach reflects our overall commitment to meaningful participation and engagement – listening and mutual learning. In many ways, this project has been, at the same time, a study *about* CSOs participation in science but also a pioneer experiment of participation in science *with* CSOs. If, as we believe, CSOs and academics have been able to cooperate on the topic of participation in science, there is no reason to believe that they cannot replicate this experience in future research projects in other, more traditional, scientific issues and priorities.



Key findings:

It is sometimes claimed that CSOs are unrepresentative interest groups. Whereas it is true that in some countries CSOs do not claim to ‘represent’ in any particular aspect of civil society, in some countries they are considered to be the very “soul” of civil society itself and therefore representatives of civil society as such. In either case, CSOs’ incentive to engage with the scientific research agenda (or the innovation trajectory) arises from their diverse and specific interests. If to say that CSOs are not representative, we would have to acknowledge that the same lack of status also affects GMO companies and agrobiotech scientists. Both are at least equally unrepresentative of all economic or scientific actors working and researching in the field of agriculture.

CSOs are sometimes portrayed as being against progress and innovation. It is clearly shown in our study that CSOs have no preconceived negative views about progress and innovation, but they do maintain that science must be responsive to wider social needs and long term, and unanticipated, impact on the environment. CSOs emphasised that science should not be understood either solely as a means of adding to overall societal knowledge, or merely as a driving force behind economic growth and development. Rather, they would like to see science more broadly conceived as fully embedded *in* society, as a societal process, involving a wider constituency of actors, whose general goal should be to improve the well-being of society. Although it is difficult to define overall public interest, CSOs can contribute, not only by giving this alternative interpretation of science, but also by providing important insights on the social impact of new technologies. CSOs do not determine public interest, but their participation is necessary for the authorities to define and pursue it.

CSOs do not wish to block science and innovation. The majority of them actually call for a closer cooperation with scientific and industrial actors, right from the very beginning of innovation process. This would, inevitably, slow down the pace of innovation processes to begin with but it would provide the scientific community, companies and CSOs with an opportunity to build mutual trust, explore innovative views of how economic and scientific progress may help social improvement, and move on shared and sustainable research directions. In the long run, commercial success could actually be enhanced by CSOs’ participation in the introduction of more innovative and socially responsible technologies.

This message, which is strongly supported by the evidence we gathered, may open up new perspectives on participation in science. It would facilitate participatory processes, through mutual learning, where CSOs can contribute to the future trajectory of science and innovation in Europe.

2. Participation in Science

2.1. Why this project

Participatory exercises are in fashion, particularly within Europe (Irwin 2006). Following intense debates on the nature of the scientific enterprise (Shrader-Frechette 1991; Kitcher 2001), and on the ‘democratic deficit’ in science governance (Majone 1998; Demmke 1998), several theorists have stressed the importance of widening inclusiveness and introducing new forms of participatory governance. The main goals are to ensure a more transparent and accountable process of decision-making, which could at the same time bring science and society closer whilst granting democratic legitimacy to the institutions and actors involved. Starting from the late 1990s some governments have begun to recognise the need for processes to be more open to public input into science policy (NIH 1998; EC 2001).

Despite the rhetoric about the need for public participation, a highly fragmentary involvement of various sectors of the public (sometimes referred to as ‘publics’) is scattered across a wide spectrum of a complex institutional framework and across Europe (Bora and Hauseldorf 2006). Empirical studies of participatory procedures implemented at national and European level have shown that very modest, if not disappointing, results have been achieved both in terms of democratic control over government appointed scientists and in terms of taking into account societal concerns (Skogstad 2003; Rothstein 2004; Hansen 2006, Wynne 2007). In an attempt to identify more valuable and effective strategies for participation, the theoretical debate has recently focused on distinguishing among various kinds of participatory exercises and their objectives (Rowe and Frewer 2000; Klinke and Renn 2002; Abels 2007, Ferretti 2007; Steffek et al. 2007).

This project is thought of not only as a contribution to this debate on the difficulties of participatory strategies and on the possible remedies, but also as a pioneer attempt to raise the issue of a more participative form of doing science. So, rather than approaching this question in abstract terms, PSx2 intends to present one specific perspective on the questions under discussion, which is the point of view of civil society organisations (CSOs). In addition, this project draws on the actual experience of participation and collaboration in a scientific activity with the partners undertaking the project, who belong to both the academic world and to the world of civil society organizations.

Despite the fact that the growing role of these organisations is widely recognised in the literature (Börzel 1997; Greenwood 1997; Levidow 2007), their views on the matter are rarely investigated as CSOs have been very reluctant to disclose strategic information about their aims, strategies, hopes and disappointments. PSx2 aimed to overcome the lack of dialogue between people writing about participation and people engaging in participation in science. Five CSOs and four academic partners have been working together, going through serious difficulties, often facing impasses, but generally learning from each other and engaging in dialogue and mutual understanding exercises. This process of mutual learning has been fundamental to the very implementation of the project, leading the partners to accept the basic controversial nature of any current definition of participation in science and to include explicitly a question on the definition of participation in science in the questionnaire later submitted to the



CSOs. In fact, the very outcomes of this process of mutual learning constitute an additional and crucial value provided by this project, whose main findings relate not only to new and important insights on CSOs' vision of participation in science, but also to the goal, strategies and experiences that embody this vision in CSOs' daily practices. Hence the results of the project, as a platform of ongoing collaboration, go well beyond the information contained in this report.

2.2 Why a focus on agricultural biotechnology?

Our project is to target an area of applied science, that of agricultural biotechnology, including the production of genetically modified organisms (subsequently referred to as 'GMOs'), in which the roles, respectively, of scientific expertise and of civil society have been largely contested. As soon as GMOs and their derived products reached Europe an intense debate on participation was initiated. Civil Society Organisations have been especially active in this debate, often adopting a leading role among the sceptical or critical voices. Although CSOs are often seen as 'pressure groups' against science, their critical attitude is largely due to external circumstances, related to the modes of production associated with GMOs innovation and commercialization. For instance, various CSOs have often pointed at the potential bias of government appointed experts towards sectional interests, and in particular those of the industry, which hinders the adoption of a transparent and sound commitment to serve the public good (Mayer 2003; Manzo et al. 2005; Pavone 2004). Controversies about novel biotechnologies soon spilled over into the public debate in many European countries.

Facing the scepticism of the European public towards GMOs some European governments attempted to regain public trust by fostering participation (Marris et. al. 2001). However, participation initially was thought of as 'educational participation', aimed at reducing scientific illiteracy and building trust in regulative institutions that were meant to assess GMO products. The studies conducted during the 1990s, commonly known as studies in Public Understanding of Science (PUS), revealed that the resistance to GMOs proceeding from the public was due more to social and cultural reasons than to a lack of knowledge and education or negative mass-media communications (Luján and Todt 2007). In official representation (e.g. BEPCAG 1997), however, experts were taken to deal with 'objective risk' whilst the public was supposed to have a subjective approach, marked by fears and anxieties.

Critics of this dichotomy pointed to the fact that ethical and social considerations, as well as political choices, were intrinsic to risk assessment. Accordingly, the dichotomy of subjective-objective risk must be overcome in order to deliver both fair and effective regulative decisions, and this, arguably, required public participation (Shrader-Frechette 1991; Thompson and Wesley 1996; Levidow and Carr 1997; Wynne 2001). Following these observations, a new understanding of how the general public may be involved in the regulation, promotion and implementation of biotechnologies was called for. In particular, in the field of GMOs participation could not be reduced to simply waiting for scientists to tell us whether the risks involved are negligible or not (Wynne 2001), but a wider and deepened societal involvement in discussing whether we need these technologies at all, and about whether concentrating money as well as human capital really corresponds to the priorities of European publics (Mayer 2003).

The issue of GMOs may be unique in terms of mobilisation of the public opinion, but exactly for this reason it is a good case study for probing into possible avenues for enhancing participation in science.

2.3 The co-production of science: the value of upstream participation

Increasingly, governments need science in order to inform their decisions (Joerges et al. 1997). There are various ways to look at the relationship between science and politics. On the one hand scientific judgement promises to bring neutrality in decision making whereas politicisation leaves outcomes in control of those who can exert the greatest decisional power (Jasanoff 1987; Zwanenberg and Millstone 2005). On the other hand the framing of science, choices on methods, and interpretation of results are often a way to make political decisions under the guise of science. There are several interpretations of the role of science in these contexts, and these span from a belief that science can indicate the way for policy solutions, to the idea that, under conditions of uncertainty and incompleteness, scientific information and advice that are used in the policy process are created by people working in institutions, so as to fit their own agendas (Funtowicz and Ravetz 1993).

Given the widely acknowledged cognitive and normative limits of scientific expertise in the policy process, PSx2 started by recognising that it is increasingly difficult to defend a monopoly of accredited expertise for the production of scientific information and advice. The crisis of the positivist model of the scientific enterprise, which used to portray the scientists as an independent community, unaffected by the general influence of ideological elements and permanently engaged in the pursuit of the truth has left place for a more complex and sophisticated idea of science, in which a plurality of co-ordinated perspectives is accepted as a legitimate way of framing problems and delivering solutions.

On the one side, several observers focused on the democratic deficit of scientific policy making procedures, highlighting the need for more inclusive schemes of decision making, capable of incorporating lay expertise and civil society actors. The need for addressing such a deficit has brought scholars as well as governmental institutions to adopt a new approach, generally going under the label *democratization of expertise*, which has tried to implement new cooperative schemes of mutual learning between scientists and citizens so as to contribute to a wider definition of the issues at stake as well as to the formulation of viable solutions (EC 2001a; Liberatore and Funtowicz 2003). Yet, democratization of expertise concerns mainly areas where there is high uncertainty in science; it aims at fostering transparency and public information; recommends broadening expertise to non academic researchers and practitioners; and also establishing guidelines for the selection of the experts appointed in science committees. Generally speaking, however, democratizing expertise focuses on participation in the regulation of science rather than in the production of science. Although the democratization of expertise represents a valuable step forward toward promoting citizenship in science, it runs the risk of framing participation in science in narrow terms, which may produce an oversimplification of the issues at stake. Moreover, democratization of expertise is likely to give rise to epistemological, political and institutional tensions. The epistemological tensions may originate when the debate focuses on what kind of expertise should be taken into account; the political tensions usually emerge in relation to the definition of moral expertise whilst institutional tensions are often generated by the industry's position on regulatory control, especially in relation to GMOs (Nowotny 2003).

In this study we have found that one of the factors contributing to the failure of many recent national and European participatory schemes is their basic approach to participation in science, which has been inspired by the democratization of expertise principles and emphasis on the enlargement of current regulatory procedures to lay expertise. As a consequence, these participatory schemes suffer from the very same narrow definition of what may count as participation in science. CSOs have a different and rather more complex understanding of what they think is, or should be, 'participation in science'. The latter, as they argue, should not be restricted to regulatory stages or limited to the provision of complementary non-scientific (be it legal, moral or social) knowledge. Rather, CSOs not only



emphasise the significant amount of scientific uncertainty affecting science and innovation policies, they also raise the basic issue of power relations, especially related to the basic question on who decides who is the ‘story teller’ about science for governance. Moreover, in relation to public participation, CSOs raise important issues related to the importance of upstream participation, quality control and the implementation of fair procedures. Whilst the importance of participating ‘upstream’ refers to a meaningful participation in the very process of choosing what is relevant for funding, what is in the public interests and who is supposed to decide about it, the importance of quality control relates to the openness of the process and the acceptance of other, equally legitimate, points of view. Finally, the importance of fair procedures mainly refers to the quality of the whole process of science production and use of science in society, which, as CSOs argue, should always include the consultation and empowerment of the final users of technological innovation.

Thus, it is clear that CSOs frame participation in science is broader, and more complex, than current participatory practices would allow. As a consequence, we propose that a different approach to science, society and politics, based on a more comprehensive and critical understanding of the general dynamics of science production would work not only to make sense of CSOs’ understanding of participation in science but also to elaborate and implement new and more participatory forms of science production, regulation and use.

Some important help may come from the conceptual framing which has emerged around the concept of co-production. Drawing on the contributions of Foucault, Callon, Latour and, more recently, Jasanoff and Nowotny, it is now widely acknowledged that

1. scientific activity has always to be studied in relation to the social and cultural context in which it takes place;
2. scientific activity and the social, political and cultural context mutually influence (and in this sense ‘constitute’) each other;
3. scientists are neither the only actors involved in the production of science, nor can they provide a ‘neutral’ perspective.

As Sheila Jasanoff (Jasanoff 1996, 2000, 2004) has convincingly argued, science cannot be approached as a neutral activity, qualitatively distinct from other social activities, as science and technology are the result of a process of *co-production* in which social, political and scientific actors interact and finally determine the directions, the priorities and the advances of the scientific activity. The advancements of science, therefore, are always the result of the priority choices of the specific society in which the advancements take place. In her words, the co-production of scientific and social order relates to the production of mutually supporting forms of knowledge and styles of life.

If science is by definition a matter of co-production, then it is possible to ask whether this process is owned by some kinds of actors or all parties have fair access points and influence. In the context of EU science and innovation processes, it has been often observed that technical expertise, in alliance with industry, has come to dominate co-production strategies. For instance, it has been noted that technology and law are co-producing technological and scientific facts (Bora 2005). A participatory perspective points to the necessity of empowering citizens both as critics and creators in the knowledge production process. Thus the scientific community no longer constitutes the sole responsible actor for the advancement of science. Other societal actors – from CSOs to economic actors, from lay public to interest groups – also play a crucial role in the actual functioning of the scientific system. From a co-production perspective this appears under a different light: as a broad societal system in which the scientific community and its methods play very important but no longer unique role. All this presupposes that science is framed as i) a social activity related to the production of new knowledge and technology, ii) an activity in which a variety of actors cooperate to set the priorities of research and development and contribute to its promotion and its implementation, iii) all actors share responsibility, financial burdens, risks and opportunities.

We suggest that co-production perspectives are better equipped to address the challenges of science in society because they offer a better interpretative framework for understanding the actual dynamics of science production and participation, rather than focussing on specific participatory exercises and their outcomes. Moreover, it stresses the relational aspects among various actors involved and their perspectives, rather than taking an ‘institutional’ perspective.

2.4 PSx2 and participation in science

Thus, our (PSx2) working hypothesis is that public participation acquires its meaning only when understood in terms of co-production mechanisms. Our guiding intuition is that the *quality* of the process rather than the *quantity* of participation is what actually matters. In other words, the problem should be rephrased not so much in terms of how much participation is achieved but when and on what grounds participation is established. In particular, drawing on the existing work on public participation (Pellizzoni 2001; De Marchi 2003; Wynne 2007), we observe that, despite the fact that there are currently various points of access for CSOs at the institutional level, participation is implemented mainly in the regulatory phase of techno-scientific innovation. Especially with regards to GMOs, in the EU, for example, the public is asked to intervene mainly at the moment of deciding upon authorisation for commercialisation. In such de-politicized, and highly specialised, contexts it is difficult for non-specialised actors to make meaningful contributions. Instead the agenda, the language and the evidence to be discussed is decided by the institutions and by the commercial actors that submit GMO products for authorisation. Indeed the biotech company generally commissions to third parties the studies which produce the data to be submitted for review under authorisation procedures. In this way, due to asymmetry in resources and information compared to the other actors involved, some observers have noted that the industry gains a dominant role (e.g.: Ferretti 2007). Asking for participation at the regulatory stage, when the large majority of issues and topics have been already framed and settled, does not encourage participation – as the recent gradual decrease of contribution made by lay publics to EU participatory schemes proves (Bora 2006).

It is therefore reasonable to argue that the participation of CSOs and lay publics could be more profitably and effectively included ‘upstream’ in the process, i.e. during the early stages of research activity when society is still considering priorities and directions, interests and societal relevance of the various scientific innovation processes. In other words, to be effective the participation of CSOs and lay public should not be confined to participation during the regulatory phase but should be considered already in the first phases of scientific innovation, such as conception and promotion. Additionally, participation at the invitation of political and scientific authorities is not the only, nor the most relevant locus of citizenship in science, but attention should be given to activities aimed at participation that come from ‘below’, as an initiative of various actors in society. Only in this way can participation in science be a fair and balanced process.

It emerged from the interviews that CSOs seem to understand current science innovation processes in terms of co-production mechanisms, which are by no means confined to institutional domains but extend across a large variety of societal contexts and actions. As a consequence, CSOs are aware of participating in many ways in science innovation processes, but they feel that institutional, and therefore ‘invited’, forms of participation in science production and regulation are constructed in such a way that only commercial and/or academic actors have reasonable chances to contribute in shaping the final outcomes of the process, whilst CSOs are prevented from meaningful and effective participation.



3. Methodological Note

The project's main goal was to individuate patterns and trends in participation in science in 6 European countries as defined from the perspective of a number of organisations active in the debate over novel agricultural biotechnology (GM plants, food and feed). Additionally we invited their representatives to talk about their views on and expectations from participation in science. The aim of the project is thus not giving an objective portrait of participation in science but soliciting the views of some of the actors involved in this debate. Indeed, we are aware that a fair and comprehensive picture of the problem of participation in science would have to take into account also other parties, such as scientists, political and economic actors. However in the 18 months devoted to this project we focused on civil society organisations, which are often not reached by scholarly inquiries. In this respect the composition of our project team (see Annex 1) had the advantage of representing both scientists and CSOs, which have contributed to a better understanding of how to approach and involve other CSOs in our study. The project was designed to cover countries, such as Germany, France and the UK, with a more established participatory tradition, as well as countries (such as Estonia, Italy and Spain) where CSOs activism in the field of science policy is relatively new and understudied. Since our partners are located in these countries contacts with CSOs have been easier to establish. Additionally a small number of interviews in Austria, Denmark, Switzerland and Sweden were conducted as in those countries some organisations with interesting experiences of participation (and willing to participate in our study) were identified by project partners. Indeed in the identification of the CSOs we have drawn mainly on the experience of the CSOs project partners and contacted those organisations willing to be involved with the subject of our study, and that could give us an insight into participation from their perspective. Thus the aim of soliciting the participation in our study of as many CSOs as possible took priority over the need to select a representative sample. However the large number of respondents considered in this study give us, we believe, a fair portrait of CSOs' perceptions of participation in the field of agri-biotechnology.

The DG Research of the EC defines CSOs as organisations non-governmental, not-for-profit, not representing commercial interests, and pursuing a common purpose in the public interest. The CSOs identified and contacted include, but are not limited to, environmentalist organisations, farmer unions, church organisations, organisations working for social justice. Most of these organisations fit in the definition offered by DG Reserach. Some rare exceptions (farmer associations; organisations for scientific information) have been made so as to include some organisations that we considered an important source of information because of their role in participation of science, often in collaboration with relevant CSOs. . Several of the contacted CSOs decided to remain anonymous and others manifested scepticism towards the intention of the European Commission in compiling a list of CSOs active in the debate over GMOs. At the same time, some peer reviewers noted that not publishing the list of the CSOs would be quite inconsistent and contradict with the call for more transparency made by the CSOs to institutions and researchers. In order to take into account both points of view, we decided to

public into a separate Annex (see Annex 2) the list of the names of the contacted CSOs without identifying those which took part in the survey. With previous consent of the interviewees, the quotes used in this report are identified with the name of the interviewed and/or the organisation s/he represents.

Recording and presenting the perspectives of these organisations has been our primary focus (rather than an evaluation or assessment). The methodology as well as this readjustment of the project aim (which in the original proposal was to identify good practices for participation through an online questionnaire) has been the outcome of an intense debate among the project partners.

In particular CSOs partners have insisted that participation cannot be defined as ‘good’ or ‘bad’ unless asking from which perspective it is considered. Moreover more open questions and personal interactions have been preferred over questionnaires so as to leave more latitude to CSOs’ ideas. Indeed the EC practice of circulating written questionnaires among CSOs has given rather modest results.

The selected methodology is based on qualitative interviews. In a qualitative study, of course some initial hypotheses are formulated but all interviews are exploratory in character and directed towards generating new hypotheses. As much as possible, we solicited narrative style answers from the CSOs representatives that accepted invitations to take part in our inquiry. In this way we were able to capture their views rather than imposing ours. PSx2 partners agreed on a protocol for interview questions (see Annex 1) that could be adapted to different national contexts and to a wide range of target CSOs, differing in size, organisation and mission. Additionally, CSOs that preferred sending written questionnaires (based on the same open questions) were encouraged to do that. This has allowed some CSOs to provide us with answers agreed with their members, or within their coordination board, rather than collecting the oral answers of single representatives. The advantage of this flexibility in the methodology is to reach organisations that normally do not participate in more structured surveys, but that were willing to volunteer precious information through a more personal interaction with our team.

We contacted 216 organisations from 19 EU countries (see Annex 2)

Table 1

	AUS	DE	DK	ES	EST	FR	IT	LIT	SUI	UK	OTHERS	TOTALS
CSOs contacted	5	59	1	13	19	34	39	2	4	21	19	216
Written questionnaires received	3	8		6	3	4	10	1				35
Interviews conducted and transcribed	1	11	1	5	8	25	4	1	2	14		72
No answer	1	40	0	2	8	5	25	0	2	7	19	109

The data hereby presented were collected through the responses of 107 representatives of various CSOs, either through written questionnaires or by telephone or one-to-one interviews (see details in Table 1). All the interviews were transcribed and analysed together with the written questionnaires. The interview results were analysed so as to identify: 1) what are CSOs definitions of participation in science; 2) what are the goals and aims of CSOs, 3) what factors foster or hinder participation 4) what are CSOs practical recommendations for improvement. From the answers received and analysed we identified some exemplary practices of participation, which were made the object of case studies based on in-depth interviews. These data, coupled with the contextual information about national patterns of participation which we have taken from the existing literature inform the pages to follow.



4. Main Findings: experiences of CSOs

4.1 The role of CSOs in the GM debate in Europe

The introduction of agricultural biotechnology into Europe has been gripped by public controversy since the mid 1990s, in spite of attempts by national and European bodies to establish pre-market policies and harmonized procedures to regulate the technological innovation and marketing of GM products. Concerns range from risks associated with safety and environmental impact to the ethical and political implications arising from potential social inequalities at individual, local and worldwide levels. The timescale, trajectory and intensity of the public debates about the introduction of GM agriculture differed across the various countries. The levels of participation by civil society and the role of civil society organizations (CSOs) have also varied. For a more detailed and representative analysis the reader is referred to the individual country reports¹. However, a common feature of the GM debate has been the close involvement of CSOs (and networks of CSOs). Overall, the role of these organizations has been to raise awareness of what they consider to be important concerns, to put pressure on government to address these issues, and to highlight the need for scientific institutions and policy makers to act more responsibly with respect to public benefit and the future trajectories of science and technology.

4.2 CSO's perceptions and definitions of 'participation in science'

When invited to reflect on the question: '*What does participation in science mean to you?*' CSOs offered ideas about how it should be, rather than how it is actually experienced because their experience of formal participation has been very limited or negatively perceived. What follows are the main common issues that arose from the interviews. It should be noted that where there are variations in responses this may reflect cultural differences and different interests and goals of the organizations.

■ ■ *The role of science in society*

Contrary to general perceptions, very few CSOs are negatively pre-disposed to science, but their idea of 'participation in science' is one in which public participation is an integral part of the innovation process rather than being confined to a separate social domain outside of the development of science and technology. In this perspective it is impossible to separate the innovation process, and the science itself, from its social, ethical and political context because one must always remember the 'social function' of science.

1 Available online at www.participationinscience.eu

« I believe that the main problem remains at the level of mentality: scientific research should be conducted in a different way [because] scientific research is not only useful for you to publish your paper, it has got a social function of development, and specifically of sustainable development ». (FACUA, Spain)

Negative perceptions arise from the issues mentioned above, and include the view that European science agendas are tending to serve the needs of an increasingly narrow sector of society. For instance, where commercial funding of research is involved, as it so often is, commercial interests are bound to influence, and narrow, the scope of scientific research:

« The problem is that the one who pays also is the one who decides what will be on the research agenda...who has the money? ...Genetic engineering and its applications are primarily about economy and money ». (Kein Patent auf Leben, Germany)

However, it appears that in many situations the boundary between science and society is vigorously and strategically defended. Thus, in the minds of some respondents there is a clear distinction between political and social debates about science and the science itself, which is a highly specialized arena. All CSOs wanted broader public participation in debates about science but some CSOs also saw themselves as having sufficient expertise to be involved in more specialized debates about the collection and interpretation of scientific data. This issue is discussed further in relation to the importance of transparency, as a key factor affecting participation in science.

■ ■ **How and where to participate in science?**

It is argued by a majority of CSOs that for citizens and citizen organizations to have any chance of influencing the fundamental direction of science and technological innovation, they must be able to participate at a very early stage. Early participation by civil society, at a meta level, should be about scientific ‘ends’ rather than ‘means’ and, to that extent, would be non-technical.

« Every topic has its meta-level, which is not that technical but more general – and at that level everybody should be able to say what he means ». (EMSA, Estonia)

For instance, in the case of agricultural biotechnologies this would be at the stage at which debates could be held about the future of food and farming. At this point choices could be made about whether to fund research into highly technical solutions such as agricultural biotechnology, or to focus more attention on perfecting traditional and organic methods. In the case of the Spanish Society of Organic Farming (SEAE) it is suggested that:

« Participative science occurs when also the final users of the scientific and technological products at stake are involved in the relative research process, from the beginning to the final release on the market ». (SEAE, Spain)



SEAE (Spanish Society of Organic Farming)

SEAE has been very active in the field of organic agriculture, not only with respect to its promotion but also with regards to participation in scientific research about organic farming. More specifically, they have participated in three EU-funded projects, under the fifth framework programme, have recently begun research cooperation with the INIA (Instituto Nacional de Investigaciones Agraria); have working relations with researchers on environmental sciences, and actively participate in academic meetings and conferences, presenting research results on co-existence. In their view, participative research needs to recognize that researchers do not have a monopoly on research and that other actors in the sector also have valid knowledge. With regards to biotechnology, they feel that participation is often not encouraged because there is a risk of discovering that biotechnology does not realise early promises made about its value to society. This is why, in their opinion, openness has been achieved in some areas, but not yet in biotechnology. Moreover, participation should happen throughout the process and not just at the beginning and the end. If participation is considered as a crucial research tool, the cost and time required should be assumed and included in the budget; groups, field visits, etc. could then be organised. As they put it: *'ideal involvement would be when you feel that you are helping a project and your opinion is considered and when you are the co-owner of the final result.'* They argue that several problems arise from science distancing itself, as a result of the increasingly specialized nature of our societies, in which the academic researcher and farmer are growing further and further away from each other. Without suggesting a straight return to the past, in which it was the farmer who carried out research using trial and error, SEAE suggest that useful knowledge may come from a wide range of sources. They cite examples of outreach approaches that involve the farmers first of all identifying a technological problem and suggesting a 'home-made' solution for it. The researchers are then called in to help the farmer develop that tool and to apply it. In this way the farmer receives financial assistance and the researcher works on the basis of the farmer's needs, the only condition being that whatever is discovered in the process is made public.

■ ■ **Fairness and equality in relation to participation in science**

If science and society are mutually reliant on each other it should be considered a democratic principle that funding for scientific research should be allocated according to public interest and the needs of the final user. For this reason, the public should have some input or influence on the research agenda to address areas where they would like to see development – for instance in organic food production may require more funding than for biotech research – rather than its being directed entirely by commercial interests.² It was suggested by various CSOs that there is a range of essential features that should be taken into account for equitable participation in science. These features include the following:

2 This is the perception by CSOs despite the Work Programme KBBE (Cordis) envisages more inclusive practices.

- Everyone could, and should be able to participate at some level and in some capacity and this would necessarily include CSOs as ‘stakeholders’ - although there is a distinction to be made between ‘the general public’ and CSOs who act, in effect as pressure groups raising awareness of important social and individual interests.

« I do think you want to get a broad spectrum of people who become involved. Of course you are going to have people who have special interests – they may be farmers – they may have other interests (patient groups in medicine for example) and there may be particular groups that you may want to seek out at certain times »». (GeneWatch UK)

- Participation must be on an equal footing to address unequal power relations. If everyone is entitled to participate there are issues associated with numbers of people (and their ‘representativeness’), degree of political influence, knowledge status and financial resources. All of these factors can affect the ability to participate on an equal footing.
- Debates about science should involve different opinions/viewpoints and a plurality of expertise and recognition of other types of knowledge that take into account minority opinions.

« Debate can not come into being if there is just a monologue of just one opinion from the state’s side. If debate is to come, then you need presentations and estimations from different science fields and different groups of society and these debates should be available for reading afterwords (eg, on the Internet) so who is interested can try to form his or her own opinion on the basis of the different opinions »». (ELF, Estonia)

- Participation in science requires consideration of specific interests and ways of life e.g. women’s perspectives and specific requirements and farmers’ needs and timetables.

« Ideally, we would like to see women much more equally involved – and this is much more than ‘consultation’ – as equal participants right through the process of development: as scientists, professionals and as members of the public. We would like to see developments in this area to take account of ‘women’s knowledge’. This could be for instance about the knowledge women from different cultures have about their food cultures e.g. ethnic minority issues in inner cities. It’s very much starting from what women already know and their everyday experiences »». (WEN, UK)

■ ■ **The importance of transparency**

It is felt that openness and transparency are crucial in the development and practice of publicly funded scientific research and its regulation.

« Participation would mean, to me, that the process is transparent from the beginning on, that science would not be conducted in an ivory tower, but that the research goals that are considered are publicly stated »». (Bundesverband Reformhäuser, Germany)

Some CSOs argue that transparency about scientific data, and alternative interpretations of it, is needed, and that members of CSOs can participate directly in collecting data and providing alternative scientific evidence and analysis:



« We have a big 'citizen science' sector, in the sense that members collect data for us but we also have members conducting surveys for farmers to give the farmer information about birds on the farm and conservation advice in looking after them. That has been very successful ». (RSPB, UK)

At the same time the wider public needs to be given the opportunity to acquire a good understanding of the technical issues associated with a new technology. Some CSOs have suggested that, where the issues are highly technical or scientific, the public is unable to participate. But as the proliferation of information available to everyone on the Internet has demonstrated, many citizens have a desire to access information when it affects them. Participation in science requires access to information so that the final users of the research products can decide for themselves whether to accept them, as the Spanish CSO FACUA argues:

« The most effective instrument we have is public information, which we deal with through publications, our web site and other media...[we want to] protect the principle of prevention so that our consumers may not consume something whose safety has not been demonstrated yet ». (FACUA, Spain)

■ ■ **Concerns about the type of engagement**

Dialogue requires a **two way** exchange of information, open mindedness and genuine engagement, by the scientific institutions, between themselves and citizens.

« On the whole, I think these processes are effective if the questions asked are framed not by somebody trying to get a particular answer, but by a genuine desire to engage civil society or particular interest groups or areas and that can happen because somebody comes along with a genuinely open mind ». (Soil Association, UK)

In the example shown below 'Von Bauern für Bauern' illustrates a project aimed at bridging the gap between Swiss farmers' knowledge and the scientific research community by opening up new techniques for better communication.

Von Bauern für Bauern (Agridea Lindau)

'Von Bauern für Bauern' (From Farmers to Farmers) is a project aimed at bridging the gap between scientific knowledge and farmers' knowledge. In particular, the objective is to convey knowledge in the field of soil protection by using films and documentaries. It started in 2001 and it was led by the biologist Patricia Fry and supported by various Swiss unions and farmers organisations, among others Agridea Lindau, an association working on the development of agriculture and rural areas.

The main objective was to make knowledge about soil accessible to farmers, by having farmers speak about their experiences with new methodologies and techniques in their own colloquial language, so distant from the language often used by scientists. Hence, the idea behind the project is to make the target group speak by itself so as to avoid the trouble of researchers trying to communicate with farmers in their scientific language which often leads to misunderstandings due to different perceptions. This is an issue about language but also of perspectives and hence of perceived problems. As the farmer lives in the same environment he works in, he experiences this environment in a completely different way than a researcher going there from time to time in order to take

a sample of the soil with specific research questions in mind. Farmers get their “implicit” knowledge from practical every day work rather than from theory books. Often researchers ignore farmers’ experiences and look down at what is in fact their valuable knowledge. On the other hand, farmers see the work of scientists as too abstract, with little connection with their practical problems.

For this reason the project mainly aims at the achievement of a successful intermediation of knowledge, so as to develop a product that the farmers and experts in soil protection developed together in cooperation. Farmers were asked their opinions and were taped in their usual working environment, using their own language, and the filming includes the normal background noises. This makes the documentary more credible.

The result is a DVD with five short films of 9-20 minutes published in 2006. It is meant to be shown in farmers’ networks at meetings, for example of machinery syndicates or the SVLT (Swiss union for agricultural technology), but also in schools. The presentation of the films is accompanied by experts who answer questions, so that the DVD can give impulse to a discussion about soil protection and offer support to people that want to experiment with these techniques and adopt them, both for research purposes and in agriculture.

Without wanting to promote genetic engineering in the field of agriculture, it is assumed that if it is possible to engage with farmers in the field of soil protection this might also be relevant in the field of biotechnology. This approach could facilitate the dialogue or at least a transfer of knowledge between scientists and lay people. This should not be thought of as a one way process but, for example, reasons for refusing GMOs and promoting alternative techniques by the farmers could be better conveyed to scientists.

■ ■ **The capacity for government and scientific institutions to respond to CSOs participation**

Where participation in science is invited by government or scientific institutions it is crucial that the input of civil society is listened to and taken account of. For instance, the features of participation in science, listed above, are dependent upon a political and institutional capacity to bring public participation into the innovation process. As the director of GM Freeze suggests: *what prevents effective participation overall is that people don't think its going to make any difference. Unless [institutions] convince people that it is going to turn things around, or change the policy, people will enter it with a lot of reluctance.* It was repeatedly asserted that invitations to participate in science have to be sincere otherwise people become very skeptical and do not trust the process: In order for participation in science to be meaningful there must be some mechanism for it to influence early funding decisions and contribute to later policy formation.

« *The most important thing is to learn from all this process with GMOs – that if you have some clear signals from population that they do not want to have something – then it is there you must listen. It does not help that people say no to GMOs and then you put it on the market and ask after that what you think of them. Those 80% who said “no” are having feeling of being quite stabbed in the back and let down and won't answer any more – that is a theatre for public and not public participation* » (Greenpeace DK)

Institutionalized participatory processes have been perceived, by some CSOs, as ‘pseudo participation’ because they have been ineffective in affecting the trajectory of GMO development or decisions about the introduction of GM products.



« The public was consulted in numerous debates, particularly citizen conferences, such as in 1998 in France in which we participated. [...] But one cannot say that the public participates directly in the development of the agro-biotechnologies since, on the whole, conclusions were not taken into account. Therefore these are examples of pseudo-participation. » (Greenpeace, F)

If there is no evidence of these essential elements of participation (as in the case of the German ‘Citizen Forum’), CSOs will see this as a ‘participation trap’. Overall, it is suggested that there is a need for greater civil society participation in science and that this should be given a higher priority in order to create knowledge and products that are attuned to the needs of European citizens. When invited participatory processes fail in this way, CSOs have realized that, in order to be effective in influencing the development of new technologies such as agricultural biotechnology, they need to take action outside of institutionalized processes. This has been the only way to achieve a slow down in order to allow time for more widespread consideration of the issues.

4.3 CSOs experiences of participation in science

4.3.1 Goals, methods and strategies of CSOs (in relation to production and use of science in society)

The interests of civil society organizations are as diverse as the societies and local cultures within which they operate. Their goals and strategies arise from the various needs of specific social groups (such as patient groups, environmental interest groups or women) or from emergent issues (such as the environmental impact of human development, global warming or third world poverty). It should be noted that these non governmental organizations rarely claim to ‘represent’ any specific civic constituency. Rather, their aim is to widen public debate to address the often neglected consequences of economic development (such as social inequality and uncertainty about risks) and to redress imbalances of power. CSOs bring different perspectives to the debate and have generally proved good at identifying concerns that have been marginalized in debates about science and technology.

In respect to science and innovation, the role of CSOs has been to raise awareness with the general public and put pressure on government to highlight the social and ethical responsibilities of scientific organizations. For organizations working to raise awareness of the many different interests of civil society, in its various capacities, their overall goal is to make sure that the future trajectory of publicly funded research will be underpinned by public benefit. In doing so they challenge what they perceive as the narrow, and often unacknowledged assumption that the role of science is only to serve as an economic driver. Lobbying for a more inclusive debate at a political level is a key aspect of this challenge. For instance, the case is often made that, as a basis for authorizing new technologies, it is crucial for research to be independent of commercial business interests. Of course individual CSOs focus on the issues that affect their particular interests, or the needs of specific sectors of society such as farmers, environmentalists, marginalized communities, women etc. From these ‘grass-roots’ positions they make the case to open up debate about the introduction of new technologies to take account of wider social and public interest concerns over and above the economic interests of biotechnology companies.

CSOs act in a variety of ways to achieve their goals. Overall, in respect to the introduction of agricultural biotechnology, these goals can be grouped as follows:

■ ■ **Proactive campaigning for alternative technologies (alternative futures):**

Many CSOs are campaigning and acting to establish alternative knowledge-based approaches and alternative technological trajectories. In Spain, for example, it has been the goal of one CSO (Spanish Society of Organic farmers SEAE) to promote organic agriculture as an alternative, sustainable and economically viable form of agricultural development and to change the direction of research to fit the needs of local farmers. At this more fundamental, or ‘upstream’, level of participation, in science the focus of CSOs is less on trying to stop the development of GM technologies and more on developing alternative solutions for farming and food production. For instance, as the Henry Doubleday Research Association maintains:

« Our own objectives have been to develop alternative agricultural methods. That is how we work on a practical level. We have never really been a campaigning organisation, so we have never campaigned to change the direction of research but we took part in debates about whether GM technologies were appropriate in organic farming research. »
(HDRA,UK)

Participation of society is crucial at this level of scientific innovation when decisions are being made that will set the course for future funding and development. Partnerships Institutes Citizens for Research and Innovation (PICRI) is an experimental new funding system set up to enable CSOs to take part in deciding how the research funding for a local region is allocated.

Partnerships Institutes Citizens for Research and Innovation (PICRI)

PICRIs are a funding system set-up by the Region Ile-de-France (IdF) in 2005 for research projects involving both scientists and CSOs. PICRIs are inspired by a Canadian program set up in 1999: Alliance Recherche Université Communauté (ARUC). The aim of PICRI is to stimulate partnerships between research institutions (universities, public and private research organisations) and all other non-profit civil society organisations in order to facilitate the transfer of knowledge, resources and skills among these different bodies. Their objective is to increase research capacity through the empowerment of citizens. The idea is to encourage associations to make better use of research resources and help them benefit from research relevant to their area of activity or specific innovation needs. It should also help to raise researchers’ awareness of the needs of society and practical problems to which they can apply their skills. It is hoped that public interest and engagement in research will be increased by offering opportunities for them to get involved in research that directly concerns them.

The projects to be supported involve both research and civil partners in a society-oriented area of research not covered by an existing programme. All projects are required to organise an awareness-raising event to publicise their activities. Funding for these projects will cover up to 100% of costs up to a maximum of 250.000 euro for a period of five years.

The Region IdF dedicates for PICRI about 1% of its budget to research and to innovation, that is about 1 million euro. There is, every year since 2005, a call for proposals by the Regional Council for PICRI. An evaluation committee, made up of scientists, representatives of CSOs, as well as administrators, is made responsible for choosing the projects which will be funded. Since the first call for proposals, around thirty projects have been financed. It is not yet possible to evaluate PICRI



because, the first call having taken place in May 2005, most part of projects are in progress. The feeling is that: “ *PICRI remains something rather marginal, rather badly seen by the majority of scientists who are in search of scientific excellence and think that this research is not serious* “. But “ *We know that information about PICRI circulate in scientific institutions. With this funding system it becomes easier for the researcher to work with associations* “.

The total amount allocated to PICRI is not comparable to other sources of funding dedicated to research. Therefore, this kind of plan is not intended (yet) to revolutionize relations between research institutions and CSOs. However, it has already strengthened relations, which some scientists could maintain, in a more or less informal way, with CSOs.

■ ■ **Actions taken to ‘empower’ citizens and to address power relationships**

In relation to the production and use of science in society many CSOs are aiming to open up space to debate the purpose of scientific technologies and to ask questions about who will benefit from them. For example, the specific goal of *Fondation Sciences Citoyennes*³ is to democratize science and decision-making about technical innovation in France. In the case of the development of GM technologies, CSOs are calling for greater transparency and accountability of agro-biotechnology companies to be required so that the safety and ethical implications of the technologies can be considered. One of the components of informing the public is the ‘translation’ of scientific jargon into language that will be accessible to people other than narrow specialists. Another component is to formulate widespread public concerns of individuals into politically viable arguments. They would also like to ‘empower’ citizens and consumers to take action on their own behalf. So, in addition to the wider social issues, most of the CSOs mentioned their role in protecting the individual rights of consumers to be able to make a choice whether to consume foodstuffs containing GM products. In this area they have played a crucial role in demanding public information and transparency through labeling.

« [A] goal we pursue is that consumers may become... more demanding in requiring proper and detailed information about these products before buying them » (OCUC, Spain)

■ ■ **Campaigning to address the wider issues of uncertainty**

There is often widespread public concern that new technologies pose unacceptable risks, so some CSOs seek to engage in highlighting a precautionary approach. However, they are aware that it is often assumed that the role of participation is just to reassure the public about knowable risks. Civil society public pressure groups have taken a wider view. They argue that a precautionary approach is about slowing down the pace at which a technology is introduced into the market in order to better understand unacknowledged and longer-term uncertainties in the science, and the possible long term risks and consequences. This goal is apparent within the UK and in France in their call for a moratorium on the release of organisms into open fields and on the introduction of products into consumer outlets. In Spain the CSO ‘Red de Semillas’ made the point that it would be necessary to slow down the process

3 <http://sciencescitoyennes.org/>

in order to ensure that everyone, particularly significant stakeholders such as farmers (who work full time and long hours) have enough time and opportunity to consider the implications of new products and to express their opinions on important issues:

« We have to make sure that no one lags behind, just because he/she has little time as he/she is busy with his/her ordinary job, like the farmers. They effectively subtract time to their agricultural activity in order to participate to these forums and debates [...] It is necessary to slow down the process to achieve an effective participation of all the actors potentially involved. » (Red de Semillas, Spain).

In Estonia the precautionary goal is apparent in blocking the process of approval because it gives time to push for independent research to study risks of GMOs. The point of slowing down the process is important in order to guarantee that alternative sustainable models such as organic agriculture, heritage plant varieties or seed saving practices will not become extinct. In the UK this is also a concern for many CSOs who believe that adequate consideration of the longer-term consequences has not been made.

« It is important for us to make sure that technologies do not rush ahead without proper assessment and an understanding of the possible consequences. In that sense we consider that it is important to alert civil society and politicians (and often the scientists themselves) to what the possible consequences could be. To accomplish this we look for the underlying assumptions made in applications [of technologies] ». (Econexus. UK)

■ ■ **Lobbying for better regulation and governance of new technologies**

There is a range of levels at which participation in science is relevant. In some cases CSOs are working to engage further ‘downstream’ in the development process and to challenge political and legal frameworks governing new technologies. Legal challenges are significant in making sure that technologies are well regulated and policies are in place to protect public interests.

In addition to this, and where there has been little or no opportunity to debate issues of public concern, legal and courtroom battles can provide a key public arena for CSOs to open up a debate (particularly when there is media interest). Although all CSOs have made the point that their goal would always be to act within existing legal frameworks and policies where possible, they will often consider (or support) acts of civil disobedience if this is unavoidable to prevent a greater injustice or risk, such as irreversible environmental contamination or social injustice.

Where technological trajectories have already been established, as in the case of GM agriculture, many CSOs are now also working to make sure that these technologies are well regulated and, if necessary, to affect policy change. For instance, alongside a protracted campaign against the introduction of GM crops into the UK GM Freeze is now *managing the GM technologies through having the right legislation in place*.



4.3.2 CSOs experience of participation (invited and uninvited)

Civil Society Organisations employ numerous methods to achieve their overall aims and objectives in line with the goals mentioned above. According to the UK Food Ethics Council they act strategically in their role as pressure groups to: *ensure that there is a vibrant public sphere and a lot of room for critical debate*. In respect to their engagement with science and innovation they work at many different levels. They have noted the importance of being flexible in order to use their limited resources effectively and this flexibility is considered to be one of the main advantages that CSOs possess when compared with more powerful institutional and commercial interests.

« *I don't think that there is ever one method that is effective...That is also accompanied by an attempt to effect change with that research and that may be achieved through public information, press work and, hopefully targeted around certain policy timetables so that it has the best chance of effect....and producing things at a time when they are going to be meaningful for policy makers. I don't think you can say that one method is most effective, you need a package of all of them – a whole array of methods at a particular time to be effective and also not just one organization working on its own. You need to work in partnership with other organizations* » (GeneWatch, UK)

A key aspect of their practice is their ability to engage with and influence institutional actors that have access to proportionately greater resources and power than CSOs possess, so their ability to network, help one another and work in coalition with other CSOs is crucial. In so far as issues arise where there are common interests in challenging a new technology, or in achieving improved outcomes for society or individual consumers, they are often able to help one another with information and present a united front in challenging specific issues.

« *Whilst the engagement in political processes is very hard to maintain successfully and we do not possess enough resources to make our own research studies, helping each other gave us the strength to reach the general public opinion and this was successful.* » (COAG. Spain)

Participatory arenas normally available to CSOs include:

Invited consultations: most often in the form of online surveys and questionnaires; sometimes as invitees at stakeholder workshops; in rare cases as members of citizen panels and juries; and, in very rare circumstances as members of advisory forums.

Invited participation occurs when CSOs are asked to contribute to consultations and, rarely, to stakeholder forums and 'dialogues'. Experience of invited participation has been mixed. Is it a wise use of limited resources? There is a widespread feeling amongst CSOs that they have been invited to participate in order to be educated into believing in a pre-determined outcome:

« *I'm trying not to be cynical about consultations. Some NGOs question the value of them, and the way the number of responses are counted and whether some of the questions are phrased in the most helpful way. There are sometimes a large number of consultations. It depends on the outcomes... its sometimes hard to know how that relates to the final policy decision – you don't see the analysis processes behind the response* » (CPRE, UK)

« ...with Stakeholder Dialogues in particular I find them quite hard work because it's not always clear what will happen differently as a result of one being there... it tends to be too hard a decision to decide whether to attend or not! It should be an easy decision if it's something you are working on, but it's normally quite hard to justify the time » (FEC, UK)

Time spent producing a response to a long questionnaire or attending a long and tedious daytime meeting can be seen as a waste of effort, but this may be the only opportunity for the CSO to bring up important issues:

« ...it's important to go along ...and just try to get the issues into the media...With consultations you can spend a lot of time producing a response and then it just disappears into a black hole and you never see any kind of result about your response has been dealt with, even if it has been read » (Friends of the Earth, UK)

On the other hand, in some instances, a refusal to participate carries its own message because, even when participation is invited, it is rarely offered as a means to contribute actively but, more often, as a passive observer: *Institutionalized participation processes are not really open for public contributions ...*, (Kein Patent auf Leben, Germany) and more specifically: *The public is only asked to agree or to disagree with what scientists say, but is not really involved in the scientific process.* (Verbraucherzentrale Bremen, Germany).

Uninvited participation is the most common mode of participation for CSOs. This includes the following: lobbying government at international, national and local level; press/media campaigns; consumer/supermarket campaigns; legal challenges; courtroom battles (as a result of civil action and disruption).

Uninvited participation can be evaluated on the basis of effectiveness and, as we have emphasized, CSOs employ a range of methods and they stress the importance of flexibility in order to use their limited resources effectively. Methods include:

- **Information campaigns** – through media and education – in order to empower citizens to take action and to politicize a debate.
- **Lobbying government** in order to influence decisions (this is considered to be most effective at local government level).
- **Independent research** –is an important aspect of participation in science, in providing alternative interpretations of scientific data (independent peer review), or alternative topics for research. For instance, in the case of MON 863 maize referred to below, we can see how independent research results published by a CSO refuted the claims of the GM companies and provided a new perspective on the health risks of this GMO (see Seralini et al., 2007).



Independent research: the case of MON863

One of the first new insecticide-GMOs in Europe is symbolic of the way GMOs are assessed. The corn MON863 is genetically modified to produce an insecticide. It has been authorized for human consumption since 2005 but the assessment of health risks of the consumption of this GMO has generated a controversy. The Committee of Independent Research and Information on Genetic Engineering - CRIIGEN- played a central role in this debate by publishing the results of a counter evaluation on the MON863 file. This study calls into question conclusions of authorities charged with the assessment of GMOs. It was possible only at the end of long judicial battle to acquire data produced by Monsanto for its file of commercial approval and illustrates the need for greater transparency within commercial research practices.

This is also a good example of positive participative collaboration between a CSO (CRIIGEN) and a University (Caen).

- **Legal actions and challenges** – to challenge illegal actions and protect citizens' rights. Legal actions also provide an arena for public debate.
- **Promoting alternative modes of consumption and 'food cultures'**. Campaigns to boycott products on the basis of their questionable political and ethical production and to create enhanced demand for alternative products, such as local or organic produce, have been highly effective.

« *The most effective method, definitely, has been changing the market – changing demand, because it is that that built the organic market into the multi-billion pound operation globally* » (Soil Association. UK)

- **Civil disobedience.** Civil disobedience (often referred to as 'direct action') is action outside of the law seeking an immediate or direct remedy for a perceived injustice. The extent that this can be seen as a form of participation is illustrated by GM crop destruction in France where it was felt that this was the most effective way to make an urgent intervention in the development of GM technology and that laws can evolve after these symbolic illegal actions.

Civil disobedience: the reapers of GMOs

The idea of "civil disobedience" in connection with GMOs arose from the actions of the Confédération Paysanne, and later the voluntary reapers.. *"This movement of disobedience became necessary due to the fact that there remained no bounds of legality, no territory of expression, in which we could make ourselves heard as citizens. It is about destruction of cultures of which we do not want, to show our disagreement and to call out to the society, and more particularly our governments, on the fact that they impose us without rule and consultation".* The goal was to conduct these actions in public. It is claimed by the activists that they do not aim to sabotage all environment research, but only *"experiments and cultures which contaminate in an irreversible way*

other plants". In addition to this they wish to highlight their opposition to the patenting of living organisms. Another objective achieved by direct action of this kind is the slowing down of the development of agricultural biotechnologies.

Since the first action, the reapings of GMO fields have been repeated every year. Until 2003, these actions were led by the Confédération Paysanne and are supported by CSO such as Attac and by political parties such as the Ecologists or the Communist Revolutionary League. Later a specific association was formed: The Voluntary Reapers (Les Faucheurs Volontaires - FV). 2006 marks a turn for FV by the return of commercialized cultures on the French soil, about 5.000 hectares of MON810 maize. *"From that moment, FV and other association strategies started to change since they were not faced with trials but commercial cultures. The responsibility had to be taken by the State who had given the authorizations. No action of reaping was done, apart from some operations to mark our disagreement towards a farmer who mostly cultivated large fields. We continued the "war" against trials to show our disagreement"*.

The destruction of GM plants by anti-GMO militants, and the resulting media coverage, have triggered a lively internal debate and subsequent court hearings which very effectively served to feed the debate on the issues involved and on the role of public research. A judgement made in December 2005 is particularly significant. The magistrates' Court of Orléans discharged about fifty FV by acknowledging "the necessity" of their action. This decision leans on the deficiencies of French law, absence of insurance and the known risks of cross-contamination. The public prosecutor's office and Monsanto will most likely win the lawsuit on appeal but it is very clear that these actions have drawn the attention of the public to the issues at stake. They widely contributed to the absence of these crops in France, in spite of the fact that the country appeared to be an ideal point of entry for the new agricultural biotechnologies to Europe.

4.3.3 Factors limiting participation in science

CSOs experience exclusion from participation in science in several ways:

■ ■ **Separation of science from its social context**

It is argued that the main factor affecting participation in science is the continued separation of science from its social context by scientific institutions and government. Instead of science in society, where it naturally belongs, these institutions maintain the boundary between science and society. The result is that scientific factors are narrowly framed as objective and highly specialized, outside the domain of societal influence, and social, ethical and political concerns are presented as subjective and negotiable. In this way the issues raised by citizens and citizen organizations are kept separate from the elitist 'ivory towers' of science where it can be argued that citizens lack the knowledge to participate. The experience of some CSOs is that this elitism is maintained by the arrogance of scientists and by highly technical language that it not accessible to lay people, farmers, or even to scientists from other disciplines.

« ...the arrogance of scientists is a major problem in that the prevailing view in the scientific community is that the public are a bunch of dunces that don't know anything about science and therefore shouldn't have any involvement at all ». (GM Freeze, UK).



« The scientists do not accept the idea that basic people are capable of having true information. The scientists have a superiority complex in relation to the citizen and in the practitioners »». (CNDSF, France)

« The difficulty is the scientists themselves and their mentality of clan and intellectual superiority »». (collectif anti-OGM PACA, France)

However, it is important to note that not all scientists have this attitude. The case studies show that there are situations where scientists are communicating across these boundaries. There are many scientists working with CSOs or, because they are judged to be more independent, invited regularly for conferences by the same CSOs.

■ ■ **Overly narrow framing of science and technology**

It appears to the majority of the CSOs that we interviewed that meaningful participation is fundamentally blocked by a lack of political will and by the narrow framing of science and technology at national and EU level in terms of scientific and industrial competitiveness.

« Essentially there is a consensus, in Europe, around the Lisbon agenda, of a powerful knowledge economy ready to challenge China and the US. The direction the technological juggernaut is going at the moment is doing very little to help ordinary people in the wider world. ...I don't see any [participatory] processes that are likely to be funded by the EC to achieve those ends because its antipathetic to the Lisbon agenda. However, were there such processes and we could engage environmental scientists, people who can think outside the box and were able to engage with people who know about sustainable farming, that would be very interesting »». (Practical Action, UK)

This overarching 'narrative' of science as commercially competitive is favorable to the goals of the biotechnology industry and much less so to the concerns of ordinary citizens. It appears to many CSOs that politicians are guided by these narrow overarching frameworks.

■ ■ **Communication problems**

As we mentioned above there are communication issues, and it appears that many scientists are not interested in finding strategies for communicating with and understanding the perspectives of people outside of their domain of expertise. They dismiss the wider public as ignorant of known risk factors and unwilling to consider alternative futures:

« ... when you just express your attitude towards GMOs [saying] no, thanks, I just like the food I use to have – this approach is thrown aside [with the following explanation]: no, we need to educate people not to have this attitude any more, we need to explain, that GMOs are not dangerous »». (Greenpeace DK)

This perspective on public understanding of science, commonly known as the 'deficit model', is challenged by CSOs who argue that understanding works two ways and very little effort is spent trying to translate wider public aspirations into research questions.

« The point is not to discredit scientific opinions, rather it is to make sure that, when new technologies are implemented, the debate may not only be technical but may also include social, economic, political and environmental implications of these technologies ». (Amigos de la Tierra, Spain).

■ ■ **Lack of opportunity to participate**

It is also worth noting that CSOs are rarely invited to participate, as members of advisory committees, in research councils and arenas where research priorities are debated. What generally happens is that research agendas and subsequent policy decisions reflect agreements made ‘behind closed doors’ in a situation that is entirely lacking transparency and where the only opportunity to comment, i.e., to agree or disagree, arises only after proposals have been framed.

In rare instances where meaningful participation is invited, CSOs generally lack the economic, personnel and time resources to participate. In some cases this situation is further exacerbated by unrealistic time frames. It takes time and effort even to respond to questionnaires and surveys, and when members of civil society are expected to be present in workshops, seminars or conferences it is important to understand the barriers they experience: women often have family commitments, farmers cannot find the time and many CSOs do not have available staff.

« We as NGOs do not have the necessary personnel to do it. But those who can make it, is the representatives of the industry. (...) And the result is a relatively distorted image, which depends on the organizations’ resources, and on whether they can claim to represent the public or not ». (Steffi Ober, NABU. Germany).

In the case of the Agro-biotechnology Observatory project (below) efforts have been made to create a network of scientists and CSOs interested in collaborating to evaluate and regulate agricultural biotechnology in Italy and beyond, and to facilitate informed public participation.

Observatory on applications for placing GMOs into the market in Europe

Agro-biotechnology Observatory (AO) is a Genetic Rights Council GRC project, started in 2004. Its mission is to participate in the decision-making process on GMOs. There are limited opportunities for meaningful participation but AO’s main aim has been to monitor and critically analyze all the requests for placing on the market GMOs presented in Europe according to the Directive 2001/18/EC and the Regulation (EC) 1829/2003. Thus, the AO has been using the instruments the Directive affords to participate indirectly in the risk assessment of new GMOs. Moreover, it has promoted, in Italy, an active and effective public participation in the decision-making process by supplying basic, easily understandable scientific information. Besides that, AO has been working on creating a network with other CSOs and with scientists to establish a fruitful dialogue on this topic. Also, with such networks in place, it is possible to create working groups on different topics such as evaluation of possible impacts in biotech innovation and improvement of food safety.

AO has managed to build up a network with experts in different fields (regulation, food safety, ecology and environmental issues) and acquired documents related to the applications on GMOs pre-



sented in Europe for detailed analysis. Comments have been sent to the referral authorities (EC, EFSA). Through a website and a database, information has been supplied to the public.

One of the projects arising from the network of scientists has been funded by the Cariplo Foundation and realized together with University of Milan, the Norwegian Institute of Gene Ecology and University of Tromsø (see <http://www.consigliodirittigenetici.org/fondazione/ogmalimentazione.pdf>).

Outcomes arising from this initiative are both direct and indirect. Directly they arise from the reports on GMOs' applications, published articles and participation in conferences or congresses and actions directed towards institutions (EC, national competent authority, EFSA) to improve the process. Indirectly there has been value in the useful exchange of ideas with scientists. This has even ended up in common projects (such as PS2) and the subsequent realization of an international network. However, there is still a lack of commitment to establish real communication and common work. This factor has been worsened by the scarcity of funds for putting together resources and for realizing the projects, the databases, etc. Moreover, the difficulty of communicating through different languages has also been problematic.

Our experience leads us to conclude that it is still possible to achieve meaningful participation and mutual learning when there is one specific common objective and a willingness to listen to different points of view and exchange ideas.

Some CSOs would welcome the resources to commission or conduct their own studies of evaluation and research on the GMOs at stake, provided that they are given time and appropriate financial resources.

« If you really want the participation of civil society actors in the research process, you really have to provide for a real participation since the beginning of the Project... you have to acknowledge that you need a monitoring council, a committee or a working group. This requires time and resources that you have to include in the very budget proposal at the beginning of the Project » (SEAE Spain)

■ ■ **Lack of capacity within institutions to act on CSOs concerns**

As we already mentioned, a key factor explaining this apparent lack of communication between civil society organizations and the institutions of science is the lack of capacity within organizations/institutions to engage with and act on the responses they elicit from consultation and participatory processes.

« The [lack of] capacity of institutions to take on board what they learn and to extract useful messages in a sensible way out of whatever processes they conduct.... to try and build the capacity of policy institutions to make the most of public engagement, rather than seeing it as a question of doing more processes or improving the methodology for PE. » (Food Ethics Council, UK)

This was particularly evident in the case of the UK's GM Nation debate below where a complex participatory process was undertaken, but it appeared to have very little impact on Government decisions about the future of GM agriculture.

GM Nation?

This case study illustrates a range of factors considered by CSOs to limit participation in science. *GM Nation?* Was an institutionalized and Government sponsored public debate. The various elements of the procedure were put together with the stated aim of promoting an informed and balanced debate and to bring public concerns closer to decision making about the future of GM agriculture in Britain.

In 2002, in the aftermath of widespread public concern about the introduction of GM crops and food into the UK, the Government announced that it intended to organize a public debate about the future of GM agriculture and food in Britain. This organized public debate was set up to run over a three-month period from June 2003 to August 2003 and to be accompanied, in parallel, by two independent reviews of the science and economic factors influencing the commercialization of GM crops in the UK. The debate took place in hundreds of meetings throughout the country and ran for six weeks.

GM Nation? Has been upheld as an example of an innovative and invited participatory process. But was it good practice? It was definitely one of the largest and most successful and complex public participatory events to be organized for a scientific and technical issue of public concern. There were, however, a number of criticisms about how the debate was conducted and concerns about whether it would have any impact at all on Government decisions about the future of GM agriculture. There are clearly lessons in the *GM Nation?* Case study about how to set up and conduct a meaningful debate that is genuinely committed to dialogue and final impact. The important issues are:

Timing i.e. the need for CSOs to be involved early enough for meaningful engagement in the process, and before issues become too polarized.

Clear commitment, needed on the part of governing bodies (and funders), to public participation in publicly funded science.

Adequate resources, needed for everyone taking part – including respect for people's specific timeframes and recognition of the role of CSOs in facilitating the process.

Balanced information, from all relevant sources, including social and ethical information alongside the science.

Well facilitated and democratic dialogue, that is not dominated either by powerful financial interests or pressured by any one specific political bias.

These are a range of the fundamental barriers faced by CSOs in relation to formal processes of participation in science. CSOs realize that for participation to be effective they often have to work outside of the regulatory framework and from the grassroots level, raising the profile of an issue in order to promote a wider debate.



5. Conclusions and recommendations

In the feedback from interviews, and in discussions within the group, we find that, for civil society organizations, participation in publicly funded science is never accomplished easily. Where participatory action is initiated outside the institutional and regulatory framework, it is often seen as blocking progress, rather than adding an alternative perspective or wider peer review. But, contrary to popular perception, we have found that CSOs that were engaged in debates about the development of agricultural biotechnology are not anti-science. The interviews demonstrate the existence of a general interest of CSOs for dialogue and participation, but also the presence of enormous barriers and the absence of adequate tools and resources to realize meaningful participation.

It appears that there is a need to redress the balance, and bridge the gap between science and other sectors of society. CSOs believe that the first step is to begin by reconsidering the relationship between science *and* society, and then for institutions to start thinking in terms of science *in* society. Within this perspective, it is also necessary to recognize that science is always the result of a process of co-production in which several actors contribute with relevant knowledge and where relative social order is being negotiated at the same time. In this respect, many CSOs feel that current institutional policy-making frameworks are disproportionately oriented towards the cooperation between science and industry, leaving other actors within civil society under-represented, if not entirely out of the picture. They believe that there is a need to re-examine the way science feeds innovation so that the whole process is more transparent and equitable. If the European science community is genuinely committed to open and democratic innovation this disequilibrium will need to be addressed through a stronger relationship between the scientific community and CSOs.

As a result of the opening up the definition of participation in science along the lines proposed by the CSOs, the engagement of civil society at an early stage in the research process (upstream) becomes crucial. This is not to suggest that contribution at later stages, such as the regulatory one, or the provision of counter-expertise, is no longer important. On the contrary, an early engagement of CSOs in the research process would enhance and strengthen their contribution in all the other possible stages and contexts, depending on their vocation and strengths. This suggestion did not arise spontaneously but is the result of wider considerations of the relationship between the scientific community and the wider society.

The collaboration between scientists and economic actors stems from an increasing dissatisfaction with the idea of scientists operating in an ‘ivory tower’. As a consequence, national and regional efforts have been devoted in the past decades to bring science closer to society, which too often has been interpreted as encouraging science to operate in close collaboration with industry. As time passed, this cooperation has not only produced a narrow interpretation of society but has also given rise to a

profound imbalance in the social equilibrium, marginalizing other societal actors, like CSOs, and facilitating the gradual adaptation of the research agenda to the needs and interests of industry.

Our original intention was to focus on ‘good practice’ in participation but we found that CSOs believe themselves to be operating within a structure that fundamentally denies them opportunities for meaningful participation. Almost all the events and the schemes implemented to enhance invited participation have been found to be unsatisfactory and the general perception was that not enough effort has been made to make participation schemes work. For example, invited participation is, more often than not, incorporated within a bureaucratic system that closes down debate, rather than opening it up. CSOs have suggested that this is because there is no ‘capacity’ within organizations to take on board the outcomes of this wider participation. However, as the case studies show, there are a few initiatives that, given commitment and continued support, show promise in the longer term. Uninvited participation, on the other hand, is more immediate. It is about opening up the debate and creating opportunities for CSOs to make their views heard: in courtrooms, in legal challenges, in consumer boycotts and in media campaigns.

The main CSO proposals to improve participation in science at the invited (or institutional) level are:

- EU as well as research and political institutions should endow CSOs with real forums and opportunities to express their opinion and to influence the process in an open debate.
- The opportunities for participation should exist from the very beginning of the process, when research projects are authorized or funded.
- Broaden the focus of debate so as to include social and political implications, rather than merely technical, safety and economic issues.
- Promote transparency in science policy. The public should be informed of what are the ultimate goals of publicly funded research, what interests are at stake and what risks are involved.
- Emphasize the need for a precautionary approach that takes into account unacknowledged and longer-term uncertainties in science and the possible long term risks and consequences, by a transparent, alternative and multidisciplinary expertise.
- Guarantee public debate, but also that conclusions of these debates are taken into account.
- Open up the innovation process in order to ensure that everyone, particularly significant stakeholders such as farmers (who work full time and long hours) have enough time and opportunity to consider the implications of new products and to express their opinions on important issues.
- Counter-expertise is regarded as the best way to expose the fact that government appointed experts may be biased towards the interests of the industry. However there cannot be counter expertise without funding. Financing counter-expertise is regarded as a way to gain better objectivity on the problem linked to research objectives and technical applications.
- General issues, like the adoption of very innovative technologies, could be submitted to more direct democracy, (such as a referendum).

Additionally, at a broader (societal) level:

- Promote research that fit the needs of local farmers, like organic agriculture as an alternative, sustainable, and economically viable form of agricultural development.
- Promote cooperation between CSOs and scientific institutions in research projects, such as PICRI (Partenariat Instituts Citoyens pour la Recherche et l’Innovation).
- Diffuse information and improve scientific education at all level, organizing conferences and creating adequate spaces for a dialogue with civil society



Thus, although we are unable to talk about best practices, we are able to address a fundamental misunderstanding which leaves CSOs on the sidelines in the governance of science and innovation and denied an opportunity to participate in an organised and meaningful way. It turns out that this is not a handbook of good practices so much as a fundamental shift in perspective in which innovation directed towards wider public benefits is given greater prominence from the very beginning: good practice follows.

Participation in regulatory stages of science and innovation process can only occur if civil society has been on board ever since the agenda setting stage opened. It is not legitimately possible to expect CSOs and wider society to participate at the regulatory stage if they have not been consulted or involved in early stages, simply because the products of the innovation process that are to be regulated come to be perceived as totally alien and unsafe. On the contrary, if these products result from both a combined effort and a shared path, all the actors involved will be responsible for the outcomes that they can legitimately perceive as 'belonging' to them. In addition, although this wider involvement would inevitably slow down the innovation process, it may uncover problems before huge investments are made and also lead to more creativity innovation because of broaden range of experience drawn upon. It is suggested that closer identification with science and innovation trajectories would facilitate responsible action and build mutual trust among those who collaborate to bring these products to life in a more sustainable way.

10 Principles of effective participation

- **Funding for scientific research should be allocated according to 'public interest'** and the needs of the final user.
- **Early participation of civil society, at a meta level**, when the terms of the innovation process are non-technical.
- **Everyone could, and should be able to participate** at some level and in some capacity and this would necessarily include CSOs as 'stakeholders'
- **Participation must be on an equal footing** to address unequal power relations.
- **Two way exchange of information, open mindedness and genuine engagement**, by the scientific institutions, between themselves and citizens.
- **Debates about science should involve different opinions/viewpoints** and a plurality of expertise and recognition of other types of knowledge that take into account minority opinions.
- **Openness and transparency are crucial** in the development and practice of publicly funded scientific research and its regulation.
- **Easily accessible and non-technical information is required**. The public needs to be given the opportunity to acquire a good understanding of the technical issues.
- **Participation in science requires consideration of specific interests and ways of life** e.g. women's perspectives and specific requirements and farmer's needs and timetables.
- **Public participation in science requires evidence that public concerns have been listened to and taken into account**.

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Annexes

The following annexes are available on the PSx2 web site at:

www.participationinscience.eu

Annex 1: Protocol for Interview

Annex 2: List of the Contacted CSOs

Annex 3: PSx2 partner organizations

Annex 4: Estonian National Report

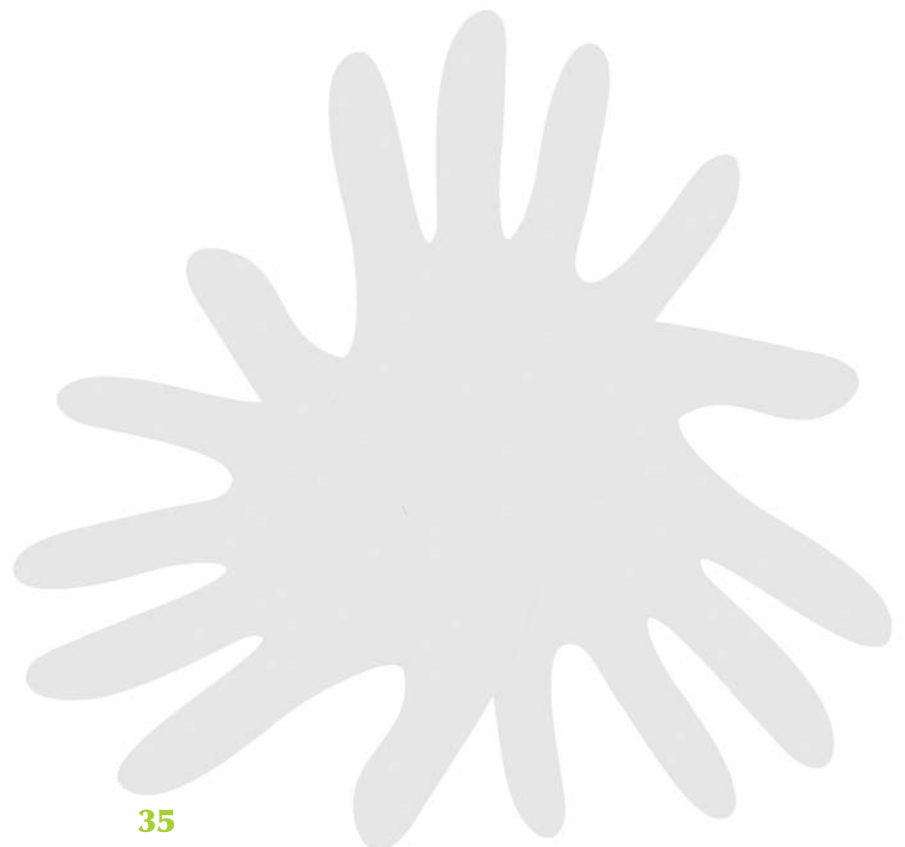
Annex 5: French National Report

Annex 6: German National Report

Annex 7: Italian National Report

Annex 8: Spanish National Report

Annex 9: UK National Report



Partners



Consiglio dei Diritti Genetici

Consiglio dei Diritti Genetici - CdG, Italy
(Genetic Rights Council)



Zentrum für Europäische rechtspolitik an der Universität Bremen- ZERP, Germany
(Centre for European Law and Politics at the University of Bremen)



European NGO network on Genetic Engineering (GENET), Switzerland



GeneWatch UK (GeneWatch), United Kingdom



Comité de Recherche et d'Information Indépendante sur le Génie Génétique - CRII GEN, France
(Committee on Research and Independent Information on Genetical Genie)



E L F

SA Eestimaa Looduse Fond – ELF, Estonia
(Estonian Fund for Nature)

Université de Caen Basse-Normandie



Université de Caen Basse Normandie, France
Institut de Biologie Fondamentale et Appliquée (IBFA), Laboratoire Oestrogène et Reproduction
(Caen University, Institute of Fundamental and Applied Biology, Oestrogen and Reproduction Laboratory)



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Consejo Superior de Investigaciones Científicas - CSIC, Spain
(Higher Council for Scientific Research, Department of Compared politics)