



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

PS2 United Kingdom National Report

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1. The GM debate in the UK

During a period between 1997 and 2005 a whole range of UK Civil Society Organisations (CSOs) became involved in an intense public controversy about the introduction of GM products into the country, when it was revealed that genetically modified soya was being imported from the USA mixed with non-GM soya. Produce was appearing in supermarkets, much of it unlabelled. Another part of the controversy focused on plans to conduct farm-scale trials of genetically modified crops in the UK prior to commercial cultivation on a larger scale. By August 1998 the ‘Great GM food Debate’¹ was well underway and widespread media coverage was assured after intensive lobbying from many CSOs and following an appearance, on British TV, of Dr Arpad Pusztai (a scientist working on a publicly funded project) who referred to his unpublished research and indicated that GM potatoes were capable of affecting the immune system of rats.

Since that time there have been a huge number of governmental and non-governmental consultations, dialogues, campaigns and participatory processes. Many environmental organisations argued that there should be no experimentation in open fields until potential environmental effects were resolved. In 1999 opposition from other non-government organisations and civic groups coalesced into an alliance of 125 diverse organisations calling for a minimum 5 year moratorium on commercial planting and production of GM food². The Government’s environmental watchdog, English Nature added its voice to a call for a precautionary approach and for a moratorium on commercial planting until the necessary research could be carried out.

The Agriculture Environment and Biotechnology Commission (AEBEC) was established, the Government, in June 2000, to act as a strategic advisory body. Subsequent advice from the AEBEC to the Government, that they should hold a widespread public debate prior to the commercialisation of GM crops and foodstuffs, resulted in an organised event, GM Nation³, in June/July 2003. However, the AEBEC was wound up at the end of April 2005. Interview responses collected for this project suggest that, after countless attempts at meaningful participation, many CSOs have felt that their efforts to change the research agenda or affect any changes in policy have been fruitless.

This UK country report represents a summary of the responses to the qualitative structured interviews carried out for the first round of the project (see Appendix X).

¹ As it was subsequently known. See, for instance, Durant and Lindsey in the House of Lords Report ‘Science and Society’ (2000)

² The ‘Five Year Freeze’ (5YF) campaign, later re-named GM Freeze

³ See UK Case study

2. Main goals and objectives of CSOs

The Civil Society Organisations interviewed for this project act on behalf of a range of different sectors of civil society and a variety of representations of the ‘citizen’, not only as individual consumers and farmers or collectively as environmentalists, but in multiple and often overlapping identities – as women, parents or as citizens concerned about social inequalities in a global context. Their goals and modes of operation also vary a great deal in terms of how they set themselves up to deal with the concerns of their members and the way they participate in scientific and technical developments.

The table below lists the CSOs that were selected for interview.

Name	Type of CSO	Goals
Friends of the Earth (FoE)	Environmental organisations	Friends of the Earth is an international membership organisation that campaigns for solutions to environmental problems.
Royal Society for the Protection of Birds (RSPB)		RSPB exists to conserve wild birds and their environment and focuses on the species and habitats that are in greatest danger.
Campaign to Protect Rural England		CPRE campaigns for a sustainable future for the English countryside by highlighting threats and promoting positive solutions.
GeneWatch UK	CSOs associated with Ag biotech	GeneWatch UK is a not-for-profit group that monitors developments in genetic technologies from a public interest, environmental protection and animal welfare perspective.
GM Freeze		GM Freeze is an alliance representing concerned CSOs. It highlights the problems with GM that remain unresolved. It aims to promote sustainable alternatives to GM food and crops.

Econexus		Econexus carries out research and provides information about issues arising from GM development, their safety, implications, patents on life and the impact of commercialisation on wider society.
Action Aid	CSOs associated with development issues	Action Aid is an international development organisation working to tackle poverty and injustice and helping poor and excluded people throughout the world to secure their rights.
Practical Action (ITDG)		Practical Action works with poor people in developing countries to help create practical answers to poverty.
Sustain	Consumer organisations	Sustain promotes food and agriculture policies and practices that enhance the welfare of people and animals.
Food Ethics Council (FEC)		The Food Ethics Council challenges government, business and society to make wise choices that lead to better food and farming.
Soil Association	Food and farming organisations	The Soil Association is the UK's leading campaigning and certification organisation for organic food and farming.
Henry Doubleday RA		HDRA is an organisation devoted to researching and promoting organic gardening, farming and food.
Women's Environment Network (WEN)	Women's organisations	WEN aims to empower women to make positive environmental change and to increase awareness of women's perspectives on environmental issues.

Women's Institute (WI)		The Women's Institute is the largest voluntary organisation for women in the UK. They play a role in providing women with educational opportunities and the chance to campaign on issues that matter to them and their communities.
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The aims and objectives of the CSOs represented here are directed towards a variety of goals:

Some of the CSOs focus attention on broad environmental issues affected by the development of new technologies (strategic environmental impact).

Broadly we are trying to improve the environment and limit negative impacts, by tackling the root causes of those problems. A key focus is the link with communities. The link between environment and society is very important to us. All our campaigns are focused on empowering people to take action, but also to try and effect political changes and to make those changes permanent so you are not relying on voluntary action by companies. (Friends of the Earth)

Others attend to the more technical aspects and risks associated with the technology and campaign in order to enable confused citizens, decision makers (and sometimes scientists) to make well-informed decisions.

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)

Where technological trajectories have already been established, as in the case of GM agriculture, many CSOs are now working to make sure that these technologies are well regulated and, if necessary, to affect policy change.

We are managing the GM technologies through having the right legislation in place. I think we realise that it's going to be difficult to completely stop it, but we feel that appropriate regulations will actually limit inappropriate use of the technology in Europe. But we've done a lot of work on controlling imports from outside Europe – on traceability, risk of contamination and labelling. (GM Freeze)

At a more fundamental, or 'upstream', level of participation in science the goal of some CSOs is less on campaigning to stop the development of GM technologies and more on developing alternative solutions for farming and food production. In the case of the Henry Doubleday Research Association the goal is to develop organic and low-technology farming methods more suited to, or in tune with, local and traditional agricultural practices.

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. (Henry Doubleday RA)

3. Participation in science: what does it mean for UK CSOs?

The question: ‘what does participation in science mean to you?’ elicited responses like: ‘*Are we talking about an ideal world? There is an ideal world and then there is the way it happens at the moment.*’ (Pete Riley, GM Freeze). In an ideal world participation brings science closer to the citizen, either through meaningful participatory processes or through genuine reconfiguration of science as a publicly responsive form of sustainable knowledge and technical innovation. Few CSOs fund their own professional science or involve themselves in scientific experiments but, without exception, it was widely felt that in an ideal world - where science is publicly funded, or directed towards outcomes of public interest, such as food production - the public should have an opportunity of having some input into the direction and overall goals of that science. For participation and engagement to be meaningful this must happen at the earliest stage in the planning and development of a technology – or even before specific technical solutions have been favoured:

Well, I think I have said that I think it needs to start early because I think there is a tendency in the scientific community to get carried away with wizz bang technology without people being given the opportunity to say: ‘hang on a minute what are the economic and environmental impacts?’ and being given an opportunity to direct the research or even stop the research dead in its tracks. This is something that doesn’t happen very often. We seem to get to the point where something is ready to go into full scale production before these questions are asked. That is exactly what happened with GM – everything was done behind closed doors and it arrived on the supermarket shelves and people said: ‘hang on a minute!’ (GM Freeze)

In a democratic society, it is felt that participation should be open to everyone and, since scientific developments such as agricultural biotechnology affect everyone, the science should be responsive to the needs of a broad spectrum of society: this would include special interests such as farming and consumer 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)

Peter Melchett, the senior policy advisor for the Soil Association and a farmer, believes that: ‘*everyone should be encouraged to participate in discussing the issues that science raises - even children. He recounted a story about how he is able to discuss farming issues, such as alternative methods of animal husbandry, with quite young children when they visit his farm.*

CSOs recognise that they act in the role as advocates or mediators for the, sometimes marginalised, groups of people they represent. For instance, the women's organisations argue that a woman's perspective is essential in the case of food technologies and that women should be involved in developments such as agricultural biotechnology at every level.

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)

Organisations working on behalf of people from developing countries, or poor and marginalised communities, suggest that participation is a moral issue and an 'absolute right' for people whose lives are impacted by a new technological innovation:

The communities that we work with have a right to be involved in these debates. These are research debates but they are also policy debates about the implications of the new technologies. I suppose our big mantra is that local communities, poor communities have an absolute right to be involved early on in these debates and, if they are marginalised or by-passed then you can get significant opposition as we saw. They have the right because all communities have the right to be involved in significant policy debates where these developments impact on their lives. (Action Aid)

As we suggested earlier, participation in science, for citizens and the public is about having your views heard and having your input 'right up front' (Margi Lennartsson, HDRA). Participation, or engagement, can happen at any level. For some organisations, such as the environmental organisation the Royal Society for the Protection of Birds (RSPB) and the Henry Doubleday Research Association (HDRA), participation in science can mean active citizen engagement in research:

we actually engage our members, actively, in our work... We have had various teams, all over the world, working on various research projects. The vast majority were either farmers or gardeners. They conducted their own trials...So, in that sense we have very much engaged the general public in science on a practical level – they were involved in the debate and they have been involved in doing. This has been anything from developing new varieties of plants, but also things like a big survey of organic food in the supermarkets. (HDRA)

The idea that citizens can be active participants in data collection is not new. Many environmental organisations have traditionally relied on the voluntary efforts of their members to collect and collate information. 'Citizen Science', as it has become known, is now an important aspect of environmental science.

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)

For other organisations the ideal participation would begin with an attitude of ‘common inquiry’ designed to bring about a two-way exchange of knowledge and concerns:

Ideally it would mean that there is openness and discussion from the very beginning. If one wants public participation there has to be an atmosphere of common inquiry, even though the public may not immediately know what they want, and of looking at the roots of problems rather than trying to impose technology ‘fixes’. (Econexus)

There is no need for the language of science to be exclusive or overly technical. It has been pointed out that the early stage of development, or even before specific developments have been proposed, is the point at which issues are most accessible to the public because the terms of the debate are non-technical: ‘*the key to it is to express the issues in ordinary language.*’ (Soil Association).

People should also be involved in appropriate ways throughout the process of development and governance of the technology. Public participation in science refers not only to basic research and innovation but also to regulation and use of science in policy because ‘*in allowing public participation in framing questions ‘upstream’ doesn’t mean that you don’t need it further down as well – you need all of it*’ (Food Ethics Council).

It was repeatedly said that invitations to participate in science have to be meaningful and sincere otherwise people become very sceptical and do not trust the process: ‘*There is a difference between going to people when your mind is already made up as opposed to really asking them for their input.*’ GM Nation, the UK Government’s public debate about the commercialisation of GM crops and food was given as an example of a public debate that happened in an atmosphere of mistrust. It is noted, however, that there can be a danger of consultation fatigue if too many ineffective processes are set up at every stage – CSOs become sceptical that too much of their time is being spent responding to unnecessary consultation exercises.

4. Methods employed by CSOs

In achieving their goals civil society organisations adopt a wide range of methods to engage with science, as we have noted above. They are pragmatic and opportunistic in their approach to participation: they have to be. Timing is important and choices have to be made about how to deploy limited resources.

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 organisation working on its own. You need to work in partnership with other organisations. (GeneWatch UK)

Concerted action (NGOs forming networks such as GENET) is one way of ensuring participation in a situation where time and resources are limited:

Probably the most effective methods have involved working in coalition with other aligned campaign groups – that’s been very very effective, more power, more voice, more access to expertise and access to the media and policy makers as a result (Action Aid)

The methods employed are largely dependent on available opportunities and participatory arenas. Participatory arenas include:

- Invited consultations: advisory forums; stakeholder workshops; citizen panels and juries, surveys and questionnaires
- Uninvited participation: 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).

The key issue is whether and how these various participatory arenas and consultation processes open up public space and provide opportunities for CSOs to mediate between their civil society membership and scientists and policy makers. Uninvited participation methods, in the form of lobbying, press work and sometimes (although rarely) direct action are all part of a desire to engage in dialogue and critical debate about the outcomes of a particular technological innovation: *Part of the point is to ensure that there is a vibrant public sphere and a lot of room for critical debate (Food Ethics Council).*

When the respondents were asked what they considered to be ‘good practice’, the majority of them had problems with identifying examples of ‘good’ participatory mechanisms. Responses indicated that some examples of innovative methods of participatory technology assessment (pTA) e.g. consensus conferences, citizen juries and citizen panels may be viewed as good practice in terms of **process** - in that they involved a range of citizens and stakeholder in an informed and participatory process - but the **outcomes** have been unremarkable or ineffective. The reason for this overall lack of effectiveness is not necessarily because the process is flawed but because it was not undertaken at a stage where it could affect the scientific research trajectory and was not backed up by a commitment, on behalf of the commissioning agency, to take account of what is being said. Furthermore, it has been suggested that some participatory processes are disingenuous, in that they are set up to help organisations to develop agricultural biotechnology in ways they are already committed to. ‘Model’ participation processes conducted in developing countries were given as an example. Overall, there appears to be a lack of **capacity**, on the part of the commissioning organisation or Government agency, to take on board what is being said:

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).

Other CSOs asked: ‘effective for whom?’ For instance, it has been suggested that many public participation processes are carried out with the aim of overcoming public dissent. In that case they would be evaluated on the basis of their effectiveness in promoting public acceptance of agricultural biotechnologies for biotechnology companies (see section 5).

Very generally, we find that any process in agricultural development which sets out not to criticise power relations in relation to a technology but rather to promote acceptance, is ineffective and resented by the people, especially those who could be negatively affected. These processes can generate a lot of noise, promote the dominant discourse on technology development and do not provide any tangible benefit to the poor majority. (Practical Action)

Civil society organisations are sceptical about the value of invited participation or consultations, such as questionnaires and stakeholder dialogues, if there is no feedback by the commissioning agency, or any evidence of how the consultation has been used:

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)

...with Stakeholder Dialogues in particular I find them quite hard work because its 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 its something you are working on, but it's normally quite hard to justify the time (FEC).

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, on the other hand 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 you're your response has been dealt with, even if it has been read. (Friends of the Earth).

Given the current level of scepticism, within civil society organisations, about invited participation and a lack of opportunity to engage at an early stage in the development of new technologies such as agricultural biotechnology, efforts are often re-directed towards achieving alternative outcomes by other methods. We are told that the most effective methods of achieving this are through media and consumer campaigns. If the market place is currently the most powerful driving force for technological innovation CSOs realise that they need to affect consumer demand:

I think the media has been quite important in alerting the public about what was going on, and that GM was coming into the food chain with no labelling. We wouldn't have been nearly as effective without that media work...Its consumer choice and the media really that have made a difference. (GM Freeze)

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)

5. Barriers affecting public participation in science

When asked about the barriers that affect public participation in science, respondents were at one in arguing that the most significant factor, in the UK at least, is the fact that institutions of science and industry are not genuinely interested in it or committed to public participation. According to Clare Oxborrow: *this is an entrenched position. They've decided already what they believe – I'm talking about civil servants. We will go and meet them for exchange of information, but we will not go and meet them to try and change their minds. They have this mind-set that they know best and nothing that we bring to them or say to them will affect that* (Friends of the Earth). In addition to this, experience with research funding bodies indicates that they do not really want public participation. *'Research Councils have not shown themselves to be committed to it. They are doing a lot more public participation exercises but they haven't taken on board the results* (GeneWatch UK).

Various reasons were offered to explain the lack of commitment to public participation. In the first place, science is often funded by private interests and many people are sceptical about whether this means that it is more likely to be directed towards private, economic outcomes and focused less on public benefits. It is:

The framing of science and technology in terms of competitiveness – as perhaps the number one purpose of doing this stuff in the first place... That is the big overarching limitation because the problem has been framed in a way that most people would disagree with. They would obviously want science to be a good thing for their country's economy but wouldn't see that as the ultimate purpose of research for public benefit (Food Ethics Council).

Another factor to explain this apparent lack of communication between civil society and the institutions of science and industry is the lack of 'capacity' within organisations/institutions to take account of public concerns and views:

the 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)

Where participatory processes are undertaken it appears that nobody is listening and, if they are, their institutions do not have the capacity to take account of what is being offered. The next step would be to pay attention through a more rigorous process of feedback and accountability:

I think you need to put in extra processes so that it wouldn't just stop at delivering the report. This is about talking back to the process of participation – accountability – saying how it has been taken account of in making each decision and that must be part of any good practice. It may be the case that this feedback would say that these considerations were outweighed by other factors – people may not like that but its clear and honest and accountable. I think it's the next step, really, that needs to happen. (GeneWatch UK)

A further factor affecting public participation in science is poor communication between scientists and the public, an elitist adherence on the part of Government and scientific institutions to a

notion of ‘sound science and a failure to acknowledge the ethical and social dimensions of wider public concerns. It has been suggested, by some CSOs, that this elitism is maintained by the ‘arrogance’ of scientists:

Well, I would say that 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. I've been to public meetings, that have been part of consultations, where scientists have been speaking on the panel, and they treat people with contempt almost (GM Freeze).

One aspect of this lack of good communication is the ‘language’ problem – scientists often use overly technical language, which excludes non-specialists (even other scientists):

scientists are specialists and they talk in specialist language to their peers and this is pretty much incomprehensible to everyone else. (Sustain)

There is a problem when scientists take the view that the public are ignorant and that more information, or better education will result in a greater acceptance of a new technology (the deficit model). This is perceived as arrogance rather than genuine engagement. According to Jeanette Longfield, scientists take the view that: ‘*if only they [the public] knew more they would be more supportive*’ but this is not the case because sometimes more knowledge makes people even more concerned (Sustain).

The majority [of participatory processes] appear to have been set up to ‘educate’ the public into accepting a particular and dominant discourse in science and technology. Very few participatory processes are looking for real engagement of the public in trying to understand the purposes, potentials, complexities and nuances of ‘new’ technologies (e.g. GM, nano etc.) from their perspective. (Practical Action)

It appears that, in the case of agricultural biotechnology, the barriers affecting public participation have been more in evidence because, the public have never been able to see the benefits of products from GM agriculture (unlike other new technologies) in spite of repeated attempts to convince them otherwise. Consultation is undertaken with an attitude of: ‘*if we ask you enough times we will get the answer we want*’ (Sustain). Peter Melchett felt that this situation was further exacerbated by: *institutional bias and economic self interest of those that control access to scientific funding who did everything they could to re-direct, limit and obfuscate the engagement of the public*’ (Soil Association).

Others made the point that access to information was difficult due to secrecy and arrogance on the part of the biotech industry in the form of misinformation, lobbying and publicity. In this area there is still a lack of transparency and the public are still receiving confusing and mixed messages about benefits and risks. Scientists working within civil society organisations (such as Ricarda Steinbrecher of Econexus) recount how they experienced stakeholder dialogues and other invited participation, where they began by being open and helpful but experienced hostility and suspicion from industry and government. This eventually made them more cautious in their approach to participation.

6. What do CSOs consider to be good practice in participation in science?

The majority of CSOs see themselves as representing the ‘interests’ of their members – their share of civil society. In contrast with industry, and to some extent Government, which are focused on commercial benefit and economic growth, their focus is on wider public benefits and risks. Ideally, participatory methods would always be directed towards achieving the various social and ethical outcomes outlined in Section 2. Their aim is to create public space for these fundamental social and ethical concerns to be addressed.

In the UK CSOs identified the need for more effective channels of communication, institutional capacity and the conceptual wherewithal to know what to do with it. No specific models were offered - because over-prescriptive notions of ‘model’ participation mask the underlying objectives. Features of good participation in science would include:

- Framing i.e. considering the purpose of science/technology so it is more beneficial to society as a whole (rather than just economic beneficiaries).
- Inclusion of a wider range of ‘stakeholders’, marginalized groups and, where appropriate, the ‘general public’.
- Research Councils must be prepared to think more widely about how to address wider social and ethical issues and about what kinds of research can be funded that will benefit society.
- ‘Intelligent’ and focused use of consultation methods, rather than applying them arbitrarily and without conviction to every decision at every level (which results in consultation fatigue).
- Accountability and transparency feedback from consultants about how decisions have been made and how consultations have been used following participatory processes.

Specifically at EC level:

- More transparency/better information provision (EC networks are difficult to negotiate).
- Involvement of CSOs in directing research frameworks.
- Two-way communication between local communities and centralised institutions.
- Citizen juries/panels at EC level to scrutinise research agendas

7. Summary

It is clear that civil society organisations, and the various sectors of the public they represent, are keen to participate more effectively in science. Research has shown that the public, and the civil society organisations that serve their various interests, are not anti-science⁴. But, a fundamental aim, shared by all the CSOs interviewed for this report, is to direct innovation

⁴ See, for instance, Marris et.al. (2001) Public Perceptions of Agricultural Biotechnology in Europe: Final report of the PABE research project. EC FAIR CT98-3844 (DG12-SSMI)

towards public benefit (particularly in respect of basic needs) as opposed to narrow commercial gain and economic competitiveness.

Everyone could and should be able to participate in debates about new developments that affect their lives. In an ideal world participation in science would begin early and with widespread debate about the ultimate goals of publicly funded science. It has been suggested for instance, that in the case of agricultural biotechnology there are alternative ways to achieve sustainable agriculture (SA, HDRA, AA, RSPB, CPRE).

Evidence suggests that civil society can, and should, participate at every level of scientific innovation, product regulation and commercial marketing. However, CSOs are aware that invited participation is sometimes either non-existent or ineffective (for the reasons given above). So, where they are unable to find space for effective participation ‘upstream’ in the innovation process, they create their own opportunities for public debate through lobbying, media campaigns and legal action. For instance, they recognise the power of market forces and may act strategically downstream to influence the commercial supply chain, by affecting consumer demand for the GM product. Overall, their goal is to utilise any available opportunities to open up spaces for people to participate in knowledge exchange, to debate the wider social and ethical issues and to try to get the Government to listen.

UK civil society organisations interviewed for this project believe that the case of the introduction of GM agriculture has demonstrated a need for scientific institutions, science funders and governing bodies to move closer to society. The message for European science organisations is that there are alternative ways to do science in the public interest, and that wider and more effective participation of CSOs is a step towards it.