



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**

## PSx2 Spanish National Report

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### 1. Historical background

Spain is the third largest maize producer in the EU and is the only EU country in which large-scale commercial production of GM crops has been set up so far. The first two GM crop varieties approved for commercial production were introduced in 1998 (Bt maize 950243 Jordi CB and Bt maize Compa CB). According to the a research project carried out in Cataluña by the Institute of Environmental Sciences and Technology (IEST) of the Universidad Autonoma in 2004, the total area of Bt maize in Spain increased to 32.000 ha in 2003 and reached around 40.000 ha in 2004. It increased to 53.000 in 2006 and seems to have approached 72.000 ha in 2007 (GMO Compass; Ministerio de Agricultura)<sup>1</sup>. Monitoring of BT maize crops by several research institutes and universities has been carried out since the first season they were cultivated, as a result of an agreement with the Ministry of the Environment and because it was a condition of the market approval. According to these studies, there have been no significant negative side-effects from BT maize Compa CB, and the Bt maize was effective at combating the corn borer. Nevertheless, Spanish environmental groups, such as Friends of the Earth, have criticised the validity of the studies because they were funded by the biotechnology company (Syngenta) that produces the BT maize, so in their view the study lacked the independence necessary to be judged credible. One of these studies, for instance, was realized in 2003 by the PG Economics Ltd on the issue of coexistence. The report minimizes the risks of cross-contamination, does not envision a major growth of either organic production or GM maize crops either, reducing, therefore, the question of coexistence to a minor economic issue of negligible implications. Moreover, it encourages organic farmers not only to drop the 0.1 per cent contamination threshold so far maintained but also to take on all the expenses related to contamination tests on their own organic crops. The study, actually, has been funded by the Fundación ANTAMA, which has been created by the main Spanish biotechnological agricultural corporations in order to act as a *think tank*.

In spite of this remarkable extension in GM crops cultivated land, the introduction of the notions of precaution and the precautionary principle for the assessment and regulation of risks related to commercial GM crops is still relatively recent. In fact, as pointed out by the IEST Report, Spanish regulatory bodies have tended to use the words ‘caution’ and ‘cautionary principle’ when dealing with GM crops, whilst environmental and consumer groups have always used ‘precautionary’ to propose more stringent controls for GM crops. Thus, Spain reveals the presence of two main accounts relating to precaution: one, a case-by-case ‘caution’, which is used within the regulatory bodies; the other, a systemic interpretation of precaution, mainly promoted by environmental and consumer organisations, and those farmers opposing GMOs. The former does

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<sup>1</sup> [http://www.gmocompass.org/eng/agri\\_biotechnology/gmo\\_planting/191.eu\\_growing\\_area.html](http://www.gmocompass.org/eng/agri_biotechnology/gmo_planting/191.eu_growing_area.html)).

not approach GMOs as a special technology carrying a peculiar level of risk and/or requiring a specific series of safety measures and practices. In fact, it approaches the question of coexistence merely in terms of economic profitability, farmer choice and label maintenance. In other words, the risk of contamination for organic cultivations is framed as a merely commercial issue, i.e. related to the potential damage against the farmers exploiting the label organic commercially, and not as environmental, i.e. related to the relative hybridization. The second approach, based on the precautionary principle focuses on food safety, environmental protection, biodiversity and economic sustainability. As a consequence, the issue of coexistence does not merely relate to commercial labels and profitability but questions the agricultural system of production as a whole and insists on a holistic approach to the topic, rather than on a case-to-case problem solving approach. The advocates of the caution approach, however, reply that, although social and environmental issues do arise in relation to the GMOs commercialisation, they should not dealt with in the specific area of technology assessment practices.

In spite of such a radical divergence between regulatory practices and civil society approaches, the public debate on GMO related issues has not been intense in Spain as elsewhere in Europe. At the beginning of the GMO implementation in 1998, decision makers released few public statements on the issue and the media paid little attention to the cultivation and commercialization of Compa Maize. The situation, as elsewhere in Europe, began to change in 1999 when several magazines and some media began to address the issue more in details. In Spain, however, they tended to present GMOs as essentially an issue of international policy-making rather than a domestic one, while emphasising the potential application and promises of human medical genetics. Many of the CSOs contacted began to address GMOs cultivations in Spain as one of their main issues precisely as a result of this temporary emphasis on GMOs manifested by the media. Unlike other European countries, the attention on GMOs cultivations faded after the year 2000 and almost disappeared from both media coverage and the public political debates. This period of reduced coverage helped the PP government to approve four new varieties of GMOs crops in 2003.. The authorizations granted in 2003 did not make explicit reference to liability in case of non compliance with the control measures or in the case of economic and/or environmental damage. In the same year, the PP government approved a specific law related to GMO authorization, release and commercialization, which now works as follows.

In case of use of GMOs products for uses other than commercialization – for instance research in confined and protected environment – potential users have a duty to inform the Regional Authority (Comunidad Autonoma). In case, the potential use may imply a dispersion of the products in the environment, the potential users need to apply to the Regional Authority for a specific authorization. The latter will be issued by the same Regional Authority, after the evaluation of a technical report on the relevant GMO and an additional report on the risks for human health and the environment that this product may carry. These reports have to be attached to the application for the authorization by the applicants. In some, exceptional cases the Regional Authority may ask for a consultative opinion to the *Inter-ministerial Council on GMOs* (CIOMG), which is, in fact, the competent National Authority for GMOs authorization.

In case the applicants look for commercialization of GMOs or GM products, they need to apply for authorization to the just mentioned CIOMG, which, in turn has to consult the *National Biosafety Commission* (CNB) for a technical report. The CNB is a consultative body whose opinion is necessary to the process but is not binding. It is composed of representatives of several Ministries (Agriculture, Environment etc.), representatives of affected Autonomous Communities (Spanish Regions), and experts on various related fields, appointed directly by the government. After the

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authorization has been obtained, the GM crops authorized are usually subjected to subsequent monitoring studies, which report to the *National Commission of Bio-vigilance* (CNBv), whose main goal is to elaborate practical measures to ensure the coexistence between GM, conventional and organic crops. The CNBv presents a composition very similar to the CNB but includes six representatives of the economic sectors involved (appointed by the Ministry of Agriculture), one representative of each professional agricultural associations and one representative of the consumer organizations appointed by their general council. In this commission, Greenpeace has been involved as a representative of the latter but the experiment has not been successful so far.

As it is clear from the above, consultation with the public is not contemplated at any point in time before authorization and may actually occur only after authorization has been granted in the context of the CNBv. Even then, as reported by Greenpeace in the interviews realized for this project, the participative interaction has been rather limited and totally ineffective. Moreover, the current monitoring system offers several opportunities to biotech corporations to voice their interests and opinions whilst it proves almost impenetrable to civil society organizations.

As to the debate promoted by CSOs, there are a few important aspects that must be mentioned in relation to the peculiarity of the Spanish context. The debate promoted by civil society organizations has been focusing so far on three main issues, which are human food safety, consumer choice and environmental social concern. More specifically, the organizations have usually stressed the risks that GMOs may produce for human health and insisted on the implementation of stricter controls on food safety. Along with this theme, CSOs have emphasised the importance of labelling in order to empower citizens and consumers. The main idea behind this position remains the belief in the importance of consumer choice, which in their discourses features as a basic principle for GMOs regulation. Finally, the debate has been focusing also on the issue of the concrete risk that GM crops constitute for the preservation of biodiversity and for the possible social conflicts among farmers that the diffusion of GM cultivations may provoke. According to the interviews realized, in this respect, the political situation under the PSOE rule seems to have slightly changed moving towards more awareness of the issues and implications involved in GMOs cultivation. Finally, it has to be mentioned that Spanish farmers have been clustering around two main associations: COAG and ANTAJA. Whilst the former, which is the biggest association (48 per cent of farmers), engulfs all the farmer groups that share a critical attitude towards GM crops cultivation, the latter is positively oriented towards GMOs, is closely associated with biotech corporations and represent around 35 per cent of the farmers.

In sum, the Spanish context is in many ways peculiar within the European Union. On the one hand, it is the country in which most GMOs cultivations are located in Europe, with a portion of cultivated land that approaches 50.000 acres. On the other hand, it is the country where the CSOs have been most cooperative with the project. In fact, all the associations contacted, though sceptical about current state of affairs in participatory technology assessment on GMOs, not only have displayed moderate optimism about certain initiatives of the current Spanish government, such as the *Comision de Biovigilancia*, they also showed a constructive and collaborative attitude towards the need and the feasibility of future participatory practices and initiatives. However, unlike the German case, very few participatory practices have been tried out so far in Spain and there has been very little involvement of civil society organizations at the level of governmental policy-making and regulative process on GMOs. In addition, one of the peculiar outcomes of the interviews relates to the implementation of a national public registry of GMOs cultivated lands, as indicated by the EU regulation on the matter, which in Spain has been set up in a very vague form, which currently does not really allow for exact geographic localization of GMOs lands, nor for its actual size.

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Previous to this project, two main research projects dealt with GMOs participation and attitude in Spain, in comparative studies. The first one, PABE, focused on the issue of perception of GMOs, among both the general public and the stakeholders. The second one focused on precautionary expertise in GM Crops, and studied in detail the concept of caution (*cautela*) used by the Spanish legislation to address GMOs issues as an alternative to the more common precautionary principle. This project has contacted many of the associations previously cooperating with these two projects. As a general introduction, it is interesting to notice that most of the associations began to deal with GMOs at the end of the Nineties, most of them in connection with the rights of consumer issues (AVACU, Facua Andalusia and OCUC) or in relation to the risks and dangers of GMOs consumption (OCUC). Some of the associations focused more on the environmental risks (Greenpeace), in terms of coexistence and biodiversity (Red de Semillas, Seae, AVACU) or on the issues related to the relationship North/South, world poverty and alternative agriculture (AVACU, Amigos de la Tierra).

In the following report, we present first the results of the first round of interviews, placing particular emphasis on the goal and objectives the CSOs contacted have been pursuing and still pursue in relation to GMOs and GM technologies related participatory practices. We will also highlight the main methods and tools employed as well as all the main obstacles encountered in participatory practices or experiences. Finally, we will also deal with the main definitions of participation in science formulated and supported by the CSOs as well as with the concrete proposals they have been suggesting and formulating as a result of the interaction with our project.

## 1. Main goals and objectives of CSOs in relation to GM technologies

We have contacted sixteen civil society organizations in Spain, belonging to three main categories: environmental associations, consumer associations as well as farmers associations. Thirteen associations have replied positively, either filling in the questionnaire or answering to the questions in a phone or personal interview. Two organizations have refused to collaborate on the ground that they were not working on the subject, whilst one association has never replied. In the second round of in-depth interviews, we have selected three associations, one for category. Whilst the results of the first round of interviews will be discussed in the main sections of this report, we have decided to address the outcomes of in-depth interview in a separate report.

Although the different cultural background and final aims and interests influence the organizations' respective social and political action, it was possible to identify some specific actions which feature as common to all associations. Generally, these actions belong to the genre of political and economic lobbying as well as to the general information of the citizens about the risks and the abuses related to the GMOs commercialization and release into the environment. On the one hand, the associations try to pressure political authorities in order to ensure a tight regulation, informed by the strictest interpretation of the precautionary principle:

Our main goal is to force the political authorities to enact a strict policy regulation on all the issues related to biotechnology innovation, especially in relation to GMOs, whose safety has not been clearly ascertained so far (FACUA).

The precautionary principle (one of the principles that have been less respected so far) should always be applied when food safety is at stake (OCUC).

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On the other hand, many of the associations also try to produce pressure on the economic actors, such as the multinational corporations involved in developing and producing GMOs, in order to ensure both better transparency of their actions and more information for the general public.

Second, we try to force the industry sector in order to avoid them falling into the temptation of seeking quick profits without taking into account the implications of a large-scale implementation of biotechnological practices (FACUA).

Some of the associations largely focus on a series of action at the informative level. These actions range from the promotion of responsible and sustainable forms of consumption to large scale campaign to inform the public about the economic, technical and political issues directly related to the release of GMOs in the environment as well as in the market.

The starting point is obviously informing the general public given that they are misinformed by the big companies and not informed at all by the majority of public authorities (EHNE).

For instance, Greenpeace, but also EHNE and Red de Semillas, has been focusing on the threats that GMOs crops represent for the ‘agricultural sovereignty’ of the farmers:

We think that (GMOs) are a weapon of destruction against the agricultural and food sovereignty of the people. Whilst we oppose their release in the environment, we accept that basic research should keep going on as long as it is carried out in totally isolated places, with no interaction with the environment.

In fact, this general attitude, which opposes the release of GMOs in the environment but tolerates, or even supports, GMOs basic research is quite common across the different types of associations. I quote: “*We understand that in biotechnology there is much more than GMOs. Our organization does not criticize technology as such but some of its potential uses and applications (COAG)*”.

In some cases, environmental associations (Greenpeace) and farmers associations (Seae) have also engaged in research and case studies generally related to organic agriculture but also, occasionally, on the impact of biotechnological organisms and products on the environment, on the consumer health on the biodiversity and on the general agricultural research policy. Their main goal is to ensure a high level of scientific and quality control on the GMOs already approved or about to be approved. One of the main criticisms raised by these associations is, in fact, the conflict of interests that characterizes the expert committees, in which the experts selected have, more often than not, professional and/or commercial links with the very biotech companies whose products they are supposed to evaluate. Amigos de la Tierra framed the problem as follows: “*It is crucial that the authorization of new technologies is based on independent research studies, i.e. independent from economic interests (AMIGOS DE LA TIERRA)*”. Actually, one of the main goals these associations pursue is the renovation of the expert selection process in regulative committees, which they propose to restrict only to independent, non-linked scientists working for public research institutions:

Decisions should proceed from independent technical committees. Independent means that these experts not only should be free from any connection with the industry, they should also

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be paid entirely with public money. We want both political and economic independence of those who participate in the regulative committees (Greenpeace).

On the other hand, some of the associations consider feasible the idea of producing 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).

Both environmental and organic farmers associations share a common concern about the impact of GMOs commercialization on the general biodiversity of both wild and cultivated species. One their main objectives, thus, is to slow down the release and the diffusion of GMOs in order to defend and protect agricultural biodiversity. The arguments employed to defend this strategy are various but generally focus on the risk that the gradual reduction of biodiversity may cause in the long run, especially in the event of future and unpredictable plant diseases and/or rapid climate changes.

Genetic modifications may reduce, in fact will reduce, the genetic heritage and, thus, local varieties and the overall biodiversity. With time, this may generate problems of new allergies or resistance to diseases that today are not problematic (AVACU)

In social terms, they defend biodiversity as a tool that guarantees the right to choose of small farmers, as well as their independence and economic competitiveness. In general, this issue is associated with the promotion of organic agriculture as alternative, sustainable and economically viable form of agricultural development. Several organizations mention organic agriculture as the ideal counterpart of genetically modified crops and insist on its environmental and cultural added value. In one case, the association SEAE not only presents the promotion organic agriculture as the main goal of their ordinary action, but also the very field in which they have been promoting collaborative research projects with academic partners, trying to bring science and society closer. I quote *“Originally, the main objective was to promote information exchange and to improve the development of research in organic agriculture”*. This collaboration not only took place at national and local level but also at the European one: *“We have been involved in various European research projects, especially in the sixth framework and in various consultations about the Plan of Action in Organic Food and Agriculture”*.

Red de Semillas presents more or less a similar perspective: *“We have presented our works and studies in the conferences and congresses of the Spanish Organic Agriculture Association, in order to inform and involve the community of scientists and researchers into new research projects that aims at promoting local varieties, which is, in fact, a pending task of current research”*. As they say, their current main goal is to “change the direction of research”. EHNE, the Basque Country association of farmers, affirmed explicitly *“We have worked on Green Revolution and Agricultural R&D, opposing GM R&D and campaigning for a R&D that marries research with farmer knowledge and facilitates farmer independence.”*

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As a matter of fact, in several interviews the two types of agricultural models, GMOs and Organic Farming, often feature as opposite frameworks in the sense that organic agriculture is presented as favourable to collaborative research projects between the scientific world and the civil society domain, whilst the emerging biotechnological research and development in agriculture is presented as an agricultural model that increasingly links techno-science to multinational corporations profits and, therefore, pushes it further and further away from the society at large.

As a general rule, consumer associations share the goals and strategies so far outlined, but focus more on the rights on the consumers, approaching the issues from a more individualistic point of view. In other words, whilst environmental associations and farmers groups insist more on the principle of collective good, highlighting the social and political consequences associated with the release and diffusion of GMOs, consumer associations insist more on the crucial role of public information and transparency, stressing consumer choice as the ultimate solution to the social dilemma raised by GMOs. In fact, their main goal is to ensure consumer rights protection, assisting consumers in their legal actions against abuses and informing them about the risk of consuming GMOs. Apart from this direct action, they also promote a long-term strategy that emphasizes consumer education to different and more sustainable forms of consumption.

Another goal we pursue is that consumers may become reluctant to buy genetically modified products and or that they may at least become more demanding in requiring proper and detailed information about these products before buying them (OCUC).

As a consequence, it is now possible to re-arrange the general goals of the civil society organizations interviewed in the main categories. There is a first general category that comprises several actions largely pursuing an improvement of both quantity and quality of information about GMOs innovation, release and commercialisation. This category of actions mainly aims at studying the impact of GMOs release on biodiversity and human health, and approaches GMOs in terms of the risks they represents for both the natural and the social environment. In this respect, it has emerged clearly that CSOs generally opposes uncontrolled release of GMOs in the environment but that they accept basic research on GMOs in safely isolated research environments. In fact, some organizations admit that is necessary to keep doing basic research on GMOs in order to comply with the precautionary principle: unless it is proved that GMOs are safe, they should not be released into the environment. It is self-evident that scientific research is the only way to acquire information on GMOs safety.

There is a second category involving more constructive actions, which are not limited to radical opposition. Within this category, it is possible to identify two main types of actions. On the one hand, CSOs try to promote alternative forms of agricultural development, such as organic agriculture. On the other hand, they try to influence the research agenda, change research directions and policy and, occasionally, to contribute with their own studies and research activities.

Research related actions are directly linked with a third main category, which presents a strictly political nature and focuses on lobbying strategies. In fact, all CSOs, though with different emphasis and outcomes, consider political pressure on regulative institutions and policy makers a crucial activity, to which they are highly committed. It is an important strategic area, which implies two main types of actions. The first one, which they consider quite successful, concentrates on indirect forms of political pressure, such as political campaigns, demonstrations, boycotts and consumer actions, conferences and thematic days. The second one contemplates direct forms of political pressure, normally exercised in decision-making or consultative governmental bodies, such

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as regulative committees and/or consultative bodies. The latter type of action, however, has been almost always presented as a failure, for reasons that will be dealt with in details in section 4 of the present work.

The last main category relates to consumer actions. In general, these actions are enacted by consumer associations and aim at empowering the consumer from both a cognitive and a legal point of view. In other words, CSOs engage in this type of actions in order to enable citizens to act directly on the issue at their micro-level, backed by the legal protection and the organizing power of consumer associations. Although this category mainly relate to consumer associations, some farmers organizations also engage in similar actions in order to help, empower and protect their members vis-à-vis the big agricultural and biotechnological corporations.

## 2. Main methods and tools employed

The variety of goals and the diversity of the associations involved and contacted for this project led us to identify an equally large variety of methods and tools employed. Some of these methods are participative in the sense that they try to establish some forms of collaborations with scientific institutions and personnel, occasionally as a result of CSOs scientific expertise and research studies. OCUC, for instance, considered their research studies as very important: *“The implementation and publication of our own studies are very useful to address certain issues and topics in details in order to offer our own opinion whenever possible”*. Focusing on research about organic agriculture, Red de Semillas also emphasised the importance of their own internal research programs:

Our own internal research has been published in various conferences, in the Spanish Organic Agriculture Society as well as among the community of academic scholars, with whom we could and we should collaborate to develop new local varieties, which is, in fact, an unaccomplished task of current research (Red de Semillas).

It is interesting to notice that research collaboration has indeed taken place in the last year in the field of organic agriculture, but there is no equivalent in biotechnological agriculture. Greenpeace explains this phenomenon as following: *“Unfortunately, the pressure exercised by the biotechnological industry is huge and even the socialist government is, to a certain degree, linked with the industry”*. The connection between the scientific community, the biotech multinational corporations and the political actors is, almost without exception, considered the main obstacle preventing a more open, participative dialogue between the scientific community and civil society organizations. I quote. *“In the Comisión de Biovigilancia, we invited the scientific members to make a public statement in which they were expected to declare that they had no link with the biotech industry. Unfortunately, none of them accepted to make such a declaration”* (Greenpeace). Apart from the link science-industry, several associations pointed out how difficult is to achieve a real participative dialogue with scientists and experts. The main reason, as they say, is the persistence of a deficit model approach among the scientists and the experts present in the main regulatory or monitoring bodies. In the same Commission, for instance, the presence of a member of Greenpeace representing the CSOs was not tolerated. *“When we met for the first time, as soon as realized I was there to represent the environmental movement, two experts stood up and said: if anyone can sit here we’d rather go home, and left the room”*.

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In spite of the persistence of a deficit model attitude and of the link between the industry, the scientific community and the policy-makers – which is perceived as structurally pernicious for its implication on both scientific reliability and political accountability – some associations do consider the dialogue with the scientific community as an important participative tool, even in the absence of internal research and studies. I quote:

Sometimes, we come across the paradox that various national research institutions are researching in depth some issues that are totally unknown to the population and that are of no use to the general public. If the actors developing these technologies would take the public opinion into account, this would be public participation (AVACU).

In fact, Red de Semillas pointed out that a better collaboration with the scientific community should also be complemented with the participation of the local farmers, especially in relation to the promotion of local plant varieties. These methods belong more to the direct participation type, which call for a close collaboration between CSOs, scientists, producers and farmers as well as policy-makers. These methods are mainly used to re-orient the research agenda, promote of transparency of information and of a more effective exchange of opinions, to develop a closer connection between civil society and scientific community as well as to broaden the scientific debate so as to include alternative scientific contributions offered by both CSOs and independent experts.

The direct form of participation, however, is neither the most frequent nor the most important one, for CSOs find it more effective and useful to engage in what we have been elsewhere defined as ‘indirect’ type of participation. It is indirect because it does not aim at influencing the techno-scientific production system directly, i.e. through alternative research contributions or direct CSOs involvement in academic, industrial or regulatory bodies. It rather aims at influencing the general scientific policy of a given government in a given society by operating at the level of the general public opinion, mainly through the media, or addressing directly the consumers, in order to exercise through them an indirect pressure against the biotech industry and the policy makers.

Among the indirect methods and tools employed, the presence in the media is often considered a crucial and effective one. The main advantage of a significant media exposure is the possibility of reaching a wide audience in the general public whilst at the same time exercising pressure on policy makers. It is probably the tool with the widest reach, but some organizations believe it should also be complemented with a constant participation in cultural, social and political events; such as demonstrations, public events, and local celebrations. In these events, many organizations implement big national campaigns on specific issues, using their own material as well as independent (academic) studies. I quote:

The media are very important as they reach the people... we also organized thematic days in which farmers and general public may participate, in which we can speak about our main issues... yet, speaking with the media is very important (COAG).

We organize a biodiversity fair every year, some thematic days in which we not only try to present the issues related to local biodiversity, but also promote exchanges and cooperation among farmers (Red de Semillas).

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Whilst all the organizations try to address the general public in order to promote awareness, and alternative views on the issues of biotechnological farming and biodiversity, some of them try to address the citizens as consumers. In other words, some associations not only try to defend the right of the consumers vis-à-vis the producers and distributors of GMOs products, they also try to set up educational campaigns to promote alternative models of consumption. Greenpeace, for instance, suggested that these educational actions involving the consumers are very important because of the specific consumption model currently dominant in Spain:

We live in a context in which the consumer looks for a cheaper product and neglects the aspects related to quality. We do not know why Spanish consumers, once they had achieved high life standards, did not change their consumption style favouring quality over quantity – I guess this should be studied by sociologists and anthropologists – here, people did not switch to healthier and more sustainable food habits, like in France, Italy or Germany (Greenpeace).

The alternative models proposed by the CSOs in their educational action with the consumers generally emphasise the importance of agricultural sustainability and of organic farming, as well as the preservation and promotion of local varieties of food and crops.

The best and most rewarding action, which is in fact the one with best results, is to be done with the consumers. We always thought this is among the most important actions... and we organize several meetings, food and wine tasting... this usually achieves very good results, especially when people see realize how much biodiversity exists (Red de Semillas).

In general, the organizations prefer to work in collaboration with other civil society organizations dealing with similar or parallel issues and showing compatible approaches. Although the educational actions constitute probably the most important actions among those involving organizations and consumers, some CSOs have also mentioned boycott campaigns as alternative and effective methods to promote not only a change in the public opinion but also concrete outcomes in the market.

There is a fourth set of tools and methods usually employed by CSOs, which refers directly to the political and normative domain. Many of the CSOs try to engage, whenever possible, in political processes with local and national political authorities. Although it is a common opinion that this type of action, with its relative tools, may turn out to be crucial, several associations admitted that it is usually quite ineffective. I quote

“The engagement in political processes and normative regulation processes is quite difficult, and the results are rarely the one we expect. The point is that the political and normative structures are quite rigid and hostile to innovation processes (OCUC).

Politicians are obviously a weak link, due to their supposed “realism”, i.e. sudden conversion to the *status quo* once in power, the no-longer-so-hidden priority they give to big company interests even when these clash with public interest... (EHNE).

Public administration keeps a closed attitude, unwilling to listen to the citizens on those issues that affect them directly. In fact, they make sure that these issues are discussed only in a scientific debate or in a legislative committee (FACUA).

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In fact, some associations pointed out that occasionally their experience in the political processes has been successful, but they also acknowledged that remains a hard and unpredictable area of action, especially because most of times the participation of the CSOs occurs when the basic decisions have already been taken and there is no real space for debate and change. The same situation applies to the relationship between the scientific community and the CSOs. Some organizations pointed out that the relationship remains difficult because of three main factors: the persistence of a deficit model attitude, the link between the scientists and the multinational corporations, and the lobbying power of the latter. I quote:

The experts have such a closed attitude that it is very hard to make them take seriously any other contributions, even in the presence of sound and independent data” (Amigos de la Tierra).

The relationship with the scientific community it is difficult in the sense that we find it hard to find interested researchers willing to work on this area (organic farming) in participative research directions (SEAE).

In general, the CSOs contacted believe that their actions should be conducted along three main directions, dealing with different actors. The first direction addresses the scientific community directly, either through research collaboration and agenda setting negotiations or through the introduction of independent studies and research in the general scientific debate. The second direction relates to the interaction between CSOs and the political domain, which includes parliamentary representatives as well as policy-makers, both at the normative and regulatory level. Finally, the third direction focuses on the interaction between the CSOs and the public in relation to public opinion formation processes. Here the public is intended as both the general public and the individual consumers as such. Each of these directions require distinctive tools and methods, which yield different results and outcomes, depending on the general situation of GMOs technological and commercial development as well as on national and local factors, which require CSOs to develop a high degree of flexibility. In turn, this flexibility is considered one of the main advantages that CSOs possess in their confrontation with multinational corporations

There are not more or less effective methods in general terms: what works here one day, won't another or what works here may not work in, say, Italy. That is precisely one of the reasons why the big companies can't fight back easily. They just don't get the feel of ordinary people and they cannot cope with the huge power and range of initiative, imagination and militancy shown by the quality farm and feed movement (EHNE).

Yet, whilst the tools and methods so far developed in relation with the scientific community and the political domain have been only partially effective and successful, the methods and tools employed in relation to the general public and the consumer movements have been almost always successful.

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).

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### 3. Participation in science, or participative science?

As previously outlined, many of the CSOs have experienced some cooperation with both the scientific community, although mainly in organic farming research, and with the policy-makers, especially in the regulative stages of the techno-scientific process. Given their mixed or even negative outcomes, the CSOs have developed a critical attitude towards participation in science, not so much at the theoretical level, where they keep a relatively open and collaborative attitude but at the practical level, where they look sceptical and, occasionally, worried. Nonetheless, CSOs seem to believe not only in the necessity but also in the viability of a participative science. More specifically, in order to have a participative science, that is a science that ensures participation the CSOs have outlined some conditions, or basic elements, without whom it is not possible to speak of participative science. I wish to outline them as follows:

One of the main issues mentioned relates to the importance of public information and transparency. The CSOs affirmed that there is a general lack of transparency, which in turn affects both quantity and quality of public information on the implications and safety issues related to GMOs. This situation, as they remarked, eventually discourage public awareness and prevent any serious public debate. In contrast, the CSOs insisted on the promotion of a real and inclusive public debate, followed by a large consensus, whenever the issues at stake are related to food, health, environmental safety, and social repercussions of any new technology funded, implemented and/or commercialised.

To make sure that any participation in science may be effective is absolutely necessary to have an adequate access to information, especially when we deal with research projects related to agro-biotechnology. It would be interesting that civil society organizations could know more about these projects, given that the results have an impact directly on the citizens. In addition, in organizations like us there are technicians and experts who may well contribute with their vision (OCUC).

CSOs insisted that participation in science is a complex issue, which cannot be simply addressed by adding more representatives from CSOs, i.e. by quantitative solutions. In other words, upstream participation and involvement of CSOs representatives in local and national, political and technical, committees is not enough. It is necessary to **broaden the debate**, so far excessively focused on technical issues, so as to include **social and political issues**, consequences and repercussions of GMOs development and commercialisation. In the second quote, another related problem has emerged, that is the social function of scientific research, which is considered crucial by the CSOs.

I think it is common opinion that this topic should be dealt with only by experts, therefore most of the times the participation of the society is restricted, on the basis of the belief that the society does not understand and therefore cannot express a valid opinion [...] which is false, because the society understands very well and can legitimately talk about evaluations and fears as well as about the need of being informed in details about these things, because in no case it is acceptable to put our health at risk for economic interests (FACUA).

I believe 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 to for you to

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publish your paper, it has got a social function of development, and specifically of sustainable development.

The need to involve CSOs at all times in the research process, from the debate on research priorities and funds to the final approval and regulation of product for commercialisation. This has been elsewhere described as **upstream participation**.

Participation should always occur at the early stages of research plans, in order to analyse the problems and to establish what is useful to be researched in the national research programs: It is necessary to define together what the most urgent problems are so that the scientific research may tackle them (AVACU).

In the very same way in which pharmaceutical research takes into account patients' opinion, it is convenient that farmers, workers and consumers may take part In this scientific debate (GMOs), in order to make sure that researchers and experts may discuss, study and elaborate their research not only in their laboratory but also taking into account the opinions of the society at large (FACUA).

In fact, as Red de Semillas suggested, it would be necessary to slow down the speed of the process, in order to ensure that even those participants, who work full time on other activities, such as the farmers, may have enough time to consider the implications of the new products, advantages and disadvantages, and to react and express their opinion on the most important issues.

We have to make sure that no ones 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.

In one case, the association EHNE went as far as to question the very nature of science itself.

The whole science issue needs to be opened up to debate, from the very beginning, which means re-considering all existing science projects and proposals, given that the dogma itself needs serious debate (EHNE).

In general civil society organizations seem to make a distinction between **public participation** and **civil society participation**. The former usually refers to the involvement of the general public at large, through specific tools, such as referendums, consensus conferences, and so on. The latter, in contrast, refers to the participation of civil society organizations, which implies the active participation of CSOs representatives in all institutional and political contexts where other types of organizations are involved, such as, for instance, the GMOs producers.

The point is that when the main research lines are defined, in this decision making process all the actors involved in this sector should participate: consumers, farmers, researchers and experts... because most of times nowadays are selected research lines that are of no general interest (Red de Semillas)

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In fact, Greenpeace mentioned the recently constituted *Consejo Asesor de Medio Ambiente* has been presented as a possible model, especially in relation with a new internal committee on GMOs where Greenpeace has been invited, too. Yet, the committee has been meeting only once and, in the meanwhile, several decisions have been taken at the political level without even informing the members of the committees.

They also suggest broadening **the set of criteria** to assess the viability of GMOs development and commercialisation. The economic criteria, usually narrowly focused on economic benefits, neglect what should always be considered the main criterion: the public good. Technical and scientific safety and economic gains are necessary but not sufficient conditions to grant support for GMOs.

The regulatory process is crucial and should not only take into account technical aspects but also all the most important social aspects implied, which can only be achieved through the participation of the actors involved. For instance, the introduction of GMOs is has produced a situation in which some farmers oppose other farmers; now this is a social issue rather than a technical one and nonetheless quite relevant. Another example is introduction of bio-diesel, which is having dramatic consequences in the developing countries (Amigos de la Tierra).

In addition, CSOs argue that current debates, based merely on the scientific evidences provided by the GMOs producers, are unacceptable. In this respect, some organizations suggest a double pattern for private and public research. On the one hand, public scientific research should be merely conducted on public funds by public research institutes, on an equal balance between those research lines that focus on biotechnological development and those that should assess the actual and potential implications of GMOs for human and animal health as well as for the preservation of the environment and of biodiversity.

To be really at the service of the society, public scientific research should not receive fund from any private source; it should only receive public funds, equally distributed between technological development and the study of its potential effects, including the environmental and the social ones (Amigos de la Tierra).

Scientific research would be neutral only if it relied entirely on public funds. As long as the multinational corporations keep funding the research projects in the Universities and public research centres, the nature of scientific research will be perverted. The researchers live out of their projects; therefore they are forced to focus their research on the issues and themes selected by the multinational corporations paying for their research (VIDA SANA).

On the other hand, Amigos de la Tierra pointed out that private research should be subjected to a more serious monitoring before authorization is granted. In this respect, **it becomes necessary to fund independent studies** to make sure that the debate may eventually be balanced and reliable.

It is incredible that in order to obtain authorizations for the commercial release of GMOs the evidences provided by the same companies that applied for authorization are usually sufficient [...] It is crucial that all the authorizations granted to new technologies should be based on research studies that are thoroughly independent from any economic interest (Amigos de la Tierra).

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Finally, **public information**, through extensive media campaigns, is absolutely necessary to make sure that the final users of these products may freely decide on their consumption habits

The most effective instrument we have is public information, which we deal with through publications, our website, 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).

We believe that the consumer has the right to choose whether to eat transgenic food or not, and that current regulatory norms about labelling are not sufficient to guarantee such right (VIDA SANA).

In sum, although generally critical about current modes and processes of participation, CSOs showed a remarkable cooperative attitude that not only emphasised the crucial importance of civil society participation in both the research and the regulative processes but also constructively proposed some guidelines to help with the setting of a regulation process democratic and participative at the same time. In brief, their suggestions for a truly participative science can be summarised in the following points. CSOs suggest to: a) broaden the debate, b) involve civil society in upstream participation, c) make a distinction between civil society participation and public participation, creating opportunities and instruments for these two different channels of communication and interaction separately, d) broaden the set of criteria to assess the viability of GMOs, e) fund and include into the assessing procedure independent studies made by researchers unconnected with biotech corporations and, finally, f) improve sensibly the quality and the transparency of flow of information to the public, in order to empower citizens to decide freely and consciously about their consumption habits. Finally, we would also like to include and quote the definition of participative science formulated by the representative of the association SEAE: *“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”*.

#### 4. The main obstacles to an effective participation in science

Although the following paragraph may repeat, in many ways, some of the issues and themes previously mentioned and discusses, the CSOs interviewed did mention explicitly some of the obstacles that have so far hindered or, even, prevented real participation in agricultural biotechnology related to GMOs. Therefore, though briefly, we would like to reconsider some of them explicitly because this may facilitate the following task, which relates to recommendation for future policy-making processes. First of all, it was common opinion among the interviewees that the persistence of a deficit model approach is still wide, strong and dominant. In almost all the opportunities CSOs had to make their opinions, concerns and suggestions heard, the latter were quickly dismissed on the grounds that non-scientific or non-technical opinions should not be taken into account as they are irrational or relativistic:

Those opinions that do not proceed from the scientific domain are usually discredited. In contrast, we claim the right of civil society to express its opinion on the introduction of biotechnology in our lives (Amigos de la Tierra).

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In these types of projects, in general only experts get involved; it is quite uncommon that the opinion of consumer associations may be taken into account (OCUC).

In this respect, the public administration has shown little flexibility, unwillingness to listen to its citizens in those issues that, in fact, affect them directly. The administration has simply carried the issues to the scientific debate or to the legislative settings [...] however, in this respect, it would be more appropriate that also farmers, consumers participate so that when the issue gets to the laboratory the researchers may take into account the opinions previously expressed by the society at large (FACUA).

The technocratic attitude, however, was not only restricted the number of actors legitimated to participate, it also narrowed down the focus of such debate, preventing social, environmental and political issues from being seriously addressed and taken into account.

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, economics, political and environmental implications of these technologies (Amigos de la Tierra).

One of the economic implications mentioned relates to the huge economic and political pressure exercised by biotech multinational corporations. This very issue has been generally identified as one of the main obstacles against fair, independent and reliable technology assessment procedures, which in turn negatively affect public participation.

In the case of biotechnology, we know what is going on in terms of market pressure from the US and the European Commission, whenever there is no consensus; simply adopts its decisions under these pressures, according to the needs of the industry (COAG).

In any event, and in spite of all these factors, the main problem remains that there are usually very few opportunities to participate, for CSOs are rarely invited to cooperate either in the research or in the regulative process.

From what I see, both research groups and public administration have rarely looked for civil society participation. Whenever we participated, it was rather an informal participation because they have never formally invited us (RED SEMILLAS).

In fact, even when some participation of civil society is sought for, the CSOs generally lack economic, human and time resources and cannot afford to actively take part in the participative processes open so far, especially because of the limited time granted to react. As previously mentioned (section 1), some CSOs have consistently insisted that time and resources should be officially devoted to enable civil society organizations in both scientific and regulative processes. In fact, CSOs also deplored the poor development of existing participative processes, which are limited to consultative forums where CSOs have no real power to make a contribution. In some occasions, the CSOs have pointed at the trade unions system as a model for effective participation in policy-making processes.

It is necessary to include representatives of civil society in the technology assessment procedures (like the European Food Safety Agency, for instance) or, even better, to create

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new assessing organs composed of civil society representatives whose opinion may be taken into account on an equal foot with the technical committees (such as the *Consejo Asesor de Medio Ambiente* in Spain). These new organs should have the authority to influence policy making and research practices in all its stages, from funding to authorization (Amigos de la Tierra).

Finally, CSOs argued that the strict financial interconnection between multinational corporations and academic centres remains a formidable obstacle against public participation. The private funding of public research is considered as a crucial driving force behind the gradual dependence of public research institutes on private resources, which is often presented as a phenomenon of 'perversion' of scientific research.

Last but not least, various CSOs shared the opinion that the focus of the current debate, which is essentially centred on technical issues, is excessively narrow. They bring examples of non-technical issues that should be debated, such as the current social tension between farmers using GM seeds and traditional or organic farmers, the social and the environmental risks associated with the destruction of biodiversity, the economic impact of GMOs monopolies on the life and work of farmers operating in the developing countries, the impact of bio-diesel production for the price of wheat and bread in developing countries and so on and so forth.

In spite of all these hindering factors, however, some CSOs have been involved in participatory processes at both national and local levels, in relation to organic agriculture and it seems that in this field they had positive experiences. These experiences lead us to think that the very theme, i.e. GMOs as it is currently framed and socially structured, may be a major factor hampering successful participative processes in scientific and technological development. Previous negative experiences, lack of trust and permanent confrontation among the various stakeholders, combined with the low profile often adopted by public administration seem to have largely contributed to the current impasse, which does not allow for more successful participative practices, as those set up in relation to organic agriculture.

## 5. CSOs proposals

The CSOs interviewed did not limit their contribution to a negative criticism of current participatory practices, but spent some of their time to suggest concrete measures, ideas and proposals to improve and sustain future participatory practices. In fact, none of the organizations contacted ever expressed a negative opinion about participation as such, for they all acknowledged the importance and the contribution that real dialogue and participation may bring into scientific and technological processes. As a result, it has been possible to reconstruct a sound set of proposals to help with future reflection and action on GMOs scientific participation.

The first, and most essential, measure the CSOs suggested was a wide diffusion of scientific and technical information about the GM products authorized or in the process of being authorized. Such information should not only include all the data used by the companies to support their application, but also all the data and results of monitoring studies that follows authorization. In fact, the proposal implied also the availability of these data for alternative studies, conducted by public research institutions on a totally independent basis. Both data, public and company-owned, should be available at all times to CSOs interested, which claim the right of being fully considered as stakeholders. The flow of information, as CSOs continued, however should not be one-way but

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reciprocal, in the sense that CSOs are also committed to exchange their information with experts, policymakers and industry representatives.

It is necessary a better information, because most of the times the results of the research do not reach any of the farmers and associations interested, for the transfer of information fails in several occasions. This in agriculture is even more so: the themes and fields of research are often disconnected from the real needs of the farmers (VIDA SANA).

It seems basic to me that there should be a reciprocal transfer of information, so that they (the experts and the industry representatives) may also know well what the society thinks and relieves (COAG).

Although crucial, correct and reliable information is no sufficient condition. Some CSOs pointed out that it would also be seriously beneficial the establishment a clear and fixed protocol, regulating all the steps and stages of research, authorization, commercialization and monitoring of GM organisms and products.

The EU should elaborate a framework directive that may fix all the steps that each national country should adopt and, at the same time, set a pause in the research process in order to include civil society and re-adapt the research process to the needs of the citizens. In this directive, the EU should make clear who is expected to participate, how and through which mechanisms (AVACU).

In this new participatory framework, it seems crucial that the EU as well as the research and political institutions endow CSOs with real forums and opportunities to express their opinion and to influence the process in an open debate.

The research and political institutions, as well as the European Commission, really have to understand that they have to open new ways – without bypassing the experts or the policy-makers who in fact have to take the final decisions – new ways that may encourage civil society to participate, express its opinions, and even contribute with its own experts (FACUA).

One of the points on which nearly all CSOs insisted was the moment in which participation should occur to be most effective. Current regulatory practices involve participatory stages almost always at the end of the regulative procedure, when most of the decisions have already been taken. This constitutes, in CSOs' opinion, a formidable obstacle to real participation. In fact, the opportunities for participation should be granted since the very beginning of the process, when research projects are authorized or funded.

In general, the process ends when there is legislation, and some norms are approved and transformed into rules that regulate these activities of production in farming. We do not believe that this moment, in which a norm already exists, is a good moment for participation (FACUA).

First all those who are affected by decisions in science should be listened to, not only those who are financially and economically involved in selling this technology Second, these actors should be take into account since the very beginning of the political and legislative process.

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Third, this participation should not only be consultative but also politically relevant: our opinion must have an impact on the development of science (Greenpeace).

In some occasions, CSOs suggested that further committees should be created in order to allow for a different expertise to be taken into account. These committees should be compounded of various representatives of civil society and should give a binding opinion on the social, economic and political implications of a large-scale commercialisation of GMOs.

In addition, other CSOs introduced a new concept, which addresses the issue of political accountability. In their opinion, the authorization of GMOs implies a responsibility for future consequences and implications of those who first authorized the product. As a result, in case of environmental or health problems, this responsibility implies a liability not only of those who actually produce and commercialize GM products but also a *political* liability of those politicians who authorized them. In fact, CSOs asked for the elaboration of a public form to enforce this liability, so that policy-makers may become more responsible and cautious when dealing with GM authorization.

Finally, one of the main issues related to the enhancement of public participation was the lack of resources. Participation in technological issues requires time, educational efforts, and a lot of financial resources, both for participation in regulatory and advisory bodies and for acquiring information and spread them. Civil society organizations, most of the times, are not able to afford these costs and this very aspect prevent real participation from occurring. As a consequence, CSOs claim a substantial reform of current participatory practices, not only in terms of *who* should participate, *when* this participation should take place and *what types of implications* should be taken into account, but also in terms of the *time* needed and of the *resources* that should be made available to enable the CSOs to a full and effective participation.

Another point, which is related to the reform of participatory practices, was raised in relation to the participation of experts and scientists in the assessment exercises. CSOs insisted that the contribution of experts and scientists is of enormous value and absolutely necessary for the participatory practices to function but they also made clear that these scientists should be independent from any link with biotechnology firms and should have no economic interest in the matter. As a consequence, CSOs propose to elaborate a declaration of independence that all scientists and experts should sign before taking part in any advisory or regulatory committee. In fact, this declaration of independence was submitted to the experts present in the Bio-vigilance Commission, but none of them accepted to sign it.

## 7. Conclusion

In sum, the suggestions advanced by the CSOs encourage both policy-makers and scientists mainly aim at reconsidering current participatory practices, especially with regards to the definition of the legitimate stake-holders, to the different stages in which participatory practices should occur and to the types of societal expertise that should be taken into account. In contrast to current models of participation, they suggest to involve farmers, environmental organizations and consumer associations along with experts, policy-makers and industry representative since the beginning of both the innovation and the regulatory practices. In this respect, they even suggest to create *ad hoc* committees with the task of broadening the focus of debate so as to include social and political implications, rather than merely technical, safety and economic issues. Yet, their contribution is not

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merely oriented towards practical suggestions reforming current systems. In fact, their reflections call for a general re-definition of the nature of the scientific enterprise as such, of its purposes and of its social role and relevance. They consistently advocate a new concept of science, which ceases to consider research in technology as a neutral, objective activity, disembodied from society and isolated from social and political dynamics. In contrast, they formulate a different definition of science, which is now portrayed as fully embedded in the social context from which it originates and in which it continuously promotes social and political changes, giving rise to a mutually constitutive relationship that has been elsewhere defined as ‘co-production’ (Jasanoff 2005). In this co-production mechanism, CSOs claim their right to full participation, along with other actors already involved, in order to contribute to the future development of the society and the economy. As a consequence, they emphasise the political and the social responsibility that researching and implementing new technologies necessarily carries and call for a wide, shared and transparent assumption of this responsibility and of the consequences it may carry. In other words, CSOs claim both their competence and their social legitimacy to take on their share or responsibility and cooperation, fully committed as everyone else, to shape not only the future orientation of technology development but also the ways in which we are about to live and the very environment in which we will conduct these lives.

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