GM Vine

How to design a participatory process for a research institute on a controversial issue?

Section D: Discussion
No. 11: Article on GM Vine

Interactive Technology Assessment in the Real World: dual dynamics in an iTA exercise on genetically modified vines

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Abstract

Participatory Technology Assessment (pTA) initiatives have usually been analyzed as if they existed in a social and political vacuum. This paper analyzes the linkages that occur, in both directions, between the microcosm set up by a pTA exercise and the real world outside. This dual dynamics perspective leads to a new way of understanding the function and significance of pTA initiatives. Rather than viewing them as a means to create the ideal conditions for "real public debate", they are viewed here as an additional public arena in which sociotechnical controversies are played out. This perspective is developed from the analysis of an interactive TA exercise conducted by the French National Institute for Agricultural Research, on the topic of genetically modified vines.

Keywords

technology assessment, participation, GMO, INRA

Introduction

Participatory Technology Assessment (pTA) initiatives have usually been analyzed with a focus on the exercise itself: how society was represented and how to optimize the process (Banthien et al. 2003; Grin et al. 1997; Joss and Bellucci 2002; Rowe and Frewer 2000). However, the effects of pTA do not just depend on the quality of representation and on the productivity of the deliberative process, but also on what happens in the wider world before, during and after the exercise. This paper focuses on the dynamics, which occur in both directions, between: (i) sociotechnical developments in the real world and attempts to influence them by various actors; and (ii) the microcosm created by the pTA exercise that delivers an assessment which then impacts on the wider world. We develop this dual dynamics perspective on the basis of our analysis of a pTA initiative commissioned by the French National Institute for Agricultural Research (INRA[1]). We have extensive data on the exercise, because we were closely involved in it: Pierre-Benoit Joly (PBJ) and Claire Marris (CM), staff members of INRA, as project leaders, and Arie Rip (AR), outside expert, as chair of the evaluation committee. Data used included: (i) participant observation at all stages of the project; (ii) video-recordings of all meetings of the working group; (iii) interviews carried out with each member of the working group, with the facilitator, and with members of the INRA Directorate; and (v) analysis of media coverage and of documents produced by actors about the exercise. We first analyze how the pre-existing political context influenced the conception and design of the exercise; then zoom in on the microcosm of the working group that conducted the TA and show how the dual dynamics played out during the exercise and influenced its output; and then zoom out again to see what happened in the wider world. A chronology of the exercise is given in Table 1.

The conception and design of the iTA exercise

INRA context

INRA has interacted with organized bodies of professionals in the agricultural sector since its creation in 1946, so why did it feel the need, in 2001, to experiment with a novel participatory procedure? Until the 1990s, the role of INRA in agricultural "progress" was uncontroversial:

INRA was widely perceived as working, by definition, for the public good. But as the BSE and other agriculture/food related crises led to concern about the negative environmental and health impacts of evolutions in agricultural systems, INRA's relationships with professional groups became more complex. This situation was exacerbated by the controversy about the use of GMOs in agriculture and food, which emerged in France in 1996. Thus, the idea that the institute necessarily works to promote the public good was challenged: research orientations and collaborations between INRA and the private sector were criticized, and it was accused of failing to interact with ordinary citizens and farming organizations promoting alternative models of agriculture, such as the farmers' union *confédération paysanne*. It was against this background that Marion Guillou, the then newly appointed General Director of INRA, initiated a pTA initiative. She came from a senior position at the Ministry of Agriculture, where she had had to deal with a series of risk-related food crises (BSE, *listeria*, dioxins...) and this had sparked her interest in ways to improve citizen input in policy making. She approached PBJ and CM because of their expertise in the analysis of participatory processes in the governance of risk and innovation, and they agreed to conduct a pilot experiment for the Directorate.

The case chosen: field trial of potentially disease-resistant GM vines

The issue of GM vines surfaced as a potentially good case for the experiment, because INRA had a concrete problem on its hands. In 1994, Moët & Chandon, one of the leading champagne producers, had set up, in collaboration with INRA, a field trial of GM vines potentially resistant to a disease-causing virus. But when, in December 1999, the French satiric newspaper *Le Canard Enchaîné* published an article entitled "GM bubbles in the champagne", the CEO of Moët & Chandon, fearing negative repercussions on the company's image, asked for the vines to be uprooted. Consequently, INRA hesitated about whether to resume the field trial or abandon the project. As stated by the Director of INRA's Plant Science Division in discussions with the authors: "We could yield to public pressure now and abandon the experiment... but in years to come, when winegrowers need new disease-resistant varieties and we tell them we need twenty five years to develop them, what will they say then? Do we have a responsibility to carry out such experiments with a view to the future, even in the face of current public opposition?" Choosing wine as the topic was however delicate, given its cultural significance in France: "If we can handle GM vines, the most difficult case, we can handle anything" was one of the arguments

put forward by the INRA General Director. Indeed a group of wine producers, including some prestigious Châteaux, had already signed a petition in June 2000 calling for a moratorium on any use of GM techniques in wine production and joined forces to create an NGO (*Terre et Vin du Monde*)[2].

Negotiations about the design of the operation

Because PBJ and CM were INRA employees, and thus open to charges of bias, it was particularly important to clarify the distinct roles of each party involved: the Directorate was the commissioner and decision-maker; the project leaders (PBJ and CM) were solely responsible for the choice of methodology and the conduct of the operation; and they would set up a "*groupe de travail*" (working group, GT) to conduct the interactive TA, supported by a professional facilitator. Transparency was essential and an agreement was obtained on full public disclosure of the GT's report and of INRA's response, with a website where all documents relating to the project could be viewed[3]. As an additional guarantee an independent committee was set up to oversee and report on the methodology and its implementation[4]. The most difficult issue in negotiations between PBJ/CM and the INRA Directorate centered on the way in which the output of the iTA exercise would be used by INRA managers in their decision-making process. Although the commitment to take the output seriously into account was assured from the start, agreeing about how this would be done was more problematic. In the end, the Directorate committed itself to responding explicitly in writing to the TA report, explaining how it had influenced its decision. The Directorate was thus free to take on board or reject the recommendations, but had to do so transparently. This also ensured that it would have to take a specific decision about its GM vine research. This may seem a trivial point, but in most pTA exercises – including those previously conducted by French governments on GMOs – no decisions had been explicitly linked to the exercise, and it was often difficult to determine whether or not any related decisions were taken. Finally, it was agreed that one ongoing field trial of GM vines would be uprooted and no new trials would be conducted until the iTA was over.

iTA and the co-construction of technology

Unlike most pTAs, the initiative presented here was commissioned by a research organization rather than a government, and aimed to assess research orientations rather than national policy on

a scientific and technological issue. In this context, a key aim for the project leaders was that the pTA should lead to the "co-construction" of a research program, rather than an assessment of black-boxed and ready-for-the-market technological innovations (as was the case in many pTAs, including the French consensus conference on GMOs in 1998). On the basis of their experience of evaluating pTA exercises (Joly and Assouline 2001; Joly and Marris 2002; Joly et al. 2003; Marris and Joly 1999), PBJ and CM proposed to use interactive[5] TA (iTA), which seemed the most appropriate method to achieve this aim. iTA differs from other forms of technology assessment (participatory or not) in that it does not seek to predict and accommodate the impacts of a given technology in post hoc decision-making, but rather to exert leverage on its development (Grin and van de Graaf 1996; Grin et al. 1997; Rip et al. 1995; Schot and Rip 1997). This departure is rooted in the insights from the field of STS, which recognizes that impacts are not just passive effects of a given technology on its environment, but are actively sought and/or avoided by a multitude of diverse actors. Technology is thus shaped out of the interplay of actors and their assessment, and impacts are viewed as being co-produced during the development of technology. These processes occur all the time, but the influence of some actors is limited due to their lack of power and resources, especially early on in the development of a technology. iTA seeks to redress this situation by providing strategies and instruments to enable interactions to occur between technology developers, promoters, users and other impacted communities as early as possible in the development of a technology. Given this perspective, iTA also distinguishes itself from other pTA procedures (e.g. consensus conferences, citizen juries) by requiring the participation of parties involved in the technology's development path, rather than members of an undifferentiated public.

Composition of the working group (GT)

When composing the GT, a number of important methodological choices were made. It was decided to invite "ordinary actors", rather than spokespersons from NGOs or professional groups, for example farmers rather than leaders or staff from farmers' trade unions. This followed recommendations by Grin et al. (1997, p. 58), which suggest that it is important to "avoid selecting people who get easily wrapped up in strategic games in the real-world" and "look for people from the work [shop] floor". It also fitted-in with the project leaders' desire to avoid repeating what they perceived as confrontational and sterile public debates which had been

occurring over the previous few years between spokespersons for organized stakeholder groups. It was hoped that ordinary actors, with no representational mandate, would be better able to deliberate with an open mind, and would not resort to bargaining from previously determined positions, as in stakeholder negotiations.

The iTA method requires that a variety of beliefs related to the problem at stake be present. Participants were therefore selected in order to obtain a group with members who held the widest possible range of views about the subject, as well as having diverse underlying generic beliefs. A sociological survey of actors involved in the production of vines, wines and/or the debate of GMOs was carried out (involving over 40 interviews). Key dimensions that differentiated the actors' worldviews emerged from the interviews and these were used to select the members of the group. They included:
(i) Attitudes to genetic modification techniques: Is GM a continuation of previous techniques? ...A transgression of Nature? ...A progress to consider with precaution?
(ii) Perceptions of the wine industry: Is the *Appellation d'Origine Contrôlée* system (the regulatory framework for wine production) a guarantee of good quality wine? ...Or a system that simply enshrines the status quo? What are the major problems facing the French wine industry today: diseases? ...Or competition from New World wines?
(iii) Attitudes towards INRA: How well does INRA fulfill its vocation to serve the public good? How well does it relate with actors on the ground?

This fundamental selection criterion (diversity of worldviews) was overlaid with a second consideration that aimed to ensure a balanced representation of the categories of professional actors involved in the technological path. The group was thus composed of four researchers (from different disciplines) working on vine diseases, four vine growers (three of whom also produced their own wine), one extension worker and one owner of a vine nursery. In addition, it was decided – in a departure from standard iTA practice – to include also four laypersons, with no direct involvement with the world of wine, of research, or of GMOs, except perhaps as consumers. In the case of this working group, as well as in most other pTAs, the aim was to set up a "microcosm": a little world that in some ways resembles what happens in the wider world,

because the variety out there is captured to some extent in the composition of the group. It is assumed that if the requisite variety of the outside world is captured, the results of the exercise have a meaning for the wider world.

The microcosm and its output

We now zoom in on the microcosm of the GT. In general, and also in this case, a pTA working group will search for a more or less shared problem definition on the basis of which its work can proceed. Unlike consensus conferences, there were no preliminary information sessions, pre-designed by the organizers, as this tends to impose a particular framing of the problem on the participants. Instead, the GT was able to request auditions with experts of their choosing, and/or further information in the form of documents or briefings produced by the project team. Moreover, the whole of the first two-day meeting was devoted to re-phrasing the initial question posed by INRA –"the appropriateness of conducting field trials of GM vines potentially resistant to *grapevine fanleaf* virus" - into a set of questions that the group was prepared to work on. This created commitment in the GT, and helped to reassure the members that they were not being manipulated by INRA. In practice, a shared problem definition was generated gradually over the following months, as an outcome of the dynamics of the deliberations.

Fairly quickly, the group began to use three categories to describe their fellow members: "professionals" (meaning those involved in the grapevine industry), "researchers", and "laypersons". This was done by members themselves, for example by prefacing their contributions by "I, as a layperson, think that...". At other times, the attribution came from another participant; most frequently, it was done when formulating a question, which was addressed to a particular category that was perceived as having the more reliable expertise on the subject, in the form of: "As wine growers (or researchers), do you think that...?". Interestingly, this last formulation was also used to address the laypersons, often using the label "simple consumer" ("As a consumer, what do you think?"), as if the speaker him/herself was not also a consumer. This positioning of members with regard to their professional and lay categories had not been anticipated or wished for by the project leaders, who had tried to emphasize the

importance of worldviews in the selection of the members, and the equal validity of all forms of knowledge and experience present in the group. Yet the group themselves chose to emphasize these categories, and gave credence to specialist types of knowledge and experience. As the members got to know each other better, particular worldviews were also attributed to individuals, but this was done, for example, by labeling one particular farmer as a representative of the *confédération paysanne,* even though he was, like all the others, recruited only on the basis of his worldview and not as a spokesperson for this organization (of which he was indeed a member).

The prominence of these lay/professional categories had important consequences for the deliberations and their outcome. It meant for example that they turned to the only molecular biologist in the group for an explanation of the technical details of the use of genetic modification to develop disease resistance, and did not question his account or ask for any alternative critical analysis, which could have been provided from outside sources. Over time, however, it was the professionals from the value-chains in the grapevine industry that were given the most credence by other members of the GT, rather than the researchers. Thus a focus on the grapevine industry (the vine/wine "*filière*"[6]), ended up being the starting point for a shared problem definition. This is reflected in the structure and content of the GT's report: most of it is devoted to a broad analysis of the social, cultural, economic and technical dimensions of the grapevine industry in France; only the final chapter - which was drawn up at a late stage - is devoted to the proposed field trial. The whole GT supported the conduct of further experiments in the laboratory and greenhouse, but the group eventually split on field trials. This happened during the final two-day meeting, five months after the start of the exercise, when the pressure to produce a final report weighed heavily and the facilitator organized a discussion about arguments for and against field trials.

For the majority (twelve members) it was "acceptable and opportune" to conduct the proposed field trial, but only as long as certain conditions were met, including:

- carrying out research on alternative solutions in parallel;
- explaining the objectives and limits of the experiment to civil society;
- setting up a pluralist and independent body to evaluate the experiment, with the power to decide whether to continue or suspend it;

- organizing further consultations with professionals, researchers, politicians and civil society if and when the development of commercial varieties of GM vines were envisaged.

The other two members were opposed to the field trial, even if conducted under these conditions, because: "this technical solution (to vine disease) is not socially acceptable", the consequences for the image of wine are likely to be negative, and INRA cannot prevent others from developing commercial GM varieties on the basis of the research it conducts. These two positions could be summarized as "yes, but" and "no, even if". But despite first appearances – and as acknowledged later by GT members - they were actually not so distinct because they put the same issues high on the agenda.

The emergence of a shared problem definition makes the work of an iTA group manageable. One can see this in the way the GT compartmentalized issues. The first compartmentalization was of themselves as insiders (of the world of vine/wine), while citizens (and their fears) were identified as outsiders. This was visible in the curious title of section 4.1.4 of the GT report, "Genetically modified organisms scare citizens". Normally, in consensus conferences, "lay citizens" tend to enlarge the frames of reference used, and to challenge and evaluate specialized knowledge (Dryzek 2000). As in a consensus conference, the sense of responsibility of the members of the GT was intense; but in this case, the responsibility was focused on the moral commitment toward INRA and on the world of wine, as compared to a consensus conference where the responsibility is broader since the members of the panel develop a collective identity as representatives of other lay citizens (Joly et al. 2003).

A second compartmentalization concerned the boundary between "research" and "innovation". The GT accepted the stance of the INRA Directorate, that research (for the acquisition of knowledge) can be distinguished from "innovation" (the commercial application of research); moreover for research there should be freedom for the researchers to follow leads that they identify as interesting, civil society only has a role to play when it comes to innovation. In their report, the GT positioned the GM vine field trial as research. Thus, those who said "yes, but" to the trial did so on the understanding that INRA was able to guarantee that any move toward eventual commercialization would remain under further societal control; while those who said

"no even if" did not believe that INRA could effectively control this boundary- but they did accept the research/innovation distinction.

Clearly, the GT became a microcosm with its own type of interactions and problem definitions, and this shaped the report produced. But of course the GT was not closed off from the wider world, which entered through the backgrounds of the members of the group, through the categories used and through real-world developments that were discussed in the group; for example when the Ministry of Agriculture authorized some (non vine) GMO field experiments in July 2002, thereby ending a temporary moratorium on new authorizations for field trials, a few members of the GT reacted and said: "we don't have to discuss anymore, the decision has already been taken". They did go on, though, feeling a commitment to INRA.

Reception of the iTA in the wider world

Early responses from outsiders

As soon as the iTA initiative was announced in 2001, NGOs involved in the GMO debate showed great interest in the project. Having heard that INRA wanted to open-up its decision-making process to outsiders, several asked to take part and were disappointed to be told that they would not be able to, because no representatives of NGOs or professional groups would be present in the GT. This led to early criticisms that INRA was handpicking participants with views that would support its research. Early criticism also came internally, from some INRA researchers who were outraged that the institute did not seem to have the courage to pursue this research, which they considered to be of scientific interest and beneficial to grape growers, in the face of opposition orchestrated by NGOs. One researcher was angry enough to express this view in a professional journal of the grapevine industry (Bouquet 2001):

"I note with regret that INRA has taken a decision that amounts to imposing upon itself a moratorium on its own research. [...] I dare not imagine that such a decision, which goes against the general interest, might have been taken under the influence of a well advertised anti-GMO campaign led by a few big chateaux."

Ongoing GMO controversy during the conduct of the iTA

During 2001-2002, when the iTA was conducted, the French controversy on GMOs continued unabated; moreover, it focused increasingly on the issue of field trials (Bonneuil et al., forthcoming). In response to the wave of field trial destructions in the summer of 2001, the government announced that a "big debate" would be held; in the meantime, no further field trials would be authorized. The ensuing "Four Wise Men's debate", at which key stakeholders gave their views, took place in February 2002. The report contained a number of recommendations that would restrict the conditions under which field trials of GM crops could be conducted (Babusiaux et al. 2002). The (left wing) government that initiated this debate did not respond. The new (right wing) government elected in May 2002 did not respond either, but began to authorize field trials again in July 2002 – right in the middle of the iTA exercise.

Some of these events were relayed to the GT when members spotted them in the media, or through knowledge transmitted via their social and professional networks. For example, at its fourth meeting in July 2002, there was a discussion about whether there was any point in continuing to participate in the exercise, since the government had authorized field trials, thus ending the September 2001 moratorium. To diffuse this crisis, the project leaders were brought in. They emphasized the difference between decisions made by the government and those made by INRA: INRA had stuck to its own commitment not to carry out field tests of GM vines until the exercise was completed. Despite some ill feeling, the GT decided to continue.

In the same period, INRA as an institution firmly took a public position in favor of field trials: (i) in February 2002 Marion Guillou spoke at the Four Wise Men's debate; and (ii) on 23 September 2002 she published, together with the President of INRA, an opinion piece in the daily *Libération*, entitled "Yes to GMO trials". On both occasions, she argued that field trials were "necessary and legitimate", and mentioned the iTA initiative as one of several examples of INRA's commitment to dialogue with society. In response, a group of individuals, many associated with environmental NGOs, published an "Open letter to the INRA Directorate" entitled "GMOs: grossly manipulated opinion"[7], which criticized not only INRA's position on

field trials, but also the way in which it favored collaboration with the private sector and refused dialogue with anti-GMO NGOs.

The INRA Directorate's response to the iTA

It was in this heated context that INRA's Directorate had to prepare its response to the GT's report, submitted in September 2002. The seven-page response, published in January 2003:

(i) Emphasized the distinction between "the production of targeted knowledge" and "marketable innovation", with INRA positioned – especially with respect to research on grapevines – as a key actor only in the former activity: "The development of innovation is a matter of the market and is not the central mission of INRA; it must obtain the go-ahead from public authorities and the interest of economic agents. INRA cannot decide alone, with respect to the sensitive subject of vines and GMOs, to develop a GMO innovation [...]. It will only envisage the development of such an innovation program when the profession will have clearly expressed a demand".

(ii) Acknowledged the need to widen its research activities in order to cope with different vine/wine worlds, including sustainable, organic and biodynamic agricultural systems. To this end an advisory committee would be set up, charged with giving a plural expertise on research orientations for wine and vine.

(iii) Accepted the "yes, but" GT majority position including the detailed conditions, notably the decision to set up a local committee charged with discussing the protocol of the field trial and evaluating the precautionary measures taken.

Because the INRA Directorate knew that the decision to go ahead with the field trial would be controversial, they spent two months preparing the ground by consulting with some key professionals in the grapevine industry and senior officials at the Ministry of Agriculture. The aim was to look for the support of national leaders who were influential in the world of wine production and who had been by-passed by the iTA exercise. The Directorate has stated that these consultations did not influence the content of their decisions, but they did alter the timing of the press launch, which had originally been due in early December 2002. Some of those consulted argued that no announcement concerning GMOs and wine should be made by INRA during the weeks before Christmas, traditionally the most important time in the year for wine sales (and even more so for Champagne), so the announcement was delayed until January – thus

demonstrating another way in which external force fields affected the conduct of this iTA exercise. The Directorate also took the unusual step of employing a communication expert, and asked the chair of the evaluation committee (AR) to be present at the press launch, to add credibility to the methodology used.

Press launch

The report of the GT and the response of the Directorate were together made public at a press lunch on 20 January 2003. This event, organized by INRA's Communications Department, was a tightly controlled affair: only half a dozen journalists were invited, all science or agriculture specialists with whom the Department had previously had positive relations. No NGOs were allowed in, even though some journalists working for NGO publications asked to be present. Fearing leaks, members of the GT and of the project team were given only a few hours prior notice of the content of INRA's response. These choices clearly aimed to seek to avoid negative media coverage, but the INRA Directorate also sought to ensure that the coverage generated would cover the whole process in some depth, rather than just the decision to resume the GM vine trial. This was to some extent achieved, with quite lengthy articles in the dailies *Le Figaro* and *Le Monde* (on 21 and 24 January) by journalists present at the press lunch. But the decision to hold such a select press event had other repercussions: the *confédération paysanne*, upset at having been excluded, organized an alternative press conference later the same day, where strong criticisms were presented.

NGO responses to INRA's decision

In the subsequent weeks and months, the *confédération paysanne* continued to protest not only against the decision to resume the field trial, but also against the iTA methodology used. Straight away (21/01/03), it published a press release (taken up by AFP and thereby relayed to other press organs) stating its "revolt" against the trial and protesting that "INRA has organized a sham of a debate, inviting a sample of fourteen hand-picked people, in a closed enclosure that has nothing to do with neutrality"[8]. On 23 January, a coalition of NGOs, including the *confédération paysanne*, published a seven-page critique entitled "The GM vine pilot experiment: A program of manipulation of public opinion"[9]. The document developed a detailed critique of the method

used, in particular with respect to the selection criteria for the GT members and their lack of exposure to arguments against GMOs; and expressed concern that INRA was proposing to generalize this approach: "This substitution of an internally self-organized group, working confidentially behind closed doors, to the transparency of a real public debate upsets those who believe that the orientations of public research should result from a democratic decision process". *Terre et Vin du Monde*, also published an open letter to Marion Guillou dated 17/05/03, complaining that "The 'pilot project' that was to allow INRA to construct, together with the public, a consensual research programme served only to authorize an experiment that has been planned for years"[10]. Unusually in the French context, this letter was written in English, thus seeking to spread the controversy about INRA's iTA exercise and GM vine research worldwide, and threatening the export market for French wines.

A separate reaction came from wine producers in Alsace, where the trial was to take place, who were fearful of repercussions on the image of their AOC wines, and also annoyed that they had not been involved in the consultation process or given prior notice of the decision to resume the trial. The Director of AVA, the federation of Alsatian wine producers, was cited in the media saying[11]: "We are not in principle against research on GMOs, but we would like the trial to be conducted at a reasonable distance from our vineyards".

In the following months the wave of criticism diminished, but did not subside completely. It became linked with the implementation of INRA's decision to go ahead while observing certain conditions.

Co-construction work carried out by the local committee

The debate about where to site the trial was one of the most sensitive points dealt with by the local committee, set up in April 2003, as recommended by the GT. It was composed of representatives of Alsatian wine producers (including AVA and the *confédération paysanne*), of local environmental and consumer NGOs, and of the Colmar town council, working together with INRA researchers involved in the trial. During intense discussions, INRA researchers had to explain the scientific interest of the experiment and discuss how and where it would be

conducted. Researchers wanted it on their site, where the conditions were similar to those of commercial vineyards, and where they could keep a close eye on it, but this was only a few kilometers from the AOC zone and wine producers wanted the trial taken further away. INRA won on this point, but the outcome was a much-modified experimental protocol, with a reduced surface area of GM vines and additional biosafety measures, which meant some research questions could not be investigated (e.g. all flowers were to be cut in order to prevent pollen dispersion, which prevents analysis of any impact on the quality of the grapes). On the other hand, some research questions were added to the protocol on the suggestion of members of the committee (e.g. detailed analysis of risks of horizontal transfer and recombination of viruses).

Although the *confédération paysanne* participated in this committee, they did not cease to campaign against the trial and announced in March 2004 that they were resigning from the committee (even though they admitted to a "good working atmosphere") since they could not prevent it from going ahead[12]. They also, together with a local NGO that supports organic agriculture, lobbied the Mayor of Colmar to declare the town "GMO free", as have many other towns and regions in France. The President of INRA's Regional Center in Colmar reacted promptly, explaining the iTA exercise, and the contribution of the local committee to the design of the field trial. His arguments appear to have convinced the Mayor not to take any decision that would negatively affect the trial.

An unexpected additional hurdle: opposition by the Government

When INRA submitted their proposal to the government for authorization of the GM vine field trial in April 2004, the relevant expert consultative committee[13] quickly issued a positive opinion regarding the health and environmental risks involved and, following normal procedure, the government then put the proposal out for public consultation on its website in July/August 2004. There is no detailed information available about the e-mail responses received by the Ministry of Agriculture, but *Terre et Vin du Monde* were quoted in the media stating that they would try to block the trial and would "declare war on GMOs"[14]. Nevertheless, most actors expected the government authorization to follow shortly, and the trial to be started in the autumn. However, the government, sensitive to the political context, took the unusual move of not issuing an

authorization for the trial (the regulatory procedure does not require it to explain why). INRA managers and researchers were obviously upset, given the amount of time and effort they had invested to try to ensure that their decision would hold up to societal scrutiny. They had obtained the support (or at least deflected the most virulent opposition) from so many actors and were now rebuked at the last hurdle, where they least expected it. It took another year of negotiations before the governmental authorization was issued, in June 2005. INRA managers argued with the Cabinet of the Agriculture Minister that this field trial was important because of the long term stakes, the very low and hypothetical nature of the health and environmental risks and the exemplary nature of the consultation process – which now encompassed not only the original work carried out by the GT but also the co-construction work carried out on the field trial protocol by the local committee.

Implementation of the field trial

The trial was planted in September 2005, accompanied by heightened transparency: INRA posted on the web the proposal submitted to the government, as well as descriptions of the trial specially designed for the wider public, including a slide show of the installation of the trial[15]. A public protest was organized by the *confédération paysanne* and its allies, at which one placard read "INRA we love you, but without GMOs", which INRA managers considered a positive sign that their public image was surviving the controversy. To date the trial has not been physically attacked, which could be seen as an indication that a socially robust outcome has been achieved, given that numerous other GMO field trials throughout the country have continued to be destroyed, and that some activists had called for this one to be targeted. It may also be related, though, to the exceptional security measures around this site (high fence, video surveillance, security floodlights).

Internal learning at INRA

One of the benefits of this exercise was to foster deliberation within INRA on a complex and controversial decision. Intense debates occurred within INRA about the desirability and validity of the project, throughout its life and beyond, between researchers, and between researchers and

top managers. There were disagreements about whether and how INRA should open-up its decision making on research orientations to outsiders. The Directorate, through the conduct of this experiment, succeeded in convincing at least its Board of Directors and its Scientific Advisory Council that the approach was worth pursuing. In 2003/2004, there were discussions about setting up a similar initiative about animal cloning, another topic which is controversial and where INRA's research plays a leading role. This project has, at least temporarily, been shelved, but the concept of "co-construction" now permeates INRA discussions and documents on research policy. It is for example at the heart of a report by the Scientific Advisory Council entitled "What GMO research for INRA?", produced in February 2006, which defines co-construction as one of the key pillars for the organization of research on GM crops at INRA. Such a position would not have been possible a few years earlier. The Board of Directors is now in the process of adopting of a formal policy document that states the necessity to open up decisions about the choice and conduct of research to social actors concerned (different types of farmers, consumer NGOs, environmental NGOs, firms...). Interestingly, this would only apply to "pre-competitive research and research aimed at innovation", thus re-emphasizing the compartmentalization between research and innovation[16].

Discussion

Our analysis of dual dynamics at work in this iTA exercise and its aftermath shows how force fields from the wider world entered the microcosm in a variety of ways and also how the microcosm had an impact on the wider world, not only through its output (the report) and the implementation of its recommendations, but also by its very existence and methodological format. Such dual dynamics are not unique to this case study: they occur in all pTA initiatives, whether they be organized by governments, research institutes, universities or NGOs. They are sometimes apparent in published analyses (e.g. Loeber 2003; Rowe et al 2005), although they have not been studied as such as before. Analysis of these dual dynamics provides a novel insight into the function and significance of pTA initiatives compared to analyses that focus solely on the inner workings of the microcosm, as if they existed in a social and political vacuum.

Here as in most cases of pTA, the very idea for this iTA exercise emerged in response to a public controversy, and was promoted by the INRA Directorate as a means to navigate a course in that controversy. It wished to open up its decision-making process to new actors, but because it had waited until the controversy pushed it to do so, the battle lines had already been drawn. The presence within the institution of two social scientists with expertise in participatory technology assessment provided an opportunity to experiment while keeping some degree of control on the operation. Putting its own staff in charge did, however, have immediate negative consequences on the perception of the exercise by outsiders, who, despite efforts by the project leaders to distinguish their role from that of the Directorate, found it easier to label it as a "program of manipulation of public opinion". External force fields also influenced the choice of criteria for the composition of the working group that would conduct the technology assessment: the decision to recruit ordinary actors instead of spokespersons from professional organizations or NGOs was partly determined by the desire to avoid just reproducing within the microcosm the confrontational dynamics of the ongoing public debate. The real world then entered the GT microcosm in various ways: through the worldviews, experiences and networks of the members, through inputs they got from outsiders, through informal accountabilities to outside constituencies, and through what was happening in the world outside. Thus, although the microcosm was somewhat shielded against the force fields in the real world, these remained present and influenced the outcomes. Participants were chosen as individuals with no formal representative status, but they were not isolated from their social and professional networks. Moreover, we observed that informal constituencies were constituted in the process of deliberating as members took to categorizing themselves as laypersons/wine professionals/researchers, or were characterized as such by other members of the group. Thus, the way the wider world enters the microcosm depends not only on the composition of the GT but also results from the deliberative process, which leads to particular selections and translations of relevant issues and of the pertinent knowledges to address them. *Ex post*, we saw that the dynamics of the deliberations within the GT led to the domination of specialized knowledge over the ordinary language and perspectives of lay citizens. But, surprisingly perhaps for an operation set up by a research institution, it was not so much the scientists who accrued expert status, but the members with knowledge and experience about vine growing and wine producing. The

outcome was a report in which the GT positioned itself as an insider to this vine/wine world, with citizens as outsiders. These dynamics also meant that some questions and concerns raised by NGOs and members of the public in the outside world were not addressed at all, or not in depth, within the microcosm. For example, the report focused on whether the use of genetic modification techniques would affect the image of wine in the eyes of consumers, but largely ignored the issue of potential environmental and health risks. Events in the wider world also influenced the GT, with particular events entering the microcosm (e.g. the governmental decision to resume authorizations for GMO field trials in July 2002) while other potentially relevant ones did not (e.g. the speech given by Marion Guillou at the Four Wise Men's debate in February 2002). Such events can have important effects, especially if they give the impression, as was the case here, that the decision under consideration has already been taken. This could (and nearly did) lead to GT members withdrawing their commitment to the endeavor.

Links from the microcosm to the real world also occurred from the very inception of the project. Criticism arose as soon as it was announced, not only from external groups involved in anti-GMO campaigns, but also internally, from INRA researchers and managers. Each of these actors could and did use the fact of the iTA exercise to advance their positions within the overall controversy about GMO research. For example, NGOs involved in the campaign against GMOs seized on public statements of INRA leaders about GMO research, GMO field trials, or the best forms of public debate for the governance of research to argue that the iTA exercise was a masquerade since INRA had clearly already made up its mind, and was not sincerely open to listening to external voices (such a theirs). It was however when the GT's report was completed that it had the most obvious impact on the outside world. In this case, the external impact started before the report was made public, in the three months the INRA Directorate took to decide on how to respond to the GT's recommendations. Members of the Directorate have stated (in public meetings and in interviews) that their decision was influenced by the assessment produced by the GT, and that if its position had been more emphatically opposed to the trial they would probably have abandoned the project. It is difficult to guarantee the truthfulness of such statements, but the fact that the Directorate had – following intense negotiations with the project leaders - committed itself to publishing both the GT report and their response to it definitely put strong pressure on

the Directorate to take the report into account in their decision-making process. Moreover, regardless of any impact on the specific decision to go ahead with the field trial, it is clear that the iTA exercise did have broader and longer-term effects on internal learning and decision-making processes at INRA.

With respect to the field trial itself, the iTA process seems to have produced a robust result, in that INRA was able to defend, and eventually to implement, a controversial decision in the face of numerous and diverse opposition from important social actors: anti-GMO NGOs (including environmental NGOs, the *confédération paysanne*, and a group of prestigious Châteaux), Alsatian wine producers, and even, unexpectedly, the government. In negotiations with local and central government, reference to the iTA played a legitimizing role, as an exemplary model of consultation, and for the analysis produced by the GT. Through compartmentalization, that is, treating the field trial as research rather than a first step towards commercialization, and through emphasizing a broader research agenda, the GT helped INRA to go beyond the yes/no alternative. In addition, following the GT's recommendation to set up a local committee to oversee the field trial further increased the social robustness of the decision: deliberations in this committee - which, unlike the GT, did include spokespersons from professional and environmental groups - addressed some of the concerns that had been sidestepped in the iTA exercise (e.g. biosafety measures).

The choice to populate the GT microcosm with ordinary actors, selected on the basis of the diversity of their worldviews, thus appears to have offered a useful window on the variety of relevant views, and produced an assessment that enabled INRA to take a decision that was robust enough to navigate in the stormy waters of positions and interests in the wider world. The drawback was that actors mobilized against GMO field trials could hardly accept a decision contrary to their position when they had not even been consulted. Thus, the iTA exercise did not produce wide agreement in the real world. On the contrary, it fostered the controversy by adding a new dimension, the possibility to accuse INRA of employing strategies to "manipulate public opinion" rather than engaging in "real public debate". Such an outcome was probably unavoidable, once INRA had decided to follow the "yes, but" recommendations of the GT. In

such an agonistic context, the option of including spokespersons in the exercise would, however, have been counterproductive since direct participation of groups mobilized for or against the decision would lead to bargaining, instead of deliberation as envisaged in an iTA. Such an effect was for example observed in a pTA in Germany on transgenic herbicide-resistant crops: environmental groups were reluctant to participate, did so, but then stepped out at a late stage because they did not want to be co-responsible for the conclusions of an exercise which appeared to be going in a direction which contradicted the official policy of their organizations (Van den Daele et al. 1997). There is thus a trade-off between setting-up closer links with the wider world, by including representatives with formal constituencies, which provides more legitimacy but leads to bargaining rather than deliberation, and using ordinary actors selected on the basis of their worldviews, which fosters collective learning of the group at the price of lower legitimacy.

The INRA initiative had to fight hard for its legitimacy – and never obtained total assent – but did produce innovative ways of thinking about the problem at hand which helped to produce a more robust decision with respect to the field trial. This, in turn, helped to promote internal learning and a change in the approach to decision-making on research programs at INRA, with INRA managers agreeing on the importance of opening up choices about (some of) its research to external stakeholders. The iTA exercise was of course only one of several factors which has brought about this transformation, which is in line with the "new mode of scientific governance" observed in many European institutions dealing with science and risk over the last decade (Irwin 2006; Jasanoff, 2005); but it clearly played an important role by providing a concrete example of what could be achieved with this approach. It has also perhaps helped INRA to avoid some of the inadequacies of public dialogues criticized by Irwin (2006), by focusing on ways in which participation by outsiders could help to co-construct research questions and agendas, rather than seeing public dialogue simply as a way to deal with an apparent legitimation crisis.

Of course, another line of argument is possible: if it is the "real world debate" which raises the "right" questions, then INRA should respond to that debate. This was the view taken by the *confédération paysanne* and its allies, when they demanded a "life-size citizens' debate, truly articulated to the democratic process"[17]. Taken to its logical conclusion, this could imply that any

organized form of pTA is pointless, since it is by definition not possible to set up a life size microcosm. In a less antagonistically normative vein, Cambrosio and Limoges (1991) and Rip (1986) have shown that public controversies about new science and technology do stimulate learning, create forceful agendas and outcomes that can be robust, and in that sense are the "real public debate". A pTA exercise which isolates itself from the ongoing dynamics of the wider world, or just does not recognize their effects, will have no or contrary effects (as in the example of meetings on risks of the herbicide 2,4,5-T in the USA discussed in Rip 1986). Our present analysis of the dual dynamics which occur between the microcosm of a pTA exercise and the wider world leads to a new perspective: organized pTAs are part of the real debate occurring in the wider world; they are neither a substitute for nor irrelevant to public controversies. Previous analyses, because they were concerned with improving the internal dynamics of the microcosm, have suggested that the most important criteria for their evaluation are the appropriate representation of society and the creation of an environment where the ideal conditions for public debate could take place. These considerations are clearly important, but the dual dynamics perspective presented here demonstrates that pTA exercises can instead be analyzed as an additional public arena where part of the sociotechnical controversies are played out.

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Table 1: Chronology of the iTA and its aftermath

February-Sept. 2001	- Negotiation and design of the project
Sept. 2001-March 2002	- Sociological mapping of actors in the wine and/or GMO sectors - Selection of members of the working group *(groupe de travail*, GT) - Set-up of the evaluation committee
April – Sept. 2002	- Work by GT, which met 5 times for a total of 7 days - Preparation and submission of GT report to INRA Directorate
Sept. 2002 - December 2002	- Meeting between GT and Directorate in October - Preparation of reaction by INRA Directorate - First report of evaluation committee submitted to INRA Directorate, focusing on the implementation of the iTA methodology
January 20th 2003	- Public announcement of GT report and of decisions made by INRA Directorate
Jan – May 2003	- Appreciative reporting in some media - First wave of critiques of the decision and the process
July 2003	- Final report of evaluation committee, encompassing the response of the INRA Directorate to the GT's report
April 2003 -March 2004	- Design of new protocol for proposed field trial, in consultation with local committee
April 2004	- INRA submits proposal for GM vine field trial to government - Regulatory committee issues positive evaluation of health and environmental risks involved in this trial
July –August 2004	- Web-based public consultation about the trial - Government decides not to authorize the trial
June 2005	- Government authorizes trial, following long negotiations with INRA Directorate
September 2005	- Field trial planted out - Negative reaction by some NGOs

ENDNOTES

[1] INRA employs approximately 9000 staff members, conducts research in 21 regional centers, and had a annual budget of €680 million in 2005, 80% of which comes from central Government. For further information, see http://www.international.inra.fr/.

[2] http://tvbtvm.online.fr/ (last accessed 27/09/06).

[3] http://www.inra.fr/Internet/Directions/SED/science-gouvernance/ITA-Vignes/index.html (last accessed 25/09/06).

[4] The members were: Arie Rip (Chair), Michel Callon, Marie-Angèle Hermitte, Michalis Lianos, Jacques Theys and Brian Wynne. We thank them all for their valuable input.

[5] The terms interactive TA (iTA) and constructive TA (CTA) are used by different sets of authors to refer to very similar forms of pTA. For the sake of simplicity, we do not enter here into the possible differences between these two terms and use the term iTA throughout, even when referring to writings by proponents of CTA. Furthermore, some authors sometimes use the term "interpretive" to describe the iTA method.

[6] The French term "*filière*", used by members of the GT, is difficult to translate into English. It encompasses the whole chain of production and transfer activities for a particular type of product (here wine), from the production of seed material and other agricultural inputs, through all connected farming activities, to final value-adding, marketing and consumption activities. We use the term "grapevine industry" as a poor translation.

[7] http://www.infogm.org/article.php3?id_article=706 (last accessed 20/09/06).

[8] http://www.infogm.org/article.php3?id_article=857 (last accessed on 20/09/06).

[9] http://www.infogm.org/IMG/rtf/ogmvigne2.rtf (last accessed on 20/09/06).

[10] http://www.leflaive.fr/english/presse/letter-inra-may2003.pdf (last accessed 29/09/06).

[11] "France: projet de vigne OGM en plein champ inquiète les viticulteurs d'Alsace", AFP 20/02/03.

[12] http://www.infogm.org/article.php3?id_article=1542 (last accessed 26/02/07).

[13] *Commission du Génie Biomoléculaire* (CGB).

[14] "Les grands crus en guerre contre les OGM", Le Figaro, 09/07/04.

[15] http://www.inra.fr/la_science_et_vous/dossiers_scientifiques/ogm/questions_de_recherche/porte_greffe_transgenique_de_vigne (last accessed 20/09/06).

[16] "Recherches de l'INRA sur les OGM : éléments d'une politique". Draft policy document to be adopted by the INRA Board of Directors (September 2006 version).

[17] http://www.infogm.org/IMG/rtf/ogmvigne2.rtf (last accessed on 20/09/06).