

## A TWO SIDED COMMUNICATION APPROACH FOR SCIENCE AND TECHNOLOGY POLICY RESEARCH: THE CASE BIOTECHNOLOGY & FOOD IN THE NETHERLANDS

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### Abstract

In order to avoid costly and emotional clashes between stakeholders in innovative fields of technology (nuclear energy, cloning, GMO crops) many scholars blame the knowledge divide between scientists, politicians and society and therefore advocate a cautious (network) approach to synchronize knowledge levels among all stakeholders. The proposed solutions are described under various headings like “interactive science communication”, “Interactive policy” and “New Modes of Governance”. However, hardly any examples of good practices are presented yet. This paper describes an actual case which involves citizens in policy making on the issue of biotech food in The Netherlands by applying a bottom up methodology. The approach is unique in the sense that it sandwiches classical tools for policy analysis (analysis of policy documents, interviews of experts, relational problem analysis) with participative tools (citizens’ panels, focus groups, Socratic dialogues, stakeholder workshops) resulting in a so called “constructed societal agenda”. This societal agenda reflects the interrelated complexity of the different positions taken by stakeholders and at the same time it is a frame of reference to enable communication between stakeholders with opposed views as they can recognize their own position in relation to others. Common grounds are used in the final steps to shift various dead ended one-way discourses by stakeholders with a specific interest (scientists, entrepreneurs, politicians) towards constructive dialogues to proceed with technological innovations in a mutual acceptable way. Citizens views and experiences are equally matched with expert views and experiences. The constructed societal agenda offers in addition a framework for successive monitoring and evaluation studies. Due to this transparent frame of mutual understanding, the two-sided approach in PCST will commit the parties for the future and thus empowering the public (and other stakeholders) to an open and trustful communication.

**Keywords:** two sided communication, biotechnology, food, bottom-up, societal agenda, interactive methods, controversies

### 1. Introduction

Some scientific innovations, such as nuclear energy and biotechnology, seem to develop a love-hate relationship with society, while other innovations such as ICT are absorbed effortlessly into daily life. A great deal of research has been done on this in the past decade. Whereas previously the relation between technology and society was approached from a top-down or technology-push perspective (how can we make an already developed product accepted?), science studiers currently assume a strong exchange or even interweaving of technological and societal developments. For issues relating to the management of scientific activities (and in particular research programming), this new perspective is of considerable importance. It implies a different method and a new phase of relating societal perspectives to technological developments. It is not so much a case of removing society’s concerns about technology, but of analyzing these concerns and then applying this analysis to the content of research policies. One way of achieving this is to formulate a societal (research) agenda as a challenging reflective mirror within an interactive process.

#### 1.1. Agenda-setting in the institutional void

What is the position of societal agenda-setting in present-day decision-making processes? In our Western post-war society, the systems of political decision-making and policy formulation are consolidated within established authorities and institutions. Considerable progress was achieved in the previous century with the segmentation of policy themes in departments and the specialization of policy fields. As Hajer (2003) argues, under the influence of globalization and individualization, these arrangements do not provide an adequate response to new issues, such as those relating to biotechnology, genetics, food and the environment. According to Hajer, new policy formulations take place in an institutional void, with a growing role for civil society and new forms of mobilization. As an example Hajer cites the ‘successful’ lobby by Greenpeace against the sinking of the Brent Spar.

This growing influence of civil society has consequences for the legitimacy and the effectiveness of processes of policy formulation. Whereas in the classical-modern institutions legitimacy can be guaranteed by democratic representation, and via formal consultative procedures and professional lobby organizations, in the new political arenas we have to find a new way of legitimizing agenda-setting and policy-making processes, all the more so because organizations which are responsible for preparing policies use a historically developed range of information channels. Ministries frequently receive their signals from umbrella organizations which implement a specific policy for which the priorities and posteriorities have already been established. The same applies for the political agenda which is formed under the influence of as political positions and media response.

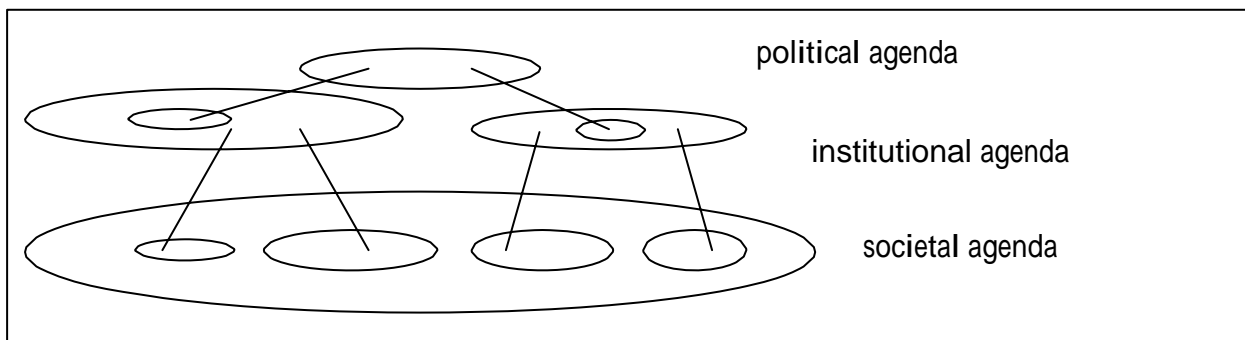


Figure 1. Political, institutional and societal agenda

### 1.3 A societal agenda for biotechnology

The developments in the field of biotechnology are a striking example of Hajer's argument that decision-making power in our post-modern society no longer rests with the classical-modern institutions, but that civil society is able to organize itself in such a shrewd and transnational way that it has become a significant, yet elusive (f)actor. British opponents of genetically modified food products, for example, were able to reach a broad network of supporters using the media and internet, which quickly led to the collapse of the market for this type of product. Also, in 2000, in the US, the introduction of genetically modified corn (Starlink) failed after consumers in Japan and Europe refused to accept this technological innovation. The American government, which had approved the product, was unable to resolve the problem (Kettle, 2002: 1-5). This illustrates that in our current political climate, not only is the legitimacy of 'traditional' decision-making processes suffering from a loss of power, but also that its efficacy is in serious doubt. We see that, although civil society exercises considerable influence on the development and acceptance of, in this case, biotechnology, this is primarily in the form of obstructive actions and countervailing power. This has the effect of maintaining or even reinforcing the polarized positions of the established parties [2],[5].

In a recent typology of forms of governance of science and technology, the above-mentioned process is referred to as 'agonistic governance' by Hagendijk. When conducting research into the societal agenda-setting of biotechnology from an agonistic perspective, one would probably opt to make analyses of the media attention and positions of NGO's, and possibly to carry out a public survey. However, many present-day policy specialists and those engaged in administrative and policy studies believe that policy analysis should not only be descriptive, but should also play a substantial role in new forms of policy formation. With regard to unstructured issues in particular, such as those relating to biotechnology, deliberative forms of governance are both possible and desirable. Therefore, the following question is relevant to our research on a societal agenda for biotechnology: What criteria does a societal agenda have to meet in order to be able to make a contribution to the transition from 'agonistic governance' to 'deliberative governance' in the area of biotechnology? [3]

An important conclusion from studies into deliberative policy-making is that, in spite of principles such as equality between participants, some participants nonetheless have an advantage. "The dice, however, may in many ways be loaded in favour of those with superior resources, including through better access to customized knowledge and rhetorical resources." (Hagendijk et al. 2005: 174). It is primarily these rhetorical sources which society lacks because opinions, feelings, knowledge, etc., about biotechnology are not articulated. In line with a great deal of STS research (Science, Technology and Society), our approach assumes that, in particular with unstructured issues, society can play a role in discussion, deliberation and decision on research and policies, provided the working methods facilitate the articulation of opinions which are held but not expressed. In research into a public debate on Biotechnology and Food in England, Irwin observed that: "Public groups expressed well-developed views on these topics (despite their initial unfamiliarity), once they had been given the opportunity to reflect on and discuss them both inside and outside the workshop." (2001:12).[3],[4]

### 1.4 From consultation to construction

While the ideas and opinions of important stakeholders (government, industry, NGO's, the scientific community) have largely been shaped and even institutionalized, the body of ideas held by society is generally under-articulated. So, although the institutional agenda includes inputs from society (via NGO's, but also via ministries) we hypothesized that these may differ from the societal agenda. In order to go beyond already well-known opinions, professional societal spokesmen are not consulted in this research, but a societal agenda is constructed together with interested, but not professionally involved citizens. The construction of a societal agenda might provide options to overcome the vested polarization between the institutional agendas. A starting point for elaborating this issue can be found in the work of Grin and Van de Graaf [1].

Grin and Van de Graaf indicate that actions of social actors are based on their frames of meaning. This is the set of assumptions held by an actor which guides his behaviour, and which operates at different levels (a multi-layered set of assumptions); from the levels of assessing solutions and defining problems, to more fundamental levels of underlying theory and value systems.

Table 1. Layers within communicative action theory (adapted from Grin and Van de Graaf [1])

Levels	Notion from communicative action theory	Order
1. (Technical)	Assess solutions	1 <sup>st</sup> order of argumentation: specific situation
2. (Situational)	Problem definition (policy problems, practical problems)	
3. (System)	Background theories (value systems, perceptions)	2 <sup>nd</sup> order of argumentation: value systems and world views
4. (Societal-rational perspective)	Final preferences (e.g. on the preferred structure of society)	

Unlike Grin and Van de Graaf, we treat society in our approach not as a singular target group for policy, but we focus on the multiple patterns of preferences, value systems and problem definitions. The notion of the theory of frames of meaning, teaches us that when questioning people from societal groups, one should not only look at their assessments of solutions and expressions of concerns (problem definitions), but also examine their underlying value systems and world views. [1]

In other words, the development of a societal agenda which avoids polarized viewpoints is subject to a number of criteria:

- The starting point is the problems and dilemmas which people themselves experience; not the formal policy agenda;
- Relevant issues should be approached integrally (for example, food safety, instead of specifically the safety of genetically modified food);
- The problem definition will be better elaborated by the participants if intuitive assumptions are made more explicit through the use of 'Why?' questions.
- Participants are addressed as people rather than as stakeholders.

### 1.5 Focus groups and argumentation trees

Our approach is not aimed at a quantitative description of opinions; on the contrary, it is a qualitative study of the underlying reasons why people hold a particular opinion. Every effort is made to map a complete spectrum of the lines of argument within the framework of biotechnological innovations. A method of research which is suited to helping people to express concerns, problems and solutions, and which moreover involves the elaboration of underlying values, is group interviews, such as focus groups, citizen panels and Socratic discussions.

#### Society in this study

In this study 'society' was questioned about the personal vision(s) held by its members in regard to the challenges and restrictions arising from biological innovations relating to food. Who is this society? And how can one determine the diversity of views relating to biotechnology and food? Because this project is about the articulation of the societal agenda, a quantitative study of the opinions of a representative selection of all individuals (a large scale enquiry) is not appropriate. A quantitative approach supposes that the possible agenda issues are known and have been articulated. A qualitative study was therefore carried out among a diverse group of interested 'citizens'.

In making an inventory of the societal spectrum, participants were sought who are preferably

interested in the subject, but are not lobbyists for any pressure group. Participants are motivated to consider the subject, but have not yet adopted any clear position; they are, as it were, still trying to make up their minds. Also, every care was taken not to mix experts and non-experts because of the tendency of experts to lecture the other participants, and of non-experts to adopt the views expressed by the experts. Finally, the decision was taken to keep the groups small and to focus the discussion on the themes emerging from the institutional level (reports). It was observed that in a public setting, for example a public debate, a farmer will tend to speak on behalf of all farmers, while the same farmer takes part in a small focus group as a 'person'.

Such a group interview is made up of three stages. (1) In the first instance participants are facilitated in a process where they are able to clarify their views and determine their own position in the debate. Then (2), an inventory of these positions is facilitated by the researchers. Finally (3), the group itself structures the problem in a validated way. In order to achieve these three objectives in a short space of time in one session, a focus group approach was chosen. From a general observation, the group itself formulates the focal points within a problem, via a strictly managed question and answer session. Using visualization techniques, the inter-related relationships and prioritizing of the aspects discussed are mapped on flip-overs. A summary and a construction of the discussion, in the form of an argumentation tree (see below), are sent to the participations after the session for them to authorize.

## 2. Setting the mirror

The current case is not directly linked to a (deliberative) policy-making process. The disadvantage of this may be that the effect on policy-making may be limited. An advantage, on the other hand, is that the construction of the societal agenda is not already structured in terms of policy constraints. In his research into the British debate on Biotechnology and food, Irwin describes how the Minister for Science determined the direction of the debate by defining precisely which questions would be discussed during the discussion. This research shows the significance of institutional location and of pre-framing and pre-defining the issue (Bioscience, biotechnology) for the outcome and the effects of the discussion. The objective of our approach is to bring the unarticulated societal agenda to communication, and in order to achieve this, some distance from the institutionalized policy-making bodies is appropriate. Our approach is primarily focused on the content of the discussion whereby in the process the emphasis is on uncovering the fundamental reasons behind the concerns, which have been validated in the group process; the 'Why?' behind the emotions and comments of citizens, as well as of other stakeholders. The objective is to arrive at a comprehensive communication of the concerns about biotechnology and their causes, rather than a list of separate and unrelated items, and especially postponing the 'hasty' decisions in order to create a space for mutual understanding.[5]

This interrelated problem field is, what we regard to be the 'societal agenda': it is a divers and complex framework that gives meaning to divers and complex opinions in our society. However this societal agenda is not an objective in itself; it only gains a critical communicative function when it is placed as a mirror against the current agendas of the established parties. It unites the manifolds so called layman or illiterate in a massive problem field that evokes the professional scientists and policy makers to answer.

### 2.1 Four steps towards a de-politicized 'frame of meaning' for science and technology communication

In our approach, we start with an analysis of debates which have already been conducted and documents which have already been published.

#### 2.1.1 Institutional level

One of those interviewed characterized the current societal debate on biotechnology in the Netherlands as "a ritual dance which we regularly perform and which only serves to confirm the status quo". "It is communication to the deaf". In line with the distinction already described between the consolidated institutional arrangements and civil society, the aggregate of the positions, ideas and arguments of the established parties (including the professionalized lobby organizations) will be called the institutional agenda.[6]

Since the positions are already relatively well defined, an inventory can be made of the relevant lines of argument based on policy documents, enquiries and in-depth interviews. In this analysis also the issues will be elaborated on as indicated in table 1. First order arguments will be looked at: what opportunities and threats are mentioned? And also second order arguments: what are the implicit fundamental values on which these are based? This analysis resulted in some high controversy areas relating to 7 themes. Not surprisingly these sensitive themes appear to have a high 'container concept' characteristic (concepts with a shallow content, or packet with multiple definitions), like quality of food, consumers right on freedom of choice, or north-south responsibility.

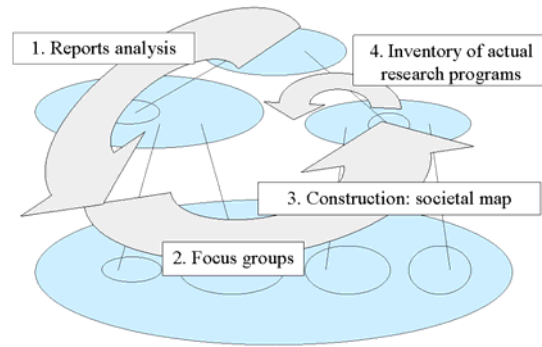


Figure 2. bringing the agenda levels in a cyclic communication

### 2.1.2 Societal level

A focus group is set up when there is a need for focus in relation to a particular issue: What exactly are we talking about? Why is this considered important? etc. A meeting consists of a closely guided group discussion, where the participants are encouraged to voice the true aspects of an issue, to make relate issues to one another and to establish their relative importance. The discussion is led by a facilitator in line with a plan devised for this specific issue along a number of analytical steps. One of the results in our design of focus groups are argumentation trees, see figure 3..

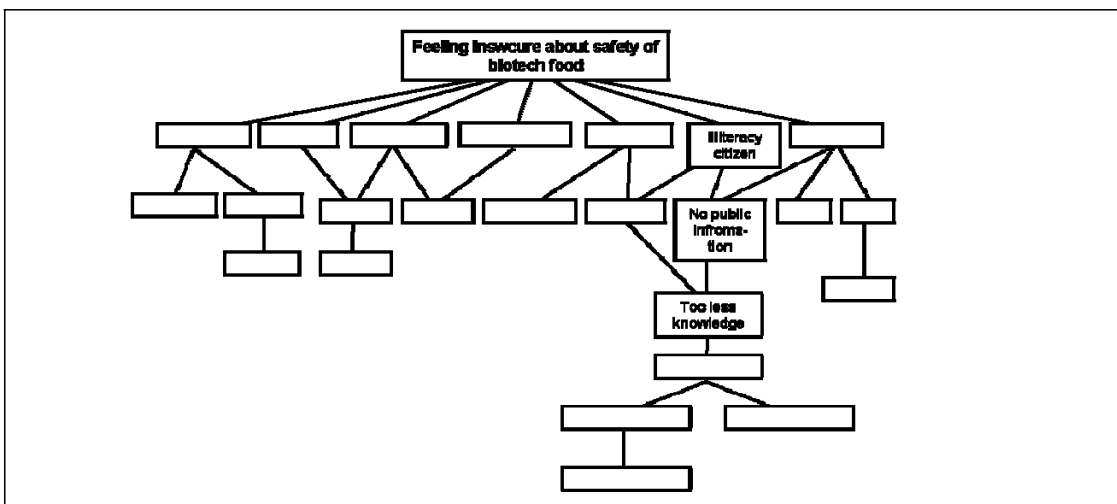


Figure 3. Example of an argumentation tree as a result of an exploratory activity of a focus group to articulate the deeper grounds of their insure feeling towards biotech food.

An argumentation tree is a diagram which at the top contains a concrete problem, with increasingly deeper causes for the problem being shown underneath. By asking in each box the question: 'Why is this a problem?' one descends via a line to a lower box which gives the answer to the question. Conversely, if you start underneath, with each upwards line the statement must be that: 'If the statement in the lower box is correct, then the effect of this is shown in the higher box.' In this way one can move from the top to the bottom of the argumentation tree using 'Why?' questions and vice versa with 'The consequence of this is ..' steps. Such trees show the mutual relationships of various arguments.

### 2.1.3. Constructing an integrated argumentation tree

An argumentation tree has roughly the same structure as the four levels of the theory of communicative action: at the top there are the more concrete and situation-specific questions ('insecure about food safety', unequal 'North-South division') and the underlying values and dilemmas are at the bottom. These last issues are very general in nature such as 'societal security' versus 'liberalism' or 'sustainability', or 'respect for autonomy'. These underlying, second order arguments are generally common to different societal themes (or sub-themes within biotechnology), which means the argumentation trees of different group meetings overlap at more deeper second order arguments. This gives the opportunity to connect the argumentation trees of all the seven focus groups to each other. (See figure 4).

The integrated and interconnected argumentation tree therefore provides a reconstruction of the complex cohesion between arguments relating to the societal aspects of biotechnology. One group of actors may feel they belong on the left whilst others feel their perspectives are covered on the right, thus enabling fruitful dialogue between people with different views on the matter.[1]

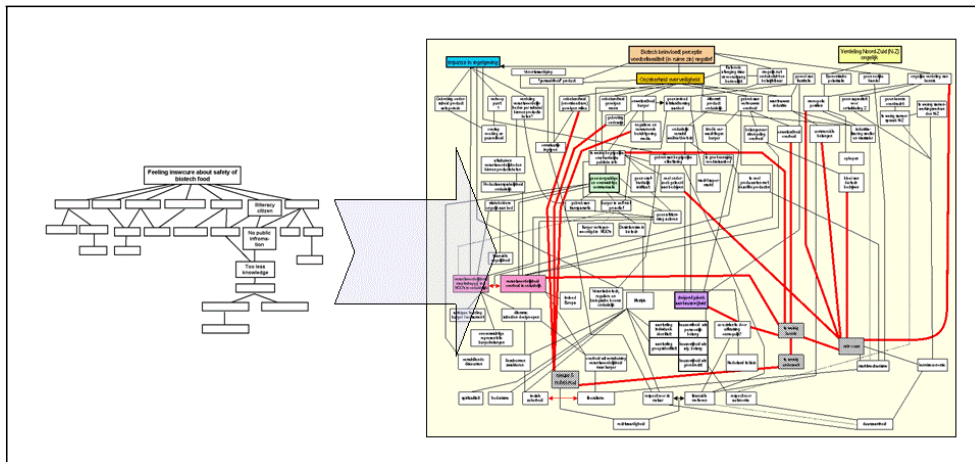


Figure 4. by connecting overlapping parts of individual argumentation trees, a complex interrelationship of yet unarticulated worries emerges

#### 2.1.4. From societal agenda to the setting of the research agenda

Knowledge deficiencies are signaled from the societal agenda (argumentation tree). In a workshop, citizens are asked to nominate and then prioritize research themes. If these research themes formulated by non-experts are placed within the current research programmes, which have been determined by diverse national bodies and which reflect the influences of researchers and the priorities set by leading authorities, a number of striking differences can be seen as well as a considerable overlap. In setting up a research agenda based on society's requirement for knowledge, important issues are (a) whether the knowledge is available, (b) whether the knowledge is known to citizens/consumers, (c) whether the knowledge comes from a reliable source, or (d) whether the requirement for knowledge is viable for research. IN addition society likes to have clear information about the added value of novel foods. However, in terms of scientific investment and communication regarding the usefulness of novel foods, we see that little (publicly accessible) research is carried out. Society likes to see scientific investment into the consequences of biotechnology for nature and the environment. However, most grant go to theoretical modeling, and hardly longterm monitor studies are performed in the fields Finally, we see that considerable safety research is carried out into the effects on man and the effects on developing countries, but that there is little awareness of this among the citizens. These differences could constitute grounds to structure a focused two-way dialogue between society and those who steer professionally the science and technology policy

### 3. Discussion

This paper focuses on the construction of a societal agenda within the process of preparing policies for a research agenda on biotechnology. This construction is based on a methodological and systematic integration of interactive and transdisciplinary research methods. The case of "biotechnology and food" has been chosen as the focus, but the methodology development is applicable to all other areas within biotechnology and genomics, and beyond this, to other complex, unstructured issues relating to the societal connection between scientific and technological innovations. A toolkit manual describing in detail the methodological arguments to design and use the various methods in a specific order and how to deal with methodological pitfalls, is planned to appear in 2006.

We observed that setting up a research agenda is not only about contrasting the requirement for knowledge with the availability of research. In addition to the conclusions reached on the specifics of the issues, there is also something to be said about the process side of the interaction between society and science in the area of biotechnology and nutrition. This is not simply a matter of whether or not knowledge is available, but also relates to the communication processes between the scientific community and society, and the involvement of citizens and consumers in achieving biotechnological innovations in the range of food available.

This research has given insights into the motivations and fundamental values on which the conflicts and dilemmas in the area of biotechnology are based. By questioning people from society who do not have a firm and prejudiced point of view on the development of biotechnological innovations, one can go beyond the polarization which is typical for the social and political discussion on biotechnology and nutrition. Themes were selected which at institutional level are often indicated as being important but at the same time appear to have little depth.

Research which is communicated from a pure academic perspective has little chance of success in removing the concerns felt by citizens; neither has a detached societal-scientific methodology, whether in the form of interviews or descriptive analysis. By applying the method to construct a social agenda from an argumentation tree, participants in the deliberative processes can recognize – and probably also understand - one another's viewpoint and position. As well as differences of opinion, there will also be shared lines of argument, which promote open and constructive communication. This means that, also in the follow-up discussion on research policy for biotechnology and food, stereotypical discussions and meaningless conventions can be avoided. We observed that a constructive dynamic can be created by which all stakeholders can identify themselves in the framework that was build on the issues communicated by the participants

The method followed in this approach to construct a research agenda leads to the identification of a number of areas where research efforts should be applied. At the same time, this method provides an insight into a number of process conditions for the way in which these should be addressed. It offers a map to avoid dead ends and pitfalls in two-sided communicating science and technology topics within a pluralistic society. And finally it offers a frame of reference to evaluate the effects over years of science policy and communication. It is expected that the application of this methodology to other unstructured issues will give a comparable insight into the cohesion between content and process aspects of science and technology communication.

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