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# Science communication in policy making – A qualitative research about the motivation of academic biotech scientists to participate in policy making in Europe

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## Abstract

Policy making regarding application of agricultural biotechnology has been controversial. This study investigates what determines the motivation of European biotech scientists to actively participate in policy making. To do this, a conceptual framework was developed based on the Theory of Planned Behavior. The framework was operationalized in semi-structured interviews with 17 European biotech scientists to collect data about their motivation to involve in GMO policy making. The results of this qualitative study suggest that the attitude of the scientists towards active participation in policy making is dependent on their view of the way science and decision making relate to each other. The respondents who are currently active in policy making seem to be driven by commitment

to the public good. However, many respondents feel social pressure from environmental NGOs to withdraw from engagement in GMO policy making. Furthermore, the respondents judge themselves more competent to take an informing role than a participating role. Finally, many of the scientists feel that encouragement by their own research institute or some science-policy organization increases their ability to involve in policy making. The conceptual framework developed in this study provides a tool to research the motivation to engage in policy making of scientists in other science and technology fields.

## Introduction

Advances in emerging fields of science and technology can cause public and political debate (van den Hove, 2007). One such challenging science-policy area is agricultural biotechnology (Levidow et al., 2005) in which genetic engineering technologies are employed to develop crops with enhanced properties, such as insect resistance, increased nutritional value and ability to grow in dry conditions (Bradley et al., 2010). While scientists state that biotechnology and the use of GMOs are not per se more risky than e.g. conventional plant breeding technologies (van Haver et al., 2008), agricultural biotech opponents state that genetically modified (GM) products impose unpredictable or unacceptable hazards (Levidow et al., 2005). The European Union has developed a legislative framework for the approval of GM crops which has been criticized for not fitting its initial purpose and being unworkable and inefficient (Bradley et al. 2010). In the science-policy interface of biotechnology, that is characterized by high perceived uncertainty about potential positive or negative implications, many scientist feel there is a risk that science is invoked as justification for selecting one course of action over others, also called the ‘politicization of science’ (Pielke, 2007). This could be a trigger for them to actively engage in policy making (van den Hove, 2007; van der Werf Kulichova, 2012); for instance by interacting with policy makers and other stakeholders to support policy decision making. This qualitative study aims to investigate which factors influence the motivation of academic biotech scientists to take an active role in policy making.

**Methodology**

To study scientists' motivation to engage in policy making, a conceptual framework was developed based on the Theory of Planned Behavior (TPB) from Azjen and Fishbein (Azjen, 1991). TPB proposes that the intention to behave is a combination of the evaluations of three motivational factors: the attitude towards the behavior, the perceived social pressure to perform or not to perform a behavior and the perceived ability to perform the behavior (Azjen, 1991). We performed a multidisciplinary literature study in diverse research domains, such as Science Communication and Science Policy and Environmental Studies, to investigate what factors could influence these motivational factors (Table 1). Based on these factors, we interviewed 17 scientists from 9 different European countries that are member of the European Union. All respondents obtained a Ph.D. and hold a research position at a public research institute, such as a university. All are active in the field of agricultural biotechnology for at least 10 years and thus had in-depth knowledge about the research field and experience with European GMO regulation. Scientists were questioned by phone or Skype in semi-structured in-depth interviews. Each interview took about one hour and focused on four topics: (1) the respondent's current role in GMO policy making; (2) his attitude towards personal involvement in policy making; (3) his perception of the way others judge the involvement of scientists in policy making; and (4) his perceived ability to take an active role in policy making. Transcripts of the interviews were sent to the respondents to correct factual information. Data was analyzed employing the Miles and Huberman framework for qualitative data analysis using the qualitative data analysis software package NVivo10.

| Motivational factor | Determinants of motivational factors | References | Research domain |
|---|---|---|---|
| Attitude | View on relationship science and decision making | (Pielke, 2007) | Science Policy and Environmental Studies |
| | Personal and professional usefulness | (Martin-Sempere et al., 2008) | Science Communication |
| | Intrinsic enjoyment | (Martin-Sempere et al., 2008) | Science Communication |
| | Perceived cost vs. value | (Shanley and Lopez, 2009; Ecklund et al., 2012) | Science Communication |
| | Attainment value (personal importance) | (Allio et al., 2006; Masip et al. 2013 ) | Science Policy and Environmental Studies |
| Perceived social pressure | Opinion academic peers | (Ecklund et al. 2012; Meyer et al. 2010) | Science Communication, Science Policy and Environmental Studies |
| | Risk of personal attacks by other stakeholders | (Brownson et al., 2006) | Science Policy and Environmental Studies |
| Perceived ability | Self-efficacy to share research with non-scientists | (Poliakoff and Webb, 2007; Shanley and Lopez, 2009; Ecklund et al., 2012) | Science Communication |
| | Institutional encouragement | (Shanley and Lopez, 2009; Ecklund et al., 2012; Pielke, 2007) | Science Communication, Science Policy and Environmental Studies |

Table 1. Determinants of motivational factors for scientists' intention to involve in policy making

## Results

### Attitudes towards involvement in policy making

Table 2 describes the roles the interviewed scientists currently take in policy making, which are defined in this study as in Pielke (2007): the Pure Scientist, the Science Arbiter, the Honest Broker and the Issue Advocate. All these roles were represented in the answers of the respondents. We asked respondents how they see the relationship between science and decision making. Some of our respondents have a linear view (Pielke, 2007) and see it as a separated process in which science gives input for policy decision, whereas others have a stakeholder view (Pielke, 2007) and think that scientists should personally involve in policy decision making. For instance, one interviewee commented that: *"I think they should be separated processes, but you should inform the policy makers as best as you can. I think they are two different jobs."* (R.11) Whereas another interviewee mentioned: *"I think they should have an active role and be*

*involved in decision making, because they have a better understanding - I think - of the potential and also of the risks involved. So they should be definitely involved at all levels of decision making."* (R.13) A comparison between the current roles scientists take in policy making and their view on the relationship between science and decision making (table 2) suggests that scientists with a stakeholder view on science more often take a participatory role in policy making.

| Role scientist in policy making (Pielke, 2007) | | Respondents (# scientists) | Linear view (# scientists) | Stakeholder view (# scientists) |
|---|---|---|---|---|
| Pure Scientist | Focuses only on facts and has no interaction with policy maker | 1 | 1 | 0 |
| Science Arbiter | Answers specific factual questions posed by policy maker | 8 | 4 | 4 |
| Honest Broker | Seeks to expand, or at least clarify, the scope of choice available to the policy maker | 3 | 1 | 2 |
| Issue Advocate | Seeks to reduce the scope of choice available to the decision maker | 5 | 1 | 4 |

Table 2. The role of interviewees in policy making versus their view on the relationship between science and decision making

Results from our interviews indicate that scientists in our study do not experience intrinsic enjoyment from involvement in policy making. Furthermore, when asking about the personal or professional usefulness, respondents indicated that although these might be present, their motivation to engage in policy making is not influenced by these effects. Nevertheless, almost all (16) scientists think that it would be especially useful for society or economy if policy makers and scientists would cooperate more to make policies. This is exemplified by an interviewee's comment that: *"You would hope, but of course that's your own impression, that if you supply the right scientific facts, and they are being picked up by policy makers in order to evolve a policy that's based on science that that is good for the general public."* (R.14) Furthermore, almost all (15) interviewees indicated that it is important or very important for them to involve in policy making. When discussing the reasons for their attainment value, scientists most often mentioned the effect on academic research and thus value for society, the personal commitment to the public good and the misuse or ignorance of science by policy makers (table 3). When

questioning the perceived cost, only three scientists interviewed think their involvement in policy making has a negative effect on their career, whereas nine scientists considered the effect neutral and four scientists positive.

| Reason | Number of times mentioned |
|---|---|
| Effect on academic research and thus on value for society | 12 |
| Personal commitment to public good | 10 |
| Science is currently misused or ignored by policy makers | 10 |
| Research is paid by public money | 5 |
| Increase weight of science in the debate | 4 |
| Worries about the future | 3 |
| Too much money spend on risk assessment | 2 |

n = 17, Interviewees could indicate more than one reason

Table 3. Reasons why scientists feel it is important to involve in policy making

**Perceived social pressure from peers and other stakeholders**

During the in-depth interviews we asked scientists whether they perceive social pressure from academic peers and other stakeholders in GMO policy making, such as environmental organizations, to withdraw from active participation in policy making. The majority (12) of the scientists interviewed feel that their involvement is or would be appreciated by academic peers. However, most (14) feel that their motivation is not influenced by the opinion of academic peers. For instance, one interviewee mentioned that: *"Everyone has to be first of all happy with his own motivations. So whether I'm accepted or not by the other colleagues, it is not so relevant."* (R.7) Nine scientists feel that environmental NGOs do not appreciate the involvement of scientists in policy making, which often negatively influences their motivation to actively participate in GMO policy making. They feel a risk of personal attack, as exemplified by an interviewee's comment that: *"People that do involve in the discussion often get smeared, as being in the pocket of companies, or accused that you're in favor of GMOs or falsifying science, or lying, things like that. And I'm not sure that I want to be exposed to that."* (R.14)

**Scientists' perceived ability to actively participate in policy making**

In the final part of the interviews we discussed scientists' self-efficacy – the judgments of the capability to perform the behavior (Bandura, 1977) – and how they perceive encouragement from their research institute to participate in policy making. Sixteen scientists feel competent to take an informing role to policy makers as "Science Arbiter". Nevertheless, only ten scientists feel competent to also take a participatory role and for instance involve in policy debates with other stakeholders. The majority (12) of the respondents mentioned competences related to communication. Furthermore, many (7) also mentioned the importance of having the right scientific background. This result indicates that many scientists feel that they need both communication skills and the right in-depth scientific knowledge to contribute to GMO policy making. Nine of the scientists interviewed feel that they don't have enough time to involve in policy making. However, seven respondents mentioned that they feel positive encouragement from their research institution to involve in policy making. For instance, one interviewee commented that: *"… the university supports it. You know, I have to take time off to do this work. But they think we should be contributing to policy. … So I could do that and I could buy out some time of my teaching for example. …the university has very clear procedures for that."* (R.1) Furthermore, eight scientists interviewed think that institutionalization in the form of an organization would increase their ability to participate in policy making, as exemplified by the comment that *"As an individual, it's very difficult. … But if you get into contact with all these networks, that's a very good way of making things more… to give some strength."* (R.15)

**Conclusion**

The respondents of this study that have a stakeholder view on science also take a more active role in policy making. This result suggests that the attitude of scientists towards active participation in policy making is dependent on their view on the relationship between science and decision making. Scientists interviewed who are active themselves, seem mainly driven by commitment to the public good, rather than personal or professional usefulness. Results from this study indicated that scientists do not feel negative social pressure from academic peers. On the other hand, we conclude from this

study that environmental NGOs give social pressure to withdraw from engagement and thus influence their motivation negatively. Furthermore, we conclude from this study that scientists' perceived ability to actively participate in policy making is determined by their self-efficacy, the availability of time and the level of encouragement by their research institute. Finally, many scientists feel that connecting to a science-policy organization would increase their ability to involve in policy making.

**Discussion**

This research explores motivational factors for scientists in agricultural biotechnology to actively engage in GMO policy making. The study has limited sample size and the qualitative nature might support socially desired answers from respondents. Therefore, we will do further studies using quantitative methods to investigate whether the results of this study can be generalized (Van der Werf Kulichova, forthcoming). This study focused on a specific science and technology field: agricultural biotechnology. However, we suggest that the framework developed in this research might be used to study other controversial science and technology fields.

**The role of the science communication professional**

Although scientists in our study had a positive attitude towards active participation in policy making, they were reluctant to do so themselves, partly because of a lack of self-efficacy. Bultitude et al. (2012) suggest the use of science communication professionals as mediators in policy debates. On the other hand, data in this study suggests that many scientists feel they should participate themselves, because they have the right scientific background. Therefore, we suggest that science communication professionals could support scientists, for instance by teaching them transaction strategies of science communication, but should not necessarily replace scientists as mediators.

**References**

Allio, L., Ballantine, B., and Meads, R. (2006), "Enhancing the role of science in the decision-making of the European Union", Regulatory Toxicology and Pharmacology, 44, 4-13.

Azjen, I. (1991), “The theory of planned behavior”, Organizational Behavior and Human Decision Processes, 50, 179-211.

Bandura,A. (1977), “Self-Efficacy - Toward A Unifying Theory of Behavioral Change”, Psychological Review, 84, 191-215.

Bradley, D., Caspari, C., Nganga, J., Ricci, M., Russo, L., De Borchgrave, R., Traon, D., and Von Gall, P. (2010) “Evaluation of the EU legislative framework in the field of GM food and feed.” 12-7-2010, Food Chain Evaluation Consortium (FCEC), Civic Consulting, Agra CEAS Consulting, Van Dijk Management Consultants, Arcadia International. Accessed 01 April 2014 from: http://ec.europa.eu/food/food/biotechnology/evaluation/docs/evaluation_gm_report_en.pdf

Brownson, R.C., Royer, C., Ewing, R., and McBride, T.D. (2006), “Researchers and policymakers - Travelers in parallel universes”, American Journal of Preventive Medicine, 30, 164-172.

Bultitude, K., Rodari, P., and Weitkamp, K. (2012), “Bridging the gap between science and policy: The importance of mutual respect, trust and the role of mediators”, Journal of Science Communication, 11, C01.

Cantley, M. (2012), “European attitudes on the regulation of modern biotechnology and their consequences”, GM Crops and Food: Biotechnology in Agriculture and the Food Chain, 3, 40-47.

Ecklund, E.H., James, S.A., and Lincoln, A.E. (2012), "How Academic Biologists and Physicists View Science Outreach”, Plos One, 7.

Levidow,L., Carr, S., and Wield, D. (2005), "European Union regulation of agri-biotechnology: Precautionary links between science, expertise and policy", Science and Public Policy, 32, 261-276.

Martin-Sempere, M.J., Garzon-Garcia, B., and Rey-Rocha, J. (2008), "Scientists' motivation to communicate science and technology to the public: surveying participants at the Madrid Science Fair", Public Understanding of Science, 17, 349-367.

Masip, G., Sabalza ,M., Perez-Massot, E., Banakar, R., Cebrian, D., Twyman, R.M., Capell, T., Albajes, R., and Christou, P. (2013), "Paradoxical EU agricultural policies on genetically engineered crops." Trends in Plant Science, 18, 312-324.

Meyer, J.L., Frumhoff, P.C., Hamburg, S.P., and de la Rosa, C. (2010), "Above the din but in the fray: environmental scientists as effective advocates", Frontiers in Ecology and the Environment, 8, 299-305.

Poliakoff, E. and Webb, T.L. (2007), "What factors predict scientists' intentions to participate in public engagement of science activities?" Science Communication, 29, 242-263.

Pielke, R.A. (2007), The honest broker: making sense of science in policy and politics, Cambridge, UK: Cambridge University Press.

Shanley, P. and Lopez, C. (2009), "Out of the Loop: Why Research Rarely Reaches Policy Makers and the Public and What Can be Done", Biotropica, 41, 535-544.
Van den Hove, S. (2007), "A rationale for science-policy interfaces", Futures, 39, 807-826.

van Haver, E., et.al. (2008), "Safety and nutritional assessment of GM plants and derived food and feed: The role of animal feeding trials", Food and Chemical Toxicology, 46, S2-S70.

Van der Werf-Kulichova,Z., Pierce,R., and Osseweijer,P. (2012), Science-policy interfaces from a communication perspective. In Quality, honesty and beauty in science and technology communication, PCST 2012 Book of Papers, (Vicenza, Italy: Observa Science in Society), pp. 362-365. Accessed at 28 Feburary 2014 from: http://www.observa.it/allegati/PCST2012_Book_of_Papers.pdf