

# Social debate about new technologies: What Nanotechnologies may learn from the GMO controversy



## Summary

### of the Workshop

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by td-net (Christian Pohl),

Nanopublic (Alain Kaufmann) and

Forum for Genetic Research (Stefan Nussbaum)



## Background

Nanotechnologies are developing rapidly. Some applications are already part of our everyday life. Their importance is growing and will deeply impact our society, which always looks at emerging technologies in an ambivalent manner. The development of nanotechnologies may raise a public controversy that does not only inhibit the development of disputed applications, but of nanotechnologies in general. This was observed in the case of GM plants, which became largely rejected in most European countries.

On November 6<sup>th</sup> 2006, 23 invited scientists (Appendix a) – who are involved in the development of Bio- and Nanotechnologies as well as in research on risks and ethical, legal and social implications (ELSI) – met for a one day workshop in Bern to discuss the social perception of new technologies (See Appendix b). The following chapters focus on a brief summary of the presentations and the discussion.

## Part 1: Looking back at the GM-controversy

The aim of part 1 was to give a personal and anecdotal view to the social reactions to new technologies by looking back on the GM-controversy in Switzerland: How did the controversy evolve? What were the critical aspects of biotechnology? Which aspects were less contested? Who were the parties in dispute? How did research react? In what sense was this strategy successful/a failure?

*D. Monard* opened the day with a historical cartoon, showing people becoming hybrids of cow and men after being vaccinated by a serum gained from cows. By the cartoon Monard pointed out that the reactions of society to new technologies are not based on rationality alone, but also on fears and expectations. New technologies therefore have to be introduced together with information, but not with brainwash.

*D. Schümperli* looked back at the work of the Forum for Genetic Research, which was founded as a reaction to the Swiss referendum on Biotechnology, with the aim to provide "information instead of propaganda". Today Schümperli thinks more critical about that aim: What the Forum learned is that information does not automatically lead to acceptance. As a major achievement of the Forum he named the proposal for NRP 59 "Benefits and Risks of the Deliberate Release of Genetically Modified Plants (GM plants)".

*C. Rehmann-Sutter* tied up to approaches of dealing with new technologies that did not work, since they do not perceive the science-society relation as bidirectional (i.e. only "informing" the public with the assumption that all necessary information for an evaluation is scientific information, using the "deficit model" of public understanding of science, expert centred risk-assessment, ethics as a provider of legitimacy or technological fix). After going into the way GM-food ("Frankenfood") is talked about, he pleaded for a more interdisciplinary and policy oriented ELSI research.

The *discussion of part 1* centred on the question of how catchwords, especially the monstrous ones, are coined in the social discussion about new technologies. It was stated that we have no routine in handling these monsters.

A second issue of discussion was the cultural embeddedness of technologies that can be observed in the way GM plants are discussed in the US and in Europe. Every dialogue between science and society has to take these cultural differences into account, meaning that it has to be lead in a specific way for each country. Such attempts in dialogue,

additionally, often fail since they try to unilaterally fix the public or the technology.

## **Part 2: The controversy about risks of GM plants**

In the case of biotechnology a core element of dispute is the use of biotechnology in agriculture. The NRP 59 "Benefits and Risks of the Deliberate Release of Genetically Modified Plants" was initiated to help solving this dispute. The aim of part 2 was to discuss the risks and the way they are presently handled by research: What are the risks of GM plants? What do we have to know about them to come to an informed decision on its application in agriculture? Is this (initiate an NPR) the way such disputes should be dealt with in general or is there a better solution?

*U. Grossniklaus* pointed out the fact that GM plants are already widely used in the world. Also, he asked for scientifically sound research on GM plant release risk, in order to have valid arguments for rational decision-making. As main reasons for mistrust in GM plants he mentioned the patenting, the strong industry-push as well as the premature release of GM products.

*A. Hilbeck* recapitulated the historical development of GM plant and GM plant release risk research. She pointed to the 10 years delay between the first GM plant developments and the first conceptual (not yet empirical) work on GM plant release risks. Generally, she stated that risk research in the case of GM plant came too late, and is weakly funded and mostly seen as opposing the technology.

The *discussion of part 2* took up the strong industry-push and the late risk research as two main reasons for public scepticism against GM plants. Research on risks should be provided earlier in the process of technology development. Knowledge on risks would not oppose the technology but instead help in building trust in it by enabling a deliberate discussion on its benefits and risks.

## **Part 3: Nanotechnologies and public engagement**

Public response on nanotechnologies hasn't yet received the dimension of agricultural biotechnology. However, internationally several initiatives have been launched, trying to involve the public in discussions on nanotechnologies in an early stage of its development (e.g. Publifocus TA-Swiss and Nanopublic at the University of Lausanne in CH, Upstream public engagement in UK). The aim of part 3 was to get an impression of coming applications of nanotechnologies and the ways social debate is established: What are future applications of nanotechnologies? In what way are the risks of nanotechnologies comparable to those of biotechnology? How far do participative methods in an early stage of technology development change the social debate about – as well as the application of – nanotechnologies?

*U. Aebi* gave a nanoscientist's view of recent (and future) developments of nanotechnologies. As a first example he presented a diagnostic application for early detection of Osteoarthritis. This may prevent patients from pain and health insurance from care costs. His second examples were peptide nanoparticles. They may be used as delivery systems for drugs, radionuclides etc. that are able to attach to highly specific targets in the body.

*M. Kearnes* presented lessons learned for nanotechnologies from the UK agricultural

biotechnology controversy. He stated that there is usually no (socially) realistic analysis of new technologies but mostly a tendency “to fight the last war”. Such an analysis would amongst others include to apply, but not to overestimate, risk assessment, to discuss the positive and negative scientific imaginaries in the way new technologies are discussed and to conceive of critical voices (e.g. from NGO’s) not as technology opposition but as constructive contribution to a science-society dialogue.

A. Kaufmann presented results from a study on the public controversy in the Grenoble nanoindustry district, asked by the regional government. The study found a deficit in public debate. It recommended organising regular citizens conferences. Such conferences should debate the development of nanotechnologies in the area. It also recommended financing studies demanded by local NGOs as a kind of counter- or complementary expertise. A. Kaufmann pleaded for more experimentation in participatory processes. For the social sciences he concluded that a move from a distant observer position to intervention research could be needed.

The *discussion of part 3* showed that the participants judge the situation of nanotechnologies differently to that of biotechnology. It was stated that the industry-push is much weaker in the case of nanotechnologies and that the main driving force is the government. Industry seems to hesitate to invest as long as there is no governmental regulation. Risk research is, compared to the GM case, much more up to date, especially in human toxicology. However, it was stated that risk and ELSI research in Switzerland – because of conflicting interest – should be financed by independent funding in the future and not, as it is well established in the USA and Britain, by nanotechnologies research programs.

Furthermore, the discussion dealt with interests and expectations evolving around nanotechnologies. Politicians and the government are seen to treat nanotechnologies as strategic technology (and therefore as of particular interest for CH). This perception amplifies the way benefits and risks are perceived and discussed. However, it was argued that the debates about nanotechnologies should closer aim at a “socially realistic analysis”. It was also stated, that hereby, the broader context of nanotechnologies (e.g. converging technologies, human enhancement) should not be forgotten.

#### **Part 4: Lessons Learned**

The overall impression of the day was that research on risk and ELSI in the case of nanotechnologies is more proactive than it was in the field of GM plants. To keep that advantage the following aspects should be considered:

- to find and secure independent funding for risk and ELSI research
- to counterbalance industry-push in nanotechnologies development
- to further develop and explore platforms for a deliberate and informed science-society dialogue

Risk and ELSI research – together with such a dialogue – may be the means to help the issue of nanotechnologies being judged in a “socially realistic analysis”, e.g. by explicitly pointing out the imaginaries and visions of humankind that underlie the discussion.

## Appendix A: Participants

Name	Titel	Institution	Expertise
Aebi, Ueli	Prof. Dr.	NCCR Nanotechnologies	Nano
El-Bez, Catherine		Nanopublic, Université de Lausanne	ELSI
Erdmann, Martin	Dr.	NCCR Nanotechnologies	ELSI
Gehr, Peter	Prof. Dr.	Uni Bern	Risk
Grossniklaus Ueli	Prof. Dr.	Forum for Genetic Research	Bio
Heitz, Philipp U.	Prof. Dr.	TA SWISS	Nano
Hilbeck, Angelika	Dr.	ETH Zürich	Risk
Hofmann, Heinrich	Prof. Dr.	EPFL	Nano
Hunziker, Patrick	PD Dr.	NCCR Nanotechnologies	Nano
Joseph, Claude		Nanopublic, Université de Lausanne	ELSI
Jotterand, Martine	Prof. Dr.	Forum for Genetic Research	Bio
Jung, Thomas	Dr.	PSI	Nano
Kaiser, Mario		Universität Basel	ELSI
Kaufmann, Alain	Dr.	Nanopublic, Université de Lausanne	Org, ELSI
Kearnes, Matthew	Dr.	University Lancaster	ELSI
Knop, Karl	Dr.	Committee on Nanotechnology SATW	Nano
Kurath, Monika	Dr.	Collegium Helveticum	ESLI
Leuthold, Margrit	Dr.	SAMW	ELSI
Monard, Denis	Prof. Dr.	Friedrich Miescher Institut, Basel	Bio
Nussbaum, Stefan	Dr.	Forum for Genetic Research	Org
Pohl, Christian	Dr.	td-net	Org.
Rehmann-Sutter, Christoph	Prof. Dr.	Universität Basel	ELSI
Schümperli, Daniel	Prof. Dr.	Forum for Genetic Research	Bio
Torgersen, Helge	Dr.	Austrian Academy of Sciences	Bio
Wengert, Steffen	Dr.	Bundesamt für Gesundheit	Nano

## Appendix B: Schedule for the day

The workshop joins researchers from bio- and nanotechnologies as well as researchers working on their risks, ethical, legal and social dimensions. The main aim of the workshop is the *exchange between researchers on the question of what can be learned* from the debate on biotechnologies and possibly made better in nanotechnologies. The role of the presentations is to trigger this exchange. Presentation time is limited to 15-20 minutes.

### Welcome address (9:15-9:30)

10'	Address of welcome	Denis Monard, President elected SCNAT
5'	Program of the day	Christian Pohl/Stefan Nussbaum

### Looking back at the GM-controversy (9:30-10:45)

≤20'	Looking back as biotechnology researcher	Daniel Schümperli
≤20'	Looking back as ELSI researcher	Christoph Rehmann-Sutter
≥35'	Discussion	

### Coffee-break (10:45-11:15)

### The controversy about risks of GM plants (11:15-12:30)

≤20'	A biotechnology researcher's perspective	Ueli Grossniklaus
≥20'	A environmental biosafety researcher's perspective	Angelika Hilbeck
≤35'	Discussion	

### Lunch (12:30-14:00)

### Nanotechnologies and public engagement (14:00-16:00)

≤ 20'	Future applications of nanotechnology	Ueli Aebi
≤ 20'	Experiences with upstream public engagement	Matthew Kearnes
≤ 20'	Public controversy in the Grenoble nanodistrict: a view from the social sciences	Alain Kaufmann
≥ 60'	Discussion	

### Coffee-break (16:00-16:15)

### Lessons learned (16:15-17:15)

In this section issues of common interest that evolve during the day can be further developed and, where necessary, further steps can be discussed.