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Stem Cells

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PROCEEDINGS

Of the RISKBRIDGE Final Conference ECFP6 Coordination Action

RISK GOVERNANCE AND POLICY LEARNING WITHIN AND BETWEEN RISK FIELDS

Scotland House Conference Centre, Brussels, March 26-27 2009

Proceedings prepared by James Mittra (ESRC Innogen Centre, University of Edinburgh)



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1. INTRODUCTION

The final conference of the RiskBridge Project (EC FP6) was organised by the ESRC Innogen Centre, University of Edinburgh. It was held at Scotland House, Brussels, on March 26th and 27th, 2009 and over 60 delegates participated.

RiskBridge is an EC-funded FP6 Coordination-Action Project commissioned to explore new integrative approaches to risk governance. The project aimed to develop an integrative risk governance model based on a resilient and discursive approach connecting risk assessment, management and communication. The project took:

- An open project architecture rather than a specific model as a starting point
- Policy learning as the central mode of operation, allowing for input across different science fields, geographical boundaries and science-policy interfaces
- Cases related to complex risk fields where the agreement of risk governance approaches is limited.

The project was structured in three parts. In the preparatory phase, the project partners (in consultation with nominated expert members) exchanged insights on risk governance practice and developed a framework for risk governance learning. This included classifications of risk governance situations and of social and cultural settings, criteria for 'good quality' processes in governance, and methods to promote learning within and across different risk fields. In the empirical phase, the following six risk fields took centre stage:

- Stem cells
- Radioactive waste
- Nanotechnology
- Climate Change
- Sediments
- Electromagnetic fields

For each risk field, a learning trajectory was organised and three workshops formed the focal points for the project. The first workshop focused on best practices in risk governance across disciplines and stakeholder groups within each risk field. Workshop 2 explored the science-policy interface for each risk field to produce recommendations. The final workshop focused on comparison, analysis and learning across risk fields, with input from scientists and policymakers.

In the integration phase, the results from the workshops and risk field studies were combined and integrated in a final report. The final report will provide recommendations on how to handle complex and emerging risks in the form of a process scheme approach. In summary, the project attempted to build "bridges" between different kinds of "risk fields", scientific disciplines, policymaking and science.

The main purposes of the RiskBridge conference was to disseminate the preliminary findings to academics, scientists and policymakers, and to generate interdisciplinary debate and suggestions for how to take this work forward and make a real impact on risk management and governance. The conference was aimed at practitioners within the various risk fields, scientists and social scientists interested in general issues around risk governance of complex technologies, and policymakers directly involved

in risk management. Individuals working in the commercial sector and relevant NGOs also participated in the conference.

These proceedings include the presentation slides of all contributors to the conference, as well as short summaries of plenary discussions and the key recommendations formulated.

2. The Conference Programme

DAY 1	
9:30-10:00	<i>Coffee and Registration</i>
10:00-10:30	<i>Welcome Address; Jaap Van Der Vlies (TNO) - Overview of the RiskBridge Project and Key Aims of the Conference</i>
10:30-10:45	Philippe Galiay (European Commission, DG Research) - <i>Statement on the Commission's Interest in Risk-Governance and Introduction to the Work of the Goverscience Seminar and its Final Report</i>
10:45-11:30	<i>Keynote Address: Prof Roger Strand (University of Bergen); Introduction to Risk Governance in National and International Contexts</i>
11:30-11:45	<i>Coffee Break</i>
11:45-13:00	Observations from Stakeholders (15 minute comments/statements on risk management from Filip Cnudde (EuropaBio) and Eva Marsalek (PMI/Umweltdachverband); followed by questions/discussion from the floor)
13:00-14:15	<i>Lunch</i>
14:15-16:15	Riskfield Presentations (followed by 30 minute panel discussion and questions from the floor) Chair: Dr Catherine Lyall (Innogen, University of Edinburgh) 14:15 – 14:30 <i>Nanotechnology</i> (Matthieu Craye, EC JRC) 14:30 – 14:45 <i>Stem Cells</i> (Dr James Mittra, University of Edinburgh) 14:45 – 15:00 <i>EMF</i> (Prof Luigi Pellizzoni, ISIG, Gorizia) 15:00 – 15:15 <i>Radioactive Waste</i> (Prof Andy Blowers, Open University) 15:15 – 15:30 <i>Sediments</i> (Jos Brils, TNO, Netherlands) 15:30 – 15:45 <i>Climate Change</i> (Viola Schetula, Dialogik, Stuttgart)
16:15-16:45	<i>Coffee Break</i> (video/slides about risk to be shown in main conference hall)
16:45-17:45	<i>Results of RiskBridge</i> (followed by questions from the floor): Viola Schetula (Dialogik) and Jaap Van Der Vlies (TNO) to present preliminary findings of the project <i>Concluding Remarks and Summary of the Day</i>
19:30	<i>Conference Dinner</i> at L'Atelier Restaurant (Rue Franklin 28, 1000 Brussels)
DAY 2	
9.00-9:15	<i>Coffee</i>
9:15-9:30	<i>Introduction to Day 2: Jaap Van Der Vlies (TNO) to introduce the</i>

	second day which will address the implications for EU policymaking and research
9:30-12:15	<i>Thematic Workshops</i> (delegates to split into small groups to discuss key insights and issues emerging from the RiskBridge work and broader implications for science and policy) Each group to be chaired by a RiskBridge partner/member
11:00:-11-15	<i>Coffee break</i>
12:15-13:15	<i>Lunch</i>
13:15-14:00	<i>Plenary: Reporting Back From the Workshops</i> (each group to provide short structured summary of what they discussed. Outputs will be written into conference proceedings)
14:00-15:00	<i>Panel Discussion: Common Lessons and Research Needs</i> (academics and practitioners to discuss implications of RiskBridge findings for European science, politics and risk management) Chair - Claire Mays (Symlog, Paris) Panel members: Prof Andrew Webster (University of York), Dr. Bengt Juliusson (NS/Gene); Prof Rinie van Est (Rathenau Institute); and Dr Sören Norrby (The Swedish National Council for Nuclear Waste)
15:00-15:30	<i>Plenary Discussion: Final Questions and Statements from the Floor</i>
15:30-15:45	<i>Concluding Remarks and close of conference</i>

3. DAY 1 PRESENTATION NOTES AND SLIDES

The first day of the conference focused on presenting the main outputs of the RiskBridge project to the academic and policy communities, as well as the non-governmental sectors. The day was structured around a number of formal presentations by both members of the RiskBridge project and invited participants from the European Commission and stakeholder groups.

3.1. Welcome Address: Jaap Van Der Vlies (TNO)

Jaap Van Der Vlies (RiskBridge Project Coordinator, TNO) opened up the conference by presenting an overview of the original aims and objectives of the RiskBridge project.

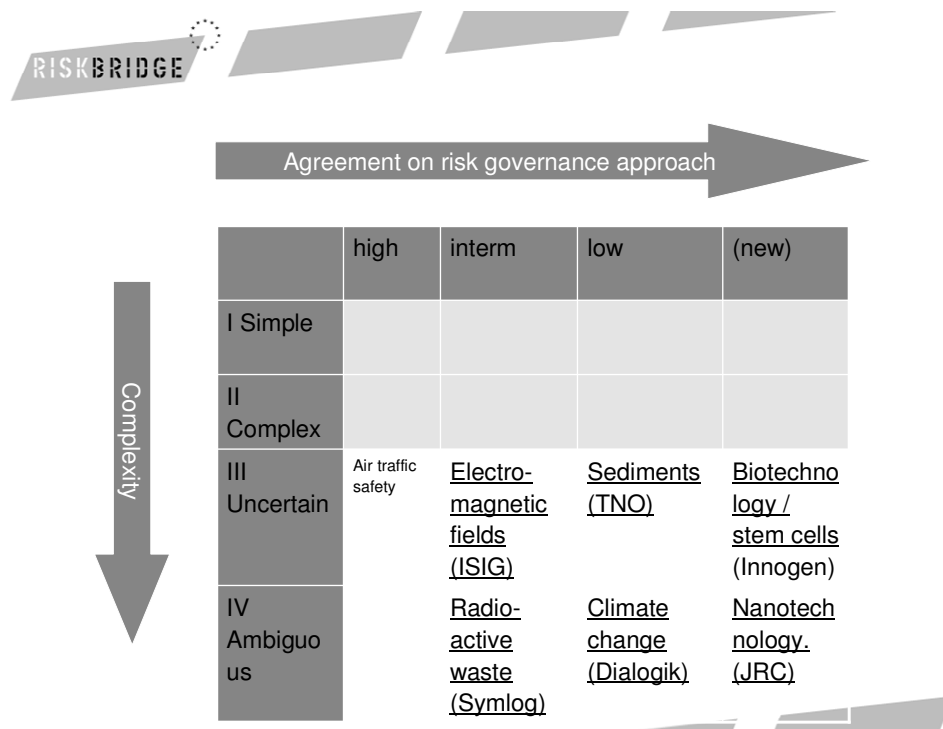
Risk Bridge:

- A CA that aims to develop “Integrative” approaches to risk governance, aiming to make “bridges” between:
 - different kind of cases / “riskfields”
 - scientific disciplines

- policy making and science

The Project takes:

- An open project architecture (not a specific model) as starting point
- Cases: (6) complex riskfields with limited agreement of riskgovernance approaches
- Six partners and 30 members (in total about 50-60 people)



Main Achievements (1)

- Creation of a multi disciplinary network of scientists and policymakers
- Inquiry: Members at first appreciated “in depth” discussions within their own riskfield

(Mixing up the groups was not much appreciated and even debated in the beginning)

But Later

- The discussions with other scientists and other policy makers were the most appreciated as it opened up opportunities for:
 - external reflection
 - learning

- and out of the box thinking

Main achievements (2)

- Six “in depth” case descriptions and analyses
- Website: www.Riskbridge.eu
- WorkShops:
 - WS1: Learning across Riskfields
 - WS2: Science policy interfaces
 - WS3: Building bridges across Riskfields(Publications and proceedings see website)

Work in progress

- **Final report: chapters on:**
 - similarities & differences between the 6 cases
 - Governance approaches
 - conclusions and recommendations
- **Conference**
 - stimulate interdisciplinary debate
 - generate suggestions to take the work forward
 - disseminate main findings

Few remarks about the main results so far

By framing the cases as **risk** fields we had to be clear about:

1. What is the problem / risk , for whom, how, what, where and when
2. Not narrowing the discussions to negative aspects

Some other common features and findings

- Limited capabilities to understand and quantify risks
- R&D can fill some knowledge gaps, but create others!
- Mostly: there are no established “standards” (or not complete, lagging etc)
- Multiple Framings “perspectives” / values / “Truths” can co- exist
- Frames and discourses change in time
- Policy makers challenge: take decisions even if not all “facts” are known

1. Problem framing

A thorough analysis of the “problem” putting the “what” question central (instead of “how”) and to recognize that the debate may be on other grounds than the “factual” problem at first sight

Keep the problem definition open because of the interconnections in order to create open and permeable system boundaries

Useful questions are: risk of what, to what, to whom, how, where ?

2. Risk governance: Process of Systems Change

Think and act (management) in terms of continuous ***processes of changes*** in the physical ***and*** related social ***systems : dynamic system thinking and adaptive/ resilient management with inclusion of stakeholders***

Accept circular / cyclical decision making scheme in order to include new insights developments and changes

3.2. Statement from the Commission: Philippe Galiay (DG Research)

In this session, Philippe Galiay, from the European Commission DG Research, made a formal statement on the Commission’s interest in risk-governance and its continuing support for research in this area.



"RISKBRIDGE Conference"
 26-27 March 2009, Brussels (BE)

" Inclusive Risk Governance: Putting Theory into Practice?"

1. Europe, Science and Society
2. Science and Risk Governance
3. Towards Mutual Learning and Mobilisation in Europe?



"RISKBRIDGE Conference"
 26-27 March 2009, Brussels (BE)

" Inclusive Risk Governance: Putting Theory into Practice?"



Vancouver (CA)

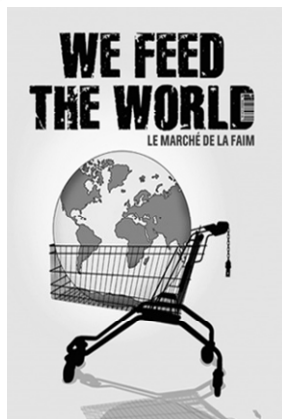
Understanding S&S issues

- Safety: Food (dioxin,...), Medical (growth hormones, contaminated blood, fertility,...),
- Environment (climate, energy, biodiversity, ozone,...),
- Economy (Finance, fisheries, agro industry,...),
- Fundamental rights (life appropriation, identity thefts, privacy, insurances,...),
- Ethics (future generations, eugenics, enhancement, doping, reproduction, animals,...),
- etc...



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" Inclusive Risk Governance: Putting Theory into Practice?"



Erwin Wagenhofer (AT), 2005

"What rising protests...

"842 million people are suffering from aggravated chronic malnutrition. Nevertheless, present agriculture produces enough food to feed 12 billion people. Said otherwise, any child dying today is, in fact, murdered."

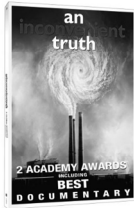
Jean Ziegler, sociologist and Swiss policy maker,
 rapporteur spécial de la Commission des Droits de
 l'homme de l'ONU pour le droit à l'alimentation





"RISKBRIDGE Conference"
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...do tell us? »

Is "progress machine"
jamming?

Knowledge society: what
kind of governance?



"RISKBRIDGE Conference"
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"Inclusive Risk Governance: Putting Theory into Practice?"

2000: Lisbon Summit (Knowledge Based Society)

2001: Governance White Paper

2001: **Science and Society** Action plan

2002: RTD Framework Program VI (80 / 17.500 M€)

2007: RTD Framework Programme VII (330 / 54.000 M€)



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Iguazú (ARG)

DAMS

Electric power
Water regulation
Irrigation
Reservoirs
Leisure
...



DAMS

Stop the water flowing!



Itaipu dam (BR-PY)



Lessons from governance case studies:

- Lack of inclusiveness in framing issues
- Partial in scientific advice
- Insufficient in risk assessment
- Insufficient in communication and dialogue



Asbestos

Asbestos (Greek "Inextinguishable")
Amiante (Latin "Unpolluted")

c. 1 CE: Used by Greeks and Romans
 1700s: « Rebirth » of asbestos
 1800s: Popular with industrial revolution
 1900: Observed death in mining industry
 1924: First diagnostic of asbestosis
 1930: First scientific publications
 1931: First limitations by law (UK)
 1992: Prohibition (UK)

<http://www.asbestosresource.com/history/>



Asbestos

Asbestos will claim 12,000,000 deaths?

"Currently about **125 million people in the world are exposed** to asbestos at the workplace. According to global estimates, **90,000 people die each year** from asbestos-related lung cancer, mesothelioma and asbestosis resulting from occupational exposures.

... Because of the **long latency periods** attached to the diseases in question, stopping the use of asbestos now will only result in a decrease in the number of asbestos-related deaths **after a number of decades**."

"Elimination of asbestos-related diseases"
 © World Health Organisation 2006

http://whqlibdoc.who.int/hq/2006/WHO_SDE_OEH_06.03_eng.pdf



Tobacco



Tobacco

c. 6000 BCE: First cultures (Americas)
 c. 1 CE: ~Everywhere in the Americas
 1492: First European Smoker
 1900: World rise of the cigarette
 1950: Link to cancer established
 1976: First public limitations in FR
 1999: World No-Tobacco Day
 2005: FCTC Treaty
 2006: Ban in public areas in FR

http://www.tobacco.org/History/Tobacco_History.html



Tobacco



Framework Convention on Tobacco Control (FCTC)

First international treaty negotiated under the auspices of the World Health Organization (WHO)

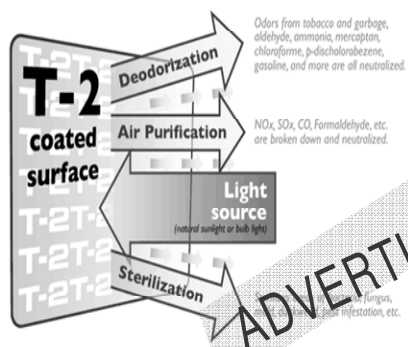
Goal: Stem the tide of **5 million deaths annually**, expected to grow to **10 million by 2030**, with 70% of these deaths in the developing world.

Ratified **February 27, 2005** by 40 countries

Ratified today by **149 countries**, representing over 80% of the world's population



Strong Oxidation Power



Hydroxyl radicals are among the most powerful oxidizing radicals, even stronger than chlorine, ozone, and peroxide. They act as very powerful disinfecting agents by oxidizing the cells of microorganisms, causing rupture of the cell and leakage of vital composition.

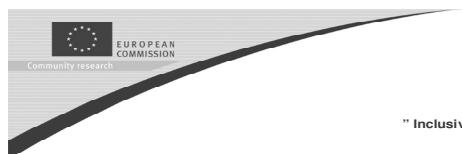
"Titanium Dioxide – TiO₂"

"Titanium dioxide is **non-toxic** and therefore is used in cosmetic products (sunscreens, lipsticks, body powder, soap, pearl essence pigments, tooth paste), and also in special pharmaceuticals. Titanium dioxide is even used in food stuffs, for instance in the wrapping of salami."

...

"Titanium dioxide's photo-catalytic characteristics are greatly enhanced due to the advent of nanotechnology."





"RISKBRIDGE Conference"
26-27 March 2009, Brussels (BE)

"Inclusive Risk Governance: Putting Theory into Practice?"

Recommendation on a Code of Conduct for Responsible Nanosciences and Nanotechnologies Research – C (2008) 424

GENERAL PRINCIPLES

- (1) Meaning
- (2) Sustainability
- (3) Precaution
- (4) Inclusiveness
- (5) Excellence
- (6) Innovation
- (7) Responsibility

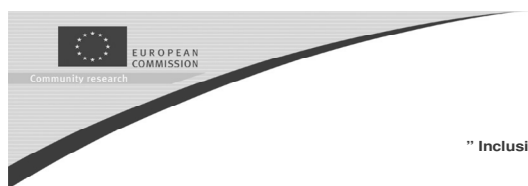


"RISKBRIDGE Conference"
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"Inclusive Risk Governance: Putting Theory into Practice?"

ACTIONS TO BE TAKEN (27)

- Good governance of the N&N research (17)
 - Stakeholders awareness, (7)
 - Favouring an inclusive approach (3)
 - Key priorities (4)
 - Prohibition, restrictions or limitations (3)
- Due respect of precaution (7)
 - Protection of people (4)
 - Reduction of uncertainty (3)
- Wide dissemination and monitoring (3)



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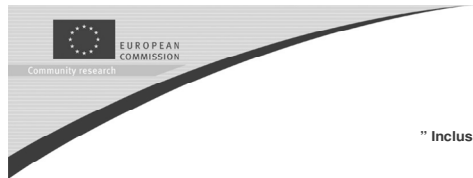
"Inclusive Risk Governance: Putting Theory into Practice?"

"Inclusive Risk Goverscience Seminar"

4-5/12/08, Brussels

- RISKBRIDGE, CARGO, MIDIR, STARC,
TRUSTNET, RISKNETWORK, ARGONA, NEWGOV,
INTUNE, PAGANINI, FRAMINGNANO, FAAN,
SAFMAMS,...





"RISKBRIDGE Conference"
26-27 March 2009, Brussels (BE)

" Inclusive Risk Governance: Putting Theory into Practice?"

"Inclusive Risk Goverscience Seminar"

4-5/12/08, Brussels

Conclusions

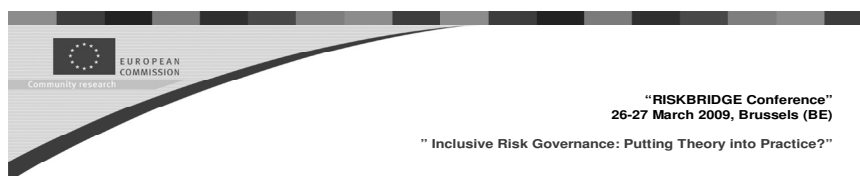
- Mutual understanding of inclusiveness
- Remaining questions
- Mandate of the European Commission



"RISKBRIDGE Conference"
26-27 March 2009, Brussels (BE)

" Inclusive Risk Governance: Putting Theory into Practice?"

1. Europe, Science and Society
2. Science and Risk Governance
3. Towards Mutual Learning and Mobilisation in Europe?



"RISKBRIDGE Conference"
26-27 March 2009, Brussels (BE)

" Inclusive Risk Governance: Putting Theory into Practice?"

"Evolution of Governance activities in the FPs" **2002-20010**

- Studies,
- Support and Coordination Actions
- "Co-operative Research Processes"
- "Public Engagement in Research" Plans
- "Mutual Learning and Mobilisation" ?



References

FP7: http://cordis.europa.eu/fp7/home_en.html
FP7 Calls: <http://cordis.europa.eu/fp7/dc/index.cfm>

Science in Society:
<http://ec.europa.eu/research/science-society/>



3.3. Keynote Address: Roger Strand (University of Bergen)

Following Philippe Galiay's presentation, we were delighted to invite Prof Roger Strand to deliver our keynote address. Prof Strand is Director of the Centre for the Study of the Sciences and Humanities at the University of Bergen. His talk was entitled "The Production and Governance of Risk: Some Philosophical Reflections".

The Production and Governance of Risk: some philosophical reflections

Roger Strand
Senter for vitenskapsteori / Centre for the Study of the
Sciences and the Humanities
University of Bergen, Norway



Contents of the talk

- It is NOT
 - a summary of the results of the Riskbridge project
 - a presentation of state-of-the art risk governance
- It IS
 - a reflection upon some key concepts of risk governance
 - an attempt at conveying some of the "Riskbridge spirit" and fuel it into our discussions these two days in Brussels
- The speaker
 - neither a risk assessor nor a risk manager
 - trained biochemist
 - working as a philosopher of science

(Commercial)

SVT

- SVT: Centre for the Study of the Sciences and the Humanities (Zentrum für Wissenschaftstheorie), University of Bergen
- Currently launching two FP7 projects on the ethics of new technologies, including:
- TECHNOLIFE: a Transdisciplinary approach to the Emerging Challenges of NOvel technologies: Lifeworld and Imaginaries in Foresight and Ethics
- Partners (persons in charge):
 - Univ. Autònoma de Barcelona (Louis Lemkow)
 - Univ. Tartu (Margit Sutrop)
 - Cardiff University (Søren Holm)
 - Univ. Versailles Saint-Quentin-en-Yvelines (Jean-Paul Vanderlinden)
 - Univ. Copenhagen (Margareta Bertilsson)
 - Lancaster University (Brian Wynne)
 - EC-Joint Research Centre (Ângela Guimarães Pereira)

Outline of the talk

- Risk governance – some key concepts
- Complexity and uncertainty in risk fields
- The functions of risk governance
 - success criteria
 - control and responsibility
 - maintaining a sustainable production of risks?
- Conclusion: *"things fall apart; the centre cannot hold"*

Risk governance

Risk assessment, risk analysis, risk management, risk communication, risk regulation, risk governance, risk perception, risk acceptability; the list of terms could be object of a separate dissertation over the developing use (to a certain extent, abuse) of what can be regarded as a proper risk-terminology. A separate dissertation could also be written over the number of different interpretations of each of the mentioned terms: depending on the disciplinary frameworks, regulatory contexts and cultural perspectives in fact, the "meaning of risk" can be remarkably different.

[Claudia Basta, Riskbridge working paper]

What is risk governance?

- The correct answer
- The authoritative answer
- The answer that is too philosophical

What is risk governance?


The correct answer (by Jaap van der Vlies)

- *Since the beginning of the 90s, it is [...] advocated to use the concept of 'risk governance' to address general aspects of decision-making regarding risks in modern society. Risk governance comprises:*
 - *Risk analysis (How can the risk be scientifically described?)*
 - *Risk management (What measures can be taken to 'control' the risk?)*
 - *Risk communication (How should we inform stakeholders and the public about risks? How should we involve them in decision-making?)*

What is risk governance?

The authoritative answer (at

<http://www.irgc.org/What-is-risk-governance.html>

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What is risk governance ?

Governance refers to the actions, processes, traditions and institutions by which authority is exercised and decisions are taken and implemented. **Risk governance** applies the principles of good governance to the identification, assessment, management and communication of risks. It incorporates such criteria as accountability, participation and transparency within the procedures and structures by which risk-related decisions are made and implemented. [\[archive \]](#) Global risks are not confined to national borders ; they cannot be managed through the actions of a single sector. The governance of global, systemic risks requires cohesion between countries and the inclusion within the process of government, industry, academia and civil society.

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What is risk governance ?

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Does risk governance apply the principle of good governance?

Can there not be bad risk governance?

What is risk governance?


The answer that is too philosophical

- What is governance?

- What is risk?

What is risk governance?

The answer that is too philosophical




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Governance

What is governance?

The term "governance" is a very versatile one. It is used in connection with several contemporary social sciences, especially economics and political science.

It originates from the need of economics (as regards corporate governance) and political science (as regards State governance) for an all-embracing concept capable of conveying diverse meanings not covered by the traditional term "government".

Referring to the exercise of power overall, the term "governance", in both corporate and State contexts, embraces action by executive bodies, assemblies (e.g. national parliaments) and judicial bodies (e.g. national courts and tribunals).

The term "governance" corresponds to the so-called post-modern form of economic and political organisations.


According to the political scientist Roderick Rhodes, the concept of governance is currently used in contemporary social sciences with at least six different meanings: the minimal State, corporate governance, new public management, good governance, social-cybernetic systems and self-organised networks ¹.

[Click here](#) for a basic bibliography covering the meanings given by the various social sciences to the term "governance".

The European Commission established its own concept of governance in the [White Paper on European Governance](#), in which the term "European governance" refers to the rules, processes and behaviour that affect the way in which powers are exercised at European level, particularly as regards openness, participation, accountability, effectiveness and coherence. These five "principles of good governance" reinforce those of subsidiarity and proportionality.

The White Paper is about the way in which the Union uses the powers given to it by its citizens.

Useful information on the meaning of the term "governance" and its different aspects in conjunction with different EU policies can be found under the heading "Governance" in the [Sordikus glossary](#) on the [European Union portal site](#).




- GOVERNANCE
- EUROPEAN
- SUBSIDIARITY
- CONSUMER
- EVENTS
- USEFUL
- HOME

- The term "governance" is a very versatile one. It is used in connection with several contemporary social sciences, especially economics and political science.
- [...] Referring to the exercise of power overall, the term "governance", in both corporate and State contexts, embraces action by executive bodies, assemblies (e.g. national parliaments) and judicial bodies (e.g. national courts and tribunals).
- The term "governance" corresponds to the so-called post-modern form of economic and political organisations.
- According to the political scientist Roderick Rhodes, the concept of governance is currently used in contemporary social sciences with at least six different meanings: the minimal State, corporate governance, new public management, good governance, social-cybernetic systems and self-organised networks.
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governance: resource reuse or sustainability and proportionality.

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What is risk governance?

The answer that is too philosophical

- What is governance?
 - Governance (of risk) can include **more** than risk identification, assessment, management and communication
 - everything that **affects** "how powers are exercised"
 - e.g. how powers are exercised in the **production** of risk
 - e.g. writing letters to the newspaper about a local chemical company
 - If this makes sense, there is no single **point of control** of risk governance.
 - Governance as an entity at the level of **society**, not only at the level of authorities or institutions

What is risk governance?

The answer that is too philosophical

- What is risk?
 - two-dimensional concept
 - probability/chance/likelihood/possibility of certain consequences of an event
 - severity of these consequences
 - (we may of course disagree on the definition!)
- Initial observation: to say that X entails a risk, is to say a lot:
 - X can happen, and something can be known about the degree of chance/likelihood, etc, of its consequences
 - The nature of the consequences is to some degree understood

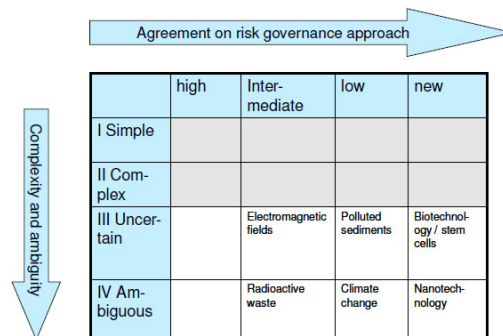
What is risk governance?

The answer that is too philosophical

- Broad concepts of risk governance
 - impractical?
 - see risk assessment, management and communication as parts of a larger system
 - welcomes a plurality of perspectives?
- Narrow concepts of risk governance
 - useful
 - may invite for the search for a method or a standard design
 - *the operation was a great success but the patient died* (J vd Vlies)

The Riskbridge Risk Fields

Figure 2.3.1 Characterization of risk fields and choice of cases



Complexity, control and responsibility.
Philosophical speculation upon two
examples well outside the Riskbridge fields

- Example 1: Storage of nuclear weapons
- Example 2: The Cartagena Protocol on Biosafety

Good risk governance of storage of
nuclear weapons?

- Openness and participation?
- Responsibility as accountability?
- Responsibility as maintaining control?
- The absence of nuclear explosions?

Good biosafety governance?

Excerpt from the Cartagena Protocol on Biosafety, Annex III

8. To fulfil its objective, risk assessment entails, as appropriate, the following steps:

- (a) An identification of any novel genotypic and phenotypic characteristics associated with the living modified organism that may have adverse effects on biological diversity in the likely potential receiving environment, taking also into account risks to human health;
- (b) An evaluation of the likelihood of these adverse effects being realized, taking into account the level and kind of exposure of the likely potential receiving environment to the living modified organism;
- (c) An evaluation of the consequences should these adverse effects be realized;
- (d) An estimation of the overall risk posed by the living modified organism based on the evaluation of the likelihood and consequences of the identified adverse effects being realized [...]

But this is impossible!

Excerpt from the Cartagena Protocol on Biosafety, Annex III

8. To fulfil its objective, risk assessment entails, as appropriate, the following steps:

- (a) An identification of any novel genotypic and phenotypic characteristics associated with the living modified organism that may have adverse effects on biological diversity in the likely potential receiving environment, taking also into account risks to human health;
- (b) An evaluation of the likelihood of these adverse effects being realized, taking into account the level and kind of exposure of the likely potential receiving environment to the living modified organism;
- (c) An evaluation of the consequences should these adverse effects be realized;
- (d) An estimation of the overall risk posed by the living modified organism based on the evaluation of the likelihood and consequences of the identified adverse effects being realized [...]

What is impossible?

- Impossible to quantify the probabilities
- *Impossible to quantify the likelihoods(?)*
- Impossible to quantify the severity of the consequences
- = No trustworthy risk assessment (in the European / orthodox tradition)
- Uncertainty
- Ignorance (unforeseen effects may emerge)
- Indeterminacy (open-ended causal systems)
- Ambiguity (plurality of interpretations of data)

But what if we wrap the technical procedures up in a style of inclusive governance?

- Still no trustworthy risk assessment(?)
- Can the lack of sound science be compensated by political legitimacy?
 - Well, yes.
 - But with which success criteria?
 - Openness and participation?
 - Responsibility as accountability?
 - Responsibility as maintaining control?
 - The absence of harmful consequences?

Might not the precautionary principle solve the dilemma?

RIO DECLARATION ON ENVIRONMENT AND DEVELOPMENT –
Principle 15

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

So what could be done differently?

- Co-production of knowledge: allow feedbacks between risk assessment, management and communication
- Transparency: admit ..
 - .. prevailing uncertainty and complexity
 - .. ignorance and lack of control

The functions of risk governance

- purpose: preventing, reducing and preparing for harm
- assigning responsibilities
- maintaining a sustainable **production** of risks

The functions of risk governance

- maintaining a sustainable production of risks
 - proper risk assessment and management is a *necessary* part of technological innovation and development of new products
 - in narrow conceptions of risk governance, the production and its benefits tend to be outside the frame
 - intended benefits tend to be more knowable than unintended side-effects
 - risk governance with an appearance of normality helps maintaining status quo in the production system

Conclusion (I)

- Management of complex risks = Management of changes in societal organisation (J vd Vlies)
- What does it mean to have *change* as a criteria of success?
- The lock-in of unsustainable consumer society
 - a *blockade* that calls for change
 - Scientists' and authorities' role in the change

Conclusion (II)

*Turning and turning in the widening gyre,
The falcon cannot hear the falconer;
Things fall apart; the centre cannot hold;
Mere anarchy is loosed upon the world*

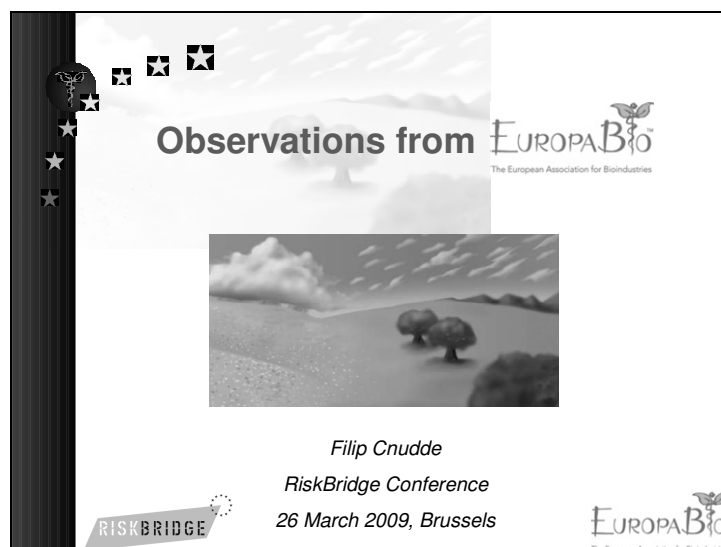
[from: W. B. Yeats, "The Second Coming" 1920]

Conclusion (III)

- Scientists', authorities' and citizens' role in the change
 - critical reflection on the adequacy of the concept of risk
 - systemic thinking about the risk governance and risk production
 - transparency about lack of control (appropriate content)
 - screaming out loud (appropriate form)
- *I look forward to our discussions!*

3.4. Stakeholder Presentations: Filip Cnudde (Europa Bio) and Eva Marselek

In this session, two key stakeholders were each invited to give fifteen minute presentations on risk-governance from their own unique perspectives. The speakers were Filip Cnudde, a representative of Europa Bio, which promotes biotechnology innovation in Europe, and Eva Marselek from PMI/ Umweltdachverband, who is an expert on risks associated with electromagnetic fields. Both speaker's slides are presented below. Filip talked largely about the experience with GM crops, whilst Eva explored the issue of public acceptance of mobile phone technologies in the context of risks associated with electro-magnetic fields.



Who are we?

The European association of biotechnology industries

- ☐ Industrial biotechnology / White
- ☐ Healthcare biotechnology / Red
- ☐ Plant biotechnology / Green

68 corporate members
 + 5 associate members, +4 Bioregions
 + 25 national biotech associations = +1800 biotech SMEs



Green Biotech Members

Member companies

- ☐ BASF
- ☐ Bayer CropScience
- ☐ Dow AgroSciences
- ☐ KWS
- ☐ Limagrain
- ☐ Monsanto
- ☐ Pioneer/DuPont
- ☐ Syngenta



KWS



Anti -GM protests



GM Cultivation in the EU

Country vs. Year	2005	2006	2007	2008
Spain	53,225	53,667	75,148	79,269
France	492	5,000	21,147	-
Czech Republic	150	1,290	5,000	8,380
Portugal	750	1,250	4,500	4,851
Germany	400	950	2,285	3,173
Slovakia	-	30	900	1,900
Romania	110,000 (Soybean)	90,000 (Soybean)	350 (Maize)	7,146 (Maize)
Poland	-	100	320	3,000
Total	55,017	67,187	110,077	107,719

Increases '07 to '08
+21%*

Spain: 5% ↑

Czech Republic: 68% ↑

Romania: 1942% ↑

Portugal 8% ↑

Germany 39% ↑

Slovakia 111% ↑

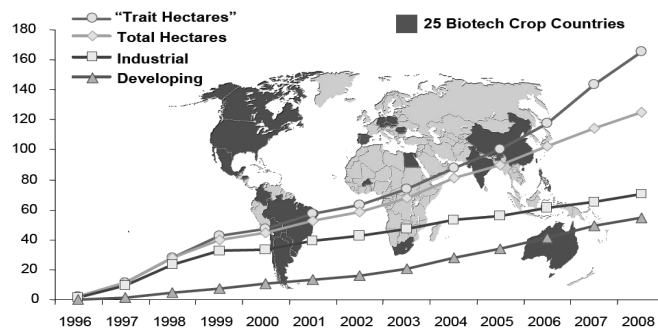
Poland 838% ↑



EUROPA BIO
The European Association for Biotechnology

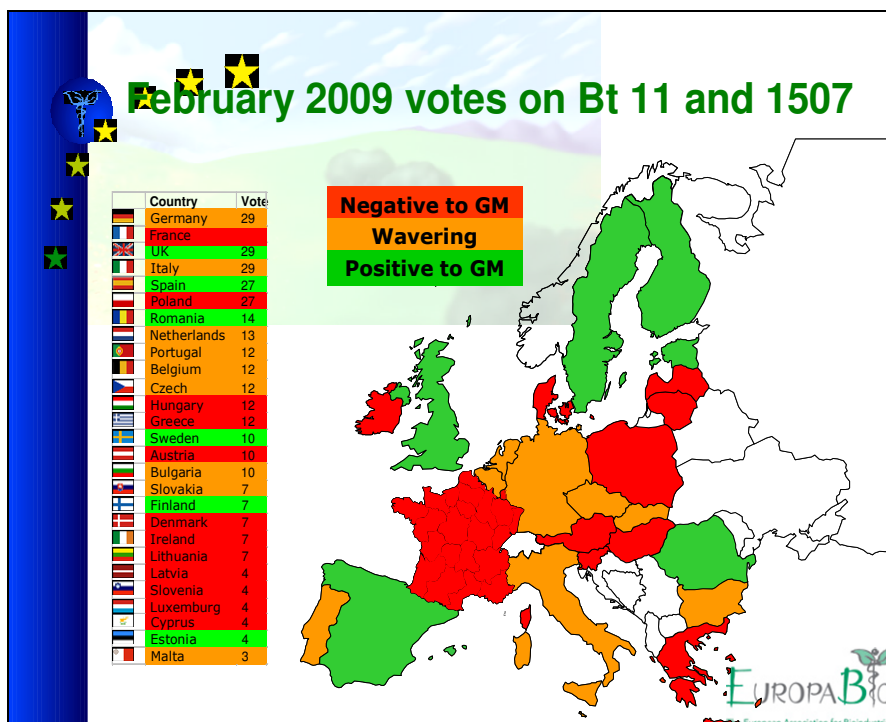
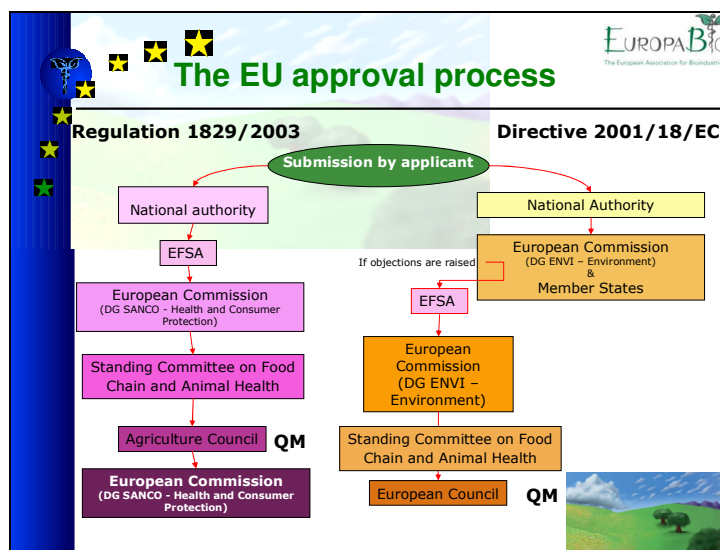
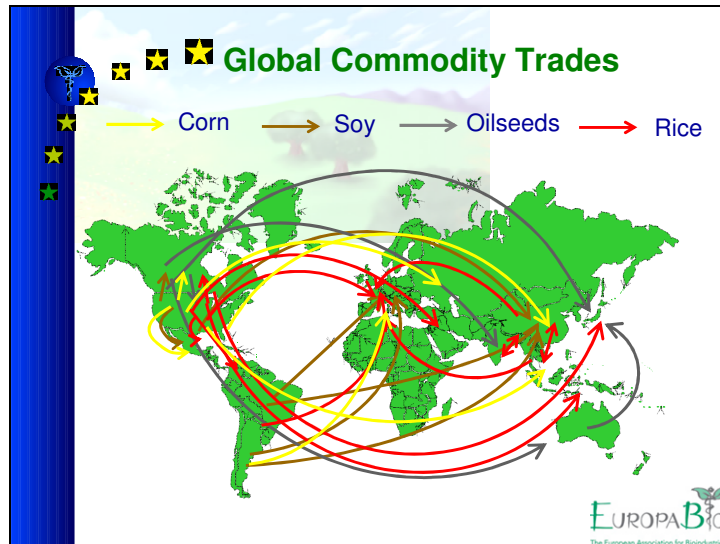
Rapid adoption worldwide

GLOBAL AREA OF BIOTECH CROPS
Million Hectares (1996 to 2008)



An "apparent" increase of 9.4% or 10.7 million hectares between 2007 and 2008, equivalent to a "real" increase of 15% or 22 million "trait hectares"

Source: Clive James, 2009.



GM labelling



EUROPA.BIO
The European Association for Bioindustries

Zero risk approach

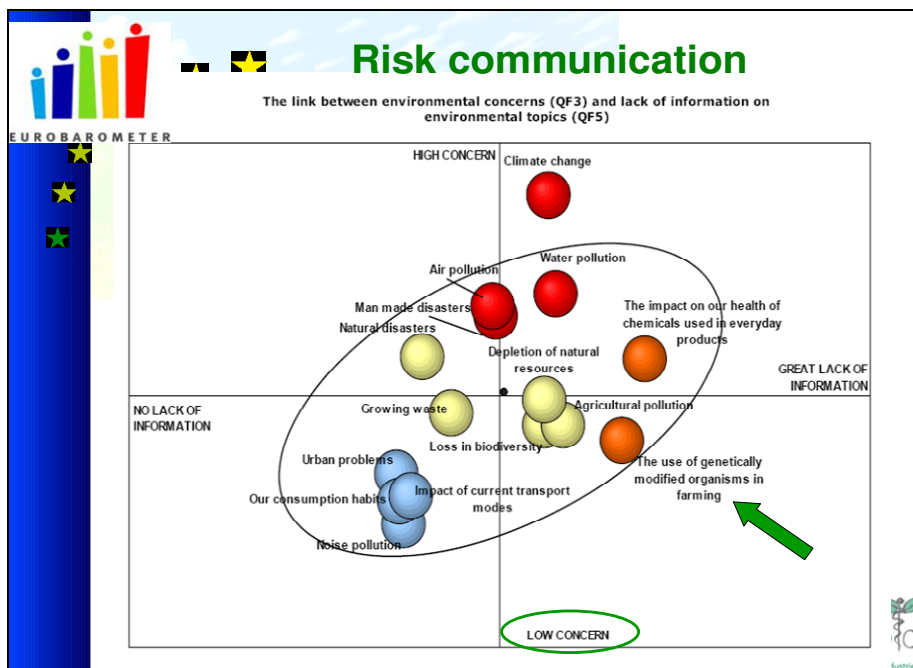
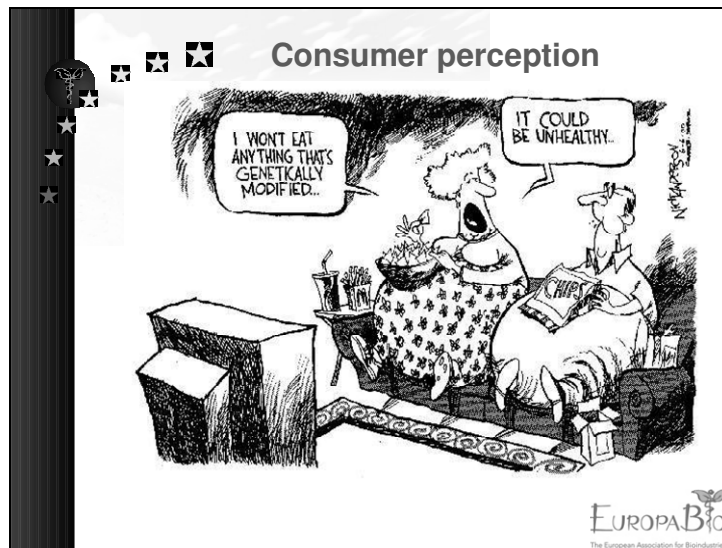


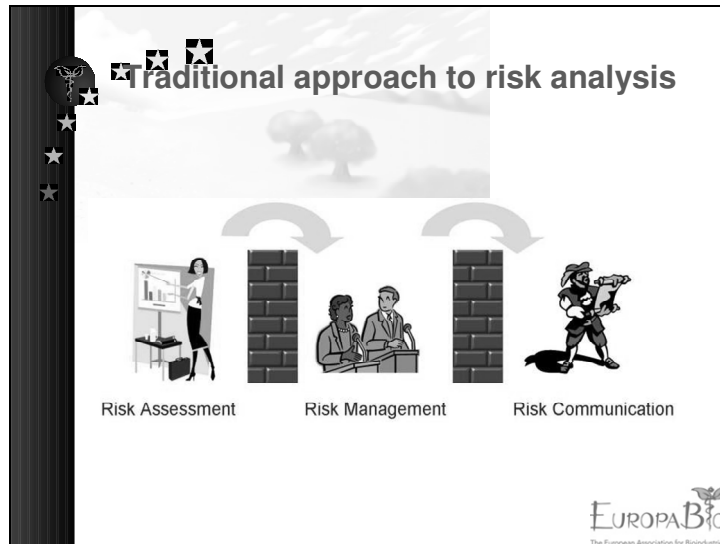
EUROPA.BIO
The European Association for Bioindustries

Data requirements are enormous and increasing



EUROPA.BIO
The European Association for Bioindustries





Thank you!

For more information visit:
Green Biotechnology Europe on the EuropaBio website:
www.europabio.org

EUROPA.BIO
The European Association for Bioindustries

„Risk Bridges“ for public acceptance of mobile-communication-infrastructure

Eva Maršálek, PMI, Austria
member of „Umweltdachverband“

eva.marsalek@utanet.at

PMI-PLATTFORM MOBILFUNK-INITIATIVEN:

non-profit-NGO
registered in Austria

one of the 33 Austrian environmental non-governmental-
organizations being member of the Austrian Environm.
Umbrella Association „Umweltdachverband“,
working with recognition of the Austrian Ministry for
Environment since 32 years

Eva Maršálek, PMI, Austria

2

„Umweltdachverband“

stated e.g. in letter dated June 15th, 2005, that he

**„fully supports the PMI-positions and –proposals
regarding consensus-solutions in the case of
„mobile communication“,
solution that respect the Precautionary Principle
and Public Health,
but also democratic rights.“**

Eva Maršálek, PMI, Austria

3

As a member of EEB
(European Environmental Bureau),

„Umweltdachverband“
included the problem „mobile communication“
in a paper presented on the occasion for the
Austrian EU-presidency 2006.

CITIZENS'S ACTUAL SITUATION – 1

- No (democratic) right for public involvement + participation in BTS-siting
- No (democratic) right to know existing and new oncoming exposures
- = Lack of „usual“ democratic (information) rights
- Often very insensitive siting e.g. before window, terrace, in protected green areas ... with construction-prohibition for everyone except... = equal opportunities?

CITIZENS'S ACTUAL SITUATION – 2

- Dislike of antenna-sights
- Devaluation of private properties
- Fears: negative long-term effects on wellbeing / health?
- Already experienced (political)
„Late lessons from early warnings“,
e.g. DDT, contergan, asbestos, smoking, etc.
- ICNIRP 1998: „...may not ... preclude interference with,
or effects on metallic implants and prostheses...“

CITIZENS'S ACTUAL SITUATION – 3

- Re-insurance compaignies: EMF = „emerging risk“
- Feasibility of public partipation + exposure-minimization
- lack of SAR-information versus publicity on water/electricity-consumption of refrigerators, dishwashers etc.
- e.g. in Austria total absence of obligation for routine-exposure-controls

CITIZENS'S ACTUAL SITUATION – 4

- absence of any official data-collection of those who claim loss of well-being e.g. after antenna-siting
- Exposure-minimization-recommendations of the Austrian Highest Medical Council neglected in political decisions
- Conflicting interests? Secret ties to industry?
In politics? In science? e.g. licence selling..., industry lobbying at a lot of levels...,
- more „equal opportunites“ for MC than for other industries?

PUBLICATIONS:

- EEA Environmental Issue report no. 22 (2001):
„Late lessons from early warnings-the precautionary principle 1806-2000 “
- American Journal of Medicine (2006):
„Secret ties to industry and conflicting interests in Cancer Research“

- American Journal of Public Health (2006):
„Tobacco Industry Influence on Science“
- Eur. J. Oncol.(2006): „How to distort the scientific record
without actually lying: truth, and the arts of science“
- Int. J. Occup. Environ.Health (2005):
„Corporate corruption of Science – Over a Barrel:
corporate corruption of science and its effects on
Workers and the Environment“

20.07.2007 –

German Government/Federal Agency for Radiation Protection:

safety warning on Wi-Fi safety, recommending that in view
of the regulated limits supplementary precautionary measures
such as wired cable alternatives are to be preferred to the
WLAN system,

... the Bavarian Regional Government issued a
recommendation to schools called up to avoid WLAN

16.09.2007 - European Environment Agency:

The EEA's initiative will increase pressure on governments
and public health bodies to take precautionary actions over the
electromagnetic radiation from rapidly expanding new
technologies.

WHO-DEFINITION OF HEALTH:

„A state of complete physical, mental and social well-being
and not merely the absence of disease
or infirmity“

- WHO-pamphlet for local authorities 1999:
- „No standards-setting body has set exposure guidelines to protect against long term health effects, such as a possible risk of cancer.“
- WHO-press-release 2000:
- „...siting decisions should take into account aesthetics and public sensibilities“
- WHO-fact sheet 193 (June 2000):
- „Precautionary measures should be introduced as a separate policy that encourages... the reduction of RF-fields...“
- „...open communication and discussion between the mobile phone operator, local council and the public during the planning stages...“
- „... An effective system of health information and communications among scientists, governments, industry and the public...“

- Dr. Repacholi, ERA-conference 2001

„... Public involvement in decision making... Siting facilities to minimize public exposure and concerns...“

EU-Precautionary Principle-decisions:

Treaties of Rome and Amsterdam:

*„The Community policy on the environment...
shall be based on the Precautionary Principle“*

Third Ministerial Conference on Environment & Health 1999:

*WHO was encouraged to take into account „the need to
rigorously apply the Precautionary Principle in assessing
risks and to adopt a more preventive, pro-active
approach to hazards“*

➤ COM (2000) 1 final 02.2000 – EU Prec.Principle-Document

➤ European Court of Justice approval on BSE-decision of the EC:

*„Where there is uncertainty as to the existence or extent of
risks to human health, the Commission may take protective
measures without having to wait until the reality or
seriousness of those risks become apparent.“*

SOME EXAMPLES OF
„RISK BRIDGES „
=
CONFLICT SOLUTION STRATEGIES
TESTED IN PRACTICE:

AUSTRIA – CITY OF SALZBURG

- Public contestation of a number of sites
- Involvement of the local council
- Finally public participation in the siting-process of these contested sites, including exposure-minimisation and civil contracts

This GSM-antenna-conflict-solution got the
Austrian-1009-Public-Relation-Award

AUSTRIA – CITY OF FELDKIRCH:

- City Council and mobile service providers work together since 1998. At the beginning the cooperation was focussed on site-sharing.
- In 2002, at the beginning of the UMTS-network planning activities, the city of Feldkirch decided to follow the recommendation of WHO – to apply the „Precautionary Principle to EMF“.
- The mobile service providers agreed to design the new UMTS-network in a way that the exposure will be as low as possible.

- before a new BTS is built, information of the public via internet (4 to 6 months in advance)
- HF-measuring instrument:
In August 2006 - 260 measurements all over the city to verify the criteria of „exposure minimisation as low as possible“.
All the results are presented via internet –
GSM 900 – max. 1,04 Milliwatt/m²
GSM 1800 – max. 1,2 Milliwatt/m²
UMTS – max. 0,4 Milliwatt/m²
Total max. 1,8 Milliwatt/m²
www.feldkirch.at/umts

ITALY – Region of ALTO ADIGE:

- Each year on Jan. 30 providers have to present their planning to the Regional Government
- Exposure-control by regional ARPA
- Involvement of the communities
- Feedback of the communities to the Regional Government
- Discussion of the planning which must be approved by the Regional Government who looks for agreement with the providers

Eva Maršálek, PMI, Austria

ITALY

In case of sufficient public pressure, the local authorities try to develop „local solutions“, different from village to village, from town to town,

however, the existing examples demonstrate that

**exposure minimisation alone,
without citizen-involvement in the siting-process
and local exposure-monitoring
is not able to avoid conflicts / antenna-contestations.**

Eva Maršálek, PMI, Austria

SWITZERLAND:

Regulation with application of the Precautionary Principle,

- Including educational projects to better evidence based politics and more self-responsability (ref. M. Moser, EMF-NET-workshop, Stresa, 2007)
- Local concepts in Zürich, Bern, Basel...

Eva Maršálek, PMI, Austria

AUSTRALIA:

„Best practice“-model of the Australian providers,

presented at the EC-mobile communication-workshop
November 2006, Brussels

Eva Maršálek, PMI, Austria

GERMANY:

- Bavarian „mobile phone pact“:
a framework for the participation of the communities in
the siting of mobile phone base stations (presentation
of Evi Vogel, Bavarian Ministry of the Environment,
Public Health and Consumer Protection, EMF-NET-
workshop, Stresa, 2007)
- Different local minimization-concepts (ICOM, Munich,
Berlin, Dortmund etc.)

Eva Maršálek, PMI, Austria

BELGIUM:

Federal Norm December 2004:
900 MHz = 21,6 V/m 1800 MHz = 29 V/m

Brussels 2007: further limit-reduction to 3 V/m

Eva Maršálek, PMI, Austria

FRANCE:

Charta of PARIS:

Agreement of 2 V/m with

- public involvement
- regular measurements incl. Internet-publication of the values

René Russo, AFOM:

„The price is high, but if it's the price for social peace, why not?“

Eva Maršálek, PMI, Austria

ISRAEL:

NON IONIZING RADIATION LAW or ANTENNAS LAW

passed on 21.12.2005 in the Parliament

- Informing the public on the locations of (new) antennas and giving to every citizen the right to resist to the antennas
- Compensations that will be given by the cellular companies to the local authorities for reduction of property value lawsuits because of the proximity of antennas
- Setting distances from sensitive places

Eva Maršálek, PMI, Austria

UMWELTDACHVERBAND

(19.06.2005)

... need to turn

- from the actual „easy recommendations“ in WHO-fact-sheets since years
- to the implementation of „strong recommendations“, that respect the WHO-health-definition as well as the European treaties/Precautionary Principle and equal treatment of all industries to ensure social peace, public health and mobile communication

Eva Maršálek, PMI, Austria

Bruna De Marchi

EMF-NET-workshop, Stresa, 2007:

„... the traditional „risk communication frame“ according to which the public needs to be convinced of the appropriateness of policy options adopted by regulatory authorities... insufficient with regard to risks generated by EMF as well as other technological applications...”

Eva Maršálek, PMI, Austria

Despite the scientific controversy ICNIRP versus BIOINITIATIVE and missing Interphone-publication

- daily increasing, constant 24hours and unavoidable chronically public exposure to a cocktail of EMF's everywhere in our daily life
- „no standards-setting body has set exposure guidelines to protect against long term health effects, such as a possible risk of cancer

Eva Maršálek, PMI, Austria

Despite the scientific controversy ICNIRP versus BIOINITIATIVE and missing Interphone-publication....

- EMC 3 V/m
- while EU-recommendations 42-60 V/m
- Re-insurance companies consider EMF as „emerging risk“ and refuse civil responsibility-coverage

since 1999 unchanged EU-recommendations

Eva Maršálek, PMI, Austria

The Russian National Committee on Non-Ionizing Radiation Protection (RNCNIRP - 2005):

- Takes into account the WHO definition of health
- „complete physical, spiritual and social well-being and not just absence of illnesses or physical defects“
- By definition of RNCNIRP, the maximum permissible level of exposure to EMF is the exposure level that does not affect human health in (1) exposed persons and (2) in following generations

Eva Maršálek, PMI, Austria

The Russian National Committee on Non-Ionizing Radiation Protection (RNCNIRP - 2005) – 2 -

- RNCNIRP does not support the ICNIRP's point of view
- ...(Bernhardt, Stolwijk, 1999)
- RNCNIRP admits a necessity of chronic EMF-exposure during development of the radiation guidelines. The studies of chronic exposure have been considered by the RNCNIRP as obligatory along with studies of the short-term acute exposures (Yu.Grigoriev, 2003)
- „ICNIRP international guidelines are based on data on short-term acute effects ... (Repacholi, Stolwijk 1991)

Eva Maršálek, PMI, Austria


INTERNATIONAL PATENT

WO 2004/075583 A1

Applicant: Swisscom AG

- „... These findings indicate that the genotoxic effect of electromagnetic radiation is elicited via a non-thermal pathway
- ... Despite increasingly strict national guidelines the impact of electrosmog in WLANs on the human body can be considerable.
- ... even when the WLAN is not used at all, an underlying stress from EMR remains for persons in the Basic Service Area of an access point of WLAN...
- ... There exists permanent stress from electrosmog from the WLAN on the employees


Eva Maršálek, PMI, Austria

Brussels, March 26 – 27 2009

INTERNATIONAL PATENT
WO 2004/075583 A1
Applicant: Swisscom AG

... In the state of the art there exists only the possibility of further reducing the limits for electromagnetic radiation.“

Eva Maršálek, PMI, Austria

Brussels, March 26 – 27 2009

EMF-RiskBridges are therefore overdue!

THANK YOU!

Eva Maršálek, PMI, Austria

3.5. RiskField Presentations

In this session, members of the RiskBridge project team each gave a 15 minute presentation reporting on the work conducted within their specific risk field. Six risk fields were covered in the project and the presentation slides from each speaker are presented below.

3.5.1. *Nanotechnology* – Matthieu Craye (EC, JRC)

RiskBridge FP6 project Work Package on **Governance of Nanotechnology**



Matthieu Craye

Joint Research Centre (JRC)

<http://www.jrc.ec.europa.eu/>

THE NANO CASE IN RISK BRIDGE

- RiskBridge nano group :
 - What has been learned from past experiences with new technologies ?
 - Members : R. Strand/F.Wickson (Univ. Bergen), R. Doubleday (Univ. Cambridge), A.Baun/K. Grieger (Danish Technical Univ.), R. van Est/B. Walhout (Rathenau Institute), P.B. Joly (INRA), A. Myhr (GenOk), S. Funtowicz/M.Craye (EC DG JRC)
- New and emerging (risk) field
- 'Ambiguous' case : prefix 'nano' can refer to particles, materials, technologies, scientific disciplines (nano-biotech,...), technological sectors (nano-electronics...), RTD/innovation in general (NBIC convergence, knowledge intensive innovation)
- Common : 'nano' is generic and has to do with engineering/manipulation at the scale of atoms and molecules, enabling new developments in techno-science and in socio-economic sectors
- Focus on 'nano' governance initiatives in the frame of European public policy (EU and member states)

FRAMING NANO GOVERNANCE IN EUROPEAN PUBLIC POLICY

Inspired by :

- EU Lisbon agenda for growth and competitiveness ("Europe needs knowledge intensive innovation")
- +- Recent experiences with new technologies ("avoid another GMO controversy" ; but : various interpretations of 'what went wrong' in the case of GMO's)

Result : consensus about three functions of governance :

- Promoting innovation (for growth and benefits for society)
- Controlling impacts (anticipate adverse health and environmental effects)
- Facilitating debate and democratic decision-making

'An integrated, safe and responsible approach to nanotechnology' (EU Action Plan on Nanotechnology : 'as agreed by all stakeholders')

Newness of nano as a governance issue : three governance functions are 'happening' simultaneously ———> tensions

Following routine regulatory procedure ? No mature science of nanotoxicology available.

- Debates are held, involving stakeholders (f.i. DG SANCO 'Safety for success dialogue'), dealing with a governance question : how to proceed with assessment and regulation? Interfacing between assessment and management.
- Influence on research agenda : risk related research is programmed along technology development.
- Acknowledgement of deeper uncertainty : benefits and ends to be discussed ? Call for 'meaningful public engagement'
- Thus : boundaries are challenged (between assessment and management, between research and regulation) – also f.i. through an initiative as the EC's Code of conduct

Sorting out technological options and enhancing public acceptance ? 'Hyping' nanotechnology is a problem for meaningful dialogue

- 'Nanotechnology' is too narrow and too broad as subject for dialogues.
- Debate should be organized around topics/applications/developments meaningful to society and to institutional actors
- Thus : boundary challenged as participants in dialogues want to see influence on research and innovation decision making and assess visions that drive RTD and decision making

- Tensions in nano governance initiatives because :
 - of new situation of 'dislocation of regulation'
 - innovative functions are integrated in institutional practices and structures shaped according to a linear model of innovation and of science-policy interactions (linear sequence of basic research – applied knowledge/technology – innovation – regulation).
- (Interpretation of) newer governance initiatives are better compatible with a more 'constructivist' model of innovation and science-policy relations.
- Learning process : moving between contrasting models and arriving at a balance
- Result : institutional practices and structures could change, boundaries could be adjusted (but not necessarily)

 **NANO GOVERNANCE : LESSONS LEARNED**


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What has been learned ?

- Transparency and communication
- Increased attention to risks and safety
- Addressing ethical issues (but as avoiding misuse of NTs)
- Partial attention to socially desirable technological development (knowledge of stakeholder views ; acknowledgement of non-risk aspects related to nanotechnology, but, until now, weak integration of this in research and innovation decision making)

What has not/hardly changed ?

- *Quality* of innovation - ends and benefits – not addressed as a priority
- Wider, 'embedded' ethical issues are hardly part of ethical debate
- Institutions to deal with nanotechnology still shaped according to innovation as mainly a linear process (no collective co-responsibility for innovation)
- Safety as legitimate concern f.i. for nanoparticles and nanomaterials
- No open acknowledgement of the possibility of surprise
- Societal acceptance and consensus still seen as the 'ideal' ; accommodating diversity of reactions to techno-economic innovation is not an explicit policy objective

 **NANO GOVERNANCE : OPEN QUESTIONS**

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- Has the public already made up its mind ? (nano in food ?? synthetic biology ??)
- No guarantee that the proposed policy implementation will avoid controversies
- Possible problem for 'trust' : the lack of recognition of the possibility of surprise
- Evolutions/changes in institutional structures and practices ?
- Opportunities if innovation is framed as socio-technical experimentation ?

3.5.2. Stem Cells – James Mittra (University of Edinburgh)

innogen

   Building robust, integrative, inter-disciplinary governance models for emerging and existing risks

The Stem Cell Risk Field: Risk Governance and Regulation of Stem Cell Therapies

Dr James Mittra
Research Fellow and Lecturer
ESRC Innogen Centre
University of Edinburgh
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EC RiskBridge Conference, Brussels, 26th March., 2009

Introduction to Stem Cells

- Complex and varied technologies/techniques with own unique characteristics and “risk frames” – stem cells may be derived from embryos, fetuses, cord blood and placenta etc
- This diversity in the technologies for procuring stem cells and the range of therapeutic applications is a problem for regulators and innovators
- The stem cell field is very much characterized by uncertainty, in terms of risks, benefits and market potential

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Characterisation of the Stem Cell Field: Known and Potential Risks

- Human pathogen transmission or zoonoses – ‘community level’ risk
- Risk of tumorigenicity – largely unknown “individual risk”
- Risks associated with immune responses
- Epigenetic culture effects or presence of latent retrovirus in the cell
- Health risks to women who donate eggs for embryonic stem cell research

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Management/Regulatory Responses

- For well understood risks, management responses confined largely to the scientific and regulatory communities
- Regulatory agencies play a significant role in managing “process risks” associated with stem cell development – technocratic and incremental
- For broader social and ethical issues around certain types of stem cell research, the management responses have been more adversarial and un-coordinated
- But, there is emerging consensus around the risk-based issues and need for things such as traceability standards
- The European Advanced Therapies Regulation provides more harmonious and consistent rules/requirements for market authorization of stem cell therapies

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Summary of the Stem Cell Risk Field

- Distribution of risks and benefits: individual versus community level risk is important
- Level of uncertainty/ambiguity: short-term uncertainty about stem cell risks, although technical solutions may emerge that mitigate such risks.
- Important to consider social and commercial risks and the impact of regulatory instruments on the ability of different sectors to innovate
- Process and participation: For stem cells, most of the health risk issues have been debated within the scientific and regulatory communities with little participation from broader publics. But, debates about embryonic stem cell research have involved much broader stakeholder groups
- Institutionalisation and risk governance: Institutions are in place to govern stem cells at various stages of development, but still a lack of international standards and harmonisation.

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3.5.3. EMF - Luigi Pellizzoni (ISIG, Gorizia)

Brussels, March 26-27 2009

Riskbridge Project

Risk governance and policy
learning: the EMF case

Luigi Pellizzoni – ISIG

INTRODUCTION

- Analysis has mostly dealt with **mobile phone technology**
- Though initially focused on the ELF produced by the electric power lines, the controversy over EMF is today largely connected to the mobile phone technology. Such technology has known a very **rapid growth** in a short period of time with the massive diffusion of mobile phones. Masts for transmitters have appeared at the beginning of the 1990s. **Mobilizations began in late 1990s**, increased in number and intensity for over a decade, until recently.
- There are **four different regulatory levels** to take into account: European, state, regional and local, with **problems of coordination**, also because regulatory matter is partially about health and partially about land-use planning, and these competences are usually distributed to different levels of governance.
- At **European level**, Recommendation n. 1999/519 of the Council of the European Union suggests that the **guidelines of ICNIRP** (International Commission on Non Ionizing Radiation Protection) should be adopted by member states. However, some countries adopt **stricter emission thresholds**
- IARC/WHO has classified **ELF** as '**possibly carcinogenic**'.

STRUCTURE OF THE CONTROVERSY

- **Controversy involves**: companies, public authorities at different territorial levels, experts, citizen groups/NGOs and mobile phone users
- **Protest grows** after promulgation of national regulations on electromagnetic emissions
- **Protest organized** by different types of groups:
 - a) associations and groups already active against power lines or electromagnetic fields in general;
 - b) newly constituted groups, both at local and national level
 - c) environmental groups and organizations. The latter have often been compelled to put on the agenda EMF after committee mobilization
- **Mobilization of counter-expertise** is a noticeable feature of protest
- **Strategy adapted** to structure of opportunity: different territorial levels, different topics
- **Nimby-ism** and 'shift to generality' strategy
- **Distribution** of risks and benefits >>> phone and transmitters
- **Mobile phone users'** needs, attitudes, opinions constructed by other stakeholders for instrumental use in the debate

THREE PROBLEMS

- The problem of evidence
- The problem of ambiguity
- The problem of governance

THE PROBLEM OF EVIDENCE

- **Sufficiency of evidence** >>> Bradford-Hill's (1965!) insight
What counts as sufficient evidence is not independent of the perceived costs of being wrong and their expected distribution >>> from 'relatively slight evidence' to 'fair evidence', to 'very strong evidence', as needed for public restrictions on e.g. smoking or diets (comparable to use of mobile phones).
- **EMF controversy fuelled by:**
 - >>> contrasting views on costs of being wrong
 - >>> technological and economic paths >>> frequency licenses, technology choices
 - >>> dominant issue-framing >>> thermal vs. non-thermal effects; major vs. minor health issues
 - >>> scientific assessors' underlying assumptions >>> The California study (2002)
- **Experimental designs** >>> animals vs. humans; EMF 'mixture'
- **Epidemiological studies** >>> problems related to
 - >>> **latency lacunae (EEA)** >>> Evidence of harm may be acknowledged after a long latency period after exposure has begun. Yet in the meantime technology is likely to have changed, so that it becomes hard to assess whether new technological solutions are still hazardous or not
 - >>> **independence of assessments** >>> many studies blamed for being funded with company money (yet similar blame for 2007 Bioinitiative review & recommendations)
 - >>> **criticisms on design** >>> (selection bias, recall bias...) e.g. IARC promoted Interphone study (ended 2006, analysis yet to be completed)

THE PROBLEM OF AMBIGUITY

- **Ambiguity:** problematic, controversial issue-framing, due to presence of different reasonable and legitimate perspectives
- In the EMF case ambiguity stems from:
 - >>> **different disciplinary viewpoints** >>> engineering, physics, biology, medicine, psychology, sociology, urban design, law, economics, philosophy, policy analysis...
 - >>> **overlap of framings** >>> health, land-use, market and ethics (equity and agency)
 - >>> **ambivalences within health framing** >>> major vs. 'minor' issues (electro-sensitivity)
 - >>> **regulatory and judicial ambiguity** >>> health, land use, market regulation, administrative/civil/penal courts >>> who is competent for what?
 - >>> **institutionalized preferences for risk governance** >>> type I and type II error bias
- **Ambiguity and type III errors** (right answer to wrong question)
 - >>> risk governance or technology governance
 - >>> health, land-use, or ethics?

THE PROBLEM OF GOVERNANCE

• Blurred competences

- >>> rules and competences specified gradually and incompletely, controversially and sometimes contradictorily (e.g. municipal health-land use planning competences; national rules-local autonomy)
- >>> regulatory criteria contradictions: different thresholds; threshold vs. minimization (precaution)
- >>> courts' ruling on scientific evidence
- >>> status of phone company networks (is the issue about service or business?)

• Low trust

- >>> lack of adequate and reliable information on installations and their effects
- >>> 'stealthy' behaviour of the companies (e.g. transmitters installed overnight without previously contacting and informing the affected groups)
- >>> public agencies seen as weak in defending public interest, health, and well being

• EMF as source of political risk

- >>> The 'BSE syndrome'
- >>> Crossing pressures on policy-makers (companies-citizen groups; EU-national/local levels; market-urban layout-property-health aspects)

• Science-policy interface

- >>> relevance of science-policy 'boundary organizations' at international, national and local level
- >>> national policy styles on selection, tasks and use of scientific expertise

• Participation and legitimacy

- >>> Inclusive processes often enforced, yet limited power (consultation, compelling "public service" status of networks, health-land use competences)
- >>> Companies also appeal to confidentiality of information and/or refuse to acknowledge legitimacy to citizen groups

CONCLUSION

• EMF: a settled controversy?

- >>> Governance success or "shifting involvements"?

• A heated scientific debate

- >>> The Bioinitiative report and the Interphone study
- >>> New official opinions (e.g. Russian National Committee on Non-Ionizing Radiation Protection about children exposure)
- >>> New technology applications (e.g. wireless Internet connections)

• A new policy phase?

- >>> The European Parliament 2008 Resolution (existing limits now obsolete, take into account best practices, relevance of new diseases or syndromes like electro-sensitivity)

• Any lesson learnt?

- >>> **more science** not always the answer (cf. Sarewitz: science can make controversies worse)
- >>> **regulatory inconsistency** and disappointments with inclusive processes do not help
- >>> **regulatory choices** related only partially to scientific considerations: technical opportunities, institutional set ups and economic aspects all play a role
- >>> **opposition is "moveable"**: ups and downs in intensity, shifts in concern
- >>> **institutional mistrust** 'piles up', across issues and along time
- >>> **technology-policy paths** act as constraining factors: difficult to go back and take another way

3.5.4. Radioactive Waste – Andy Blowers (Open University, UK)

Radioactive Waste

Andrew Blowers, UK

Risk Governance and Policy Learning
Within and Between Risk Fields
Brussels, March 26-27, 2009

Radioactive Waste - Characteristics of the Risk Field

- Long history and well established risk field
- Nature of risk – recognised but controversial
- Time/space dimensions – distribution of risk and benefit between places and generations
- Science/policy interface – scientific and social aspects coexistent and overlapping
- Policy making – conflict and consensus with shifting power relations

Trust in Technology

Post War to 1970s

- Military origins, the peaceful atom
- Belief in technology, trust in expertise
- Closed decision making
- Radwaste a non-problem
- Nuclear interests powerful

Danger and Distrust

1970s to 1990s

- Era of accidents, protest and peace movements
- Growing mistrust of science and policy
- Radwaste an issue of conflict and policy reverses
- social issues emergent and anti-nuclear interests powerful

Consensus and Cooperation

1990s –early 2000s

- Nuclear in retreat, need to address problem of legacy wastes
- Cooperation between interests
- Open and participative approach to policy making
- Consensus on disposal and voluntarism
- Power relations balanced

Security

present time

- Climate change and energy security
- Nuclear renaissance part of the solution
- Need for solution to radwaste problem
- Policy making more centralised, less participative
- Loss of consensus as power relations tilt towards nuclear interests

Implications for RiskBridge

Three potentially fruitful areas emerge from the radwaste field

1. The integration of different knowledge streams – science, social science, public, ethical
2. The importance of participative forms of decision making to achieve acceptable solutions
3. The concern for achieving equity between places and generations in order to justify and legitimate solutions

But, there is the danger that new build will destabilise progress achieved so far

3.5.5. *Sediments* – Jos Brils (TNO, Netherlands)

Lessons Learned in Risk Governance from Sediment Management


Brussels, 26 March 2009



Building robust, integrative
inter-disciplinary governance models
for emerging and existing risks

Sediment risk field members:



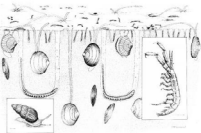
*Ramon Batalla, Jos Brils, Matjaz Mikos, Henk Senhorst, Adriaan Slob,
Jaap van der Vlies & Rick Wenning*



Sediment: a nuisance or a benefit?

(after Martin 2002)

Too much sediment	Too little sediment	Sediment benefits
Obstruction of channels Rivers fill and flood Reefs get smothered Turbidity	Beaches erode Riverbanks erode Wetlands are lost River profile degradation	Construction material Sand for beaches Wetland nourishment Soil enrichment Habitat and food for life

Sediment = essential and integral part of our river basins

2 RISKBRIDGE FINAL CONFERENCE Brussels, 26 & 27 March 2009

Sediment risk

Of what?

- Unforeseen changes of quality and quantity (key-issue)
- And its combined impact

To what?

- Human health & casualties
- Biodiversity
- Physical processes
- Goods and services (impact to soil productivity, water storage, filtering capacity etc.)



Photo: Matjaz Mikos

Keep in mind:

- large temporal & spatial scale AND highly dynamic

3

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Sediment risk governance

Was characterized by us as:

“the culmination of consideration of the many options that stakeholders and institutions, both public and private, together apply to the management of sediment”

4

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Brussels, 26 & 27 March 2009

Five cases studied

Great Lakes (USA)	Stože slope (Slovenia)	Dutch rivers (Netherlands)	Ebro river (Spain)	Rijnland region (Netherlands)
Contaminated sediment is problem to environment and/or impairs its beneficial use	Unexpected debris flows have devastating impacts on property and human life	Contamination exceeds WFD standards, but are we already capable to take measures?	Damming and gravel extraction destroy balance of sediments and thus also impacts ecology	Deposition of contaminated dredged material faces a lot of public opposition



Photo: Matjaz Mikos



Photo: Ramon Batalla

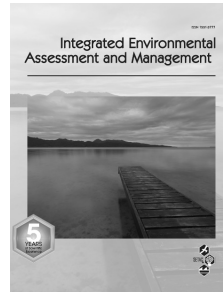
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Series of papers

To be submitted shortly to peer-reviewed SETAC journal IEAM



- One series of 7 papers
- Each case as separate paper by single or max. 2 authors
- One introduction paper and one synthesis paper by all
- Flyer/brochure with abstracts available at conference
- See also: www.setacjournals.org

Lessons learned from the cases (1)

- Sediment is an important environmental requirement, as well as a critical requirement of society
- Perceptions of risk associated with sediment are difficult to merge and resolve among stakeholders, suggesting that raising awareness through education is needed
- Pure "technocratic" risk governance approaches do not work in sediment management, and hence, there is considerable room for improvement of sediment risk governance approaches


Lessons learned from the cases (2)

- Improvements in risk governance may be achieved by improving the understanding of the role of sediment in river systems and the human built environment, as well as the means by which society interferes with these functions
- It is evident that a certain level of uncertainty will always remain in the context of sediment management. Society may accept this uncertainty with the understanding that a flexible, adaptive approach to management actions will be adopted as new information becomes known
- This may be one of the most important policy changes to consider for managing sediments in Europe

RISKBRIDGE

Lessons learned from exchange with other risk fields

- **Problem definition:** a thorough analysis and shared perception of what constitutes a “problem” is necessary for addressing actual or perceived risks associated with technologies and events
- **Problem response:** need to have a common understanding of the “sense of urgency” to develop and implement responses to risk



the quality of the response to risk depends on the quality of the question or reaction to the condition of risk

Therefore: take the time for thorough problem framing and for gradual building of risk governance models that are inclusive

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RISKBRIDGE

Thank you:

RiskBridge for
all the fun and productive meetings we had

Audience for
listening

Ramon, Jos, Matjaz, Henk, Adriaan, Jaap, Rick

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3.5.6. *Climate Change* – Viola Schetula (Dialogik, Stuttgart)

Risk Bridge

Brussels, 26 & 27 March
Climate change / Viola Schetula (Dialogik)



RISKBRIDGE

Building robust, integrative
inter-disciplinary governance models
for emerging and existing risks



RISKBRIDGE

Climate change

1. State of the art of risk governance
2. Science policy interface
3. Output from the workshops
4. Summary of the key findings

2 Final Conference of the RiskBridge Project, Brussels

26 / 27 March 2009



RISKBRIDGE

Climate change: State of the art of risk governance

Two general policy options:

- **Mitigation:** measures aiming at the reduction of greenhouse gas emissions and concentrations
 - *mainly market-based economic measures*
 - *based on technological advance in "decarbonising" economy*
- **Adaptation:** measures aiming at reduction of vulnerability to consequences of climate change
 - *partly technical solutions (dams etc.)*
 - *partly societal re-organisational processes (migration etc.)*

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Climate change: State of the art of risk governance

Challenges to Risk Assessment

- **Complexity:**
 - Projections of climate system and highly interdependent subsystems
 - Indirect effects on social and economic systems have to be taken into account
 - Global + regional impacts vary widely
- **Uncertainty:**
 - Natural variability + long timeframes
 - Need to rely on highly complex climate models
 - Assessment of positive and negative feedbacks
 - Integration of data from different sources + varying timeframes
 - Assessment of climate sensitivity
- **Ambiguity:**
 - Prioritisation of mitigation or adaptation assessments
 - Definition of thresholds of "dangerous" climate change

⇒ *requires interdisciplinary co-operation and societal discourse*

Climate change: State of the art of risk governance

Unresolved Challenges to Risk Management

- **Questions of Equity:**
 - distribution of risks and benefits is a typical "*Tragedy of the Commons*"
 - Industrialised countries with high emissions less vulnerable than developing countries with (still) low emissions
- **Enforcement of international reduction targets**
 - Although being modest, the reduction targets (Kyoto, EU) are not met in practice
 - non-existence of efficient means to ensure commitment to international law
 - Benefit of the Kyoto targets without ratification in the US (and other states) is contested
 - International negotiations to strengthen Kyoto targets

Climate change: State of the art of risk governance

Role of Risk Perception & Individual Action

- **Lack in public understanding** climate change (climate change – weather – environmental pollution)
 - Public feels **poorly informed** about climate change
 - Climate change is perceived as **distant** in time and space
 - Growing concern, but **economic status** (lifestyle) and **personal health** are judged more important
 - Growing concern about climate is **not translated into individual action**
- ⇒ *Tendency to personal passivity and demand for collective action & governmental responsibility !*

Climate change: Science policy interface

- The IPCC has been set up by the World Meteorological Organisation (WMO) and the United Nations Environmental Program (UNEP) in 1988

Main task:

- Identification of gaps and uncertainties in the present knowledge concerning climate change, its possible impacts and preparation of an action-plan to fill these gaps in short term
- Identification of the needed information to evaluate policy implications and response strategies
- Review of current and planned national and international policies related to greenhouse gases
- Scientific and environmental assessments of all aspects of greenhouse gas issues, and transfer of this information to governments and intergovernmental organisations.

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Climate change: Science policy interface

- The use of uncertain scientific outcomes in climate change policy
- The IPCC has developed guidelines on how to address uncertainties in the IPCC Reports.
- The difficulty in the IPCC Reports is that they represent findings from very different disciplines, like natural and social sciences, covering a broad range of approaches to uncertainty.
- The Guidance Notes aim at defining common approaches and a common language to be used consistently in the IPCC Reports of all three Working Groups and the Task Force

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Climate change: Science policy interface

- A first step in addressing uncertainties is to make use of a consistent and *systematic typology of uncertainties*.

Three types of uncertainty

1. *Unpredictability*: Effects are not predictable due to chaotic/stochastic effects of complex systems (e.g. projections of human behaviour).
2. *Structural uncertainty*: Describes the uncertainty that results of inadequate, incomplete or competing models or conceptual frameworks, ambiguous system boundaries or definitions, significant processes wrongly specified or not considered.
3. *Value uncertainty*: Describes missing, inaccurate or non-representative data, inappropriate spatial or temporal resolution in models, poorly known or changing model parameters.

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Climate change: Science policy interface

- **The use of uncertain scientific outcomes in climate change policy**
- Policy makers dealing with climate change are in a challenging job being in the situation to have to make decisions under the condition of uncertain science outcomes.
- This perceived limitation of knowledge often leads to a shift towards prevention strategies, in many cases framed as "precautionary principle", "adaptive environmental management", "the preventive paradigm" or "principles of stewardship"
- As uncertainties in climate change science can in most cases not be resolved, policy-makers have to integrate uncertainty into policymaking.

Climate change: output from the workshops

- IPCC is very dominant / necessary to integrate different point of views / different impacts
- Important Question: how much space is there for special national aspects?
- IPCC is not focussing on extreme outcomes which are important for risk assessment of climate change
- Agreements are not binding / No way how to implement the results
- The larger the scale (global to local) the higher the focus on mitigation, the smaller the scale the smaller the scale on adaptation

Climate change: Summary of the key findings

- **Pre-assessment**
 - *problem framing*: questions regarding the causes of climate change. But problem framing also includes the question of 'whose fault is it?' which should be dealt with at a very early stage of the governance process. This part implicates the normative choice of the principal governance strategy
 - *solution framing* plays an important role as there exists an almost infinite set and combination of possible technical, economic, financial, social, moral and political solutions to the risk. The central question should the problem be solved through technical fixes or through a change of lifestyle, or a combination of both?

Climate change: Summary of the key findings

Risk appraisal:

- Risk assessment is internationally carried out by the IPCC, as this is the body to collect and provide the state of the art knowledge on climate change. It aims at defining the consequences (or impacts) of future climate on vulnerable or climate-sensitive exposure units and receptors on the basis of records of climate changes in the past.
- Concern assessment is not systematically addressed at this point in climate change policy making. There exists a large number of studies on national levels and EU level, exploring public perception of climate change, but they are not systematically taken into account within the risk analysis and particularly management process.

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Climate change: Summary of the key findings

Tolerability and acceptability judgement

- Anthropogenic climate change, in the terms as it is described in the respective chapter of this report, is being defined as a tolerable risk within certain limits established by the IPCC and, for example for Germany, the German Advisory Council on Global Change (WBGU)
- These limits are expressed through a 'tolerable window', which is defined as a rise of 2°C of the absolute global mean temperature change relative to pre-industrial levels between 1861 and 1890, and a rate of 0,2°C global mean temperature change per decade.

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Climate change: Summary of the key findings

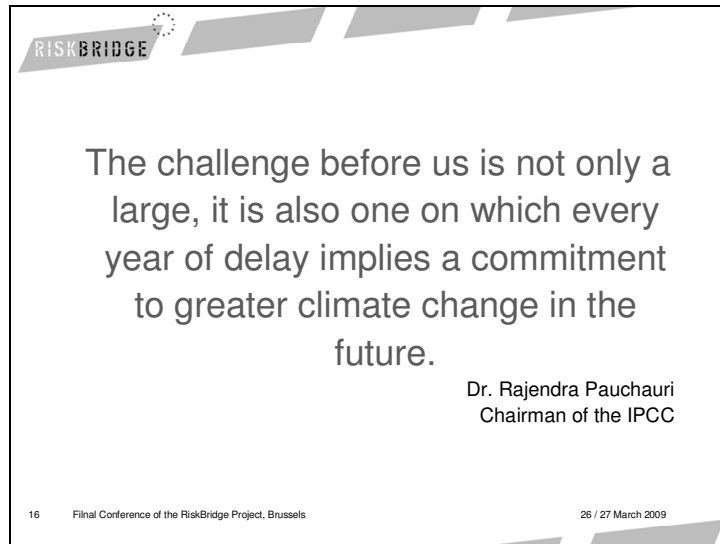
Risk management

- General reduction goals based mainly on the risk assessments of the IPCC
- international level: United Nations Framework Convention on Climate Change (UNFCCC) and the subsequent Kyoto Protocol defines emission reduction aims for all member states.
- On the EU level: EU Emission Trading Scheme using financial incentives to reduce emissions within the industry and energy sector
- national level: huge variety of mitigation and adaptation measures
- In sum, risk management largely depends on the recommendations of the IPCC

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3.6. Results of Riskbridge – Jaap Van Der Vlies followed by Viola Schetula

In this session, Viola Schetula (Dialogik) and Jaap Van Der Vlies presented some of the key findings from the RiskBridge project and their slides are presented here.

RISKBRIDGE: Some Key findings

Viola Schetula (Dialogik) & Jaap van der Vlies (TNO)

Transversal (Framework) issues

- Start: “living documents” on the 6 different RiskFields
- Compilation of a long list of “transversal issues”: basis for describing, comparing Risk fields + developing a common vocabulary / understanding
- Long list was clustered to 7 themes
- Living documents restructured and updated on the basis of the 7 clusters: chapters in the final report

7 clusters

- Temporal scale
- Geographical scale
- Levels and nature of uncertainty

- Distribution of risks and benefits
- The “Process”/ roles of actor groups
- Science policy interface
- Success criteria

Frame work with the 7 clusters very useful

- Comparison / Analysis / Structuring material
 - Organising the project with dedicated workshops and the final reporting
 - Common language / understanding (one of the biggest hurdles in the science/ science & science /policy interfaces)
 - Basis for transferability of knowledge / approaches
But: Local context has to be taken into account !! (no blue print)
- Basis for transferability of knowledge / approaches
But: Local context has to be taken into account !! (no blue print)

Three Interrelated Themes: (1) Framing (2) Science policy interface (3) Management

Frames are schemata of interpretation that people use to define problems & causes and make moral judgements

Frames and discourses change in time

Multiple framings can co-exist at the same time (same policy and science perspectives dividing the risk area into different departments and disciplines)

Absolute requisite: thorough analysis of the “problem” putting the “what” question central (instead of “how”) and to recognize that the debate may be on other grounds than the “factual” problem at first sight

Useful questions are: risk of what, to what, to whom, how, where, when ?...use the RB frame work !!!

Framing includes systems thinking

- In framing there is a need for a systems perspective in order to capture the big picture including intertwining of problems and issues , facts and values
- Since Risks are continuously produced and regulated, system dynamics have to be taken into account

- Systems thinking also implies thinking in levels (societal, meso level, individual level)

Framing and (2) science policy interface

- Policy makers have to take decisions if not all “facts” are known; none of the cases has full scientific information (probably never have!!)
- Policy making has to consider a high tolerance of different framings
 - >> Better chances of illuminating uncertainty and adding resilience in approach;
 - >> Better inclusion of the concern of stakeholders
 - >> allow debate and strive for transparency (ambiguity: different legitimate frames exist simultaneously)

Framing, science policy and (3) Risk Management

- Absolutely clear from all cases that the old “linear” “Government” style DAD (decide announce defend) does not work
- It does not allow for different framings and cannot include new insights, developments and technologies
- Instead : use a step wise iterative , cyclical step wise decision making process (with feed back loops between framing, actions, monitoring and evaluation) and inclusion of stake holders

Examples of these approaches

- Private enterprise Organisations: The management cycle : “Plan, Do, check, act”, marketing and strategy cycles
- Policy science: policy cycles, “adaptive management”
- Socio economics: Interactive societal cost benefit analysis (eg Chain studies LPG, NH3 and CL2 & socopse.eu)
- Ecosystem approaches: WFD / RISKBASE / LME

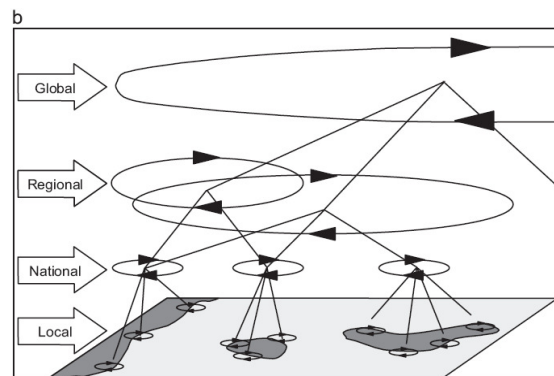
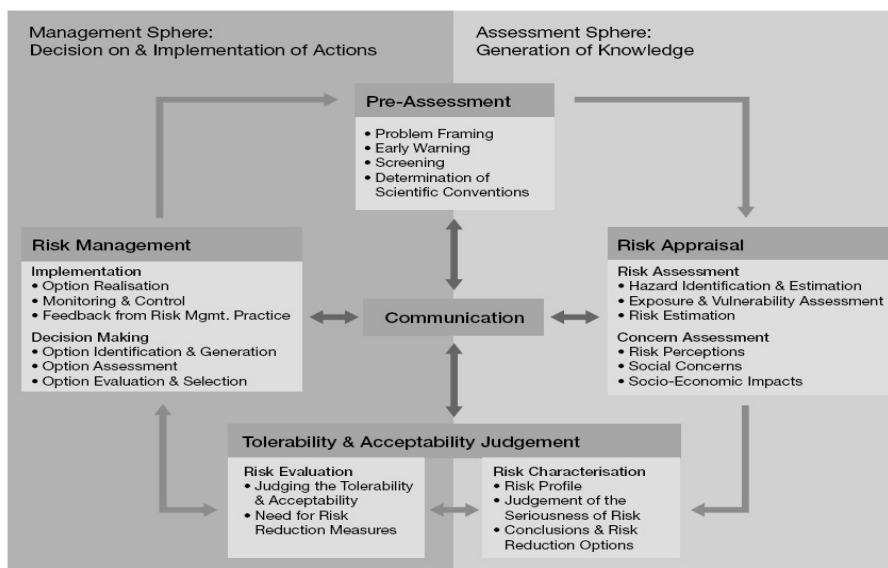
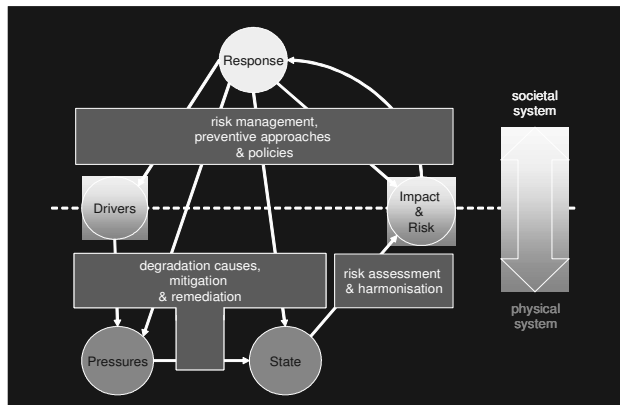


Figure 1: IRGC Risk Governance Framework





Challenge RB to take thinking in terms of adaptive management further

- Tomorrow's sessions: how do we do this in practice ?
- Recommendations wrt "adaptive management"
- Final reporting
- Heritage / dissimulation of RB results

Following the presentation from Jaap, Viola Schetula presented the integrative results of RiskBridge.

Risk Bridge

Brussels, 26 & 27 March

Viola Schetula (Dialogik)

RISKBRIDGE

Building robust, integrative
inter-disciplinary governance models
for emerging and existing risks

Risk management

- Review of the information collected from the combined risk appraisal, consisting of both a risk assessment and concern assessment together with the judgements made in the phase of risk characterisation and evaluation
- → Forms the input material on which risk management options are being assessed, evaluated and selected
- Accordingly, generic components of risk management are:
 - Identification and generation of risk management options
 - Assessment of risk management options with respect to predefined criteria
 - Evaluation of risk management options
 - Selection of risk management options
 - Implementation of risk management options
 - Monitoring of option performance

Communalities and differences

Climate change

- Covers a multitude of thematic issues
- The most salient feature of this risk field is the existence of an internationally institutionalised science-policy interface (IPCC)
- → The scientific community has hold a monopoly to define and judge the risk
- The internationalisation of the IPCC sign of global relevance
- No equivalent risk management body that is even roughly comparable to the IPCC on the assessment level.

Communalities and differences

- In contrast to the climate change arena, the risk field of polluted **sediments** has developed most of its strength in the risk management phase.
- The pre-assessment-phase is dominated by a technical point of view. Social framing is hardly taken into account. A systematic concern assessment is missing.

Communalities and differences

- **EMF** is focused on risk appraisal. While pre-assessment captures the variety of issues that stakeholders and society may associate with EMF, risk and concern assessment play an important role when addressing these risks
- Until today there is no established methods to integrate risks and concerns into a convincing strategy

Communalities and differences

- **stem cells**: risk governance dominated by medical, legal and ethical experts.
- similar to the risk field of nanotechnology, different applications demand equally differentiated approaches for the risk governance process.
- The collective issue of moral acceptability of using embryonic stem cells and the individual issue of striving the right balance between risks and benefits of a specific new medical treatment based on this new approach are often intertwined and analytically not separated.
- Different cultural and religious traditions major reason why on the collective level the European countries were unable to reach a consensus.

Communalities and differences

- **RW** management includes a fairly balanced risk governance process. Pre-Assessment and Risk Appraisal comprise both technical and social aspects leading to defining a tolerability and acceptability judgement which integrates risk evaluation and risk characterisation.
- However, the polarisation in the nuclear energy debate has prevented such integrative approaches to be implemented in corresponding risk management policies in most countries of the world.
- Issues of intra and intergenerational equity have yielded a succession of different discourses (from "need for passive solution" to "need for flexibility" including reversibility of solutions)
- Today's trend is to envision the integration of RW facilities into a sustainable territory, with active control by local stakeholders

Communalities and differences

- The risk governance process of **nanotechnology** is still developing. Learning from the governance deficits made in the GMO debate, private as well as public risk professionals have placed emphasis on early detection of social and cultural concerns beyond physical risks.
- In spite of these signs of openness, current priority seems to be with regulatory practices focusing on issues of safety, with emphasis on 'filling knowledge gaps' in order to implement a traditional sequence of risk assessment - risk management decisions.
- Addressing the 'lessons' from past risk debates, such as the one on biotechnology, one should consider to strengthen deliberation about benefits and ends of technological developments and the visions that drive them.

Synthesis

- The results demonstrate that the four phases of the risk governance sequence can assist analysts to detect, in a comparative review, the deficits and accomplishments of different risk fields.
- They also illustrate the selective nature of risk governance in the different fields. Only nuclear waste showed a fairly equal distribution of effort for each of the four phases and communication.
- All other risk fields were characterized by clear deficits in at least one of the four phases.
- These deficits may not result in a political paralysis or a major management crisis: this depends more on the degree of ambiguity and conflict that is embedded in each case than on actual performance.

Synthesis

- While we concluded that the radioactive waste issue is the one that met most of the normative requirements of the governance framework, the issue is far from being resolved and the ongoing attempts to site repositories reveal a high degree of frustration and polarisation that has been absent from all the other case studies.
- On the other side of the continuum, the sedimentation case showed major deficits in the governance process but remains a "No-issue" in the political and public arena.

So given this discrepancy, what is the analysis of governance good for?

1. Provides risk manager with an indication where to improve performance and where goals such as accountability, sustainability and fairness can be better accomplished.
2. The comparative review may show that some aspects of risk governance are systematically underrepresented. So the comparative review was able to put attention to systematic deficiencies of risk governance regimes.

So given this discrepancy, what is the analysis of governance good for?

3. The comparative review can help risk professionals to learn from other cases. By having a common framework and identical phases such learning is highly facilitated
4. Our research is leading to new research questions. This is to be expected when conducting research that new questions pop up. Yet it became obvious during our research that some pressing issues do not get the attention of the research community as they should. Although many authors press for acknowledging the relevance of plural frames in risk governance, there is very little research in this area.

Need for research

- We know little about the generation of frames in public debates.
- We have little guidance on how to collect and integrate frames in risk governance.
- gap in research: the science-policy interface. There is an abundance of theoretical and normative literature on this substance but rather little evidence about how this interface is designed and constructed in real cases. Adding more empirical knowledge on the interface may help risk assessors and managers to find more productive ways of cooperation.

4. DAY 2 PRESENTATIONS AND DISCUSSION

4.1. Introduction to Day 2; Jaap Van Der Vlies

Day 2 of the conference was opened by Jaap Van Der Vlies with a brief description of the content of Day 2. This day was to focus more on interactive workshops and discussion around the broader policy issues identified by Riskbridge with the aim of developing some key recommendations to the European Commission. The day would end with a panel discussion on common lessons and research needs.

4.2. Thematic Workshops: Summary of Recommendations

In this session, the conference delegates split into three groups for in-depth discussions about the RiskBridge Project and risk governance. Each group was chaired by a partner of the RiskBridge Project and was given a remit to consider how best to set up a process for good risk-governance. The purpose of these interactive sessions was to develop some key recommendations to the European Commission on how to take the results of RiskBridge forward. Each group presented a summary of their recommendations in a plenary session. The recommendations of the groups are summarised as follows:

- The general findings, key principles and transversal issues from the framework for policy learning (e.g. transparency/inclusiveness, distribution of costs and benefits; equity, fairness and control) need to be made more concrete and **put into practice**
- Further transfer of knowledge and competences is required.
- Insights gained from RiskBridge can be used as guidance for “new”/other policy processes.
- In putting the guiding principles into action. Practical options include: creating new networks that handle risk governance practices; making use of existing networks (RiskBridge think tank); institutions (e.g. IRGC, SedNet etc); and education (training courses, summer school, Marie Curie etc). Furthermore, new networks must experiment with concrete cases, such as sustainability and special planning. New knowledge can be generated without “reinventing the wheel”, but there is a need for new forms of knowledge transfer and skills/capacity building.

In terms of how to evaluate risk and implement good risk-governance processes, the groups considered the following issues to be crucial to success:

- Recognition that the notion of risk can often be different for different disciplines and stakeholders. Also, there are different attitudes to risk in different countries. One therefore needs to question whether it is possible to have culture-independent principles of governance and look for ways to incorporate cultural aspects into the risk-governance process. Exporting high-reliability systems into contexts without a “safety culture” will often fail.
- Need to think more carefully about the monitoring of risk (all the more so since monitoring is a vital factor in precaution, in reversibility, etc.). Who

generates and collects data on new risks? Are they empowered to feed back into the system? The relevance of expertise is important here.

- The “precautionary principle” should not signal the end of a risk-governance process. Instead, there should be continual feedback and monitoring of the consequences.
- The role, time and place for inclusiveness in any risk governance process must be given more consideration. Inclusiveness is not always appropriate, particularly for some early stage risk evaluation processes. Where communities are impacted, inclusiveness is appropriate, e.g. to work out exactly which communities are affected and what their interests are.
- It is vital to clarify to relevant stakeholders the nature of the risk-governance framework to which they are subject, and the opportunities for influence it offers. Here, transparency and clear guidelines are necessary.
- Assess whether the criteria used to evaluate risk and make a policy decision are appropriately broad in each case and suitable to the nature of the risk to be prevented (e.g. human health or environment etc). Such criteria may include, amongst other things, cost-effectiveness of mitigation/prevention, quality of life, community relevance, sustainability (economical, environmental, ethical etc).
- Finally, it is recommended that regional case studies be given greater support. This is because: regional governance actors are particularly interested in improving risk management, they are close to the concerns of populations and also sufficiently empowered to take action.

4.3. Panel Discussion: Common Lessons and Research Needs

In this final panel discussion, four expert members of RiskBridge kindly responded to a number of key questions around risk-governance and the RiskBridge Project. The session was moderated by Claire Mays (Symlog, France), manager of RiskBridge’s Radioactive Waste riskfield group. The four panellists included:

Dr Bengt Juliusson (Stem cells) – Bengt is a cell biologist and head of Quality Assurance and Regulatory Affairs at NsGene/AS (Sweden), which is a small biotechnology company committed to developing novel biological products for the treatment of neurological diseases.

Prof Andrew Webster (Stem cells) – Andrew is professor of Sociology and Director of SATSU (Science and Technology Studies Unit) at the University of York. His research interests relate to the sociology of science and technology, with a focus on genetics, pharmacogenetics and stem cells. He directs an ESRC programme for stem cells.

Dr Sören Norrby (Radioactive Waste) – Sören is a senior advisor at KASAM (Swedish National Council for Nuclear Waste). He is a regulator, international practitioner, and chemist. He has been involved in the formulation of regulatory and licensing requirements upon a radioactive waste management system, in the construction of safety assessment methodology, and in reviewing the research required of industry.

Prof Rinie Van Est (Nanotechnology) – Rinie works in the technology assessment unit of the Rathenau Institute; an independent organisation located in the Netherlands that concerns itself with issues at the interface between science, technology and society; and provides advice to politicians.

Claire opened proceedings by asking the panelists to state their own field and stakeholder position therein, and to respond to a first question:

How is “risk governance” defined in your context? What concerns are reflected by that definition?

Bengt Juliusson: Bengt stated that the word “governance” is not used in everyday parlance among his peers. “Risk management”, on the other hand, is a familiar internal activity, and corresponds to meeting ISO (International Organization for Standardization) standards. The internal risk management system is pitched toward attaining regulatory compliance for products. Externally, this management cycle corresponds to regulation of medical products according to the law, and includes both safety and risk/benefit assessments (the latter, in terms of economy and of “quality of life” for patients). All in all, Bengt understands risk governance essentially as structured organizations with guidelines for risk management.

Sören Norrby: For Sören, “governance” is “*the real thing*”, representing the dialogue that must be constructed among the various actors and stakeholders of the risk management system.

Andrew Webster: Andrew defined risk governance as “accountable forms of social discipline and management of competing interests and risks”. He has a particular interest in how professional governance articulates with new regulatory challenges posed by emergent technologies.

Rinie von Est: In the context of his role in the Dutch Technology Assessment Institute, whose purpose is to advise Parliament through stimulating political and public debate, Rinie argued “governance” is the frame provided by widening circles of engagement around science and technology, ranging from parliamentary decision makers, to industry and experts, to citizens. Rinie and his colleagues have a duty of foresight, looking for new aspects to inject into the societal debate. They keep an eye out for the emergence of issues not yet institutionalized, such as nuclear new build or nanotechnology development, and take action to stimulate practical institutional engagement and bring the issues onto the political agenda.

In his plenary address yesterday, RiskBridge’s EC scientific officer Philippe Galiay explored the “gap between knowing and acting”. Do you observe such a gap in your sector or field of interest? According to you, which knowledge now should be acted upon?

The four panellists each showed how this gap—more or less extensive according to context—is a normal feature of risk handling. They highlighted the iterative actions that allow us to move forward and become alerted to the possible pitfalls.

For Rinie, we need to ensure that climate change is on the agenda now. He emphasized that lack of knowledge is a fact of life. Policy makers often say that they need research and knowledge to put an issue on their agenda, and during the time we lack knowledge, they consider they cannot act: this is a paradox that for Rinie tends to “institutionalize irresponsibility”. Yet there is always the possibility to inform people about the research undertaken and its products. His organization brings the questions and issues into debate, which is a manner of acting under uncertainty.

Bengt focussed on industrial actors' need to bring their product to market. There is a natural lag in the process of formulating knowledge and acting upon it. Academics and industry researchers, who form a network of risk handling, show external assessors the knowledge gained about a new biotechnology product's action and safety. Those who develop the product have to educate assessors before these actors in turn can evaluate its safety and authorize (or not) the product. To frame this cycle of knowledge production and action, regulators have the job of stating standards as well as guidance to meet them; it is good that regulations be sufficiently open and flexible to allow products of different nature to be evaluated case by case. Typically the product development/authorization cycle will take 2-3 years, which Bengt considered relatively short in regard to other risk knowledge/action cycles.

Sören took the example of moving from recurrent reviews of the Swedish R&D program, presented by the radwaste implementer every three years, to the license application for siting, constructing and operating a repository for spent nuclear fuel, expected in 2010. He pointed out that in this knowledge/action cycle, sooner or later each actor must decide if they know enough to take the next step. In a licensing application the proponent must define the "safety case", which implies a number of strategic and important decisions as regards safety and economy as well as issues of many other natures (role of and relations with the host municipality and other affected stakeholders, etc). R&D must be followed by a next step, but this does not mean that R&D can stop, especially as final disposal is an activity that will go on for tens of years and new questions will arise. Sören also stressed that the answer to such an application is not a simple "yes" or "no". Most probably the regulator will request complementary material and the decision, if a "yes", will be accompanied by a number of conditions (stepwise construction, review and operation, reporting, etc.).

Andrew highlighted the uncertainty that surrounds new biological objects today, in comparison with established forms of medical intervention. These new objects raise potentially crucial issues of biosecurity and safety. He feels that it may be unwise to favour existing forms of regulatory review, based on knowledge of the old pharmacy, for new tissue products. Andrew stressed that a different level of vigilance is needed because we cannot necessarily foresee how the new products will act, yet there is a temptation to routinely use the old methods.

What are the burning questions you are asking yourself as a stakeholder/actor in your field today?

Andrew sees the need to study boundaries and border-crossing between the scientific, regulatory and civil domains of biotechnology governance. He is particularly interested in how technologies embed societal notions of risk and of safety, and seeks to deconstruct what might be considered merely the "materiality" of risk.

Sören spoke of the multi barrier system which is central to the waste repository concept. One barrier placed between the radioactive material and the environment, in the SKB proposal, is the copper canister. This metal is selected because of its stability. However, data are coming forward meriting the question of whether copper corrosion may be observed over the long term in an underground repository. If confirmed, these findings could overturn the core protective arrangement considered to date. Sören further brought up Swedish stakeholders' demand to consider alternatives to the proposed method: disposal in deep boreholes, or transmutation and partitioning of radioactive waste. He emphasized that new "burning issues"

would always pop up, and that these should be put to serious trial through scientific and societal review.

Bengt and his colleagues constantly ask themselves how to effectively educate policy makers about the technologies they are developing, as the pace of science exceeds that of regulation.

In facing newly emerging technologies, Rinie's responsibility is to foster upstream institutional engagement. He must ask how to get the right stakeholders to start reflecting on the issues. The new technology wave is growing, creating a series of new public spaces in which it is necessary to build up the societal meaning of these technologies.

What insights have you drawn from RiskBridge and your exposure here to other risk fields?

For Andrew, the trans scientific and hybrid nature of emergent technologies calls for the establishment of appropriately hybrid regulatory arrangements. We need to understand how resilient the existing regulatory framework and legislation can be in the face of political change.

Sören was struck by the similarity of challenges across the six risk fields. He called for more opportunities for discussion and integration across fields. As participant he would like to review the RiskBridge recommendations and conclusions.

Bengt said the project had been his first contact with the social science of risk in the larger sense. The discussion sensitized him to the various standards and requirements applied in the different risk domains, and he asked the provocative question: "What if the mobile phone was a medical device?".

Rinie reflected that science doesn't solve the issues raised by risk, but allows us to recognize them. He urged us not to underestimate the different risk fields: sediment may turn out to be just as important as climate change. The discussions highlighted for him a strange concept according to which we may seek to live a life of minimal risk: instead, for him risk governance is about balancing risk and benefit. The timing and urgency of achieving this balance may differ across contexts; we need to ask where the judgment of tolerability or acceptability is made. Here, public participation is sometimes misused. Rinie said it is necessary to get the regulations right by involving societal actors in tuning them. We need to take care of producing proper information so that members of the public can educate themselves.

The panel session was then opened to questions from the floor. A participant spoke of **looking out for risk ahead: How can we identify it? Is it possible to prepare for surprise?**

Sören's answer was that uncertainties in knowledge include "unknown unknowns" impossible to foresee or to prepare for in detail, but we may face these with our governance arrangements (e.g., organisation of task groups, etc.). In some respects we may prepare for "probable questions" in one field if there is experience from a similar field (climate change - radioactive waste, stemcells – nanotechnology, etc) and there may also be issues of a very general character that could be expected for almost any area.

Rinie advised that we can look for new technological developments and ask ourselves: "What are the societal and ethical issues these raise?" We need to

engage policy institutions in this questioning, for these are the people we hire and pay to take care of risk for us. Rinie gave the example of carbon capture and storage, for which his institute organized a focus group 18 months ago. A politician commented that he had assumed it would be “business as usual” in adopting this technological solution for limiting the impact of greenhouse gas emissions, but from the focus group “CCS is a controversial option”. Conducting this inquiry had eliminated a blind spot.

Andrew suggested that we can look at the intersection of old and new, where new potential but also new problems may be found. Technological developments service needs, but may have unintended effects. A rule of thumb could be: “pay attention when discussion moves to a new forum”.

A social scientist then brought up the question of “**How to make an impact?**”. Her experience is that she must be prepared to engage with emergent risk issues. To play her advisory role in government, she needs to package messages clearly and succinctly. To be heard, RiskBridge findings should be linked with national and EU priorities. She asked “**Which two messages should I take back?**”

Andrew advised that the specific risk profile does matter. We can learn transversal lessons when we have carefully mapped the likenesses and differences of risk fields. Rinie advised that government practitioners should build a network of relevant risk actors. Together they can consider the essential broad perspective in dealing with risk. For instance, they can ask “Are we doing risk assessment properly? Are we assessing the right things?” This should lead automatically to discussion of alternatives and options, which in turn leads to specifying the criteria used in choosing among them. Revealing criteria informs on the goals we pursue, which could be adjusted. Rinie highlighted the interesting dynamic he sees: ideology has instrumental effects, which through debate again influence ideology.

Luigi Pellizzoni (Institute of Sociology of Gorizia), RiskBridge manager of the EMF group, referred to the classical linear, polarized model of relations between science/technology and society. Responding to Rinie’s observations he urged governance actors to take a more dynamic stance.

In closing this session, Philippe Galiay suggested the next area of investigation could be “BenefitBridge”.

5. CLOSING REMARKS

The issue of risk governance and regulation for existing and emerging risk fields continues to be a major concern in national and international contexts. How we frame new and emerging risks, and develop proposals and policies to deal with them, has social, political and commercial consequences. The final RiskBridge conference sought to disseminate key findings from the project work and initiate broader discussion and debate about the nature of risk management and ways to take the work forward. We would like to conclude these proceedings by thanking the members and partners of the RiskBridge project for the time and effort they gave in attending the various workshops and conducting the core project work. We would also like to thank all those who gave presentations at the conference. Finally, we would like to thank all the delegates that attended the conference and contributed to its success.

Appendix 1: List of Delegates

Title	Forename	Surname	Institution
Mr	Jean-Pierre	Alix	CNRS
	Marjory	Angignard	Technische Universität Dortmund
Dr	Sallie	Bailey	Forestry Commission
Miss	Angeliki	Biliri	ESRC Innogen Centre, University of Edinburgh
Prof	Andrew	Blowers	Open University
Mr	Franck	Boissière	European Commission – DG Information Society and Media
Dr	Laurent	Bontoux	European Commission – DG SANCO
	Jos	Brils	Deltares / TNO
Dr	Filip	Cnudde	EuropaBio
Mr	Matthieu	Craye	European Commission DG Joint Research Centre
Mr	Silvano	De Iesu	Regione Lazio
Ir.	Arie	De Jong	Copernicus Institute, Utrecht University
Mrs Ir	Brigitte	Decadt	Belgian Federal Science Policy Office (BELSPO)
Dr	Gaetano	Di Bartolo	European Commission (RTD/J/2)
Mrs	Lori	Engler-Todd	Health Canada
M	Elie	Faroult	European Commission
Ms	Doreen	Fedrigio	European Environmental Bureau
Mrs	Marie Valentine	Florin	IRGC International Risk Governance Council
Prof	Simon	French	Manchester Business School
Dr	Phillipe	Galiay	European Commission
Miss	Lu	Gao	Tsinghua University

Title	Forename	Surname	Institution
Miss	Carolina	Garcia	University Milano-Bicocca – University of Dortmund
	Jean-Noël	Guye	AXA Group
Ms	Helena	Hansson Nylund	Örebro University
Prof	Takuji	Hara	Kobe University
Mrs	Akemi	Hara	
Dr	Burkhard	Jandrig	Max-Delbrück-Center for Molecular Medicine
Mr	Hans Kristian	Jensen	Oslo Region European Office
Dr	Bengt	Juliusson	NsGene A/S
Dr	Mihail	Kritikos	European Commission-DG Research
Ms	Julia	Kroemer	EU.select
Mr	Knut	Kroepelien	Norwegian delegation to the EU
Dr	Erik	Laes	SCK-CEN
Dr	Vivian	Leacock	Scottish Government
Ms	Heather	Lowrie	University of Edinburgh
Dr	Zxyyann	Lu	National Yang-Ming University (University of Edinburgh)
Dr	Catherine	Lyll	University of Edinburgh
Ms	Eva	Marsalek	PMI – Plattform Mobilfunk-Initiativen
Ms	Claire	Mays	SYMLOG
Prof	Matjaž	Mikoš	University of Ljubljana
Dr	James	Mitra	Innogen, University of Edinburgh
Dr	Sören	Norrby	Swedish National Council for Nuclear Waste
Mr	Marco	Pallotta	Campania Region's Office in Brussels

Title	Forename	Surname	Institution
Prof	Luigi	Pellizzoni	Dipartimento di Scienze dell'Uomo, Università di Trieste
Mrs	Federica	Prete	APRE
Ms	Dragomira	Raeva	EEB
Dr	Gene	Rowe	Institute of Food Research
Mr	Marcus	Sangster	Forestry Commission
	Viola	Schetula	Dialogik – non profit institute for communication and cooperation research
	Anamarija	Slabe	Institute for Sustainable Development
Dr	Adriaan	Slob	TNO Built Environment and Geosciences
	Claudia	Som	Empa Swiss Federal Laboratory for Materials Testing and Research
Prof	Roger	Strand	University of Bergen
Mr	Tony	Tweedale	RISK Consultancy (Rebutting Industry Science with Knowledge)
Dr	Jeroen	Van der Sluijs	Copernicus Institute, Utrecht University
Dr	Jaap	Van der Vlies	TNO
Dr ir	Rinie	Van Est	Rathenau Institute
Mr	Ludo	Veuchelen	SCK-CEN
Dr	Bart	Walhout	Rathenau Institute
Prof	Andrew	Webster	University of York
Mr	Richard	Wenning	ENVIRON International Corporation
Dr	David	Zaruk	Risk Perception Management
	Betty	Zucker	Stiftung Risiko-Dialog St. Gallen