cal tool that may predict the outcomes and impacts of a planned policy, but it is also a communication tool on relevant aspects, expectations and finally also on judgments. For the criteria of cost-effectiveness or efficiency, it is easy to rank different options on the basis of a single dimension. In case of trade-offs between the different dimensions of SD, this is hardly possible. How should potential trade-offs between employment, economic prosperity and natural capital be judged? This task is obviously not only analytical, but also encompasses normative decisions. Certainly this cannot be left up to the sole responsibility of the unit which is responsible for the preparation of the legislation and the IA. Compared to standard RIA, a SIA is potentially subject to wider politicisation.

Another important aspect of SIA is the need to assess the long-term impacts of policies: How far are the burden, costs and the return of investment of a planned policy distributed over time? Typically, future generations have very little say in the political process. In the negotiations on political decisions and in finding compromises, future generations are weakly represented. In the context of SD, it is an important objective to analyse whether costs are going to be imposed on future generations rather than only analysing the distributional impacts among different societal groups. If a return of investment can be demonstrated in the long term, it may contribute to increasing the legitimacy of political decisions.

Impact assessment, and in particular SIA, has to find a role within the institutional context of decision-making. The frequent call for more evidence in decision-making is particularly necessary in the face of the requirements of SD. However, this has to fit into the rationality of the political process. On the one hand, SIA requires resources and opportunities for analysis, and on the other it requires a demand from decision-makers who utilise the results.

Risk Communication

This section discusses issues related to risk communication across a range of publicly perceived high-risk industries (such as pharmaceuticals, nuclear, oil, etc.). It reports critically and provides analysis on risk communication as an outcome of risk research within these industries. Contributions are intended to include methods working towards the advancement of risk perception research and describe any lessons learned for successfully communicating to the public about risk.

Can Practitioners Do Better at Risk Communication? Using Evidence to Develop Best Practice

*Frederic Bouder**

The best way for practitioners to improve their skills in effective risk communication is to take on board the decades of research in this area. Risk communication has its roots in risk perception studies and has evolved as a rich and diversified research field. It has undergone an evolutionary process from top-down information towards two-way and proactive exchanges. Today, guidance is available to support practitioners' efforts. "State of the art" risk communication is attainable. Finally, moving guidance documents from rhetoric to reality often implies procedural and managerial adaptation.

I. Introduction

Many practitioners struggle when trying to communicate scientific information. Indeed, it has been known for poor risk communication to add fuel to risk controversies, quite independently of the quality of the risk assessment or the level of uncertainty involved. Well-known examples abound, from BSE[1], to dioxin in chicken[2] or vaccine scares[3]. On the other hand, there is also evidence of successful risk communication. The Leiss volumes[4] and the

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1 Douglass Powell and William Leiss, *Mad Cows and Mothers Milk* (Montreal: McGill-Queen's University Press 1997).

2 Corie Lok and Douglass A. Powell, *The Belgian Dioxin Crisis of the Summer of 1999: A Case Study in Crisis Communication and Management* (Guelph, Ont.: Department of Food Science, University of Guelph 2000).

3 Richard Horton, *MMR: Science and Fiction* (London: Granta Books 2003); Frederic Bouder, "A Comparative Analysis of Risk Perception Related to Human Health Issues", in Ingo K. Richter, Sabine Berking and Ralf Müller-Schmid (eds), *Risk Society and the Culture of Precaution* (Basingstoke: Palgrave Macmillan 2006).

4 William Leiss and Christina Chociolko, *Risk and Responsibility* (Montreal: McGill-Queen's University Press 1994); William Leiss, *In the Chamber of Risks: Understanding risk controversies* (Montreal: McGill-Queen's University Press 2001); Powell and Leiss, *supra* note 1.

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Lofstedt studies of trust[5] present detailed accounts of a number of success stories.

What are the ingredients of successful risk communication and how can it be achieved? Is risk communication simply about making risks understandable to the public or is it more complex? This contribution offers a succinct discussion of the most important developments emerging from the risk communication field. It is also intended to guide practitioners who are looking for more effective practices.

II. Defining risk communication

Risk communication can be said to belong to the area of multi-disciplinary research rather than independent "disciplines". It has its roots in risk perception[6], a field developed by Gilbert White at the University of Chicago in the 1940s. First applied to natural hazards[7], new research avenues were open from the 1970s onwards, when Baruch Fischhoff, Paul Slovic and others started to explore a large number of technological hazards[8]. They demonstrated that some members of the public perceive certain risks differently than others for a number of reasons, such as degree of control, catastrophic potential, and familiarity[9]. In the late 1980s a formalised definition, which has since become classic, emerged from the seminal work undertaken by the National Research Council (NRC):

"Risk communication is an interactive process of exchange of information and opinion among individuals, groups and institutions. It involves multiple messages about the nature of risk and other messages, not strictly about risk, that express concerns, opinions, or reactions to risk messages or to legal and institutional arrangements for risk management."[10]

In this context, the form of the risk communication needs to reflect the nature of the risk under consideration[11]. It also needs to comprehend the attitudes and mental representations of those involved in the two-way communication process[12] as well as the level of trust vested in critical actors and organisations[13].

III. The road towards two-way communication

Baruch Fischhoff and William Leiss highlighted the evolutionary process undergone by risk communication. Leiss[14] identified three phases in the evolution of risk communication practice:

- Firstly, the need to convey probabilistic thinking to the general public and to educated lay audiences;
- Secondly, persuading audiences and managing public relations in order to convince people that some of their behaviour is inappropriate;
- Finally, a two-way communication process in which scientists, risk managers and various laypersons engage in a social learning process.

5 Ragnar E. Lofstedt, "Risk communication: The Barsebäck nuclear plant case", 24(8) *Energy Policy* 1996, pp. 689 *et sqq.*, at p. 696; Ragnar E. Lofstedt, *Risk Management in Post-Trust Societies* (Basingstoke: Palgrave 2005).

6 Vincent T. Covello, David B. McCallum and Marie Pavlova, "Principles and guidelines for improving risk communication", in Vincent T. Covello, David B. McCallum and Marie Pavlova (eds), *Effective risk communication* (New York: Plenum 1989), pp. 3 *et sqq.*, at p. 16; William Leiss, *Prospects and Problems in Risk Communcation* (Waterloo: University of Waterloo Press 1989); Caron Chess, Kandice L. Salomone and Billie Jo Hance, "Managing risk communication agency reality: Research priorities", 15 *Risk Analysis* (1995) pp. 128 *et sqq.*, at p. 136; M. Granger Morgan and Baruch Fischhoff, *Risk Communication* (New York: Cambridge University Press 2001); Ragnar E. Lofstedt, "Risk communication: pitfalls and promises", 11(03) *European Review* (2003), pp. 417 *et sqq.*, at p. 435.; Glynis M. Breakwell, *The psychology of risk* (Cambridge: Cambridge University Press 2007).

7 Ian Burton and Robert W. Kates, "The perception of natural hazards in resource management", 3(3) *Natural Resources Journal* (1964), pp. 412 *et sqq.*, at p. 441; Ian Burton, Robert W. Kates and Gilbert F. White, *Environment as Hazard*, 1st and 2d ed. (New York: Oxford University Press 1978 and 1992); Gilbert F. White, "Human Adjustment to Floods", Department of Geography Research Paper no. 29 (Chicago: The University of Chicago 1945); Gilbert F. White, "The choice of use in resource management", 1 *Natural Resource Journal* (1961), pp. 23 *et sqq.*, at p. 40.

8 Baruch Fischhoff, Sarah Lichtenstein, Paul Slovic, Stephen Derby and Ralph Keeney, *Acceptable Risk* (New York: Cambridge University Press 1981); Paul Slovic, "Perception of Risk", 236 *Science*, pp. 280 *et sqq.*, at p. 285.

9 HSE, *Improving health and safety, An analysis of HSE's risk communication in the 21st century*, prepared by King's College London, Research report RR785, (Her majesty's Stationary Office: Norwich 2010).

10 NRC, Improving Risk Communication (Washington DC: National Academy Press 1989), at p.21.

11 Ortwin Renn, *Risk Governance: Coping with Uncertainty in a Complex World* (London: Earthscan 2008).

12 Baruch Fischhoff, Ann Bostrom. and Marilyn Jacobs-Quadrel, "Risk Perception and Communication", 14 *Annual Review of Public Health* (1993), pp. 183 *et sqq.*, at p. 203.

13 Lofstedt, "Risk Management in Post-Trust Societies", *supra* note 5.

14 William Leiss, "Three phases in the evolution of risk communication practice", in Howard Kunreuther and Paul Slovic (eds), Special Issue of the Annals of the American Academy of Political and Social Science, 545 (May) *Challenges in Risk Assessment and Risk Management* (1996), pp. 84 *et sqq.*, at. p. 95.

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Fischhoff, having come to similar conclusions, offered a history of risk management organised in eight development stages (see Table I)[15].

Table I: Developmental stages in risk communication

All we have to do is get the numbers right
All we have to do is tell them the numbers
All we have to do is explain what we mean by the numbers
All we have to do is show them that they've accepted similar risks in the past
All we have to do is show them that it's a good deal for them
All we have to do is treat them nice
All we have to do is make them partners
All the above
Source: Fischhoff, 1995

During the first development stage of risk management, experts had focused on the production of technical expertise to control the risks, which involved the development of probabilistic estimates. This exercise often took place behind closed doors. When technicians realised that their expert status did not necessarily mean that people would trust them, they decided to hand over the numbers in the form of corporate reports, briefings, press statements, etc.[16]. At the next stage, experts realised that they would need to go beyond the presentation of statistical facts and started telling people what they need to know, assuming that people were rational decision-makers. They soon realised, however, that people in general are not always interested in numbers and often concentrate their attention on how the risky process "works". Cognitive scientists have attempted to address this more direct need through the so-called "mental model approach"[17](third stage) which helps to characterise the individual beliefs of experts and lay people in order to correct misconceptions, fill gaps, or reinforce correct beliefs in a way that can be understood by all recipients.

Recognition that people were more interested in the risky process than in its probabilistic attributes opened the door to the exercise of comparing situations (fourth stage). However, this communication approach has not proved to be very effective[18], partly because the type of anecdotal evidence frequently used does not address the fact that public expectations are largely context-based. The fifth developmental stage emphasised the weighing of risks and benefits. This development came at a more mature stage of the risk management history, since the weighing of risk and benefit for any activity presupposes specific skills, including robust economic and statistical analysis. Risk/benefit communication is far more successful than risk comparisons, because it presents concrete ups and downs that will speak to people and help them re-assess their previous attitudes. Scholars, however, suggest a number of issues that may affect judgement about risk/benefit trade-offs, for instance "framing effects"[19] and biased rhetorical comparisons of risks and benefits[20].

The sender-receiver model of communication[21] was used to conceptualise the process of transmission of information[22]. The next two developmental stages in risk communication moved away from the content of the message to focus on the relationship between senders and receivers. Experts and decision-makers have acknowledged the importance of the relationship between them and those affected by risk

15 Baruch Fischhoff, "Risk Perception and Communication Unplugged: Twenty Years of Process", 15(2) *Risk Analysis* (1995), pp. 137 *et sqq.*, at p. 145.

16 Lester B. Lave, "Health and Safety Risk Analyses: Information for Better Decisions", 236 *Science* (1987), pp. 291 *et sqq.*, at p. 295.

17 Anne Bostrom, Cynthia J. Atman., Baruch Fischhoff and M. Granger Morgan, "Evaluating risk communications: completing and correcting mental models of hazardous processes", 14 *Risk Analysis* (1994), Part II, pp. 789 *et sqq.*, at p. 798; M. Granger Morgan, Baruch Fischhoff, Ann Bostrom and Cynthia J. Atman, *Risk Communication: A Mental Models Approach* (Cambridge: Cambridge University Press 2001).

18 William R. Freudenberg and Susan K. Pastor, "NIMBYs and LULUs: Stalking the syndromes", 48(4) *Journal of Social Issues* (1992), pp. 39 *et sqq.*, at. p. 62.

19 Baruch Fischhoff, "Value elicitation: Is there anything in there?", 46 *American Psychologist* (1991), pp. 835 *et sqq.*, at p. 847; Baruch Fischhoff, Paul Slovic and Sarah Lichtenstein, "Knowing what you want: Measuring labile values", in Thomas Wallstein (ed.), *Cognitive processes in choice and decision behavior* (Hillsdale, NJ: Erlbaum 1980), pp. 117 *et sqq.*, at. p. 141; Robin M. Hogarth (ed.), *New directions for methodology and social and behavioural science: Question framing and response consistency* (San Francisco: Jossey-Bass 1982); Daniel Kahneman and Amos Tversky, "Choices, Values and Frames", in 39 *American Psychologist* (1984), pp. 341 *et sqq.*, at p. 350.

20 Allan Mazur, "Bias in risk-benefit analysis", 7 *Technology in Society* (1985), pp. 25 *et sqq.*, at p. 30; Baruch Fischhoff, "Acceptable risk: A conceptual proposal", 1 *Risk: Health, Safety & Environment* (1994), pp. 1 *et sqq.*, at p. 28.

21 Harold D. Laswell, "The structure and function of communication in society", in Lyman Bryson (ed.), *The Communication of Ideas: A Series of Addresses* (New York: Cooper Square Publishers 1948), pp. 32 *et sqq.*, at p. 35; Claude E. Shannon and Warren Weaver, *The Mathematical Theory of Communication* (Urbana, IL: University of Illinois Press 1949).

22 Ortwin Renn and Debra Levine, "Credibility and trust in risk communication", in Roger E. Kasperson and Pieter Jan M. Stallen (eds), *Communicating Risk to the Public: International Perspectives* (Amsterdam: Kluwer 1991), pp. 175 *et sqq.*, at p.218.

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decisions. Their first reaction has been to focus on improving the form of the delivery of their message, for example through communication training, language simplification and inter-personal relationships with the receivers. Fischhoff has warned against the danger of a one-way approach to communication that would rely on smooth delivery and neglect adequate content: "the ignorant smiles of PR types are a good tool for digging oneself into a hole"[23].

The seventh developmental stage in risk communication introduced the belief that people should be treated as partners, in other words, the relationship between experts and lay people is redefined so as to recognise the real nature and competence of the public. This does not mean that expert knowledge should be confused with lay knowledge, but that , people ought to be recognised as active players of the risk communication process, whatever their degree of technical competence may be. According to this view, all actors may be described as both senders and receivers. This approach also requires experts to reassess the relevance of their decisions for society as a whole, which implies that non-technical considerations should be factored into their decisions, including the potential for building or destroying public trust[24].

The eighth and final developmental stage of risk communication acknowledges all the above stages and may itself be described as a "two-way model" of risk communication.

IV. Formalising guidance on risk communication

Decades of evolution supported by empirical evidence have led to the development of numerous practical recommendations for achieving a proactive model of communication. Key documents have originated from academic-led reviews[25], international organisations[26] industry and consumers organisations[27], and, most notably, from governments. In the UK, for instance, noticeable efforts to provide guidance on risk communication have come from interdepartmental and ad hoc committees[28], central government bodies[29] and sectoral regulators[30]. These efforts have converged to support a number of key risk communication principles. Renn's 16 guidelines on how to communicate risk effectively may be used to illustrate the latest consensus point on what constitutes effective risk communication (see Table II).

Table II: 16 guidelines on how to communicate risks effectively

(1)	Be clear about your intentions and make them the central message of your communication effort.
(2)	Simplify your message as drastically as you think you can do without being inaccurate.
(3)	Place your simple messages in the beginning of a text and gradually add the complex issues.
(4)	Anticipate the interests of your target audiences and design your communication program to match their needs.
(5)	Devise different communication programs for different target audiences.

23 Baruch Fischhoff, "Risk Perception and Communication Unplugged: Twenty Years of process", *supra* note 15, at p. 142.

24 Lofstedt, "Risk Management in Post-Trust Societies", *supra* note 5.

25 NRC, Improving Risk Communication, *supra* note 10; Renn, "Risk Governance: Coping with Uncertainty in a Complex World", *supra* note 11.

26 OECD, "Guidance Document on Risk Communication for Chemical Risk Management", 25 July 2002, available on the Internet at <http://www.olis.oecd.org/olis/2002doc.nsf/43bb6130e5e86e5fc12569fa005d004c/cb81407367 ba51d5c1256c01003521ed/$FILE/JT00129938.PDF> (last accessed on 29 June 2010).

27 EUFIC, "An introduction to food risk communication", April 2003, available on the Internet at <http://www.eufic.org/article/en/food-safety-quality/risk-communication/expid/review-food-risk-communication> (last accessed on 29 June 2010).

28 ILGRA, "Risk Communication: A guide to Regulatory Practice", 1998, available on the Internet at <http://www.hse.gov.uk/aboutus/meetings/committees/ilgra/risk.pdf> (last accessed on 29 June 2010); RRAC, *A Practical Guide to Public Risk Communication, the five essentials of good practice*, May 2009, written and researched by Frederic Bouder, available on the Internet at <http://www.berr.gov.uk/files/file51458.pdf> (last accessed on 29 June 2010).

29 Cabinet Office, *Risk: Improving Government's Capability to Handle Risk and Uncertainty* (London: Strategy Unit Report 2002); HM Treasury/Government Information and Communication Service (2003), "Communicating Risk" (available on the Internet at <http://www.cabinetoffice.gov.uk/media/132679/communicatingrisk.pdf>, last accessed on 29 June 2010).

30 FSA, "Signpost labelling, agenda item 5", 9 March 2006, available on the Internet at <http://www.food.gov.uk/multimedia/pdfs/fsa060303.pdf> (last accessed on 29 June 2010); FSA, "Front of Pack Nutritional Signpost Labelling Technical Guidance", January 2007, Issue 1, available on the Internet at <http://www.food.gov.uk/multimedia/pdfs/frontofpackguidance.pdf> (last accessed on 29 June 2010); HSE, "Improving health and Safety", *supra* note 9.

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(6) Messages should be distributed on different channels and feedback communication should be stimulated and encouraged as much as possible.
(7) Be honest, complete, and responsive in the composition of your message.
(8) Try to escape from role expectations by using a personal approach and by framing the communication to the personal experience of the addressed receiver.
(9) Allocate enough time for packaging your message, but do not change your message in order to make the package more attractive.
(10) Be careful in selecting the right cues for appealing to the peripheral audience without offending your central audience.
(11) Explain the risk rationale to your audience and demonstrate the logic and adequacy of this rationality without claiming superiority.
(12) Place risk in social context and report numerical probabilities only in conjunction with verbal equivalents.
(13) Institutional performance is the major key to trust and credibility. The more you can demonstrate that you did a good job the more you can expect trust in your message.
(14) Risk managers have to learn from the public as much as the public can learn from them.
(15) You can only convince the receivers of your message if it addresses their concerns and interests.
(16) Encourage or initiate attempts to conduct a rational discourse, in particular for third level debates.

Source: Renn, 2008

V. Conclusion – Conducting "state of the art" risk communication

When compared to more established disciplines, risk communication is a relatively new field of research. Nevertheless, the richness and robustness of its cognitive basis and its potential for improving concrete situations have led to considerable theoretical and empirical advancements over the past forty years. The debate is currently moving away from "what needs to be done" towards "how it needs to be achieved", and in particular, to the capacity of decision-makers to apply prescriptive guidelines and principles in real life situations. A practical guide to public communication recently suggested a five-step approach[31]:

- Demonstrate that you have a credible basis for your position;
- Understand how those who are affected understand the risk;
- Consider the broad range of options and the associated trade-offs;
- Define the nature of your involvement with the risk;
- Identify the audiences and the appropriate methods for communicating with them.

The review of successful risk communication practices also suggests concrete procedural recommendations to support "state of the art" risk communications[32]. They include:

- Developing frequent dialogues between regulators, industry, media and key politicians. One key to successful risk communication is building relationships based on trust. This trust building is best done before any a crisis arises.
- Choosing dialogue over confrontation. Confrontation between the key parties in any dispute will not only destroy public trust in the key actors involved, but also, in more cases than not be socially amplified by the media[33].
- Avoiding actors who inject distrust in risk communication disputes unless this is absolutely necessary. For instance, when it comes to disputes, lawyers tend to inject more rather than less conflict into the process.
- Promoting competence. Risk communication will always be easier if both parties involved in a dispute are competent and both base their decisions on the best available science.
- Involving highly trusted individuals as early as possible can help in solving risk communication disputes amicably.

31 RRAC, "A Practical Guide to Public Risk Communication, the five essentials of good practice", *supra* note 28.

32 HSE, "Improving health and Safety", *supra* note 9.

33 Nick Pidgeon, Roger E. Kasperson and Paul Slovic (eds), *The Social Amplification of Risk* (New York: Cambridge University Press 2003).

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– Acknowledging the importance of environmental NGOs. In the era of post trust they can significantly shape policy outcomes[34].
– Recognising that the opinions of local policy-makers matter. Where policy-makers perceive a community benefit (such as jobs in a depressed area), they may still push a process forward even if some of the public oppose it.

And finally,

– Facing up to one's responsibility.

WTO

The section on WTO law highlights the interface between international trade law and national risk regulation. It is meant to cover cases and other legal developments regarding the SPS, TBT and TRIPS Agreements and the general exceptions in both GATT 1994 and GATS as well as to inform about pertinent developments in recognized international standardization bodies and international law. Of recurrent interest in this area are questions of whether precautionary policies can be justified under WTO law, the standard of review with which panels and the Appellate Body assess scientific evidence and the extent to which policy can and should influence risk regulation.

Global Governance of Risks: WTO, Codex Alimentarius and Private Standards – Report on the SRA-Europe 19th Annual Conference

Alessandra Arcuri, Lukasz Gruszczynski** and Alexia Herwig****

I. Introduction

The Society for Risk Analysis (SRA) is a scientific society, established in 1980, which provides a multi-disciplinary forum for scholars interested in risk research.

The European section of the SRA recently organized its 19th annual conference, hosted by King's College London (21-23 June 2010). One of the symposia in which the authors of this report participated was dedicated to the problems posed by current structures of global governance for food-borne risks.

This symposium ("Global Governance of Risks: WTO, Codex Alimentarius and Private Standards") focused on the key organizations and institutions that directly or indirectly govern risks related to food and veterinary products: the World Trade Organization (WTO), the Codex Alimentarius Commission (Codex) and the set of private actors playing an influential role in the design of food safety standards at the global level. The underlying idea of the symposium was that the operation and cooperation of these institutions might be seen as the central part of an emerging system of global governance of food-borne risks. The role of the WTO in this area originates in the linkage between trade/environment and trade/health issues. The influence of the WTO, though indirect, is substantial, mainly because of its strong capacity to enforce law compared to the capacity of other international organizations. The wide range of safety standards set by the Codex (which are, in principle, non-binding) are in fact gaining 'quasi-binding' status because of the way they are being endorsed by the WTO. This system is complemented by the growing importance of private standards applied to food products across the board. The emerging regime of international regulation of risks at different (though interrelated) levels is being criticized in the scholarly discussion for not being sufficiently transparent, for sometimes overriding democratic values and for its lack of legitimacy. The symposium aimed to address different aspects of this complex system, drawing attention to new developments and pointing out possible new solutions to the existing problems of legitimacy.

II. WTO and global governance of risks

Two speakers addressed the role played by the WTO in the newly emerging system of global governance for food safety. The central instrument in this context is the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). As a general rule, it requires scientific justification

34 Lofstedt, "Risk Management in Post-Trust Societies", *supra* note 5; RRAC, *The changing nature of communication and regulation of risk in Europe*, written and researched by Ragnar Lofstedt, Frederic Bouder, Jamie Wardman and Sweta Chakraborty, available on the Internet at <*http://www.bis.gov.uk/files/file53401.doc*> (last accessed on 29 June 2010).

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