
The chapter is a brief and personal introduction to risk communication. The views expressed here derive from observation over the past fifteen years.

Janet begins by describing some of the background to the book, and then examines the origins of risk communication, and the relationship between risk communication, risk perceptions and acceptable and tolerable risk. The context for this discussion is environmental risk communication, which includes consideration of risk to the natural environment and the health and safety of individuals and communities.

She outlines briefly some of the principles of risk communication, and notes the importance of internal risk communication within organisations as well as external communication between an organisation (public or private) and its stakeholders. Risk communication is an intrinsic part of risk management and this relationship is examined in the context of the Australian and New Zealand Risk Management Standard.

New Zealand's experience in the practice of risk communication has tended to focus on particular areas and Janet describes some of the programmes from personal experience. Finally, Janet refers to some of the more recent developments in terms of recognition of the importance of good risk communication, and introduces the CAE Risk Communication Project being launched in 2003.

The purpose of this chapter is to 'set the scene' and provide a context for the remainder of the book. While this chapter provides an introduction to the field of risk communication it is not intended to be an exhaustive review of a discipline that is employed in a wide range of subject areas, and by a large number of expert international practitioners (two of whom have provided chapters for this book). Nor is it intended to provide best practice guidelines – this will be the objective of a forthcoming CAE project. It is, however, intended to introduce the sound theoretical foundation of the practice of risk communication, and to make the reader want to know more about the theory and practice of risk communication. To this end a selection of recommended readings is provided.

Introduction

The papers published in this book were presented either at the CAE conference, *The Risk Communication Challenge: Issues, Techniques and Practice* held in November 2000, or the CAE Risk Communication Workshop held as part of the New Zealand Society for Risk Management inaugural conference in October 2002.

The contributors come from a wide range of backgrounds, including ecology, biology, veterinary sciences, psychology, mathematics, economics, geography, law, and engineering, thus illustrating the importance of risk communication within a range of disciplines. Many of the papers presented here reflect experience in the public sector, at a national and regional level. To some extent this reflects the public notification requirements of much of our environmental legislation, including (in New Zealand) the Resource Management Act (1991) and the Hazardous Substances and New Organisms Act (1996). However, CAE is very much aware of the importance of risk communication in private sector organisations and has initiated a project examining practice and performance in organisational risk communication, with emphasis on risk appetite, in both the public and private sectors.

The origins of risk communication

People's perceptions of risks provide a valid and required input to both formal and informal risk assessment and risk management procedures. In recent years the public has become much more aware of, and concerned about, environmental hazards. Part of this concern has arisen because of changing attitudes to the environment, reflecting changes in people's value systems, and a greater awareness of the importance of environmental health to our own well-being. This chapter concentrates on perceptions of environmental risk (unless otherwise stated). This includes risks to people and their physical and social environment (health and welfare) as well as the environment itself. The primary emphasis is on technology-induced risk, but most of the discussion also relates to natural hazard risk.

One of the drivers of risk perception research was the recognition that individuals and particular groups in the community view risk in a very different way from technical experts and scientists who use scientific models and tools to analyse and measure risk. Early researchers examined the different factors and characteristics of situations and specified risks that individuals take into account when they are making their own estimates of risk (and benefit).

Some researchers were initially motivated by the expectation that if it were possible to understand why people perceived risk in different ways to experts then it would be comparatively straightforward to 'educate' people so that they would 'understand' risk better and would therefore accept the advice being given by technical and scientific experts. However, greater understanding of both the factors affecting public perceptions and the reasons why expert predictions and lay perceptions differ has shown that this may not necessarily be the appropriate outcome. Over time, more emphasis has been given to understanding risk percep-

tions and including consideration of them in making decisions involving risk.

Perceived risk research (see Chapter 3) has provided improved understanding of how individuals think about risk, with the key outcomes being the identification of the main factors affecting people's perceptions of risk, the recognition that the technical concept of risk as a compound of probability and magnitude is inadequate in terms of the way most people think about risk, and a greater comprehension of the heuristics that people use in their efforts to estimate risk (e.g. Starr, 1969; Tversky and Kahneman, 1982; Fischhoff *et al.*, 1975; Fischhoff *et al.*, 1978; Slovic, 1987).

Risk conflicts arise when experts and the public differ in their views about risks associated with an activity, and are due to many causes. Research into perceived risk has provided considerable insight, and has highlighted a major social problem that derives from risk conflicts — the lack of confidence that the public has in the technical expert. The credibility of the expert is now a key issue of risk research reflecting on the credibility of the public-sector decision-making processes.

The concept of acceptable risk is linked to perceived risk. Acceptable risk is best seen as the result of a decision process where risks are analysed and, according to the particular decision criteria, specified as being either 'acceptable' or 'unacceptable'¹. In public decision processes, the criteria for determining acceptability or tolerability² should include consideration of public opinion or public perceptions of the risk, though how this 'consideration' is included in the decision process may vary widely, and is the subject of some of the following chapters. The concept of 'accepted' risk, referring to that which people choose to accept even if they don't like it³, is also relevant.

One important result of the early perceived risk and acceptable risk research was that people's perceptions are not simply 'irrational', and that people use a wide variety of input information including expert predictions to make their own social evaluations of risk (Fischhoff *et al.*, 1982, Kraus *et al.*, 1992). Essentially, individual and community perceptions are a valid input into decision processes, particularly the perceptions of groups likely to be affected by decisions. As a result, and also as a by-product of a certain amount of soul searching as to the purpose of research into perceived risk, the emphasis in risk research in the late 1980s switched towards designing ways of communicating risk information, as a

¹ Needless to say it isn't as simple as this, and in many cases three categories are defined, such that there is a group between 'acceptable' and 'unacceptable' that consists of those risks that require further attention.

² Tolerable risk depends primarily on the idea of the benefits outweighing the risks. The risk will never be accepted, but it will be tolerated for a particular activity or for a specified time period. Moore (1988) describes the term 'tolerable risk' as originating from the Sizewell B Inquiry in Britain. "A tolerable risk is not the same as an acceptable risk as people may tolerate a certain level of danger associated with a particular risk but that does not mean they will ever accept it." The term derives from comments by Sir Frank Layfield Q.C. (1987) that "although acceptable risk is often used in balancing risks and benefits, it does not adequately convey the reluctance with which possible substantial risks and benefits may be tolerated".

³ Accepted risk differs from tolerable risk in that people accept it voluntarily; for example, smoking.

means of (a) capturing public knowledge, and (b) avoiding costly risk conflicts that have the potential to slow or even halt some development activities. There is also a considerable body of work directed towards exploring the differences between expert and lay perceptions of risk (e.g. Lazo, *et al.* 2000; Flynn and Slovic, 1999).

An important driver for finding better ways of communicating on risk issues, and incorporating public knowledge into decision making, is that in many environmental decision processes there can be no absolute right answer because of the existence of uncertainty⁴. Therefore, the most acceptable solution to all parties must intuitively be reached by a process of trade-off between them (Renn, 1989; Renn and Levine, 1992).

For this to be successful, all parties must be prepared to negotiate and to establish a framework for this negotiation that will include the areas in which they are prepared to negotiate. Risk conflicts typically include elements of value conflicts as well as interest conflicts and risk communication seeks to clarify ways in which these can be defined and properly described.

Some principles of risk communication

The National Research Council (1989) defined risk communication by stating that the risk communication approach:

“...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.”

There are two important concepts outlined in this definition. Firstly, risk communication is an exchange of information, or an interactive process requiring the establishment of two-way communication channels. Secondly, at times the communication channels will process messages that are not strictly related to risk. Risk concerns are often used as a surrogate for other issues in public-sector decision processes. This aspect of risk communication can be very important, as long as it is used judiciously and does not result either in ‘information overload’ or in a loss of confidence in the channel.

There are many manuals written on the ‘how to’ of risk communication. A number of consultants have taken the results from risk perception research, as well as communications research and participatory research, and have used this to specify sets of ‘principles’ or rules to be applied in communicating with the general public on risk issues. Some of these are described in Chapter 5.

⁴ Other important issues to be mentioned here include the Precautionary Approach and decision maker’s approach to risk.

Some key messages can be extracted as to what should, and should not, be done. The following list is a useful set of aims for a programme.

- Start early;
- Identify stakeholders and be inclusive rather than exclusive – communicate broadly;
- Always involve the community in the decision-making process if appropriate representatives can be identified;
- Address community concerns when explaining risk (try to consider their perspective), and be very careful when making comparisons with other risks;
- Present material clearly and simply (but not condescendingly), give people time to assimilate and familiarise complex issues, and remember that there are no ‘dumb’ questions;
- Pay as much attention to the community’s intuitive perception of the risk, and to the community’s concerns, as to scientific variables (provide the information that the community wants as well as what it ‘needs’);
- Don’t avoid negative information, and admit when you simply don’t know; and
- Focus on building trust as well as generating good data, and only make promises that you know you can keep.

All of these aims are directed towards building trust and credibility which are essential elements of a good risk communication programme.

What risk communication can’t achieve

When risk communication processes were initially promoted some experts believed that it would be possible to solve all conflict simply by providing the public with ‘better’ information. This has indeed been the case in some instances, however, there have also been a number of studies of conflicts where the public is not prepared to accept that the experts’ viewpoint is ‘better’. The fundamental flaw in this approach is that risk communication is not just about ‘telling people’ or ‘educating the public’ but about exchanging information for the purpose of better informing all parties. With hindsight, most experts who have been involved in risk communication processes now have a greater understanding of the public’s attitudes and concerns.

Attitudes are based on values and beliefs. Communication is associated with flow of information (and knowledge). Therefore while risk communication can provide all parties with a better general understanding of the issue it cannot (and should not) attempt to change basic values and beliefs. However, risk communication can help by identifying points of commonality and points of difference, and also why these arise (Gerrard, 1995).

The National Research Council definition of risk communication (see above) addresses the issue of purpose obliquely, by noting that it may be used for a variety

of messages some of which may not be related to risk. The notion of purpose is important because the organisation or individual initiating the process needs to be clear about the intended purpose of the specific process so that the success or otherwise can be judged against the criteria implicit in the purpose. Risk communication is not necessarily unsuccessful because all parties cannot reach consensus. In some cases the purpose may simply be to gauge opinions or establish a communication vehicle.

Internal and external risk communication

While much of the risk communication literature concentrates on communication between an organisation and its stakeholder, it is important to remember that communication about risks within an organisation can be critical. A classic and dramatic example of where poor internal communication about risks led to a tragic outcome is the case of the Challenger Shuttle disaster. The details on how this occurred are well described in Feynman (1988). In this instance it was lack of communication between engineers (analysts) and managers that resulted in poor decisions. Another, more recent, example from the medical field relates to an instance in the United States where information from gene therapy trials was not sent to the central registry, thus resulting in incomplete information being given to patients (*New Scientist*, 2000).

Chapter 2 touches on the way in which internal communication about risks can affect the way and organisation communicates with its stakeholders, and Chapter 10 illustrates how differences in interpretation within an organisation regarding risk appetite can arise when there is no explicit policy established.

Internal risk communication ensures that those who are responsible for implementing the risk management framework understand why certain actions are required. It can be used to encourage internal staff to keep a watchful eye for activities or situations that may lead to risk. Good internal communication about risk should be part of an organisation's risk culture, and embedded into risk management profiles and programmes.

Risk communication and risk management in Australia and New Zealand

The Australian and New Zealand risk management standard *AS/NZS 4360: Risk Management* (Standards Australia and Standards New Zealand, 1995, 1999), was first published in 1995. This first version of the standard did not include explicit consideration of risk communication. However, when the revised version was republished in 1999⁵, risk communication had become a fundamental component of all steps of the process⁶.

⁵ AS/NZS 4360 is currently (2003) under revision again. In the 2004 version of the Standard the role of risk communication has been further reinforced.

⁶ The development of the Environmental Risk Management Handbook (Standards Australia and Standards New Zealand, 2000) was a positive driver in ensuring the recognition of risk communication.

The standard promotes the development of a risk communication programme as an essential part of risk management, where elements of such a programme include determining:

- **why** communication and consultation is required;
- **who** is going to be involved (who are the stakeholders);
- **when** the different parties are going to be involved;
- **what** is to be the subject of the communication and consultation; and
- **how** the process is to be undertaken throughout the risk management cycle.

One of the benefits of embedding risk communication within the risk management process is seen as being improved stakeholder relationships, allowing an organisation to explicitly identify its internal and external stakeholders, and to develop a conversation between the stakeholders and the organisation. One important element may be assigning responsibilities for internal and external communication, whilst keeping in mind that communication, as well as risk management, must be part of everyone's responsibility.

Communicating and consulting on risk issues requires knowledge and consideration of the varying factors that affect all stakeholder perceptions. Individuals and communities respond to risk according to how the risk is perceived. Such perceptions are influenced by a range of factors that go beyond the simple two-dimensional model of likelihood and magnitude of effect, should the event occur.

When designing risk communication programmes as part of risk management, the distribution of risk across the population is highly relevant since, in many cases, external stakeholders believe that they are being asked to bear the risk while the organisation garners the benefits. Chapter 2 and Chapter 12 illustrate how directly involving stakeholders and convincing them that the organisation has an interest in ensuring that stakeholders are not unnecessarily disadvantaged can help to allay these concerns. As discussed in Chapter 6, 'respect' is an important element of good communication.

Risk communication in New Zealand

New Zealand has not yet faced the sorts of major risk conflict situations that have concerned Europe and the United States over the past two decades. One reason is that these have focused largely on large-scale questions such as nuclear power generation and hazardous waste disposal. The second area is of concern to a number of groups and agencies, but it has not yet surfaced as a major focus of the general public.

In the past few years, however, there have been significant areas where differing perceptions of risks have led to conflict. These include the siting of microwave and cellular phone towers, genetic modification and biotechnology (Chapters 6 and 9), and large scale spraying of residential areas to eradicate pest species (Chapter 12).

Risk communication techniques have been applied in New Zealand to natural hazard management and flood control. While Chapter 8 provides one example, there are a number of other circumstances where councils have applied successful risk communication programmes that have used community knowledge and experience to help design appropriate systems. These include flood control (Kingsbury, 2000), and general natural hazard management (McSaveney, *et al.* 1996; Gough, *et al.* 2001).

Since the implementation of the Resource Management Act 1991 (RMA), communities have become accustomed to being consulted on the development of District and City Plans. Along with this, the notification requirements of the RMA has resulted in community groups becoming more active about engaging with planning authorities in a number of areas, many of which involve risk.

The health sector in New Zealand has also become more aware of the importance of risk communication, though in a number of recent examples the emphasis has been on informing the public, rather than consulting the public. Part of this is the result of current legislation; proposals for changes to the Health Act may result in better recognition of the benefits of properly designed risk communication programmes. At a clinical level, a great deal of emphasis has been given to improving doctors' and clinicians' communication skills in recent years.

Two areas where long-term risk communication channels have been established in New Zealand are the Ministry of Agriculture and Forestry (MAF) Farm Advisory Service, and the Civil Defence Service. The Farm Advisory Service has for many years operated as a communication channel between farmers and the scientific and technical researchers of MAF. This has proved to be an effective two-way communication channel with farm advisors acting as communicators. One of the features of the service is that the communicators have been trained primarily as farmers rather than as communicators so they have used their own professional judgement to determine what the message should be and how it should be communicated. Unfortunately, institutional change has resulted in the downgrading of the service.

The Civil Defence service has largely been a one-way communication system with Civil Defence providing the public with information on what to do in cases of emergency. The efficacy of this communication channel is hard to judge since Civil Defence situations do not occur very often. The new Civil Defence and Emergency Management Act (2002) aims to strengthen the role of risk communication in managing for emergencies, and communities and councils will be more directly involved in all aspects of planning for emergencies.

New Zealand needs to place emphasis on:

- encouraging institutions and agencies currently involved in risk assessment to recognise the validity and utility of their procedures;
- enhancing the credibility of agencies and institutions likely to be involved in risk communication exercises;

- considering ways of providing comprehensive and comprehensible technical information to the media and the public; and
- exploring imaginatively the establishment of communication channels (either as institutional arrangements or flexible processes)⁷.

Towards the future

In 1997, the United States Presidential/Congress Commission on Risk Assessment and Risk Management published a document entitled *Framework for Health Risk Management*.

The importance of this document to proponents of risk communication was that the central element of the diagram illustrating the relationship of risk assessment and risk management was ‘engage stakeholders’. It discusses the need for better communication between regulators and the public and concludes that “The practice of risk communication is moving from trying to explain risk information to citizens toward building partnerships between plant managers and nearby residents, between companies and consumers, and between agency risk managers and the public. Although our air, water, and food are measurably cleaner and therefore less risky than they were 30 years ago, the fact that many citizens believe that they are at greater risk indicates that risk communication has a long way to go.”

In November 2002, the United Kingdom Cabinet Office published a document entitled *Risk: Improving Government’s capability to handle risk and uncertainty*. In it they refer to the importance of risk communication and note the following:

“Three specific concerns were raised in our study in relation to communication with the public about risks they face:

- communication needs to start earlier in the policy development and decision process, wherever possible when framing decisions are being made. A number of NGOs⁸ told us that they were frequently approached for comments on a narrowly defined solution to risk issues, rather than being involved early on in analysing the problem and the range of options available for tackling it;
- communication with the public on risks that affect them needs to be a genuinely two-way process. NGOs have suggested that a one-way approach to risk communication is more likely to increase public anxiety about risks than to provide reassurance; and
- involvement of the public in decisions about risks, both formal and informal, needs to be as widespread and balanced as possible. Stakeholders we spoke to suggested that, by restricting formal consultation to their usual list of contacts, Departments were more vulnerable to ‘group think’ and as a result key risks were sometimes missed. Similar concerns were voiced about informal soundings such as public attitude surveys, with one politician we spoke

⁷ This statement derives from Gough, 1991. It remains appropriate today.

⁸ Non Governmental Organisations

to suggesting that Departments sometimes confuse market research with genuine involvement in the decision process.”

The importance of these conclusions is not so much their content, which will be well recognised by people familiar with risk communication literature and practice, but that they are presented in high level government documents.

In the New Zealand context, the public participation elements of our environmental legislation (Resource Management Act 1991, Hazardous Substances and New Organisms Act, 1996, Civil Defence and Emergency Management Act, 2002) provide a legislative foundation for the development of better practice in communicating about risk issues. However, while there is an imperative for public participation, this does not necessarily translate to an imperative for risk communication in the broadest sense, and there is often a perceived as well as an actual power imbalance. Changes to the Local Government Act may help to empower communities, who will need tools to assist them in participating fully. At the same time (as identified in later chapters) organisations also require tools for both internal and external risk communication.

CAE is seeking to address some of these issues in a new project on risk communication. The goal of the project is –

To develop approaches and techniques for enabling risk communication suitable for New Zealand organisations, *by means of*

- An improved understanding of the psychology of risk taking and risk perceptions at an organisational level
- The development and promotion of a process within organisations for promoting a more general awareness and understanding of expectations regarding managing risk i.e. risk attitude
- The development and promotion of a process for assisting organisations to communicate risk to external stakeholders and interested parties both on a project basis and on a more general basis

It is important to note that the use of the term ‘approaches’ here includes notions of how, why, what, when, and why, so as to assist organisations to undertake ‘better’ communication about risks.

This book provides a good base for the project. In order for New Zealand to manage risks better, there needs to be an open discussion on what risk management can and cannot do, and how and where it should be applied. An excellent start would be greater recognition of the importance and value of risk communication and stakeholder contributions to decision making.

References

Feynman, R P, 1988. *What do you care what people think?*, Unwin.

Fischhoff, B, Slovic, P, and Lichtenstein, S, 1975. “Fault trees: sensitivity of

- estimated failure probabilities to problem representation”, *Journal of Experimental Psychology - Human Perception and Performance* 4 (2): 30-344.
- Fischhoff, B, Slovic, P, Lichtenstein, S, Read, S, and Combs, B, 1978. “How safe is safe enough?”, *Policy Sciences* 9: 126-152.
- Fischhoff, B, Slovic, P, and Lichtenstein, S, 1982. “Lay foibles and expert fables in judgements about risk”, *American Statistician* 36 (3): 240-255.
- Flynn, J, and Slovic, P, 1999. “Expert and public evaluations of technological risks: Searching for common ground”, *Risk Analysis* 19(2): 153-166.
- Gerrard, S, 1995. “Environmental risk management” In : O’Riordan, T. *Environmental Science for Environmental Management*. Longman Scientific and Technical, Singapore.
- Gough, J D, 1991. “Risk communication: the implications for risk management”, *Information Paper No. 33*. Centre for Resource Management, Lincoln University, New Zealand.
- Gough, J D, 2001. *Changes in Understanding, awareness and preparedness for natural hazard risk - Franz Josef Glacier*, Institute for Geological and Nuclear Sciences Science Report 2001/22.
- Kingsbury, P, 2000. Presentation to World Bank Tour on risk communication processes for flood control in Ashburton (*pers. comm.*)
- Kraus, N, Malmfors, T, and Slovic, P, 1992. “Intuitive toxicology: expert and lay judgments of chemical risks”, *Risk Analysis* 12(2): 215-252.
- Layfield, Sir Frank, 1987. *Sizewell B public inquiry report*, Her Majesty’s Stationery Office
- Lazo, J K, Kinnell, J C , and Fisher, A, 2000. “Expert and layperson perceptions of ecosystem risk”, *Risk Analysis* 20(2): 179-193.
- McSaveney, M, Davies, T, and Gough, J D, (1996): *Natural hazard assessment for Mt Cook/Aoraki Village and environs*, Unpublished report to the Mount Cook Village Development Steering Group, and the Department of Conservation.
- Moore, G, 1988. “Risk assessment — black art or science”, *IEE Review* 34 (4): 151-153.
- National Research Council, 1989. *Improving risk communication*, National Academy Press, Washington D.C.
- New Scientist, 2000. “Don’t keep secrets”, *New Scientist* Editorial, 18 March 2000, page 3.
- Renn, O, 1989. “Risk analysis: a need to communicate”, *Forum for Applied Research and Public Policy*, Summer 1989.

- Renn, O & Levine, D, 1991. "Trust and credibility in risk communication", In R. E. Kasperson & P. J. Stallen (Eds.) *Communicating risks to the public*, 175-218, Dordrecht, Kluwer.
- Slovic, P, 1987. "Perception of risk", *Science* 236: 280-285.
- Tversky, A, and Kahneman, D, 1982. "Judgement under uncertainty: heuristics and biases" In Kahneman, D., Slovic, P., and Tversky, A. *Judgement under uncertainty: heuristics and biases*, Cambridge University Press, Cambridge.
- Standards Australia and Standards New Zealand, 1995. AS/NZS 4360: 1995. *Risk Management*, Sydney and Wellington.
- Standards Australia and Standards New Zealand, 1999. AS/NZS 4360: 1999. *Risk Management*, Sydney and Wellington.
- Standards Australia and Standards New Zealand, 2000. HB-203: 2000. *Environmental Risk Management: principles and process*, Sydney and Wellington.
- Starr, C, 1969. "Social benefit versus technological risk", *Science* 165: 1232.
- United States Presidential/Congress Commission on Risk Assessment and Risk Management, 1997. *Framework for Environmental Health Risk Management. Presidential Commission*, Washington.
- United Kingdom Cabinet Office Strategic Unit, 2002. *Risk: Improving Government's capability to handle risk and uncertainty*, London.

Some further reading

- Chess, C, 1999. "A model of organizational responsiveness to stakeholders", *Risk: Health, Safety and Environment* 10(3): 257-265.
- Chess, C, Hance, B J and Sandman, P M, 1989. *Planning dialogue with communities: a risk communication workbook*, Environmental Communication Research Programme, Rutgers University, New Brunswick, New Jersey.
- Chess, C, Tamuz, M, Saville, A and Greenberg, M, 1992. "Reducing uncertainty and increasing credibility: the case of Sybron Chemicals Inc.", *Industrial Crisis Quarterly* 6: 55-70.
- Covello, V T, McCallum, D B and Pavlova, M T, (Eds). 1989. *Effective Risk Communication*, Plenum Press, New York.
- Fischhoff, B, 1995. "Risk perception and communication unplugged: twenty years of process", *Risk Analysis* 15 (2): 137-145.
- Jasanoff, S, 1993. "Bridging the two cultures of risk analysis", *Risk Analysis* 13 (2): 123-129.
- Lundgren, R E, McMakin, A, 1999. *Risk communication: a handbook for commu-*

nicating environmental, safety and health risks, Battelle Press.

Renn, O, 1998. "The role of risk communication and public dialogue for improving risk management", *Risk, Decision and Policy* 3: 5-30.

Rohrmann, B, 2000. "A socio-psychological model for analyzing risk communication processes", *Australasian J. of Disaster Studies*, 2000 (2).
[www.massey.ac.nz/~trauma/issues/2000-2/rohrmann.htm]

Rohrmann, B, 1996. "Perception and Evaluation of Risks: Findings for New Zealand and Cross-cultural Comparisons. *Information Paper No. 52*", Lincoln Ventures, Lincoln University, New Zealand.

Rohrmann, B and Renn, O, 2000. "Risk perception research: an introduction"
In: Renn, O. and Rohrmann, B. *Cross Cultural Risk Perception: a Survey of Empirical Studies*, Kluwer Academic Publishers, Dordrecht.

Slovic, P, Layman, M and Flynn, J H, 1991. "Lessons from Yucca Mountain",
Environment 33(3): 7-11.

Useful websites

Risk Communication in Print and on the Web: A Critical Guide to Manuals and Internet Resources on Risk Communication and Issues Management, Philip CR Gray and Peter M Wiedemann — www.fz-juelich.de/mut/rc/inhalt.html