Public Participation in Sustainability Science.

A Handbook

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Contents

CHAPTER ONE

Citizen participation in sustainability assessments

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The challenge

Perhaps the biggest challenge of our times is the task of achieving a transition to sustainability, a transition that will enable people around the world to live free from want and fear without compromising the ability of future generations to do so as well (Annan 2000). Research that supports such a transition can build upon first steps toward understanding nature–society interactions from two converging areas of study. The first area is work in environmental science, that has not only made substantial contributions toward our understanding of the natural world, but also has begun to include human causes and impacts of environmental change. The second area is work in economic, social, and development studies, that has started to go beyond purely societal issues and to incorporate environmental factors as well.

The emerging field of 'sustainability science' combines these two areas of study and uses these foundations for a better understanding of complex dynamic interactions between social, environmental, and economic issues. In order to be successful and robust, sustainability science needs to include methods and procedures for increasing public participation in its discussions and debates. In the current volume, we discuss why this is the case, and what such procedures for public participation in sustainability science could look like. We have used the issue of climate change and its relation to urban lifestyles as a case study to examine the possible roles of public participation in sustainability science.

While the beginnings of global climate policy were shaped by research results from the natural sciences, another phase has started with the development of the Kyoto Protocol to the UN Framework Convention on Climate Change (UNFCCC). Before Kyoto, results from the natural sciences were crucial in initiating a worldwide awareness of the problem of climate change as well as in encouraging the negotiation of the UNFCCC and Protocol. As discussions of the Kyoto Protocol have shown, the process of reducing greenhouse gas emissions will be slow and difficult.

In response to this situation, it will be necessary to design further institutions and mechanisms to respond to the climate change issue, the implications of which are gradually being explored. This phase is essential to build up the know-how and the trust relationships that are required to develop effective environmental policies on a global scale (Jaeger *et al.* 1997a; Social Learning Group 2001). However, this alone is clearly insufficient, if the problem of climate change is to be effectively addressed on a global scale. If an effective climate policy is to emerge, actions taking place at the level of international environmental diplomacy must be combined with actions involving various kinds of stakeholders. These stakeholders range from peasants to forest managers, from tourism operators to inhabitants of coastal zones, and from financial investors to ordinary citizens. Involving such a wide variety of the world's citizenry in debates on an issue as complex as climate change is a difficult challenge, and needs innovative participatory procedures.

This chapter discusses the overall approach of a major research initiative to address this challenge and to develop procedures that facilitate the participation of stakeholders – especially citizens – in integrated sustainability assessments. The special focus was on processes that allow interfaces between expert models of sustainability issues on the one hand, and lay participants in focus group discussions on the other hand. The procedures were tested in seven urban regions throughout Europe. Approximately 600 citizens participated in this process. The design of these 'IA Focus Groups' is discussed in detail in this chapter, together with an overview of main results.

To prepare this discussion, we will address briefly three topics in the remainder of this introductory section. First, the history of climate change debates. Second, the need for public participation in taking these debates further. And, finally, knowledge claims advanced by various scientific communities about the orders of magnitude involved in debates on climate change and sustainability.

A brief history of climate change debates

While individual scientists and groups had discussed the issue of climate change earlier, broader scientific interest as well as public attention concerning this issue increased in the late 1970s.[1] In 1970, the first Earth Day was held in the US, one of the largest demonstrations in human history. In the same year, the US Congress passed the Clean Air Act, and the

[1] We have used the excellent web-site www.puc.state.oh.us/consumer/gcc/chron.html as our main source for the following overview.

Environmental Protection Agency was created. Three years later, oil prices surged and worldwide fear of energy shortages emerged. The oil crisis of the time was a trigger for the largest global recession for many decades. Nuclear energy was proposed as the key energy source for the future by some, but met fierce opposition because of fear of the risks involved. In this setting, the risks of climate change were emphasized by proponents of nuclear energy – like Helmut Schmidt, the German chancellor at that time – as a key argument against further reliance on fossil fuels. Environmentalists countered not by denying the risks of climate change, but by stressing the need for a different energy future, based on increased energy efficiency and the use of solar and other renewable sources of commercial energy. While disagreement about energy policy loomed large, agreement about the seriousness of climatic risks was rapidly established. In 1979, the United Nations' World Meteorological Organization (WMO) sponsored the First World Climate Change Conference in Geneva. In the same year, the British scientific journal *Nature* claimed: "The release of carbon dioxide to the atmosphere by the burning of fossil fuels is, conceivably, the most important environmental issue in the world today."

At that time, there was no direct evidence of human-induced climate change. Rather, a long-lasting scientific effort had made humankind aware of an unprecedented global risk. That effort started nearly 200 years ago. In 1827, the French mathematician Jean-Baptiste Fourier outlined a process by which solar energy is captured by the Earth's atmosphere, thus raising the planet's temperature. He suggested the term 'greenhouse effect' for this phenomenon as an imperfect, but graphic analogy to the way glass windows allow for the warming of the inside of a greenhouse. In the 1890s, Svante Arrhenius, a Swedish chemist, predicted that a doubling of atmospheric carbon dioxide due to burning of fossil fuels would lead to a worldwide warming on the order of 5° Celsius. Complex as the fast dynamics of weather events and the slower dynamics of climatic processes are, he could only make a very coarse model. In the 1950s, computers could be used to start modeling the climate system in much greater detail. Up to the present day, these models have shown that Arrhenius' basic finding is remarkably robust.

In 1957 Charles Keeling, a postdoctoral student at the California Institute of Technology, initiated the longest continuous series of detailed atmospheric measurements in modern history. He established monitoring stations on Mauna Loa in Hawaii and at the South Pole to sample the concentration of carbon dioxide in the atmosphere. Meanwhile, the steady increase of that concentration has been established beyond doubt. Sophisticated measurement networks have been established, many of

them over the past decades, to measure temperature, precipitation, and other meteorological variables worldwide at regular intervals. In 1987 a team of Soviet and French scientists took an ice core 2,000 meters deep at Vostok in the Antarctic. Other teams probed the ice in the Arctic. By analyzing air bubbles trapped in the ice, they were able to estimate atmospheric composition and temperature over a period of about 160,000 years. By 1990, it was clear that in the 1980s the Earth's annual average temperature was higher than for any decade in the twentieth century, and as far as one can tell for any decade since at least 1,000 years. The 1990s were warmer still: the seven globally warmest years recorded in modern history have occurred in the 1990s, including the year 2000.

In 1988, the Governing Council of the United Nations Environment Program (UNEP) established, together with the WMO, an intergovernmental body to review ongoing studies of climate change. This organization, the Intergovernmental Panel on Climate Change (IPCC), is now the most important single agency dealing with climate change on an international level (www.ipcc.ch). The huge number of findings collected by IPCC clearly indicate that climate change involves serious risks. Global warming is likely to raise sea level through thermal expansion of ocean water and melting glaciers and portions of the Greenland Ice Sheet. It is also likely to change precipitation patterns, leading to more severe and more frequent extreme weather events – including floods and droughts – in many regions. How likely these and other events will be is hard to tell, and assessing their severity in economic, aesthetic, and moral terms is even harder.

To decide which actions to take, and which actions to stop, in the face of such risks is impossible without a wealth of scientific findings. However, to take these decisions, scientific information must be combined with arguments and judgments that draw on other sources, ranging from common sense to the experience of different cultural traditions as well as different human individuals. Designing ways to foster such integration is the focus of the present book.

Public participation is essential

The main goal of the research discussed in this book, much of which was based on work conducted in the ULYSSES project (see Acknowledgements), was to explore procedures for citizen participation (see Kasemir *et al.* 2000; Schüle 2001). Involving citizens in climate policy debates is necessary, because successful implementation of climate mitigation measures will require consumer, worker, and citizen consent (see Kempton 1991; and also Löfstedt 1992). Without integrating the points of view of

citizens, environmental policy runs the risk of getting stalled early in the implementation phase. Climate policies that are consistent with the visions, beliefs, and aspirations of citizens will have more chance of success in the twenty-first century than policies imposed without consideration of citizen opinion.

However, the role of the public in decision-making on sustainability issues depends very much on whether, in principle, science can articulate a comprehensive, complete and unique description of the issues at stake. If this were the case, the main question about the public would be whether it had understood the scientific information properly, and if not, how it could be educated. But if such a complete and unique overview of the problems themselves and their interrelations with other issues on the decision-makers' agendas is not possible, then the public can and should play a more active role. The way that the public understands and defines the issues then becomes a complementary input to the scientific assessment and ultimately the policy-making process. In such cases of multiple legitimate descriptions of the decision-making issues at stake, the role of science changes. Scientists are then expected to provide a variety of plausible assessments regarding different courses of action, and thus to support rather than to settle an informed and pluralistic public debate.

Global change and sustainability are complex issues. While the term 'complexity' has been used with many different connotations (Shackley, Wynne, and Waterton 1996), we will use it here specifically to denote systems or situations for which there are inherently multiple legitimate descriptions. This has been described as the essence of complexity e.g. by Rosen (1977) and Casti (1986). Along these lines, it has been argued, for example, that the climate problem cannot be adequately understood on the basis of any one unique description (Pahl-Wostl *et al.* 1998). Funtowicz and Ravetz (1994a) have distinguished between ordinary and emergent complexity. In emergent complex systems "at least some of the elements of the system possess individuality, along with some degree of intentionality, consciousness, foresight, purpose, symbolic representations and morality." Global change, where people in different situations and different cultures are a central part of the equation, is certainly an emergent complex system in this sense.

Given the complex nature of democratic decision-making, together with the complex nature of global change, the simple pattern of science supporting policy-making in the mode described by the familiar aphorism of "speaking truth to power" would not be fruitful here. While a continuing dialogue between science and policy will remain essential (Moss 1995), it will have to be complemented by the involvement of wider

stakeholder groups. A lot of research has been carried out discussing the relationships between science, decision-makers, and the public at large (see, for example, Jasanoff 1990; Jasanoff *et al.* 1995). Especially regarding assessments of global change from a regional perspective, the need to integrate stakeholder views has been stressed in recent research (see, for example, the discussions by Yin and Cohen 1994, concerning the Mackenzie Basin; by Magalhaes 1998, concerning Northeast Brazil; and by Cebon *et al.* 1998, concerning the Alps). The increased need for enhanced stakeholder interactions implies a growing need for integrating social science research (see Shackley and Skodvin 1995), and, in particular, participatory techniques, into research on sustainability.

The input that social science can provide is needed to gain knowledge about stakeholders and their ways of opinion formation, and also to create opportunities for including the knowledge of stakeholders and their judgments about controversial issues in the policy-making process. Integrating participatory techniques from the social sciences is especially promising for sustainability research that uses methods of Integrated Assessment (IA). IA research is characterized by focusing on integrated pictures of complex decision situations, rather than on highly detailed but not integrated pieces of knowledge (for more on Integrated Assessment concepts, see Weyant *et al.* 1996; Rotmans and van Asselt 1996; Tol and Vellinga 1998). Traditionally, IA research has mainly focused on the development of integrated computer models. But as IA aims to provide more comprehensive decision support to policy-makers than can be achieved with traditional disciplinary research, participatory procedures from the social sciences would fit well into this overall approach. Indeed, while the participatory dimension of IA – especially with regard to citizen involvement – is still somewhat underresearched, there is great interest on the part of the IA research community in developing techniques of participatory IA (Jäger 1998; Toth and Hizsnyik 1998; Schneider 1997).

What are the implications for IAs if the aim is to provide decision support in the context of democratic decision-making, where there is a network of interacting decision-makers who are accountable to the public at large? This question is especially pertinent for issues of sustainability, which may well be what Gallie (1956) called an "essentially contested concept" (see Kasemir *et al.* 1999b). Essentially contested concepts enable different parties to engage in a shared conversation about some controversial issue by providing adequate focus as well as sufficient ambiguity to fuel interesting and fruitful debates. While it may be important to acknowledge the creative potential of ambiguity, however, no debate about sustainability will make much sense without taking into account the knowledge claims advanced by various scientific

communities. We will consider briefly some of these claims in the context of climate change in order to prepare our discussion of procedures for involving stakeholders in IAs of complex sustainability issues.

Science suggests major challenges for climate policy

Currently, humankind is using commercially supplied energy at a rate of about 2,000 watts per capita (see Imboden and Jaeger 1999, for a more detailed discussion).[2] The burning of fossil fuel, coal, oil, and natural gas, contributes to more than 90 per cent of the total energy used today. Presently, this leads to annual emissions worldwide of on average about 4 tons of carbon dioxide per capita. This is much more than the oceans and terrestrial systems can absorb from the atmosphere. Therefore, atmospheric carbon dioxide concentrations are rising. This rise in carbon dioxide in the atmosphere is a major contributor to increasing risks of potentially catastrophic changes in the world's climate. Energy use per capita varies from about 500 watts in Africa to approximately 1,000 watts in Asia, 5,000 watts in Europe and about 10,000 watts in North America. Energy use may or may not increase further in industrialized countries in the coming decades, but as developing countries strive to overcome misery and to emulate the lifestyles of industrialized countries, the global average of energy consumption per capita could potentially double in the next five decades. In the same period, global human population might increase by 50 per cent as well. As a result, global energy use would increase by a factor of three between now and 2050.

These figures are important because they convey the orders of magnitude involved in the sustainability debate. If one wants to substantially reduce carbon emissions, even combinations of several measures must involve truly massive efforts. Suppose four options are combined so that each one of them could reduce today's global carbon emissions by 50 per cent. Such a scenario could include the dedication of one quarter of today's total agricultural land to crop fuel production, the complete sequestration of carbon from half of today's fossil fuel production, and two more options of similar size. If total energy use increases by a factor of three, these options would stabilize today's emission level, but would not reduce it! It is quite obvious, then, that reducing emissions will have to include strategies to limit overall energy consumption, and will have to involve very substantial changes in the global energy system and infrastructure.

[2] One watt corresponds to using 1 joule of energy per second. Watt measures the rate of energy use much like an indication of kilometers per hour measures the speed of some movement.

Central to the debate is that these changes will certainly affect technologies, as well as lifestyles and the economic welfare of various parties. However, if emissions are not reduced, we must face the potential of severe risks of climate change such as sea level rise, desertification, or changes in the functioning of the Gulf Stream. Neither options for emissions reductions nor the risks of climate change or measures to adapt to such change can be identified without the expertise of the scientific community. Like debates on other issues of sustainability as, for example, increasing water scarcity or loss of biodiversity, meaningful debates on climate strategies require major inputs from scientific research.

Of course, any serious discussion of climate policy options requires some assessment of the potential costs and benefits involved for different parties. The qualification "for different parties" is essential here, and immediately points to a further difficulty. The ways in which sustainability issues affect a multitude of different parties cannot be dealt with adequately by any decision framework involving just one decision-maker (Jaeger *et al.* 1998). Nor can the relevant interactions of many decision-makers be handled simply by market mechanisms, as one of the basic problems in sustainability issues is whether and how existing markets should be modified or new ones brought into existence. Not even the well-known formula that markets should be supplemented by government measures in such a way as to internalize external effects offers a simple solution. The options that should be considered are often characterized by bifurcation points at which their development may take one of several very different trajectories (Hourcade 1993). As a result, at critical junctures external effects do not have well-defined magnitudes that could be used as obvious yardsticks for policy-making.

Under such conditions, the success of long-term strategies to deal with sustainability issues depends on multilateral negotiations between different stakeholder groups. In this process, "policy-makers" will not so much make decisions in splendid isolation but rather take on the role of facilitators between different interest groups (Beck 1994). This is part of a larger process of the changing roles of actors within today's societies, involving increasingly informal networks based on trust (for these changing roles of actors in society see, for example, the work by Fukuyama (1996; 1999), concerning the importance of informal networks based on trust, and the work by Beck (1994), on the changing role of state representatives). In relation to complex environmental problems, policy-makers especially need to find ways to deal with the extremes of a "technocratic" policy design, based on scientific results gained independently of wider public debates, and a "populist" policy design, enforcing policy choices without trying to legitimate them with rational arguments. Public participation

in sustainability science can help to overcome this impasse by combining the rationality of expert models with the rationality of social discourses.

A procedure for stakeholder participation

In order to facilitate stakeholder participation in integrated assessments of sustainability issues, the researchers engaged in the ULYSSES project developed a methodology based on informed group discussions. While many terms (including Citizen Panels, IA Focus Groups, and In-depth Groups) can be used to describe this methodology and to emphasize specific facets of it, in the present chapter we use the label "IA Focus Groups" to designate an approach that comes in many variants, and which can be tailored to novel circumstances and applications. The point of our research was to show that citizen participation in assessments of complex sustainability issues is feasible, and to outline a procedure for achieving this.

While IA has become a common methodology in climate change research and other environmental studies (Jaeger 1998), up to now the tools used have usually been restricted to computer models and expert panels. In IA Focus groups, these tools are complemented with group discussions with various stakeholders, including ordinary citizens. The participatory techniques used in this procedure build on the focus group method (see Morgan and Krueger 1998a). Doble (1995) described a related process that draws upon elements of focus group methods and of opinion polling on complex environmental issues. Kasemir *et al.* (1999b) have discussed the concept of IA Focus Groups, which combine focus group techniques with the use of IA computer models, and first results from IA Focus Groups in connection with the hypothesis of "reflexive modernization" are given by Jaeger *et al.* (1999).

In the following we first give an overview of some major traditions in understanding the foundations of stakeholder dialogues. We then discuss why we have chosen focus group methods, in particular, as the basis of participatory procedures with citizens presented in this volume. And finally, we discuss the general format of these 'IA Focus Groups', as well as an example for a detailed process design.

Is there a theory of stakeholder dialogues?

In many quarters, there is an increasing need for stakeholder dialogues involving both laypersons and scientific experts. The present book develops know-how for such dialogues. What are key theoretical ingredients of that know-how? This question allows for more than one answer – as is perhaps

appropriate for a reflection on dialogues (for an in-depth discussion of the theoretical issues involved in deliberations between experts and laypersons, see Jaeger *et al.* 2001). Here, we will discuss four possible answers to the question about the theoretical background for understanding such dialogues.

Dialogue as bargaining

First, stakeholder dialogues are often looked at as negotiations along the lines of game theory (Osborne and Rubinstein 1994). A powerful approach along these lines has been proposed by Susskind and Field (1996). The theoretical framework of this kind of approach can be sketched as follows. Different agents with different interests, beliefs, values, and knowledge meet and try to reach their goals in the setting of a shared conversation. They may hide or disclose information, provide incentives for or against certain actions, and perform speech acts – promises, offenses, reconciliations, etc. – in line with whatever strategies they pursue.

The conversation then may or may not reach some equilibrium between the different interests in play. In this setting, an equilibrium is defined as a Nash equilibrium, i.e. a situation where no player can improve her or his situation unilaterally. Of course, even if the system is in equilibrium, some individual may prefer a different state, but that individual has no means of reaching it. What is worse, there may even be reason to collectively prefer a state that is no equilibrium at all – but by definition this state cannot be stabilized. Such is the well-known situation of a social dilemma, to which we will return below.

If there is a unique obvious equilibrium, there is little point in running a conversation. The different agents will quickly realize that there is one best way for all of them. Some may not be particularly happy about it, but they will know that there is no better option. Unlikely as such a situation may be, it is still worth exploring. A unique equilibrium can be framed in terms of a cost-benefit analysis for the different agents: For each one of them, the advantages of moving away from equilibrium are offset by the disadvantages of the same move. Advantages and disadvantages need not be expressed in monetary terms, it suffices to use some index that relates them to the preferences of the various agents. The larger the move away from equilibrium, the larger the net cost of the move. These circumstances allow the aggregation of the individual cost-benefit schedules with some arbitrary set of weights – the situation can be analyzed as if a single collective agent were maximizing its overall utility. The straightforward rhetoric of the common good is perfectly appropriate here.

If there is a unique equilibrium that is far from obvious, a conversation may be an effective procedure to discover it. Often, there may be a

need to feed expert knowledge into the conversation so as to make sure important information is not ignored. The rhetoric of the common good is still appropriate, and cost-benefit analysis provides a useful scheme of analysis. This is probably the situation most often taken for granted by decision-makers, at least in the way they justify their decisions. There is a single best choice for the collectivity on whose behalf the decision-maker is taking decisions, and of course she or he is striving for precisely that choice. However, in such situations a stakeholder dialogue has its drawbacks, too. It is cumbersome, may cost a lot of time, attention, and other resources, and it may be distorted by group thinking and irrational mechanisms. Therefore, some combination of expert knowledge with leadership by decision-makers may well be a superior procedure, not just from the point of view of the decision-makers themselves, but also from the point of view of the collectivity – a political community, a business firm, or whatever – involved.

The most important case, however, is the situation where more than one equilibrium is accessible. Now the question is not only how to reach an equilibrium, but what equilibrium to select. The famous issue of cooperation versus defection is a case in point. A married couple may be able to each earn $50,000 a year if they coordinate their professional lives. If one of them is reckless in pursuing his or her career while the other partner tries to adjust, they may earn $60,000 and $30,000, respectively. If both are reckless, however, they may end up with each earning $40,000. If individual greed is their main motive, they will end with the last situation and miss the superior outcome of the first one. And clearly things may be more complicated due to asymmetries, further options, additional players, etc. In a social dilemma of this sort – with preferences of different actors untainted by any form of solidarity – cooperation is not feasible, and all that remains is the urge to reflect on this sad state of affairs, much as in the face of a Greek tragedy.

But then even tragedies may inspire one to discover options that might have saved the characters in the play had they not ignored them. A social dilemma may turn out to be part of a larger game that was hidden in the beginning. There may be moves to avoid the weird equilibrium of the prisoners of self-interest and to form the trust required for a cooperative solution. Conversation then may work as a mechanism for equilibrium selection. Of course, one could also cast a dice or choose some other mechanism, and sometimes this will in fact be quite reasonable. Nevertheless, conversations provide opportunities to develop trust and mutual understanding. This in turn may be needed to embark on the journey from a given equilibrium toward another one with more attractive features.

Dialogue as understanding

The emphasis on trust and understanding actually marks the transition to the second answer concerning theoretical knowledge about stakeholder dialogues. In fact, one may see a conversation not only as a negotiation process but also as an exchange of arguments that enables people to reach a consensus both on factual and normative issues. Such is the ambitious program of Habermas (1981); for a recent application to public participation see Palerm (2000). In stakeholder dialogues, the weights between the two poles of factual and normative issues may vary, but there is little doubt that both are present.

The debate about global warming, for example, has led not only to shaky compromises about a couple of political issues, but also to a remarkable consensus shared by large scientific communities, networks of policy-makers, media operators, and larger publics. Of course, there are important open questions, and moreover, consensus need not protect from error. Nevertheless, this debate is an interesting example of a complex process of social learning in a rich fabric of oral and written conversations. And keep in mind that there is a consensus not only on some key facts and mechanisms, but also on important normative issues, like the responsibility of present generations for damage they may be causing in the future. Clearly, a normative consensus cannot be based on scientific insights alone, but then it is also often impossible without taking such insights into account. That is exactly the point of a conversation involving both scientific experts and laypersons.

Stakeholder dialogues can hardly produce compelling proof of any specific claim. Consensus emerges, if at all, through a subtle interaction between received views and specific criticisms based on new evidence or concepts. And while there is no recipe for managing a conversation that will lead to consensus, let alone to "truth," guidelines that have proved useful in practice can be indicated. The present book certainly proposes some such guidelines, for example, with the method of IA Focus Groups. But while the purists of rational debate may look for guidelines of idealized conversations so as to have a yardstick for assessing the much less perfect conversations of real life, here we are interested in procedures that are operational even under the often quite unsatisfactory conditions of practical problem solving. Such procedures might even be able to mitigate some of the imperfect conditions.

This pragmatic approach represents a compromise – or perhaps a problem-focused synthesis – not only between the two approaches discussed so far, but also between these and the two next ones. Just as the view of conversation as a shared search for reasonable consensus implies a criticism of the representation of conversations as pure bargaining, so

the next approach is highly critical of the "idealistic" flavor of images presenting conversations as a rational pursuit of truth. This image is taken to task for neglecting and even hiding the role of power and domination in actual conversations between scientific experts and laypersons.

Dialogue as domination

The third answer to our question, then, is based on a critical analysis of the authority of science in modern society. For a philosophical discussion of related issues see Kelly (1994); for an example of how to use a critical awareness of power relations in empirical studies dealing with public participation see De Marchi *et al.* (2000).

According to this kind of analysis, the authority of science is geared to an alliance between scientific communities and nation states, an alliance that displaced the one between religions and empires in earlier times. Science, as we know it, is financed mainly from taxes, while giving amazing autonomy to the scientific community in allocating these resoures. From the point of view of the most powerful governments actually running world-class scientific systems, a main return on this investment is military technology. A second return is the existence of a body of professionals with sophisticated training in fields ranging from engineering to medicine, the law, and many others. Governments expect a third return in the form of competitive advantages for their national economies.

Since the development of the atomic bomb, the alliance between governments and science has been increasingly exposed to critical scrutiny. The debate about nuclear energy has made all parties involved much more sensitive to issues of trust that cannot be handled simply by invoking the authority of science and backing it with the authority of the state. Meanwhile, these trust issues have become prominent in a wide array of controversies about various kinds of risks, ranging from toxic waste to genetically modified organisms, from medical treatments to economic policy in a globalized setting. It is precisely these issues that have generated the increasing need for stakeholder dialogues involving both scientific experts and laypersons, ranging from powerful decision-makers to ordinary citizens.

When engaging with such a critical view of the science–state relation, we are faced with an ocean of problems that is extremely difficult to navigate. The attempt to disentangle the intricate and sometimes questionable links between science and power has led more than one author to assume a pretty irrational stance, sometimes tempered by a Socratian sense of irony and compassion, sometimes rather less so. If one were to wait for a satisfactory analysis of the relations between science and power

in order to design workable schemes of public participation, one might have to wait for a long time.

Fortunately, another approach is feasible. Exercises in public participation, stakeholder dialogues, etc., may well be essential tools for an inquiry into the actual relations between science and power as well as into their possible future evolution. Therefore, it is not only justifiable, but even necessary, to engage in such exercises well before the theoretical issues involved have been fully clarified. By so doing, stakeholder dialogues become a form of scientific inquiry in their own right, and one that promises discoveries concerning some of the most fascinating unresolved issues in social theory, like the relations between arguments and incentives, knowledge and power, facts and values. This is the approach that we advocate here, and if the proof of this pudding lies in the eating, then we can say that we have eaten it and found it to be tasty.

Dialogue as common sense

As for the fourth answer, one may make a case for the view that there is simply no need for scientific theories here. Wittgenstein (1958) still provides one of the most inspiring warnings against the belief that human knowledge – and especially knowledge about humans – becomes truly reliable only when it takes the shape of a scientific theory. Perhaps this warning provides good guidance when looking at the huge body of practical experience synthesized in the management literature dealing with the importance of discourse for organizations (a case in point is Senge 1990).

In many ways, stakeholder dialogue is more an art than a technology. To be a great playwright takes many capabilities and a lot of training, but hardly a scientific theory. And even technologies sometimes are based more on experience and singular creative insights than on theories. Actually, a stakeholder dialogue between scientists and laypersons may suffer if it is shaped by scientific theories because equality between these two parties may then be tilted in favor of the former.

It seems odd to engage in a sophisticated technical argument in favor of such a view. To the extent to which it is appropriate, this must show in the fruitfulness of using common sense and ordinary language in running stakeholder dialogues, not in developing some arcane metalanguage to justify such use. And yes, a careful look at most, perhaps all stakeholder dialogues confirms what is known from human life in any case: wisdom, character, humor, and compassion matter, and so does a rich record of personal experiences with various dialogues. It would be foolish to expect any scientific theory to substitute for these, and even if it were feasible, that might well be a huge loss rather than a gain. The real question is

whether in practice such virtues are impaired or enhanced by scientific theories.

While the fourth answer has not just its merits, but actually an indispensable and vital role to play in any serious attempt to think about stakeholder dialogues, it can be overstated in two ways. On the one hand, there are various attempts to top the sophistication of existing scientific languages with a jargon that is accessible only to the "cognoscenti." This is rarely helpful, as it tends to aggravate the lack of understanding between various parties involved in a stakeholder dialogue. The limits of specialized reasoning by scientific disciplines can be drawn in ordinary language rooted in real-life situations, but not in a specialized language designed for the business of criticizing specialization, scientific or otherwise. On the other hand, drawing such limits makes sense only if enough space is left within the fences for the wonderful gardens of scientific inquiry. Claims that stakeholder dialogue is just something for practitioners, with no need or scope for scientific inquiry and theoretical arguments, miss the potential of professional support in the face of a challenging task.

Dialogue

The three theory-driven answers that we have discussed above provide more than general philosophical framings for thinking about stakeholder dialogues. Even if their lineage goes back to thinkers such as Hobbes (for the game-theoretical approach), Kant (for the role of arguments in discourse), and through a critical turn even Plato (for the relation between truth and power), each approach has generated empirical research of considerable practical relevance. Anybody running stakeholder dialogues ignores the know-how generated by such research at her or his own peril, just as does anybody who ignores the indispensability of a know-how rooted in everyday life rather than in scientific studies. While Wittgenstein's restoration of common sense is indispensable for handling tensions between these traditions, it must not be misconstrued as the refusal of scientific insights in the dynamics of human conversations.

Therefore, we advocate a careful combination of approaches that have developed by criticizing each other. We propose a practice of stakeholder dialogue embedded in a larger inquiry, taking advantage of existing knowledge and addressing open questions so as to generate new knowledge. How do arguments about the appropriateness of norms work in a culture that tends to treat rationality as dealing with facts, not norms? How do science and power interact in a historical situation where their alliance is increasingly questioned? How does human reason deal with uncertainties generated by scientific inquiries that promised certainties in the first place? These are examples of research questions that can be

fruitfully addressed by designing, implementing, and analyzing stakeholder dialogues.

One more example: how does a dialogue between two juxtaposed voices differ from a polylogue that is open toward a potentially infinite variety of voices (Kristeva 1977)? The philosopher and the king, science and policy, Romeo and Juliet, Faust and Mephisto are reminiscent of the dualistic mode. The interplay between aesthetic patterns in Giotto's "Campanile," the polyphony of voices in Bach's "Musical Offering," the interlinkage of events and personalities in Tolstoi's *War and Peace*, the interactions between the "founding brothers" shaping the foundations of the American republic (Ellis 2000) transcend it. We do not propose a shallow compromise that ignores the contradictions between incompatible theoretical outlooks. We advocate a debate that gives space to the various approaches so as to enable them to learn from each other – much as a well-designed stakeholder dialogue is supposed to do.

Why use focus groups in participatory IA?

In the stakeholder dialogues discussed in this volume, participatory techniques for IA were mainly based on further refinements of the focus group methodology. Why have we chosen focus groups as a starting point for participatory procedures in IA?

Focus groups are a research tool that has been used for more than fifty years (Merton and Kendall 1946; Merton 1987). They have been widely used in marketing research and applied social sciences, including evaluation research (Krueger 1988), communications and organizational research (Byers and Wilcox 1991), media research (Conner, Richardson, and Fenton 1991) and decision research (Stewart and Shamdasani 1990). However, it is only recently that focus groups are receiving increasing attention as a means to obtain qualitative data in an interactive context (Goss and Leinbach 1996).

The term 'focus group' derives its roots from a combination of two standard social scientific research methods.[3] First, the focused interview, in which an interviewer elicits information on a topic without the use of a fixed questionnaire guide. And second, the group discussion, in which a possibly heterogeneous, but carefully selected group of people discuss a series of particular questions raised by a skilled moderator. A focus group can meet once or several times. The group is provided with a common input and the reaction of the group to this input is explored. A focus

[3] The discussion of the focus group methodology in this section is based on the methodology review given by Dürrenberger *et al*. (1997).

group can thus be described as a guided group discussion where a limited number of persons focus their attention on a specific topic.

Results of a single focus group may be biased, for example due to the specific people involved, perhaps some dominant individuals, or the moderation style. This implies that a series of focus groups should always be conducted in order to get reliable results. Data gathering is generally done by means of written notes, video taping, questionnaires and different types of output produced by the group. Data analysis techniques range from brief summaries with selected quotes to detailed coding of full transcripts. As qualitative data are subject to hermeneutic interpretations, more than one researcher should iteratively analyze the focus group output in order to produce robust results.

Why are focus groups an interesting basis for participatory methods in IA? The advantage of focus groups compared to individual interviews is that focus groups intrinsically exhibit social dynamics that allow for interactions between multiple perspectives, instead of just compiling different perspectives by individual questionnaires or interviews. Furthermore, an interesting feature of focus groups, in contrast to ordinary group discussions, is that purposive information on a focal issue (e.g., written documents and/or product demonstrations in the case of marketing applications) is given as stimulus to the participants. The aim of focus group discussions is then to elucidate relevant perceptions, attitudes, values, and behaviors of both the individual participants and of the group as a whole.

However, conventional focus group techniques are not sufficient to provide input for IAs of the complex issues related to sustainability. For this reason, the ULYSSES researchers adapted these techniques in several ways. The adaptations include the use of a longer and more structured discussion process than in conventional focus groups. This allows the participants to express their spontaneous associations (e.g., in collage work), and to access current research findings (usually by the use of computer models in the focus groups), before the group summarizes their views on the focal topic. The resulting focus groups were called IA Focus Groups to distinguish them from other types.

Because the principal purpose of the research discussed here was to study views that emerged in discussions between different types of participants (thought to be more indicative of public opinion dynamics than a study of the views of isolated segments of the population), it was important that the IA Focus Groups were diverse with respect to age, gender, income, educational level, and attitudes toward the environment. To that end, the potential participants were carefully screened, with quotas established for manual workers and college graduates; those who felt that

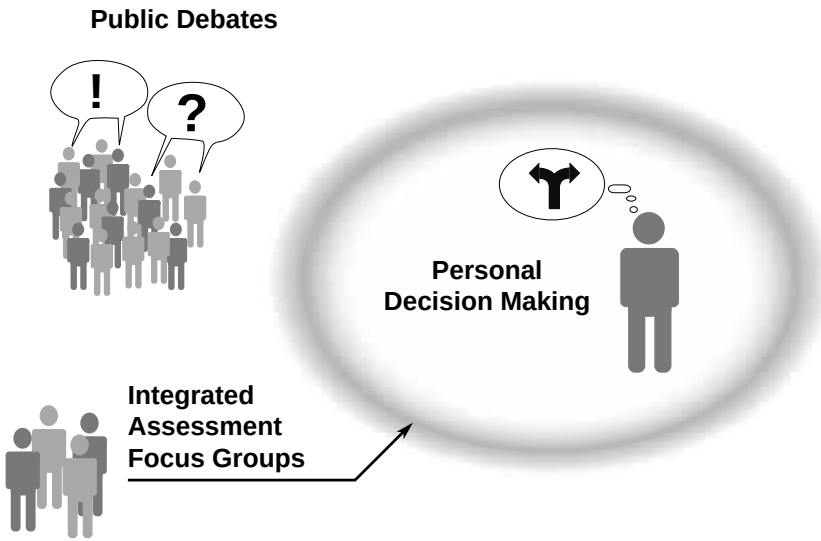

Figure 1.1 IA Focus Groups at the border between private decision-making and public debates

environmental problems were important and those who did not; and those who favored environmental regulation and those who did not.

A crucial feature of IA Focus Groups is that they explore the border between private decision-making and public debates (Figure 1.1). While the physical setting is more typical of a private conversation (a small group of people sit around a table and respond to each other's remarks), the topics introduced by the moderator and the overall group situation (people who have not met before and who may or may not produce common conclusions) belongs more to the realm of public debate. Because ordinary people tend to make up their minds about climate change (and, in fact, on most environmental issues) at the interface between their private lives and public debates, such participatory procedures that are built upon focus group techniques may be especially promising here. Understanding the private/public interface is essential for interpreting the results of IA Focus Groups. In decision theory as in micro-economics, the standard assumption is that any decision-maker, be it an individual, a household, or an organization, can be characterized by a set of stable preferences (Kreps 1988; Kleindorfer, Kunreuther, and Schoemaker 1993). These preferences cover the range of possible options in such a way as to enable the decision maker to order all of them so that any two alternatives are

either indifferent or ranked according to preference. Useful as this default assumption turns out to be in many cases, it is insufficient to deal with the specific human ability to reflect on one's preferences and to try to change them – as may be the case with somebody who decides to change her or his eating habits. Moreover, it is also insufficient to deal with the case where a person or organization displays different preferences in different situations – as when different social roles come with different preference orderings. Both problems are highly relevant for sustainability issues. The lifestyles of people may be at stake, and a need to critically examine one's present preferences may well arise. Moreover, the role of citizens, which is relevant for policy decisions, may involve other preferences than the role, say, of consumers, which is obviously relevant for sustainability issues too.

IA Focus Groups are not designed to elicit consumer preferences – these are studied much more fruitfully by observing actual consumer behavior. Where new products are to be investigated, conventional focus groups may be a useful complement to the investigation of such behavior. IA Focus Groups, however, are designed to observe citizen preferences in a dynamic setting. This means that preferences may be expressed, criticized, and/or revised in the course of the conversation. It also means that the relevant preferences do not necessarily apply to individual consumption decisions, but rather to collective policy decisions. Such collective decisions can be understood to be at the heart of climate and sustainability problems:

> Reducing carbon dioxide and taking further steps to curtail global warming will require collective action and institutional change (both intra- and internationally) and are unlikely to result primarily from people changing their consumption patterns on an individual basis. Indeed, one could argue that public support for environmental regulation and incentives, and for politicians who will implement them, is far more essential than voluntary change in individual consumer behaviors when it comes to achieving a global-level "public good" like a (reasonably) stable climate. (Dunlap 1998)

Given a certain infrastructure and a certain pattern of monetary and other incentives, individual consumers may currently choose to use energy at a rate of 5,000 watts and more. As citizens, the same individuals may support policies that would enable them to consume much less energy in the future. Such behavior is not a sign of irrationality, it is an expression of human reflexivity in a complex society. IA Focus Groups are designed to stimulate this reflexivity.

A subtle understanding of preferences and their dynamics is especially relevant when it comes to decision-making under uncertainty. IA Focus Groups enable stakeholders to make up their minds about major choices that will have to be made on uncertain issues like global change in the light of scientific information. They also enable researchers to learn what preferences, including subjective probabilities, come into play in this process, and how such preferences are shaped by social interactions with scientific expertise and with other stakeholders.

General format of IA Focus Groups

IA Focus Groups are further developments of focus group techniques that allow lay participants to interact with expert inputs, for example, information on environmental change. This input is usually in the form of computer models. However, there is a fine line to be aware of in designing such procedures. On the one hand, if the process is dominated too heavily by expert input, participation becomes more symbolic than real. On the other hand, if expert input is not adequately integrated, the point of facilitating interfaces between expert and lay perspectives is missed and the result is more of a usual focus group process that assesses, for example, environmental attitudes. In order to keep a balance between these two extremes, for any issue to be debated, participants should be given the opportunity to express and share their initial knowledge and views before any expert input is provided. The debates should not be limited to the information provided by the facilitators, but discussions of diverse viewpoints should enable a shared learning experience.

In the IA Focus Group procedure discussed here, this concept of allowing for more open discussion before providing expert input was followed in the overall design. Indeed, there were three distinct phases to these focus groups (see Box 1.1).

Each group consisted of approximately six to eight citizens (while overall approximately 600 citizens participated in the study reported here). The citizens were invited to the meetings on the basis of recruitment criteria. The recruitment procedure ensured a heterogeneous mix of participants not only with regard to social stratification but also with regard to different environmental attitudes, and furthermore prevented the participating citizens from holding an unusually high level of expert/scientific knowledge about the issue before participating in the group debates. Most groups met for five sessions of approximately 2.5 hours per session, or for an equivalent amount of discussion time organized in fewer sessions. A moderator facilitated the group discussions, which focused on climate and energy issues and on possible or desirable urban developments in