International Institute for
Applied Systems Analysis
Schlossplatz 1
A-2361 Laxenburg, Austria

Tel: +43 2236 807 342
Fax: +43 2236 71313
E-mail: publications@iiasa.ac.at
Web: www.iiasa.ac.at

Interim Report IR-01-014

A Survey on the Methodology of Participatory Integrated Assessment

Marleen van de Kerkhof (marleen.van.de.kerkhof@ivm.vu.nl)

Approved by

Joanne Linnerooth-Bayer (bayer@iiasa.ac.at)
Leader, Risk, Modeling and Society Project

April, 2001

Contents

Abstract

A methodology that has received increasing attention in recent years is Integrated Assessment (IA). IA can loosely be defined as a multi- or interdisciplinary process of structuring various knowledge elements in such a manner that all relevant aspects of a problem are considered in their mutual coherence, for the benefit of decision-making.

The notion of participation as a central element of Integrated Assessment is gaining wider recognition. This so-called Participatory Integrated Assessment (PIA) approach implies the engagement of non-scientific knowledge, values and preferences into the IA process through social discourse. This is considered to improve the quality of IA by giving access to practical knowledge and experience, and to a wider range of perspectives and options. Especially in the case of complex environmental issues, the involvement of non-scientific knowledge, values and preferences is considered to improve the decision-making process and also the quality of science.

In recent years a wide variety of PIA methods and techniques has been developed, but also a strong renewed interest in PIA methods from previous decades is discernible. Often, many different methods are used and combined, but often without a clear argumentation why.

This paper contains a literature survey on the PIA methodology. It addresses the methodological key-issues that should be considered in the design of a PIA approach. It argues that taking into account these key-issues can improve the design and application of a PIA approach.

The first section of this paper deals with the concept of stakeholder participation. Different definitions of a stakeholder are compared, and the pros and cons of participation are described. The second section addresses different methodological key-issues that should be taken into account in the design of a PIA approach. These issues include the degree of participation, the role of scientists and the type of issue that is at stake. In the third section selected PIA approaches are discussed in relation to the methodological key-issues described in the second section. The last section of this paper wraps up.

Acknowledgments

This paper has been written during my participation in IIASA's Young Scientist Summer Program (YSSP) 2000, where I participated in the Risk, Modelling and Society project. I would like to thank Joanne Linnerrooth Bayer and Jill Jäger for their comments on draft versions. I also want to thank my fellow YSSPers for the great, interesting and inspiring three months we spent together at IIASA. The content of this paper is the author's responsibility.

About the Author

Marleen van de Kerkhof graduated from the University of Nijmegen, the Netherlands, in 1998 with a master's degree in environmental policy sciences. In January 1999, she started as a PhD student at the Institute for Environmental Studies (IVM)[1] at the Vrije Universiteit of Amsterdam. She conducts research on the methodology of Participatory Integrated Assessment, and uses as a case study, the Dutch COOL project[2] (Climate OptiOns for the Long term). This project applies a stakeholder approach to formulate long-term strategies for Dutch climate policy in an international context.

In the summer of 2000 Van de Kerkhof participated in the Young Scientist Summer Program of IIASA and conducted research in the context of the Risk Modelling and Society project, under supervision of Joanne Linnerooth Bayer.

---

1 http://www.vu.nl/ivm

2 http://www.wau.nl/cool

A Survey on the Methodology of Participatory Integrated Assessment

Marleen van de Kerkhof

Introduction

A methodology that has received increasing attention in recent years is Integrated Assessment. Integrated Assessment has been defined in many ways (Rotmans and Dowlatabadi, 1998; Rotmans, 1998a; Rotmans, 1999; Weynant et al., 1996; Parson, 1996, 1997). Though, all these definition have three elements in common: multi- or interdisciplinarity, structuring of knowledge and decision-support.

Using these commonalties, Rotmans (1998b, 155) gives the following definition: "Integrated Assessment is a structured process dealing with complex issues, using knowledge from various scientific disciplines and / or stakeholders, such that integrated insights are made available to decision makers".

The notion of participation in Integrated Assessment

The notion of public participation as a central element of Integrated Assessment is gaining wider recognition. Renn et al. (1995; 2) define public participation as: "Forums for exchange that are organised for the purpose of facilitating communication between government, citizens, stakeholders, interest groups, and businesses regarding a specific decision or problem."

A Participatory Integrated Assessment (PIA) approach implies the engagement of non-scientific knowledge, values and preferences into the IA process through social discourse. A PIA approach is considered to improve the quality of IA by giving access to practical knowledge and experience, and to a wider range of perspectives and options.

There is a growing interest in the use of participatory methods at both the national and the international level In recent years a wide variety of participatory methods and techniques has been developed, but also a strong renewed interest in participatory methods from previous decades is discernible. On the basis of combinations and learning experiences, new methods have arisen, resulting in a creative methodological compilation. This compilation exists of hybrid and dynamical combinations of approaches, concepts and techniques (Mayer and Geurts, 1998; 194).

Despite the boom of different participatory methods no general methodology for participation exists. Participatory approaches combine many different methods, which are often used without a clear argumentation for the chosen design or procedure.

The Participatory Policy Analysis (PPA) aims at providing a common methodology for participatory methods. For this, Mayer and Geurts (1998; 190) redefine the concept methodology: "The emphasis is on participatory procedures and on argumentation and debate, and not on complex decision-making techniques. Important questions are: a debate between which parties, at what moment, on what issue, with what techniques and in what setting?"

Mayer (1997; 81) defines PPA as follows:

"PPA is a practical discipline which aims at contributing to policymaking by designing policy analytic fora, providing favourable conditions for participation, and facilitating and supporting the relevant debate and argumentation within this forum. PPA is a domain of a wide variety of participatory methods and tools that specify how policy-analytic fora can be arranged."

The set of participatory methods and techniques is various: decision seminar, future workshop, gaming, citizen panel, consensus conference, delphi method, brainstorming, policy exercise et cetera. Participatory methods are used for several purposes: strategic explorations of the future, finding solutions to controversial issues, brainstorming on possible policy actions, stimulating co-operation and co-ordination, generating support and commitment et cetera (Mayer and Geurts, 1998; 194).

It is clear from this variety of methods, techniques and purposes that the participatory methodology should not be straitjacketed, since any forced standardisation would be at the cost of the creative and innovative character of the different methods and techniques. Besides, it is impossible to develop one single participatory method for all the different applications. What is needed, though, are guidelines that provide a helping hand in designing and applying a participatory methodology in a well-reasoned way. Better guidance in the design of a PIA approach would serve two goals. The first is policy oriented: an argued and well-reasoned choice for a certain PIA approach can result in a more effective support of the policy process. The second goal is scientifically oriented: if a PIA approach is designed in an argued and well-reasoned way, the scientific quality of PIA methodology will improve.

Scope of this paper

Participatory Integrated Assessment (PIA) is a form of Participatory Policy Analysis (PPA). The PIA approach, just like the PPA approach, aims at providing insights to the decision-making community in the design of their policies. In addition, the PIA approach aims at providing insights to the scientific community with regard to the quality and usability of environmental science. A PIA approach takes into account the entire context of a problem and applies methods that involve different disciplines, and also knowledge other than scientific.

Similar ideas and approaches are described by many other authors: the Policy Orientation of Lasswel (1951), the concept of Action Science by Argyris, Putnam and McLain Smith (1985), the Participatory Action Science by Whyte (1991), Post Normal

Science by Funtowicz and Ravetz (1992, 1993, 1994) and Gibbon's concept of Transdisciplinarity (1994).

This paper provides a literature survey on the methodology of Participatory Integrated Assessment. The first section deals with the concept of stakeholder participation. Different definitions of a stakeholder are compared, and the pros and cons of participation are described. The second section addresses the methodological key-issues, that should be taken into account in the design of a PIA approach. These issues include: the degree of participation, the role of scientists and the type of issue that is at stake. In the third section selected PIA approaches are discussed in relation to the methodological key-issues described in the second section. The last section of this paper wraps up.

1. The concept of stakeholder participation

"An expert is not a special kind of person, but each person is a special kind of expert, especially with respect to his or her own problems." (Mitroff et. al., 1983; 125)

1.1 What is a stakeholder?

In the literature, the concept of stakeholder is defined in many ways. Renn et al. (1993; 190) define stakeholders as: "Socially organised groups that are or perceive themselves as being affected by a decision." Von Winterfeldt (1992; 326) states: "Stakeholders are groups – not necessarily organised – that share common values and preferences regarding the alternatives under consideration." Mason and Mitroff (1981; 43) regard stakeholders as: "All those claimants […] who have a vested interest in the problem and its solution." Van der Werff (2000; 1) states that: "Stakeholders are individuals or organisations who have an interest in the use of a particular resource."

Using elements of all these definitions, I consider stakeholders as individuals or groups that are or perceive themselves as being affected by or interested in the decision-making on a certain issue.

This definition implies: (1) that stakeholders do not have to be organised in a group in order to get involved in the policymaking process; individual actors can also participate, and (2) that not only actors with a 'stake' in the issue have the opportunity to participate, but also actors who are interested in the issue without having a particular stake.

1.2 Arguments in favour of stakeholder participation

Berk et al. (1999) present the following arguments in favour of stakeholder participation in a process of Integrated Assessment:

Participation adds meaningful information about the issue at stake and may add new insights. It may also increase the relevance of science for policy and society at large. The assumption behind this argument is that every person who feels involved in a policy matter is capable of a reasoned judgement.

Stakeholder participation can serve as an extended peer review; a review process of science that not only includes peers from the same disciplinary area, but also scientists in related areas and policy stakeholders. In this way participation may help to bridge the gap between the way the problem is defined by members of the scientific community and the daily experiences and practices of the actors who have to contribute to the solution. PIA methods may especially help to include issues that cannot be quantified by determining value systems that are relevant for policy choices.

Participation can help to address an unstructured problem by a process of interaction, referred to as problem structuring. In a PIA process, problem structuring relates to the identification, confrontation and, if possible integration of as many conflicting views on an issue as possible (Hisschemöller, 1993). The vested interests will be addressed by articulating the assumptions that underlie the different positions with respect to the issue. Especially the deep core assumptions shape the way stakeholders interpret the world around them and prevent them from seeing certain parts of reality. According to this view, one may not expect from participation that it leads to consensus, but that it

may lead to the development of the strongest argument possible for different positions and, hence, enhance political choice (see also section 2.2).

Webler and Renn (1995; 21-22) present two additional arguments in favour of participation. These arguments are ethical-normative and are put forward by participatory democratic theorists such as Rousseau (1968), Bachrach (1967), Mill (1873) and Rosenbaum (1978). These arguments concern the two central values of democracy: popular sovereignty and political equality. It is generally accepted that democracy is the outcome of an agreement among people who establish a sovereignty based upon their popular and mutual consent. All power within the sovereignty is allocated through this agreement. The ability of democracy to function is measured by the soundness of the decisions reached in the light of the needs of the community and by the scope of public participation in reaching them.

Rousseau (1968) argued that sovereignty is composed of all citizens and requires input via public involvement to determine legitimate objectives. In his reasoning, public participation is justified out of necessity: citizens must engage in political affairs, because only through interaction can the general will emerge from the plurality of particular wills.

Preservation of popular sovereignty is not the only concern of the participatory democratic theorists. To guarantee political equality, democracy must engender a population of capable and socially responsible citizens. At the core of this theory is the belief that citizens' moral and intellectual growth occurs through their involvement in political affairs. People 'learn democracy' by becoming engaged in its workings. The result of the learning experience is an awakening to the realisation that the public and private interests are linked.

1.3 Arguments against stakeholder participation

Berk et al. (1999) present the following arguments against stakeholder participation in a process of Integrated Assessment:

The major claim against stakeholder participation is that stakeholders are generally incapable of a rational judgement on matters of environmental or technological complexity.

The second argument relates to the notion that selfishness and greed lead human beings. The more involved persons defending their interests, the more difficult it will be to improve policies by means of participation. Social scientists have developed different concepts to illustrate that stakeholders are most likely to defend their own short-term interests and to 'free ride' on collective goods. This is mainly because of economic rationality: the cost for social behaviour will usually outweigh the benefits. One of these concepts is the NIMBY syndrome (Not In My Back Yard), which refers to fervent local citizen opposition to siting proposals or land-use activities with potential adverse impacts (Rosa, 1988; Webler and Renn, 1995; 27).

Another argument against stakeholder participation is the 'participation paradox' (Seley, 1983, cited in Berk et al., 1999; 27): for effective participation, one needs power resources that are not equally distributed over the affected population. Power resources include, for example, access to relevant information and a voice loud enough to be

heard by the decision-makers. Weaker interests are in a marginal position, so participation facilities will not be of great help for them.

Furthermore, participation may be considered undesirable if there are no criteria for well-reasoned selection of participants. Since the number of potential participants and alternatives may be very large, if everyone is allowed to join the process, the debate may never end and decision-making may become impossible.

More participation is not intrinsically more democratic. Van Thijn (1997) argues that there is a tension between participatory policymaking and democracy, because participation from target groups threatens the position of the Parliament. Elected MPs should be – and remain – the main actors in political decision-making (Berk et al., 1999; 27). According to the theory of democratic elitism, too much participation can even disrupt the social system operation (Burke, 1968, cited in Webler and Renn, 1995; 23). This theory argues that liberalism can only be secured if an enlightened elite is in power and if it is susceptible to pressure by a counter elite. The theory reacts against the popular values of 'classical democracy' as logically impossible and challenges the competency of citizens to participate meaningfully.

Another argument against stakeholder participation is the notion that stakeholders usually lack the knowledge needed for an argued judgement. In order to participate effectively in policy debates on matters of environmental complexity, stakeholders must have a reasonable level of scientific knowledge. Research on environmental attitudes however, shows that among the many explanations of how people come to take a certain attitude towards an environmental issue, scientific knowledge turns out to be the least significant. Furthermore, non-experts have a 'natural' tendency to mistrust scientific or technological experts.

Interaction between stakeholders can be very unproductive, as it tends to worsen conflict. The cultural approach to environmental risk (Douglas and Wildavski, 1983, cited in Berk et al., 1999; 28) analyses environmental controversies as a conflict between cultures. Different social cultures have different ways of framing, discussing and analysing an issue. For these, such conflicts are hard to handle and will probably not be solved by discussions and the input of expertise

Furthermore, participation by a person or group can only be effective if it happens at the expense of the participation by another person or group. The view that interaction between stakeholders tends to increase conflict and deadlock may especially apply to the kind of situations where so-called win-win options appear absent.

Apart from the theoretical notions presented above, there are many other explanations why a participatory approach may frequently fail to assist policy development. Participation may even become an obstacle for policymaking, as it raises expectations that cannot be fulfilled. Stakeholder approaches are time-consuming and are for that reason considered inefficient. Finally, stakeholder procedures are often in tension with legal procedures and rights. Since stakeholders do ultimately represent their own viewpoints and not that of their organisation, policymakers may have difficulties to see whether a compromise position in a stakeholder dialogue may get support (Berk et al., 1999; 26-29).

The arguments against participation refer to conditions that may prevent participation from working; the arguments in favour of participation refer to conditions that may improve its effectiveness. Many of the arguments against participation can be considered pitfalls, which have to be taken into account in the design of the process. Arguments in favour of participation highlight the aspects which have to be especially taken care of in order to make the process as effective as possible (Berk et al., 1999; 29-33).

2. Methodological key-issues in Participatory Integrated Assessment

"Public debate can only be effective if participants understand the goals of their participation, their role in the process and issues that are at stake" (Vari and Kisgyorgy, 1998; 236).

In the design of a PIA approach, several aspects should be taken into account. In this section different issues are addressed, which are considered key-issues in the PIA methodology. It should be mentioned that the overview given in this section is the result of a first exploration and does not claim to be comprehensive.

Section 2.1 discusses different degrees of stakeholder participation, varying from providing information to stakeholders, to surfacing the assumptions that underlie stakeholders' arguments. Section 2.2 addresses the type of issue at stake. Section 2.3 deals with the composition of the stakeholder groups in a PIA approach. In section 2.4, the role of scientists in a PIA approach is discussed. Section 2.5 concerns the issue of distance or involvement between the topic at stake and the participants. Section 2.6 discusses the issue of consensus or clarification.

Although the key-issues are presented as separate issues, it should be taken into account that they are interdependent and should therefore not be treated as isolated issues in the practical design of a PIA approach.

2.1 The degree of stakeholder participation

When a PIA approach is applied, careful consideration should be given to what degree of participation is desirable. In this section, different degrees of participation will be described. For this goal it is clarifying to use Mayer (1997; 251), who ranks seven participatory approaches on a kind of 'scale' (it should be stressed though, that Mayer himself does not refer to his matrix as a 'scale', but as different functions of participation in policy analysis).

The first degree of participation is labelled *information/education*. Here, the different viewpoints of participants are not really taken into account. It concerns mainly the issue of access to information and knowledge for non-experts or outsiders. This kind of approach mainly aims at enhancing societal understanding, acceptance, legitimacy and democracy.

The second degree of participation is *consultation*. Stakeholders are asked what they know about a problem and what should be done about it. It concerns problems with many different sides and aspects, for which many strategic alternatives are possible. Here, stakeholder participation mainly aims at generating policy relevant information.

The third degree of participation is *anticipation*. Anticipation focuses on getting insight in the participants' perspectives on the future, as well as in possible strategies to create or anticipate this future. The context of the problem at stake is determined by unknown (external) developments and consequences. The consequences of options, decisions or strategies are uncertain as well. The main aim is to explore and assess possible future(s).

The fourth degree of participation is *mediation*. Here, the initiator wants to know what the participants know about their mutual values and interests, and what level of consensus can be achieved. Values and norms play an important role in the definition of the problem at stake and the interests and perspectives of the actors and coalitions are difficult to integrate. The main aim of participation is to break impasse or conflict, to achieve compromises, agreements or even consensus.

The fifth degree of stakeholder participation concerns *co-ordination*, in which the initiator wants to get insight in what interdisciplinary knowledge the participants should generate, and what formal authorities the participants should co-ordinate. This degree of participation can best be applied if the body of knowledge is fragmented among many relevant disciplines (no interdisciplinarity), and the power and authority are dispersed among many administrative levels or bodies (no single decision-making authority). The main aim is to co-ordinate knowledge, objectives and means.

The sixth degree of participation is *co-operation* or *co-production*. Here, PIA approaches explore the participants' views on the relations between the issue at stake and other policy problems and sectors, as well as on a possible shared responsibility the participants can achieve. In this case, the issue at stake has important relations with different policy problems and sectors and many actors posses a part of the problem solving capacity. The main aim is to identify possible co-operation activities, projects, actions and initiatives between different involved actors.

The seventh and final degree of participation is *learning*. Here, the PIA approach aims at changing the core knowledge, beliefs and attitudes of the participants, and at exploring new styles of, or approaches to policymaking. It concerns issues of which the knowledge, problem definitions and possible solutions change rapidly. There are also frequent and rapid changes in policy, goals, programs and instruments. The main aim is to enhance flexibility and learning.

The presentation of the seven degrees suggests an increasing level of complexity in the degree of participation of the stakeholders in the exercise. It is important to note that the different degrees are not meant to be mutually exclusive. In practice, a PIA approach will aim at combining more than one degree, or the different parties have a divergent view on the desired degree of participation. The desired degree of participation depends among others on the phase of the policy process in which the involved parties consider the problem to be (agenda setting, policy formulation, policy adoption, policy implementation or policy assessment (Dunn, 1994)), and on the way the involved parties perceive the issue at stake.

2.2 The issue at stake

In the design of a PIA approach the characteristics of the issue at stake - or better said - the (possible divergent) views of the involved stakeholders on this, should be taken into account. This can be explained by making use of a typology of policy problems described by Hisschemöller (1993).

Drawing upon Hoppe (1989) Hisschemöller maps out four ideal types of problems on two dimensions. One dimension refers to (the lack of) certainty concerning the

knowledge that the solution to a certain problem may require. The other dimension refers to the (lack of) consensus on relevant values, which are at stake. These dimensions are ideal types and in practice hardly exist independent from each other. Hisschemöller (1993; 28) states that facts and values are interwoven in a problem and something that is a pursued value in a particular problem type, is in another problem type considered to be 'factual information' and vice versa. For this, the problem typology should not be used as an instrument to objectify the distinction between problems and to narrow down a problem choice to a technical matter, but rather as a methodological means in *observation* and as a guideline for an *argued* problem choice (Hisschemöller, 1993; 182).

The first type of problem is the *structured problem.* A problem is termed structured when there is a high degree of consensus on relevant values and certainty about the relevant knowledge. The settlement of these kinds of problems belongs to the daily activities of policymakers and concerns problems such as the maintenance of the roads or the application of rules on allocation of dwellings. Mason and Mitroff (1981) compare a structured problem with a puzzle: for every puzzle the ingredients for its solution - the pieces of the puzzle - are available. It is just a matter of putting them together in the proper way.

The second type of problem is the *moderately structured problem (ends).* This implies that there is consensus on relevant values but uncertainty or dissensus on the required knowledge to solve the problem. Thus, there is an agreement on the problem, but disagreement on the solution. Issues concerning the division of scarce financial means conform to the characteristics of this type of problem.

The third ideal type of problem is the *moderately structured problem (means).* This means that there is consensus on what kind of knowledge is relevant, but ongoing dissensus in regard to the values at stake. In other words: there is consensus on the solution, but there is disagreement on the problem. Ethical problems, such as the legislation on abortion in the Netherlands can be regarded as this type of problems.

The fourth and final type of problem is the *unstructured problem*. In this case there is neither consensus on relevant values nor certainty about required knowledge to solve the problem. An example here is the controversy in the Netherlands about building new nuclear power stations.

Problematic situations are very often characterised by differences in opinion on the characteristics of the problem, on the values at stake, on the appropriate solution et cetera. Some actors perceive a certain problem as structured (technical), whereas other actors consider the problem a jumble of interdependent (juridical, psychological, economical) problems. The social reality is characterised by contradictions and societal problems are considered social political constructs. In order to structure these problems for the benefit of policymaking, it is recommended to use methods that equip social political interactions between stakeholders and that surface the argumentations of the stakeholders. The PIA methodology provides these methods. The aim is to involve as many as possible divergent perceptions of stakeholders on the values and facts, which are at stake. The key argument that Hisschemöller (1993; 246) brings up for this is that excluding relevant information on problems (facts and values) may lead to so-called

'type III' errors: solving the wrong problem by employing a method that does not apply to the type of problem at hand (see also Raiffa, 1968).

In the case of structured problems, a PIA approach is less recommended. Usually, these problems are solved by scientific experts, by means of quantitative techniques of data collection and analysis (see also section 2.4). Social political interaction is less necessary since consensus exists on the type of problem, as well as on the required solution (Hisschemöller, 1993).

2.3 The composition of the stakeholder groups

It is recommendable to run the project with more than one group of stakeholders. A single group runs the risk of being biased, because of specific people in the group, or a certain style of facilitation. More than one group, with different participants, will probably deliver more reliable results.

In a PIA approach, the groups of stakeholders (the participants) can - up to a certain degree - be composed in either a homogeneous or a heterogeneous way. It should be noted however that the groups should not be heterogeneous or homogeneous in every aspect. Heterogeneity on every aspect will complicate the process too much, since it lacks a common ground to start the discussion on. Homogeneity on every aspect however, can decrease the innovative and learning character of the process.

How to compose the groups mainly depends on the goal to pursue. Homogeneous groups may build a strong case for a certain viewpoint, while heterogeneous groups may confront arguments with counter arguments. The more a method aims at cognitive reflection, the more it may benefit from a homogeneous group. The more an approach aims at highlighting different visions including values, the more it favours a debate between actors with different interests and views (Berk et al., 1999; 37).

Once the heterogeneity of the stakeholders is fully taken into account, one has to observe the heterogeneity of stakeholders on the science side as well. This implies that in the PIA approach divergent, even conflicting scientific views on a certain topic will be brought to the table.

Stern and Fineberg (1996; 89) mention four considerations that should be kept in mind in selecting stakeholders in a process of deliberation. First, the selection of participants should be sufficiently broad. Second, the selection process should be fair. However, the notions of fairness have changed over time and judgements about fairness are affected by people their past experiences. For this, the fundamental challenge is to design a process that the involved parties will *perceive* as fair. Third, the selected participants should be recognised by the involved parties as their representatives. Fourth, the participants should bring to the process the kinds of knowledge, experience, and perspectives that are needed for the PIA process.

2.4 The role of scientists

In discussing the role of scientific experts in a PIA approach, a link can be made with the problem types, described in section 2.2. Hisschemöller's (1993) four ideal types of problems each imply a different role of science (Hisschemöller et al., 1998).

In the case of a structured problem, policymakers and other stakeholders let scientists play the role of *problem solver*. Structured problems are pre-eminently technical problems. The status of experts is high and the participation of politics, interest groups and citizens in the problem solving process is limited, or at least not very effective.

When a problem is perceived as moderately structured (ends), scientists get the role of *advocate*. Here, the problem is no longer technical but has become a political problem. The involvement of parliament, interest groups and citizens is much stronger than in the case of a structured problem.

Scientists take on the role of *mediator* in the case of a moderately structured problem (means). The differences in opinion on the values at stake are profound and hard to solve. This is often the case with ethical problems. Scientists try to reconcile the involved parties and to create win-win situations. The involvement of the different stakeholders is strong.

If the issue at stake is an unstructured problem scientists have the task to *identify* and *clarify* the problem. Many PIA approaches concern this type of problem. A scientific clarification of the problem is not sufficient: as many divergent perceptions of the problem should be confronted and if possible integrated. This means also the involvement of non-scientific expertise.

The intended role of science in the structuring of an unstructured problem bears high resemblance to what Funtowicz and Ravetz (1992, 1993, 1994) call post-normal science. Funtowicz and Ravetz point out that issues of global environmental change (unstructured problems) differ from 'traditional scientific issues' (structured problems), since they are global in scale, have long term impacts, data are generally inadequate and the phenomena are complex and not well understood. Funtowicz and Ravetz plead for a new methodological approach for science to provide support for decisions on these global environmental issues. In this new approach - post-normal science - different viewpoints are confronted with each other and scientific input is subjected to an extended peer review, in which also non-scientific experts participate.

In the design of a PIA approach one should be aware of some possible pitfalls concerning the role of scientists.

A pessimistic view on the possibility of a fruitful dialogue between stakeholders and scientists points to the observation that non-experts have a 'natural tendency' to mistrust scientific or technological expertise[3] (Berk et al., 1999; 28). Different crises have enhanced this mistrust. A good example is the BSE crisis, which started in the UK in the mid-1980s when after repeated denial over several years it showed that human exposure to the recognised cattle disease BSE does damage human health in the sense that it causes Creutzfeld-Jakob disease (Wynne and Dressel, 199?).

Furthermore, a case study on climate change in the Netherlands (Hisschemöller et al., 1995) showed that there is a discrepancy between the available information and the

[3] Berk et.al. point out that this observation goes back to the British philosopher Hume. It has been used in analysing controversies about siting facilities for hazardous and – more generally – unwanted and new technologies (Hisschemöller, 1993).

information needs of the involved stakeholders. The most obvious explanation in this case study concerned the scale on which the climate problem is defined. The climate researchers consider climate change a global problem, whereas the stakeholders usually define the problem in the context of their own, local situation. However, the mismatch between demand and supply of scientific information does not only concern the perception of the problem. It also concerns other issues, such as how to deal with scientific uncertainty and scientific controversy, with facts and values etc.

Another pitfall mentioned here is the reserved attitude of scientists towards the involvement of non-experts. Scientists are afraid of a possible impingement upon scientific integrity by non-scientific demands. The Mackenzie Basin Impact Study (MBIS)[4] is an example worth mentioning here. This six-year research effort concerned a regional assessment of potential impacts of climate change scenarios on the Mackenzie Basin region, its lands, waters and the communities that depend on them (Cohen, 1997). Originally, MBIS was designed as a conventional Integrated Assessment based on the interdisciplinary participation of government scientists. Because of the concerns of the aboriginal people whose future was at stake, however, the process evolved into a scientists-stakeholders collaboration. At first the scientists were wary of this collaboration, fearing that scientific integrity would be harmed, but as the study progressed, the scientists began to appreciate the input of the aboriginal residents, especially with regard to their intimate and detailed knowledge of the environment (Cohen, 1997; 309).

Another important issue in the interaction between scientists and (other) stakeholders that showed in the MBIS is the cultural aspect that should be taken into account. The MBIS researchers met many cultural barriers in the process of working with aboriginal and native stakeholders. Accustomed to communicating with paper and pen, researchers had to learn how to relate ideas through storytelling (Cohen, 1997; 315).

Finally, one should be aware of an existing tension in the input of scientists in a PIA process: on the one hand stakeholders must have a reasonable level of scientific knowledge in order to effectively participate in policy debates on matters of environmental complexity. If scientific information is not adequately taken into account, the procedure is in danger of suffering from information deficits. On the other hand, a domination of expert input can put a heavy mark on the results of the discussion and make the participation actually more symbolic than real. It is important in the design of a PIA approach to be aware of this tension and try to find a balance. One way of coping with this is – when possible - to supply the stakeholder groups with scientific information from different sources and diverging perspectives. Another way of coping with this tension, which has been applied in the ULYSSES project, is to include a time period before any expert input is given (Jaeger and Kasemir, 1999; 9). This allows participants to express and share their own diverse knowledge and views (see also section 3.3.2).

[4] http://www.msc-smc.ec.gc.ca/airg/mbis.htm

2.5 Distance or involvement

In a PIA approach, tools can be used to create a *distance* or a certain *involvement* between the participants and the subject matter for discussion.

Methods to create *distance* are for example gaming and simulation. These methods are based on the assumption that taking some distance to everyday interests and issues helps people to see implications and new opportunities for action that they could not have seen from their narrow day-to-day perspective. These methods encourage participants to think creatively and to generate new ideas and new insights (Parson, 1996). Besides creating distance in place (by gaming and simulation), distance can also be created by a long time horizon, abstractness of the issue and the means of communication.

The disadvantage of (artificial) distance between participant and issue is, that participants feel less involved in the issue, which may affect the reliability and validity of the outcomes of the exercise. The advantage of a certain distance is that it may facilitate a conversation between parties who feel uncomfortable vis-à-vis each other or threatened by government intervention (Berk et al., 1999; 35-39).

Involvement between the participants and the subject matter for discussion is needed to get a clear insight in the stakeholders' different points of view and (hidden) assumptions. Furthermore, a certain involvement with the issue at stake will enhance the participants' commitment to the project.

The way to enhance participants' commitment, which has been applied in the Dutch COOL project[5], is to have an extended preparatory phase. In this phase of preparation, the project team developed the project design and discussed this with the different stakeholders. Interviews were held with approximately one hundred persons, who are all stakeholders in the Dutch approach of dealing with the climate change problem. The main questions in the interviews were related to the respondents' opinion on a long-term assessment on climate change policy, experiences with other dialogue projects, and possible opportunities, threats and expectations for the COOL project. In this way it was possible for the project team to fine-tune content and process of the project with the input of the stakeholders and the stakeholders had the feeling that they were taken seriously (Van de Kerkhof and Hisschemöller, 1999; Hisschemöller et al., 1999).

It is considered most favourable to find a balance between distance and involvement. Distance is needed to facilitate stakeholders to reflect on the issue and the various perceptions, stakes and positions. On the other hand, if there is too much distance, the outcomes of the dialogue may lose reliability and validity. Involvement is needed to bring the subject matter close by in order to facilitate the articulation of (hidden) stakeholder assumptions and views. On the other hand, when involvement is too strong stakeholders might not be able to reflect on the constellation of interests and policy positions that are characteristic for the here and now, which may also weaken the outcomes (Berk et al., 1999; 56).

The Dutch COOL project will again serve as an example here. In the design of this project, special attention has been paid to the issue of distance and involvement. The project is designed in such a way that there is room for stakeholders to reflect on the implications of the dialogue output, as this will increase their involvement and

[5] http://www.nop.nl/cool

commitment to the results. The climate change issue is for many distant in time and place. In consequence, the project must address the question how to increase the problem awareness of the climate change issue. It does not make sense to engage people who do not feel involved. At the same time, the stakes may be very high, especially for those who represent sectors of economy or countries that will have to pay a relatively high price for implementing emissions reductions. It would be unrealistic to expect them to spontaneously engage in a process, which is bound by the notion that, at least in the long term, the international regime will become more binding. So, the project is designed in such a way as to create an atmosphere, which allows participants to develop and discuss their personal views not restricted by formal positions and policies (Berk, et al., 1998). In order to establish this, some distance is required. The long term scope in the COOL project helps to create this atmosphere. Discussing the long term is much safer than discussing options for the here and now. The challenge for the project is to develop long-term options without ignoring the implications for the here and now. The technique used for this in the COOL project is *backcasting* (Drehborg, 1996). This concerns working backwards from a particular desirable future end-point to the present in order to determine the physical feasibility of that future and the policy measures required. Backcasting is typically applicable on long term complex issues, involving many aspects of society as well as technological innovations and change.

2.6 Consensus or clarification

Although section 2.1 has already slightly touched upon the issue of consensus or clarification in relation to the degree of stakeholder participation, this section will address this issue more extensively. After all, the effort to reach consensus or to reach clarification has a considerable impact on the rest of the project design.

Moscovici and Doise (1994; 1) consider consensus as: “A process in which various conflicting viewpoints and possibilities are explored, focused and directed towards an entente that all acknowledge.”

Clarification can be considered a process of problem structuring (see also section 2.2). Hisschemöller (1993; 32) defines problem structuring as: “A specific form of social political interaction with the aim to become aware of a problem by means of the generation, use, exchange, confrontation, evaluation and integration of as many (conflicting) information as possible, which is enclosed in causal, normative and final assumptions about the problem and its solution.” (translation into English by MvdK).

In the process of clarification, the emphasis is on argumentation. Mason and Mitroff (1981) stress that uncertainty or conflict most frequently relates to uncertainty or conflict at the core level of assumptions and not at the level of technical verification. So, providing stakeholders with information, especially scientific information about facts, trends or developments, is not a remedy for solving issues of uncertainty or conflict. Rather than clarifying the differences in view, information may even add to the confusion. Therefore, the basic notion behind clarification or problem structuring is to articulate conflicting policy assumptions of stakeholders.

The main difference between the concepts of consensus and clarification is that a process of reaching consensus will always direct towards reaching a common viewpoint, while in a process of clarification this is not necessary. A process of

clarification can result in a quite comprehensive overview of the viewpoints of different involved stakeholders, as well as their underlying assumptions, without reaching a viewpoint upon which all these stakeholders agree.

The aim of the process - consensus or clarification - has consequences for different aspects of the process design. For example, it has consequences for the composition of the groups. Consensus requires a group of actors who could potentially share the same values and beliefs about the issue under scrutiny. This does not mean that there will not be any difference in opinion, it only means that the group of actors will be homogeneous on major values. Clarification on the other hand, implies the involvement of the most heterogeneous group of stakeholders as possible. The stakeholders will confront arguments with counter arguments and in this way, highlight different visions and perceptions.

The strive for either consensus or clarification will also have consequences for the tools and techniques to use in the stakeholder participation approach. For example: in the Dutch COOL project, which aims at clarification rather than consensus, the dialogue groups work with two future images of the Dutch energy system in 2050 (Faaij et al., 1999). The images both assume an 80% reduction of greenhouse gases in 2050, but they differ from each other on essential topics, such as the international context, demography and behaviour, structure of the economy, the energy supply, et cetera. The images are meant as a tool to stimulate and trigger the discussion about an alternative energy system in 2050. By upholding both images during the entire dialogue, the groups are all the time stimulated to diverge and to deal with different views and interests.

Another way to stimulate divergence is to use tools such as association, mind mapping and the Devil’s advocate technique. Ways to stimulate consensus in a group discussion is to use the technique of voting or prioritising (Weisbord, 1992).

3. Different Participatory Integrated Assessment approaches

"We all live our lives according to the assumptions we make about ourselves and our world. To cope better, we need to surface those assumptions and to challenge them. New assumptions then become springboards to effective change" (Mason and Mitroff, 1981; vii).

It has been mentioned before that the PIA methodology is a dynamic combination of concepts, procedures and techniques. In this section four selected PIA approaches are discussed: the dialectical debate, the policy delphi, the focus group and the participatory decision analysis. Section 2.2 showed that PIA approaches are especially recommended in cases of unstructured problems, which need to be clarified. The four approaches described in this section all aim at clarification, or at consensus through a process of clarification, and are useful to deal with complex, often unstructured problems.

The approaches differ however in the way in which the stakeholders are involved. In the *policy delphi* and the *dialectical debate*, the stakeholders are individually involved and not exposed to real group interactions, whereas in the *focus group* and the *participatory decision analysis* the stakeholders actually interact with each other, exchange opinions and views and thus directly confront each other with different arguments.

For each approach, the goal and procedure is described, an example is given, and the methodological key-issues, which have been described in section 2, are discussed.

3.1 The Dialectical Debate

3.1.1 Goal and procedure

In the methodology Strategic Assumptions Surfacing and Testing (SAST), Mason and Mitroff (1981) propose the *dialectical debate* for policy, planning and strategy making. Accordingly, a situation is examined completely and logically from two different points of view. The primary goal of the SAST methodology is to become aware of the relations between stakeholder assumptions and their implications for policy. The basic ideas of the *dialectical debate* are first to interactively surface the assumptions that underlie different viewpoints and second to find out the relevancy of these assumptions by identifying the opposite argument in both claims.

The *dialectical debate* begins by identifying the prevailing or recommended plan and the data that were used to derive it. The question is posed: "Under what views of the world is this the optimal plan to follow?" This results in an attempt to specify a set of plausible and believable assumptions that underlie the plan; assumptions that serve to interpret the data so as to logically conclude that the plan is best for achieving the goals. In order to test the underlying assumptions, a search is initiated to find another plausible and believable alternative – the counterplan. This counterplan (as well as the plan) should have the attributes of being feasible, politically viable, and generally credible in the existing context. The view of the world for which the counterplan is 'optimal' is then specified.

The vehicle for the *dialectical debate* is a structured debate, which consists of the most forceful presentation possible of the two opposing plans, given the constraint that each side must interpret, in its entirety, the same organisational databank. Following a statement of the problem, the structured debate begins with the advocate of the plan stating his worldview or model of the situation. The advocate of the counterplan does likewise. Then, as each item of data is introduced, it is interpreted by each advocate to demonstrate that it can be interpreted as supporting evidence for his plan and negative evidence for his opponents' plan. The process continues until the databank is exhausted.

3.1.2 An example

Mason and Mitroff (1981; 131-136) describe an example of the application of the *dialectical debate* to a strategic planning problem of a major U.S. corporation in the abrasives industry. The corporation had two primary goals: 1) to increase after-tax corporate earnings by a minimum of 10% per annum over the 10 year planning period and 2) to be earning a rate of return on assets of at least 8% by the terminal year of the plan. Faced with the problem of devising a strategy to achieve these goals, the planning department starts to collect considerable data – market trends in the abrasives industry, demand forecasts, studies identifying their customers and factors influencing purchase et cetera. On the basis of a thorough analysis of these data, the planners conclude that the existing strategy will not result in the accomplishment of the goals. They recommend that a new strategy should be adopted, in which the corporation will become an international, marketing-oriented organisation. Within the framework of this strategy, a strategic planning document is written, which is presented to the management. Then, the dialectical study begins.

On the basis of the data, the goals, and the planning department's recommended plan, a set of assumptions is derived that underlies the 'international strategy' plan. For example, one apparent assumption underlying this plan is that most of the inhabitants of foreign countries are basically motivated toward improving their own standard of living and that each country views the company's entry into its economy as satisfying this need. With the aid of this assumption and others, it is possible to interpret the data to conclude that the 'international strategy' plan is best for achieving the corporate long-range goals. A study of the corporation's communication stream - which implies reviewing statements made in interviews, magazine articles, public announcements et cetera – shows that many members of the corporation indeed believe the point of view set forth by the plan's imputed assumption set. However, the study also reveals that there is not complete unanimity in these beliefs. This divergence of opinion serves as a clue for developing a counterplan. There are indications that some executives favour the firm's concentrating its efforts on the domestic market and emphasising technological innovation. Thus, a 'domestic technologically oriented' counterplan is formed and a set of assumptions is sought that closes its argument. One counterplan assumption is, for example, that the inhabitants of most foreign countries are motivated primarily by strong nationalistic tendencies and that this makes doing business abroad risky. Again, it can be demonstrated that this new set of assumptions can be used to interpret the data and to conclude that the counterplan is the best for achieving the corporate goals.

The next step is to organise a structured debate. This structured debate is presented to the management board in both written document form and orally in a strategic planning briefing session. In order to eliminate variances in personality and persuasive ability, the

role of the advocate of the plan and the advocate of the counterplan is assumed by one person. After the structured debate, different executives reported that the presentation of the plan and the counterplan had forced them to reconsider the assumptions of the corporate strategy, and each of the executives mentioned at least one implicit assumption that has been exposed to him. A consensus begins to grow among the executives that the plan and the counterplan are not really mutually exclusive alternatives but should rather be considered as part of a more grand strategy (the synthesis) that involves a well-timed execution of both domestic and international expansion. This timing concept was not made explicit in either the original plan or the counterplan. Six months after the structured debate the new synthesis became an integral part of the corporation's strategy.

3.1.3 Methodological key-issues

The degree of participation

In a *dialectical debate* the participation of stakeholders can occur in different degrees. First, the degree of mediation: the role of values and interests is quite important in the process of exposing stakeholders' underlying assumptions. Furthermore, via a process of surfacing hidden assumptions, it is possible to break impasses or conflicts and - at least - identify points of possible convergence. This concerns another degree of participation, namely co-operation or co-production. Finally, the degree of learning can be reached in a Dialectical Debate. As we saw in the example of the dialectical approach in a U.S. corporation in the abrasives industry, each of the executives who attended the structured debate gained new insights.

The issue at stake

The issue that is at stake in the *dialectical debate* is usually an unstructured or moderately structured problem. The available data can be interpreted in different ways and conflict exists about the best solution for the problem. The procedure of the *dialectical debate* is a process of problem structuring, in which a confrontation of different viewpoints will occur.

The composition of the stakeholder groups

In order to write two opposite plans on the basis of the same data set, the group of involved stakeholders should be heterogeneous in their views and perceptions. In the example of the *dialectical debate* in the major U.S. corporation in the abrasives industry, the opinions and views of different stakeholders within the corporation are involved in order to develop the counterplan.

The role of scientists

In the *dialectical debate*, two opposing plans are presented. Subsequently, the advocate of the plan and the advocate of the counterplan use the same new items of data to support their own plan and to tackle the opponent's plan. Scientific knowledge (the databank) in this approach serves as a trigger to surface the underlying assumptions of a plan, to 'test' these assumptions by exposing 'hidden' assumptions and, ideally, by

suggesting new and potentially more relevant assumptions. The counterplanning problem technique will stimulate a new and broadened concept of the planning problem (the synthesis). In other words: scientists have the task to identify and clarify the problem.

Distance or involvement

In the *dialectical debate*, involvement of the views and opinions of stakeholders is very important. Only then, it will be possible to get a clear articulation of different views, perceptions and (hidden) assumptions, which is the main aim of the dialectical approach. Still, effort should be made to create a balance between the distance and involvement of the participants and the issue at stake. A too strong involvement of the participants might restrain them from reflecting on the various assumptions and the implications for the policy process.

In the example of the abrasives industry, the stakeholders are not directly involved. The counterplan is developed on the basis of a review of stakeholder statements, made in interviews, magazines etc. Because of this, the issue of distance or involvement between the participants and the issue at stake is in this case less relevant.

Consensus or clarification

The application of a *dialectical debate* in an Integrated Assessment process teaches policymakers, planners and strategists about the plan's fundamental assumptions and comes to understand them by observing the conflict that emerges between the plan (thesis) and the counterplan (antithesis) and between their attendant worldviews. The expectation is that the policymaker – observer of the conflict – will integrate and form a new and expanded worldview (synthesis). The synthesis includes exposing hidden assumptions and developing a new conceptualisation of the problem (Mason and Mitroff, 1981; 131). This can ultimately lead to a new strategic plan for the policymaker. It means that at the end of the process, if possible, there will be convergence. Convergence means that a selection of central points will be made, as well as an exploration of to what extent and under which boundary conditions an agreement can be reached on these central points.

Thus, the *dialectical debate* entails a process of clarification in which different assumptions are made explicit, and possible convergence points are explored.

3.2 The Policy Delphi

3.2.1 Goal and procedure

Delphi as it originally was introduced and practised tends to deal with technical topics and seek a consensus among homogeneous groups of experts. The p*olicy delphi* on the other hand seeks to generate the strongest possible opposing views on the potential resolutions of a major policy issue.

Turoff (1975) describes the *policy delphi* extensively. He distinguishes six phases. The first phase concerns the formulation of the issues: which are the issues that really should

be under consideration? How should they be stated? The second phase deals with the exposition of the options: given the issue, what are the policy options available? The third phase is the determination of initial positions on the issues: which are the ones everyone already agrees upon and which are the unimportant ones to be discarded? Which are the ones exhibiting disagreement among the respondents? The fourth phase concerns the exploration and obtainment of the reasons for disagreement: what underlying assumptions, views or facts do the individuals use to support their respective positions? The fifth phase deals with the evaluation of the underlying reasons: how does the group view the separate arguments used to defend various positions and how do they compare to one another on a relative basis? The final phase concerns the re-evaluation of the options: re-evaluation is based upon the views of the underlying 'evidence' and the assessment of its relevance to each position taken (Turoff, 1975; 88).

In a paper-and-pencil delphi, this procedure requires in principle five rounds. However, in practice most *policy delphis* try to maintain a three-or four-round limit by utilising the following procedures: (1) the monitoring team devoting a considerable amount of time to carefully pre-formulating the obvious issues; (2) seeding the list with an initial range of options but allowing for the respondents to add to the list; (3) asking for positions on an item and underlying assumptions in the first round.

One aspect of the *policy delphi*, which usually argues for four or more rounds arises in the situation where the respondents feel very strongly about their respective views. In such a case they sometimes have an attitude where they can not imagine that there are rational and intelligent people who hold a contrary view. It usually takes three rounds until this type of respondent feels the shock resulting from a realisation that the other side also feels it has some valid points to be made. Therefore, it is only at the third round that this type of respondent begins to put a great deal of careful effort into the points he/she is making and to consider more carefully what the other side is saying. The material generated out of this type of process could have a significant impact on the group views if carried back in a fourth round (Turoff, 1975; 94).

Turoff considers the best vehicle for a *policy delphi* to be a computerised version of the process in which the round structure disappears and each of the phases is carried through in a continuous process.

3.2.2 An example

Turoff (1975) describes a *delphi* study conducted by the Federal Department of Public Works that illustrates the incorporation of policy options in an essentially *non-policy delphi*. The Department's major role is to provide accommodation for federal civil servants, and the *delphi* is undertaken as part of a model for forecasting government employment with the purpose of determining future accommodation needs. But the department's mandate extends beyond simply providing buildings to house federal employees. It is concerned with the total work environment of the civil service. Consequently, the Public Works *delphi* also explores the existing procedure for space allocation, which is based on the average salary of all employees using that space, and asks respondents to comment on that process.

In the first round, after reviewing the present process, the respondents are asked to list what they consider to be the strengths and weaknesses in the process, as well as to suggest possible options for change. In the second round, these options are voted upon

according to desirability and feasibility, keeping in mind that a particular option could be desirable and unfeasible at the same time, or vice versa. Some examples of suggestions for change according to the criterion of desirability are: “relate space to function not salary” and “more emphasis on multipurpose facilities”. The *delphi* also looks at possible parameters for measuring building performance that will go beyond the usual cost/benefit measures, such as the ratio of rental square feet to total square feet. The suggestions that the participants give on this, concern issues such as the psychological and motivational impact on the employees, the aesthetic value of the building, and energy and environment.

Subsequently, the respondents are asked to vote on the desirability and feasibility of specific suggestions and to suggest ways in which some of these concepts can be measured. Thus, Public Works uses the *delphi* exercise not only to fulfil its immediate objective of forecasting federal government employment, but also to explore policy options relating to its mandate of fulfilling broader social, economic, and environmental objectives.

3.2.3 Methodological key-issues

The degree of participation

The *policy delphi* rests on the premise that the decision-maker is not interested in having a group generate his/her decision; but rather, have an informed group present all the options and supporting evidence for his/her consideration. The *policy delphi* is therefore a tool for the analysis of policy issues and not a mechanism for making a decision. This implies that stakeholder participation should at least be at the degree of consultation, but often also mediation or even learning. By using conflict to sharpen argumentations, new insights will be gained and consequently the beliefs and attitudes of the participants might change.

In the *policy delphi* on accommodation needs of the civil servants of the Federal Department of Public works, the aim of stakeholder participation initially was to determine future accommodation needs (degree of anticipation needed). However, since the Department was concerned with the total work environment of the civil service and not only with providing buildings for its employees, the *policy delphi* went beyond the usual cost/benefit measures and also took into consideration the psychological and motivational impact on the employees (for this, a degree of mediation is required).

The issue at stake

The issue that is at stake in the *policy delphi* is, just like in the *dialectical debate*, very often a moderately structured or unstructured problem. The *policy delphi* can be considered a process of problem structuring. The reasons for different judgements on possible solutions for the problem will be made explicit. These differences are often based upon differences in interests and perspectives among the participants in the group, and not upon technical uncertainty (which could easily be solved by providing the information that is lacking).

The composition of the stakeholder groups

The *policy delphi* - in contrast with the normal delphi - makes use of heterogeneous groups of stakeholders in order to stimulate conflict and to make explicit all the different arguments in relation to the issue at stake. According to Turoff (1975; 84-85) a policy issue is one: "[…] for which there are no experts, only informed advocates and referees. An expert or analyst may contribute a quantifiable or analytical estimation of some effect resulting from a particular resolution of a policy issue, but it is unlikely that a clear-cut resolution of a policy issue will result from such an analysis." Therefore, other knowledge than (scientific) expert knowledge is needed and, consequently, not only scientific experts should be involved, but also 'other' experts (such as business representatives, NGOs etc.).

The role of scientists

Scientific knowledge will be used to support the *policy delphi* process. The scientific input could serve as a vehicle to bring all the participants to an equal level of knowledge at the start of the debate. Furthermore, in order to make a well-reasoned choice for a certain position on the item at stake, it is important for the participants that they are provided with all the (even conflicting) scientific views on this item. The input of diverging scientific information can trigger the discussion (scientists in the role of identifiers and clarifiers of the problem). It is important though, that the participants make up their own minds. The scientific knowledge should not dominate the debate.

Distance or involvement

In the application of the *policy delphi*, a balance between distance and involvement is needed. Comparable to the *dialectical debate*, a *policy delphi* needs a certain involvement of the participants in order to get insight in their different points of view and (underlying) assumptions. On the other hand, a certain distance is necessary for the participants to be creative and innovative and consequently to generate new ideas and insights. In the example of the *policy delphi* on the work environment of the civil service, different employees of the federal departments are involved. They are all very much involved with the issue at stake (their work environment). Therefore, it is important in the *policy delphi* to use some tools to create a certain distance (for example a role play).

Consensus or clarification

Similar to the *dialectical debate*, the *policy delphi* aims at clarification. A *policy delphi*, if carried out well, gives an analysis of policy options and issues on at least four dimensions: (1) desirability, (2) feasibility, (3) importance and (4) validity of each item. The aim is to make explicit the reasons for different judgements on the specific policy options and issues. Is this difference in judgement based upon uncertainty and/or lack of information with respect to consequences, or is it based upon differences among the self-interests as represented by the respondent group? A *policy delphi*, if designed well, can make this distinction. If the differences in judgements are solely caused by a lack of information, it is usually quite easy to reach consensus. A *policy delphi* though, usually aims at gaining more insight in the different arguments stakeholders have because of their different interests in, and worldviews on a specific issue.

Both the *policy delphi* and the *dialectical debate* explicitly make use of conflict as a way to gather the strongest opposing arguments. They differ fundamentally from other techniques and procedures that make use of conflict (e.g. a courtroom debate), because in the *policy delphi* and the *dialectical debate*, opposing arguments are kept strictly apart from the data. In this way the crucial function of the opposing arguments can be explicitly demonstrated. This introduces an element of artificiality that real debates do not have, but it also introduces a strong element of structure and clarity that makes this use of conflict much more controlled and systematic (Mitroff and Turoff, 1975; 32-33).

3.3 The Focus Group

3.3.1 Goal and procedure

The term *focus group* is a combination of two standard social scientific research methods. The first is the focused interview, in which an interviewer elicits information on a topic without the use of a fixed questionnaire guide. The second is a group discussion in which a possibly heterogeneous, but carefully selected group of people, discusses a series of particular questions, which are raised by a skilled moderator. The group is provided with a common input and the reaction of the group to this input is explored.

A *focus group* can then be described as: "A guided group discussion with a limited number of persons that is focused on a specific topic" (Jaeger and Kasemir, 1999; 9; Dürrenberger and Behringer, 2000; 322). Terms like citizen juries, citizen panels, in-depth groups, future workshops and others can be used to describe this approach. In the field of environmental risks the *focus group* approach is sometimes used to investigate public understanding of global warming and related issues that depend for their policy solution on environmental values and mental models. *Focus groups* can help to blend the knowledge base of laypersons with the expert knowledge relevant for specific environmental risks (Jaeger, Schüle and Kasemir, 1998).

The aim of *focus group* discussions is to get to know relevant perceptions, attitudes, values and behaviours of both the participants and the group as a whole. This group dimension is essential. *Focus groups* can operate on the border between the private and the public sphere. While the physical setting is more typical of a private conversation (a small group of people sit around a table and respond to each others remarks), the topics introduced by the moderator and the overall group situation (people who have not met before and who may produce common conclusions) belong more to a situation of public debate.

The group can meet once or several times. Result 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* with different participants might be conducted in order to get reliable results.

Like many PIA approaches, the *focus group* comes in many variants and needs to be tailored to novel circumstances of application by developing further variants. For this, it is not possible to describe a blue print of the *focus group* procedure. In the following section, the procedure of the ULYSSES project, an example of the focus group approach will be described.

3.3.2 An example

In the ULYSSES project *Integrated Assessment (IA)-focus groups* have been used to discuss climate and energy issues and possible or desirable urban developments in the region where the participants lived (Jaeger and Kasemir, 1999). ULYSSES stands for Urban Lifestyles, Sustainability, and Integrated Environmental Assessment. The ULYSSES approach was to design processes allowing interfaces between expert models of environmental change 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: Barcelona, Venice, Athens, Zurich, Frankfurt, Manchester and Stockholm. The groups met for five sessions of approximately 2.5 hours per session.

The first step of the *focus group* procedure (session one) in ULYSSES was devoted to spontaneous reactions of the participants to the topic of energy use and long term climate policy, among others by producing collages and followed by a general discussion. For producing the collages, the participants started from two alternative scenarios: on the one hand the continuation of present trends of energy use up to the year 2030 (business-as-usual), on the other hand a scenario of 50% reduction of energy use up to the same year. The results of the collages suggest that citizens across Europe see strong reductions of current levels of energy use as more desirable than a business-as-usual perspective.

The second step (session two to four) focussed on discussions of global and regional change and was supported by access to computer models. Two computer models – one with a global perspective (either IMAGE, TARGETS or ICAM[6]) and one with a regional one (either PoleStar or a CO_2-Lifestyle Calculator) - were generally used in separate sessions. By selecting both a global and a regional model, the project team aimed at enhancing debate on regional solutions for global environmental problems. The findings from the discussions suggest that the computer models were successful at conveying to participants the temporal and spatial scale of climate change, the complexity of the system and the uncertainties in the understanding of it. However, most participants felt that the computer models were less effective for the exploration of policy options and, furthermore, that the models were not sufficiently user-friendly and transparent for being accessed in an *IA-focus group*.

The final part of the *IA-focus group* procedure (session five) was devoted to expressing concluding judgements by the participants themselves, in the form of a citizens' report. The citizens' report dealt with recommendations for addressing climate change and urban sustainability. The findings include that all the recommendations were oriented towards addressing causes of the human-induced climate change, and not the effects. No measures of an 'adaptive' type were proposed. The citizens' recommendations were pointing at infrastructural and technology improvements, and to organisational and individual action. The participants called for immediate action to mitigate climate change, and did not request more certain scientific knowledge on the matter before measures were adopted.

---

[6] IMAGE stands for Integrated Model to Assess the Greenhouse Effect; TARGETS stands for TOOL to Assess Regional and Global Environmental and health Targets for Sustainability; ICAM is the acronym for Integrated Climate Assessment Model. For a description of all the models see Dahinden, Jäger, Nilsson and Querol (1999, pp. 76 - 81).

3.3.3 Methodological key-issues

The degree of participation

The stakeholder participation in the *focus group* approach should reach the degree of co-operation or co-production. The issue at stake has relations with many other policy problems and sectors, and without integrating the points of views of citizens, of local policymakers and of business representatives, the policy runs the risk of getting stalled in the early implementation phase. Via *focus groups* possible shared responsibilities can be explored and possible co-operation activities can be identified.

The participation of stakeholders in a *focus group* approach can also reach the degree of learning - or better - *mutual* learning. *Focus groups* can serve to bridge cognitive gaps between citizens, scientists and policymakers, so that they become aware of each other's perspectives and commitments.

In ULYSSES, the participation of citizens was also a learning process from a methodological point of view. The challenge was to develop participatory procedures for IA, which combine the rationality of computer models with the rationality of social discourse. The findings of ULYSSES provide evidence for the feasibility of integrating computer models in citizen deliberation. ULYSSES also shows that the usefulness of this interaction depends both on model facilitation and on model characteristics.

The issue at stake

The issue at stake in a *focus group* approach is often an unstructured problem. This implies that there is uncertainty and disagreement on both the values at stake and the kinds of knowledge needed for addressing the issue. This allows for a pluralism of possible descriptions of causes, impacts and solutions.

In the case of the ULYSSES project, the groups discussed climate change and energy issues. Since the climate change issue is for many citizens a rather abstract and vague problem, it was related to urban lifestyle, which is much closer to the citizens' perception of their environment.

The composition of the stakeholder groups

A *focus group* usually consists of a small group of participants (6 to 8 persons) and is facilitated by a (independent) moderator. While the main focus is on citizen participation, the groups are often also conducted with decision-makers, with representatives from industry, NGOs, government, media and so on. The reason for that is that debates and decisions of citizens are embedded in a context influenced by these actor groups. The groups are composed in a heterogeneous way, in order to identify the different interest and views of the involved stakeholders.

The aim in ULYSSES was to get a broad cross-section of citizens to participate in the groups. This applied both to socio-demographic criteria as well as to environmental attitudes. The latter criterion was considered to be important in order to ensure that different perspectives on climate and energy were represented in the discussions. As a consequence, the groups were highly heterogeneous, ranging from e.g. an unemployed waiter to a broker with a high income, and from an 84 year old retired teacher, to a 23

year old hotel receptionist. Accordingly, the discussions in the groups were shaped by very different backgrounds and experiences among the participants (Jaeger and Kasemir, 1999).

According to Jaeger et al. (1998), heterogeneous groups can be understood as a kind of micro-cosmos for exploring debates which could take place within the general public.

The role of scientists

In every PIA process it is important to keep a balance between lay and expert inputs. 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 a process of gauging e.g. environmental attitudes of stakeholders. In order to keep this balance, the *focus group* approach allows the participants to first react rather spontaneously to the focal topic. Only after that, expert input is given. The problem definitions of the involved stakeholders become a complementary input to the scientific assessment process.

Science has long been based on the paradigm of 'settling' debates. However, if the issue at stake is complex and science it not able to give a comprehensive description of the problem, the causes and solutions, scientists will have another 'role', namely to support the debate rather than to settle it (see also section 2.4). For example in ULYSSES, the modelling of the climate change issue was not so much considered to be able to 'predict', but rather to provide metaphors to support learning and discovery in debates including the public.

A *focus group* can be seen as a practical implementation of the concept of extended peer communities. The participants review the scientific input that is provided by the expert (usually computer models). Funtowicz and Ravetz (1992, 1993, 1994) suggest an extended peer review especially for cases with a high level of uncertainty in scientific knowledge and methods, and with high decision stakes (Jaeger and Kasemir, 1999; 111).

Distance or involvement

In the design of a *focus group*, attention should be paid at creating a balance between distance and involvement. In ULYSSES, the involvement was created by making the participants the 'owners' of the process. The end product was a report, written by the participants themselves. In this way, the participants felt committed. A certain distance was created by introducing two future scenarios with a long term scope of 2030. Also the use of computer models might have created a certain distance between the participants and the issue at stake (i.e. climate change).

Consensus or clarification

The product of the *IA-focus groups* in ULYSSES was a written citizens' report, which was a narrative script of the participants' different points of view on the issue of climate change in relation to urban life styles, as well as recommendations to policymakers on how to deal with this problem. In a *focus group*, the participation of stakeholders is not about reducing, but rather about clarifying uncertainty and disagreement. Providing

narrative scripts of different points of view of different stakeholders, and including multiple scenarios based on these, can support negotiation processes on environmental policy better than developing any single 'optimal' description or scenario could (Jaeger and Kasemir, 1999; 17).

In the ULYSSES project, the groups were encouraged to note down their agreement on points where consensus developed, but were not required to reach a common position. The reason for this was that striving for consensus at any cost might lead to a 'trivial' report, giving only the least common denominator and leaving all remaining conflict aside (Jaeger and Kasemir, 1999; 14). The actual citizens' report in ULYSSES however, shows a high level of consensus and very few contradictory suggestions between the reports.

3.4 The Participatory Decision Analysis

3.4.1 Goal and procedure

The *participatory decision analysis* described in this section concerns the three-step model that has been developed by Dienel in the early 1970s (Dienel, 1978) and further modified by Renn more recently (Renn et al., 1993). In the three-step model the multi-actor, multi-value and multi-interest aspects of decision-making are integrated into a practical procedure. In order to do this, the model assigns specific tasks to different groups in society. These groups represent three forms of knowledge: knowledge based on common sense and personal experience; knowledge based on technical expertise; and knowledge derived from social interests and advocacy. These three forms of knowledge are integrated into a sequential procedure in which the actors are given specific tasks that correspond to their specific knowledge potentials. This procedure entails elements of two other approaches described in this paper, namely the *policy delphi* and the *focus group*.

The model consists of three consecutive steps, described in Renn et al. (1993; 190-192).

The first step concerns the identification and selection of concerns and evaluative criteria. The identification of concerns and criteria is best accomplished by asking (in interviews, or in a workshop) all relevant stakeholder groups to reveal their values and criteria for judging different options. To elicit such values and criteria the technique of value tree analysis has proven appropriate. In the value tree process the (groups of) stakeholders are each given the right to assign a weight of zero to each criterion that they regard irrelevant. The result of the value tree analysis is a list of hierarchically structured values that represent the concerns of all affected stakeholders. This value tree provides criteria to evaluate policy options. Value trees have proven to be useful instruments in structuring the underlying dimensions of a debate and in linking the general concerns of groups with the concrete options that they favour or disfavour.

The second step entails the identification and measurement of impacts of the different decision options. In this step, the evaluative criteria derived from the value tree are operationalised and transformed into indicators by the research team or an external group. Once approved by all parties, they serve as measurement rules for evaluating the performance of each option on different value dimensions, providing a common rationale for measurement and evaluation of potential options. Assembling options is

also part of this step. In principle, options can be found by brainstorming within the research team, by interviews with stakeholders groups, or by political precedent. With different policy options and criteria available, experts representing varying academic disciplines and viewpoints about the issue in question are asked to judge the performance of each option on each indicator. For this purpose, the group delphi has been developed. It is similar to the original delphi exercise but based on group interactions instead of individual written responses. The objective is to reconcile conflicts about factual evidence and reach an expert consensus via direct confrontation among a heterogeneous, preferably representative, sample of experts in the field. The outcome of the group delphi is a performance profile for each decision option. This profile specifies the range of scientifically legitimate and defensible expert judgements for each indicator; it illustrates the distribution of these opinions among the expert community, and it includes verbal justifications for opinions that deviate from the median viewpoint. So, the group delphi provides: 1) a clear picture of disagreements on the expert panel, 2) reasons for the disagreements, 3) direct testing of different positions through peer review, and 4) the ability to more clearly distinguish substantive disagreements from incidental misunderstandings.

The third step is the aggregation and weighting of expected impacts by randomly selected citizens, and the elicitation of citizens' preferences. In this last step, one group or several groups of randomly selected citizens (citizen panels) evaluate each option profile. The objective is to provide citizens with the opportunity to learn about the technical and political facets of policy options and to enable them to discuss and evaluate these options and their likely consequences according to their own set of values and preferences. The product of the citizen panels is a priority list of options and policy recommendations, composed by the involved citizens. Citizen panels consist of three main components: 1) reception of information through lectures, videos et cetera, 2) processing of information through small group discussions, plenary sessions and hearings, and 3) evaluation of impacts of options through small group discussions, personal judgements and consensus building exercises in the plenary.

Thus, all actors involved (the stakeholders, the scientific experts and the citizens) play a role in each step, but their influence is channelled to the type of knowledge and rationality that they can offer best. The stakeholders are the principal source for building value trees, but the other parties may augment the joint tree. Scientific experts are principally responsible for constructing performance profiles for each option, but also the knowledge of the other actors is taken into consideration. The major task of the citizens is to evaluate options and generate or modify policies. They are assisted in this task by scientific expert and stakeholder witnesses. This division of labour introduces checks and balances into the process and constitutes a structural order that is logical and transparent.

3.4.2 An example

The three-step model has among others been applied in a national study on energy policies in former West Germany (Renn et al., 1993; 201 – 203). In August 1982, the German Ministry of Research and Technology initiated a large research project to investigate the preferences of the German population with respect to four energy policy options developed by a parliamentary commission in 1979. The government was interested in eliciting reliable information on which energy scenario was most appealing

to the population and on what basis citizens would evaluate the policy options laid out in each scenario. A research team directed by Renn conducted a three-year study to collect data on public preferences and to analyse the motivations and underlying reasons for the judgement process of evaluating the predefined energy scenarios. The study was designed in accordance with the three-step procedure.

In the first step, values and criteria to assess and evaluate energy options were identified, by interviewing representatives of 13 major stakeholder groups in West Germany. In total, the groups generated 141 criteria to evaluate energy policies.

In the second step, approximately 30 energy experts were asked to give their best scientific estimates for the performance of each energy scenario on each of the revealed criteria. The social, political, and psychological impacts were assessed by expert rating using the group delphi technique; the technical, economic, environmental, and international impacts were assessed by independent sub-contractors.[7]

In the third step, the resulting profiles of each energy scenario were conveyed to randomly selected citizens for evaluation and comment. The major tasks of the panels were to review the assessments, include their own values, and to make policy recommendations in accordance with their own preferences.

The study operated with 24 citizen panels (each including approximately 25 participants) drawn from seven communities in different parts of West Germany. The meetings were held for four consecutive days. Only 20 percent of all invited persons participated. A true representation of the West German public was not accomplished but a comparison of the basic demographics of the participants with the national average revealed that the sample was a good representation of the different age groups, gender, and educational backgrounds. The only clear bias involved the under-representation of self-employed persons. They were hardly able to sacrifice four days, whereas housewives, retired people and public servants were slightly over-represented.

The outcome of the process consisted of three products: a joint value tree with evaluative criteria to evaluate energy systems or scenarios; a performance profile of different energy systems and scenarios; and policy recommendations drafted by the 24 citizen panels. The panels unanimously rejected a high energy supply scenario and opted for an energy policy that emphasised energy conservation and efficient use of energy. Nuclear energy was perceived as non-desirable, but - at least for an intermediate time period – as a necessary energy source. The panellists recommended stricter environmental regulation for fossil fuels even if this meant higher energy prices. They developed a priority list for policies and drafted recommendations for implementing high priority policies.

3.4.3 Methodological key-issues

The degree of participation

In general, stakeholder participation in the *participatory decision analysis* should at least reach the degree of consultation, in order to get insight in the interests and

[7] Such as: the Prognos Institute in Basel (Switzerland) and the Institute for Foreign Policies in Bonn (Germany).

preferences of the involved stakeholders and to generate consensual recommendations for policymaking. For example, In the national study in the former West Germany, the aim was to investigate the preferences of the German people on different energy policy options, which were developed by a parliamentary commission.

The three-step model, as described in section 3.4.1, involves different groups of actors and assigns different tasks to each group. In the first step, stakeholders are involved in a value tree process in order to identify their values and criteria for judging different policy options (purpose of mediation). In the second step, experts from various academic disciplines judge the performance of each option on each indicator. In a group interaction the experts try to reach a consensus on the scientific, 'factual' input but not on the preferred policy option (participation degree of mediation and co-ordination). In the third step, citizens discuss and evaluate the policy options and consequently generate policy recommendations (participation degree of consultation and mediation).

The issue at stake

The three-step model focuses on issues, in which different actors, with divergent problem perceptions, have a stake (NGO's, government, citizens, but also researchers from different disciplines). These kinds of problems can be characterised as unstructured problems (section 2.2). Besides the energy-issue (which was at stake in the national study in former West Germany) the three-step model has also been used in choosing garbage sites in Switzerland and in choosing a hazardous waste site in Germany.

The composition of the stakeholder groups

The tree-step model involves three different groups of actors. The first group consists of all the relevant stakeholders which are affected by a certain problem or policy. In the example of the national energy study in West Germany, 13 major stakeholder groups concerning the German energy policy were interviewed. This implies a heterogeneous group. The second group of actors consists of the experts: a heterogeneous, preferably representative sample of experts in the field in question. The third group concerns the citizens. The groups consist of randomly selected citizens. In the example of West Germany, 24 citizen panels were composed, each including 25 participants.

Thus, the *participatory decision analysis* takes into account the heterogeneity at both the side of the scientists, as the side of the citizens and the side of the other stakeholders.

The role of scientists

Each step in the three-step model includes a different form of knowledge: knowledge based on common sense and personal experience (stakeholder knowledge in step one); knowledge based on technical expertise (expert knowledge in step two), and knowledge derived from social interests and advocacy (citizen knowledge in step three). The remarkable of this procedure is the attempt to separate the 'facts' (knowledge in the second step) from the 'values' (knowledge in the first step). The different forms of knowledge are considered to be separate, but complementary to each other. In this

respect, the three-step model tries to keep the balance between expert and lay knowledge.

Since the group of involved experts represents various disciplines, the input of expert knowledge in the second step of the procedure will be divergent. This confrontation of different scientific points of view can trigger the discussion in order to reach an argued expert consensus. In this respect, the scientists play the role of identifier and clarifier of the problem.

However, since the three-step model tries to separate the facts from the values, it can also be argued that - in the interaction between the scientists and the citizens - the scientists get the role of problem solver. Among the scientists a discussion takes place via confrontation of different opinions, but the results of this discussion, i.e. performance profiles for decision options, serve as an input for the citizens panel and are considered to be 'the facts'.

Distance or involvement

Also in this participatory approach, a balance between distance and involvement between the actors and the issue at stake is very important for the outcomes of the process. In the different steps of the procedure, attention should be paid to create this balance. The assumption is that a certain distance will stimulate the participants to reflect on the issues and on the various perceptions and interests; a certain involvement will bring the issue at stake closer to the participants and consequently facilitate the articulation of (hidden) assumptions and argumentations.

In the example of the national energy study in West Germany, the involvement of the stakeholders was strong, since their stakes in the energy problem were high. The use of energy scenarios can be considered an attempt to create a certain distance.

Consensus or clarification

The three-step model is based on the view that stakeholders, experts and citizens should each contribute their particular expertise and experience to the planning effort. Stakeholders are valuable resources for eliciting concerns and developing evaluative criteria since their interests are at stake and they have already made attempts to structure and approach the issue. Experts are necessary to provide the data base and the functional relationships between options and impacts. Citizens are the potential victims and benefactors of proposed planning measures; they are the best judges to evaluate the different options available on the basis of the concerns and impacts revealed through the other two groups. The three-step model is derived from formal decision analysis, but oriented toward a multi-actor, multi-value, multi-interest situation. It is an attempt to integrate expertise, values and concerns of stakeholder groups, and preferences of citizens into a procedural framework that enables the generation of consensual policy suggestions. In other words, the three-step model aims at reaching a consensus through a process of clarification.

4. Conclusion and reflection

This paper is the result of a literature survey on the methodology of Participatory Integrated Assessment. I have consulted literature on the methodology of stakeholder participation, on different PIA approaches and on examples of projects in which a PIA approach has been applied (such as the COOL project and the ULYSSES project).

Three main topics have been addressed: the concept of stakeholder participation (section 1); methodological key-issues in a Participatory Integrated Assessment (PIA) approach (section 2); and different PIA approaches (section 3).

I have put forward different arguments for and against stakeholder participation in an IA process. The arguments against participation (e.g. "stakeholders will most likely only defend their own interest", or "stakeholders are incapable of a rational judgement on matters of environmental or technological complexity") are not only deemed insufficient to exclude stakeholders from the policymaking process, but are rather considered pitfalls, which may prevent participation from working or improve its effectiveness. Therefore, they should be taken into account in the design of the process.

Six methodological key-issues have been derived from the literature, namely: 1) the degree of participation, 2) the issue at stake, 3) the composition of the stakeholder groups, 4) the role of scientists, 5) distance or involvement and 6) consensus or clarification. These key-issues have been described and illustrated with examples of how specific projects have dealt with these issues.

The third main topic of this literature survey concerns a short overview of different PIA approaches. The following four approaches were selected: the *policy delphi*, the *dialectical debate*, the *focus group* and the *participatory decision analysis*.

When I selected the four approaches, I thought they differed from each other in the type of issue at stake, the composition of the stakeholder groups and the aim of consensus or clarification. However the literature survey showed that most PIA approaches are similar on these issues. The PIA methodology is mainly recommended (and applied) in cases of unstructured problems in which many actors with different interests and perceptions are involved. These unstructured problems are social political constructs in which values and facts cannot be separated (although the participatory decision analysis tries to do this). I agree here with Mason and Mitroff (1981) who stress that uncertainty and conflict pertain to the core level of assumptions and not to technical verification (see also Fischer, 1995). To deal with the problem, it is essential to go beyond the cognitive level of thinking; to articulate the conflicting policy assumptions of the involved stakeholders and to become aware of the implications of these assumptions for policy. A PIA approach can facilitate this process.

The methodological key-issues should not be seen as 'criteria' for *selecting* an appropriate PIA approach. This goes beyond the aim of this paper. The key-issues are rather points of attention, which are important in the *design* and *development* of a PIA approach. The identification of methodological key-issues is a first step and fits the objective of my PhD research, which is the development of methodological guidelines for an optimal design of a PIA approach.

From the literature survey some conclusions, or at least noteworthy points, can be drawn.

As mentioned earlier, it showed during the literature survey that the analysed PIA approaches do not differ from each other in every methodological key-issue. However, they do differ in the degree of stakeholder participation. I would like to elaborate a little on this by distinguishing between *divergent* stakeholder research, and *convergent* stakeholder research (Van der Werff, 2000). Van der Werff defines research that looks at stakeholders as isolated entities as divergent stakeholder research. By means of opinion polls, interviews and other techniques, data of individual stakeholders are gathered and processed at an aggregate level. General conclusions are subsequently drawn. This introduces a strong element of structure and clarity that makes the use of conflict much more controlled and systematic. On the other hand, it introduces an element of artificiality that real debates do not have. The *policy delphi* and the *dialectical debate* are examples of divergent stakeholder research.

Stakeholder research that includes the study of the interactions between stakeholders is called convergent stakeholder research. By means of field techniques and conceptual tools, findings about social dynamics are gathered and processed at an aggregate level. Conclusions are then generalised. The *focus group* and the *participatory decision analysis* are examples of convergent stakeholder research.

Another point I would like to note is that although consensus and clarification are put forward in this paper as two opposite aims, they do not necessarily conflict with each other. For example, the participation of stakeholders is not about reducing, but rather about clarifying uncertainties and disagreement in the *focus group*. Once the participants have a clear insight into each other's arguments, the consensus that might be reached is much more reasoned, well founded and thus reliable, than a consensus that is based on the least common denominator. The same applies to the example of the *dialectical debate*: due to a structured debate on the plan and the counterplan, an argued consensus among the executives of both plans - that both plans were not really mutually exclusive - started to grow, and should be considered part of a more grand strategy. Thus, in my view, it is preferable to reach a consensus through a process of clarification.

Finally, I would like to touch upon two issues, which are worth mentioning in a literature survey on Participatory Integrated Assessment.

The first issue is the consequence of stakeholder participation for the quality of science, or better said, the consequences for the process of *reviewing* the quality of science. The traditional review processes, in which scientific peers from the same scientific discipline judge on each other scientific work, using traditional (often monodisciplinary) reviews standards, is not suitable any more. What is needed is an *extended* peer review of science; this does not only include peers from the same disciplinary area, but also scientists in related areas and policy stakeholders. Stakeholder participation could serve as an extended peer review. In this way participation may help to bridge the gap between the way the problem is defined by members of the scientific community and the daily experiences and practices of the actors who have to contribute to the solution. PIA methods may especially help to include issues that cannot be quantified by determining value systems that are relevant for policy choices.

The second issue I would like to touch upon is the expert – lay knowledge divide. Though an elaboration of this issue here goes beyond the scope of this paper, a short explanation is given. Wynne (1996; 75) states that: "Once one introduces the idea that scientific expert knowledge itself embodies a particular culture – that is, it disseminates and imposes particular and problematic normative versions of the human and the social – then this fundamental divide [between nature and culture] is no longer tenable." Wynne goes here a step beyond Giddens (1994) and Beck (1994), who only *acknowledge* the existence of lay knowledge. Wynne emphasises the constructive kinds of interaction and mutual inspiration or dependency that can exist between lay – and expert knowledge and pleads for the construction of new forms of epistemic and social order. These new forms would enjoy more democratic public identification, legitimisation or responsibility.

In a theoretical reflection on the PIA methodology, but also in its practical application, it is interesting to ponder on the consequences of Wynne's ideas about fading borders between expert and lay knowledge and mutual dependency, for the design of a PIA approach.

References

- Argyris, C., R. Putnam and D. Mclain Smith. (1985). Action science. Concepts, Methods and Skills for Research and Intervention. USA.
- Bachrach, P. (1967). The theory of democratic elitism: a critique. Little Brown, Boston.
- Beck, U. (1994). The reinvention of politics: towards a theory of reflexive modernisation. In: Beck, U., A. Giddens and S. Lash. Reflexive Modernisation: Politics, Traditions and Aesthetics in the Modern Social Order, pp. 1-55. Polity, Cambridge.
- Berk, M. , L. Hordijk, M. Hisschemöller, M.T.J. Kok, D. Liefferink, R.J. Swart and W. Tuinstra (1999). Climate Options for the Long Term, Interim Phase Report. NOP Rep. nr. 410 200 028, Wageningen University, The Netherlands.
- Bohman, J. and W. Rehg (1997). Essays on Reason and Politics – Deliberative Democracy. MIT-press, Cambridge.
- Burke, E. (1968). Citizen Participation Strategies. In: Journal of the American Institute of Planners, 35, 287-294.
- Cohen, S.J. (eds.) (1997). Mackenzie Basin Impact Study, final report. University of British Columbia, Vancouver,USA.
- Dahinden, U., J. Jäger, M. Nilsson and C. Querol (1999), A step towards briding expert-lay gaps: interacting with computer models in the second part of IA-Focus Groups. In: Jaeger, C. and B. Kasemir (eds.). Ulysses, Urban Lifestyles, Sustainability, and Integrated Environmental Assessment. Final Report. Darmstadt University of technology, Germany.
- Dienel, P.C. (1978). Die Plannungszelle. Opladen, Westdeutscher Verlag, Germany.
- Douglas, M. and A. Wildavsky (1983). Risk and Culture. An essay on the selection of technological and environmental dangers. Berkely, University of California Press, USA.
- Drehborg, K.H. (1996). Essence of Backcasting. In: Futures, vol. 28, No. 9, pp.813-828, UK.
- Dunn, W.N. (1994). Public Policy Analysis. An introduction. Prentice Hall, USA.
- Dürrenberger, G. and J. Behringer (2000). Focus Groups as Participatory Assessment Technique. In: Häberli, R., R.W. Scholz, A. Bill and M. Welti (eds.) (2000), Transdisciplinarity: Joint Problem-Solving among Science, Technology and Society, Workbook II: Mutual Learning Sessions, pp. 321-325. ETH-UNS, Zürich, Switzerland.
- Faaij, A., S. Bos, J. Spakman, D.J. Treffers, C. Battjes, R. Folkert, E. Drissen, C. Hendriks and J. Oude Lohuis (1999). Views on the future. Two visions on the Dutch energy supply for use by the National Dialogue. RIVM, Bilthoven, The Netherlands.
- Fischer, F. (1995). Evaluating Public Policy. Nelson-Hall Publishers/Chicago, USA.

- Funtowicz, S.O. and J.R. Ravetz (1992). Three Types of Risk Assessment and the Emergence of Post-Normal Science. In: Krimsky, S. and D. Golding (eds.). Social Theories of Risk. Greenwood.
- Funtowicz, S.O. and J.R. Ravetz (1993). Science for the Post Normal Age. In: Futures, vol.25/7, pp. 739-755.
- Funtowicz, S.O. and J.R. Ravetz (1994). Emergent complex systems. In: Futures, vol. 26/6, pp. 568-582.
- Gibbons, M. (eds.) (1994). The new production of knowledge. The dynamics of science and research in contemporary societies. London, UK.
- Giddens, A. (1994). Living in a post-traditional society. In: Beck, U., A. Giddens and S. Lash. Reflexive Modernisation: Politics, Traditions and Aesthetics in the Modern Social Order, pp. 56-109. Polity, Cambridge.
- Hisschemöller, M. (1993). De democratie van problemen. De relatie tussen de inhoud van beleidsproblemen en methoden van politieke besluitvorming. VU Uitgeverij, Amsterdam, The Netherlands.
- Hisschemöller, M., J. Klabbers, M. Berk, R. Swart, A. van Ulden and P. Vellinga (1995). Addressing the greenhouse effects: options for policy oriented research (in Dutch). VU Amsterdam, The Netherlands.
- Hisschemöller, M. P. Groenewegen, R. Hoppe, and C.J.H. Midden (1998). Kennisbenutting en politieke keuze: een dilemma voor het milieubeleid?. Rathenau Instituut, Working document 65. The Hague, The Netherlands.
- Hisschemöller, M., M. van de Kerkhof, O.J. Kuik and M.T.J. Kok (1999); Verslag van de oriënterende interviews, report no IVM-D99/17, Amsterdam, The Netherlands.
- Hoppe, R. (1989). Het beleidsprobleem geproblematiseerd:over beleid ontwerpen en probleemvorming. Muiderberg, the Netherlands.
- Jaeger, C., R. Schüle and B. Kasemir (1998). Focus Groups in Integrated Assessment: a micro-cosmos for reflexive modernisation. In: Darier, E. (et al.). Contributions to Participatory Integrated Assessment. ULYSSES working paper 98-1, Switzerland.
- Jaeger, C. and B. Kasemir (eds.) (1999). Ulysses, Urban Lifestyles, Sustainability, and Integrated Environmental Assessment. Final Report. Darmstadt University of technology, Germany.
- Lasswell, H.D. (1951). The policy orientation. In: Lerner, D. and H.D. Lasswell (eds.). The policy sciences. California, USA.
- Mason, R.O. and I.I. Mitroff (1981). Challenging strategic planning assumptions. Theory, cases and techniques. USA.
- Mayer, I. (1997). Debating Technologies. A Methodological Contribution to the Design and Evaluation of Participatory Policy Analysis. Tilburg, The Netherlands.
- Mayer, I and J. Geurts (1998). De instrumentele mogelijkheden van de argumentatieve beleidsanalyse: participatieve methoden. In: Hoppe, A. and A.

Peterse. Bouwstenen voor argumentatieve beleidsanalyse, pp. 187-204, The Hague, the Netherlands.

- Mill, J.S. (1873). Considerations on Representative Government. Henry Holt and Company, New York, USA.
- Mitroff, I.I., R.O. Mason and V.P. Barabba (1983). The 1980 census: policymaking amid turbulence. Lexington D.C. Heath.
- Moscovici, S. and W. Doise (1994). Conflict and consensus. A general theory of collective decisions. Sage Publications, London. UK.
- Parson, E.A. (1996). A global climate-change policy exercise: results of a test run, July 27-29, 1995. IIASA Working paper WP-96-90, Laxenburg, Austria.
- Parson, E.A. (1997). Informing global environmental policymaking: a plea for new methods of assessment and synthesis. In: Environmental Modelling and Assessment, vol. 2, pp. 267-279.
- Raiffa, H. (1968). Decision Analysis, Introductory Lectures on Choices under Uncertainty. Harvard University, USA.
- Renn, O., T. Webler, H. Rakel, P. Dienel and B. Johnson (1993). Public participation in decision-making: A three-step procedure. In: Policy Sciences, vol. 26, pp. 189-214.
- Rosa, E.A. (1988). NAMBY PAMBY and NIMBY PIMBY: Public Issues in the Siting of Hazardous Waste Facilities. Forum for Applied Research and Public Policy, 3, pp. 114-123.

Rosenbaum, W. (1978). Elitism and Citizen Participation. In: Langton, S. (ed.). Citizen Participation Perspectives: proceedings of the National Conference on Citizen Participation. Washington D.C., Sept. 28-Oct. 1, 1978. Tufts University Lincoln Filene Centre for Citizenship and Public Affairs.

- Rotmans, J. and H. Dowlatabadi (1998). Integrated Assessment Modeling. In: Raynes and E.L Malone. Human Choice and Climate Change, p.p. 291-377. Bataller Press, USA.
- Rotmans, J. (1998a). Geïntegreerd denken en handelen: een noodzakelijk goed (inaugural lecture). International Centre for Integrative Studies (ICIS), Maastricht, the Netherlands.
- Rotmans, J. (1998b). Methods for IA: the challenges and opportunities ahead. In: Environmental Modeling & Assessment. Vol. 3, pp. 155-179.
- Rotmans, J. (1999). Integrated Assessment. A bird's-eye views. Introductory guide prepared for the European Summerschool 'Puzzle solving for policy: tools and methods for Integrated Assessment', 30 August-17 September 1999, International Centre for Integrative Studies (ICIS), Maastricht, The Netherlands.
- Rousseau, J.J. (1968) [1762]. The social Contract. Translated by Cranston, M., Penguin: Harmondsworth, UK.
- Seley, J.F. (1983). The politics of public facility planning. Lexington, Lexington Books.

- Stern, P.C., H.V. Fineberg (eds.) (1996). Understanding risk. Informing decisions in a democratic society. National Academy Press, Washington D.C, USA.
- Turoff, M. (1975). The Policy Delphi. In: Linstone, H.A. and M. Turoff (eds.). The Delphi Method. Techniques and applications, USA.
- Van de Kerkhof, M. and M. Hisschemöller (2000). Bringing Transdisciplinarity into practice: the Dutch COOL project. In: Häberli, R., R.W. Scholz, A. Bill and M. Welti (eds.) (2000), Transdisciplinarity: Joint Problem-Solving among Science, Technology and Society, Workbook 1: Dialogue Sessions and Idea Market, pp. 296-300. ETH-UNS, Zürich, Switzerland.
- Van der Werff, P. (2000). Stakeholder approach. Report D00/09, pp. 4. Institute for Environmental Studies, Amsterdam, The Netherlands.
- Van Thijn, E. (1997). Politiek en bureaucratie: baas boven baas (inaugural lecture). Van Gennep, Amsterdam, The Netherlands.
- Vari, A. and S. Kisgyorgy (1998). Public participation in developing quality legislation and regulation in Hungary. In: Water Policy, 1: 223 – 238.
- Von Winterfeldt, D. (1992). Expert knowledge and public values in risk management: the role of decision analysis. In: Krimsky, S. and D. Golding (eds.). Social Theories of Risk. Westport, Conn. Prager, pp. 321-342.
- Webler, T. and O. Renn (1995). A brief primer on participation: philosophy and practice. In: Renn, O., T. Webler and P. Wiedemann. Fairness and competence in citizen participation. Evaluating models for environmental discourse. Kluwer Academic Publishers, The Netherlands.
- Weisbord, M.R. (ed.). Discovering common ground. Berret-Koehler Publishers, San Francisco.
- Weyant, J., O. Davidson, H. Dowlatabadi, J. Edmonds, M. Grubb, E.A. Parson, R. Richels, J. Rotmans, P.R. Shukla, R.S.J. Tol, W. Cline and S. Frankhauser (1996). Integrated Assessment of climate change: an overview and comparison of approaches and results. In: Bruce, J.P., H. Lee and E.F. Haites (eds.). Climate change 1995: Economic and social dimensions of climate change. Contribution of Working Group III to the Second Assessment Report of the IPCC. Cambridge: Cambridge University Press.
- Whyte, W.F. (eds.) (1991). Participatory action research. Sage Publications Inc., USA.
- Wynne, B. (1996). May the sheep safely graze? A reflexive view of the expert – lay knowledge divide. In: Lash, S., B. Szerszynski and B. Wynne. Risk, Environment and Modernity; Towards a New Ecology, pp. 44-83. Sage Publications, London, UK.
- Wynne, B. and K. Dressel (199?). Cultures of Uncertainty – Transboundary Risks and BSE in Europe. UK.