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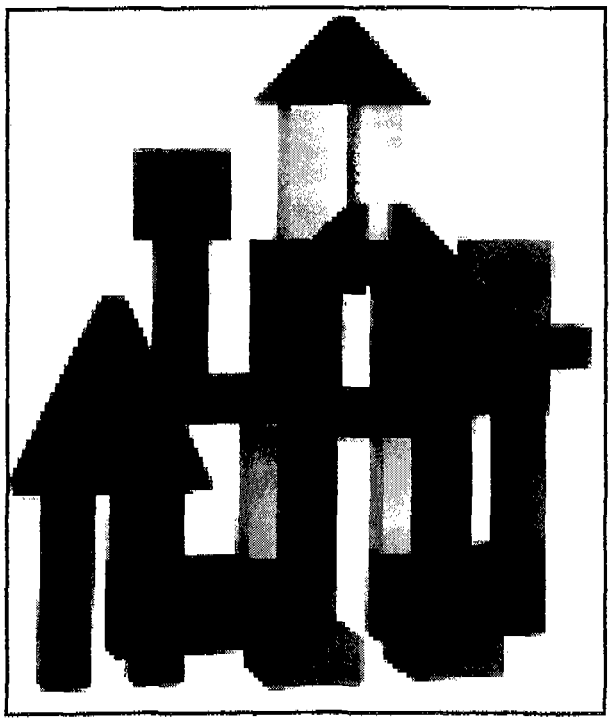
Building Blocks for Participation in Integrated Assessment

A review of participatory methods



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1. Introduction

Integrated Assessment[1] (IA) is described as an interdisciplinary process of gathering, combining, interpreting and communicating knowledge from different scientific disciplines and knowledge domains to allow a better understanding of complex phenomena. IA has the explicit aim to inform and facilitate decision-making. Although the term Integrated Assessment dates back to the 1980s, it is only since the late 1990s that Integrated Assessment has been recognised as a kind of profession and as a specific branch of scientific research.

The available tools and methods for Integrated Assessment can be roughly divided into analytical methods and participatory approaches. Until the mid-nineties modellers, mainly natural scientists and economists, dominated Integrated Assessment: modelling was considered as the way to do Integrated Assessment. In the course of the nineties, however, it became more and more acknowledged that social-scientific methods can complement and enrich Integrated Assessments. Several Integrated Assessment projects in the mid and late nineties explicitly aimed to use and further develop participatory methodologies stemming from the social sciences. Participatory methods, also labelled as interactive or deliberative methods, involve a plethora of process methods, varying from expert panels, to gaming, policy exercises and focus groups. It was first argued that involvement of non-scientists is needed to ensure the relevance and later acceptance of the analytical (modelling) approach (see, for example, (Hordijk 1991a); (van Asselt 1994); (Costanza and Ruth 1996); (Alcamo et al. 1996)). It is now generally acknowledged that input of non-scientific and practical knowledge and expertise, valuation and preferences through the involvement of actors by means of participatory methods enriches IA endeavours (van der Sluijs and Kloprogge 2000).

Participation is thus increasingly recognised as an essential pillar of IA. However, experience with participation and thorough and systematic evaluation of the value of participation in actual assessment endeavours are at present scarce. In order to address this need for deepening and broadening the knowledge basis on participation in Integrated Assessment, a working group[2] was initiated at ICIS (International Centre for Integrative Studies (Maastricht University) in 1998. The current report summarises the research activities of this participatory working group, which benefited from participatory endeavours and progress in a number of ongoing ICIS projects, such as VISIONS, FIRMA, NOP-water, projects with Telos, the Province of Limburg and the city of Maastricht[3].

The working group has performed a literature review to obtain an overview of the scope and state-of-the-art of participatory methods in general. The bibliography at the end of this paper provides a full overview of the literature found and considered. Furthermore, the group held

[1] See for literature on Integrated Assessment (Dowlatabadi and Morgan 1993), (Dowlatabadi and Morgan 1993; Haigh 1998), (Jaeger *et al.* 1995), (Morgan and Dowlatabadi 1996), (Parson and Fisher-Vanden 1997), (Parson and Fisher-Vanden 1997; Risbey *et al.* 1996), (Rotmans and van Asselt 2001), (Rotmans 1998), (Van Asselt *et al.* 2001), (Schneider 1997) (Toth and Hizsnyik 1998), (Weyant *et al.* 1996).

[2] An ICIS' working group is a team of 5-10 researchers focussing on a particular subject in order to create synergy between projects and facilitate intellectual exchange. They meet bi-weekly for several hours for in-depth discussion and working sessions.

[3] For information about these projects, see ICIS website: www.icis.unimaas.nl

discussions with scholarly experts involved in participation[4] and attended several workshops and lectures[5] to gather up-to-date information on participatory approaches. The literature about and experience with participation is scattered over a wide range of disciplines. As a consequence, our literature review is necessarily limited; for example, from discussing the draft working paper at a meeting of the FIRMA project, it became clear that we have missed literature on conflict resolution or participatory techniques used in the field of contingent valuation. We consider the current working paper as a first step towards providing the IA community with a sound scientific basis on participatory methods. With this paper, we hope to invite colleagues to point us to experiences and techniques that we have missed.

The working group discussed the different participatory methods found, paying particular attention to whether they seem to be of interest for Integrated Assessment purposes. The working group also evaluated experiences with participation in Integrated Assessment to date. Only a limited number of IA-projects has explicitly employed participatory methods, such as (in chronological order):

- **RAINS** (Regional Air Pollution Information and Simulation model), a simulation model that has been developed by IIASA (Austria) in a participatory way with scientists and policymakers and that has been used in international negotiations on transboundary air pollution (1983 – now).
- **MacKenzie Basin Impact Study** (MBIS), a climate change impact assessment focusing on Northwest Canada, co-ordinated by Environment Canada and the Sustainable Development Research Institute, Canada (1995 – 1999).
- **IMAGE / Delft Process,** a model to study forcing and feedback in the society-biosphere-climate system, developed by the National Institute of Public Health and the Environment, The Netherlands
- **QUEST** (Quite Useful Ecosystem Scenario Tool), a game-like Integrated Assessment model used in stakeholder processes developed at the Sustainable Development Research Institute, University of British Columbia, Canada (1994 – now).
- **ULYSSES**[6] (Urban Lifestyles, Sustainability and Integrated Environmental Assessment), a three year European research project (1996 – 1999) on public participation in Integrated Assessment, co-ordinated by Darmstadt University of Technology, Germany.
- **VISIONS** (Integrated Visions for a Sustainable Europe), a three year Integrated Assessment project (1998 – 2001) to assist the process of policymaking for sustainable development in Europe, co-ordinated by International Centre for Integrative Studies (ICIS), the Netherlands.
- **COOL** (Climate Options for the Long term), a three-year Dutch Integrated Assessment project (ca. 1999 – 2001) supporting the development of long-term climate policy in The Netherlands in a European and global context

[4] For example Bryan Norton (Georgia Institute of Technology, USA), Timothy O'Riordan (University of East Anglia, United Kingdom), Bernd Kasemir (EAWAG, Switzerland) and Christoph Schlumpf (EAWAG, Switzerland).

[5] For example a 5-day workshop 'Participatory appraisal' in Edinburgh, April 1999, and lectures by Prof. Dr. Jacques Geurts (Catholic University of Brabant) and Prof. Dr. Carlo Jaeger (EAWAG, Switzerland) and Dr. Frank Ruff (Daimler Chrysler, Berlin) at the Summer School on "Puzzle solving for policy: tools and methods for Integrated Assessment " at ICIS, Maastricht, August – September, 1999 (Van Asselt *et al.* 2001).

[6] It should be mentioned that the Swiss part of the ULYSSES project was connected to the CLEAR project (Cebon, et al. 1998) , in which the same participatory methodology has been used.

Notwithstanding the growing interest to use participatory approaches in IA-projects, the use of participatory techniques in Integrated Assessment is still in its infancy state: there are not (yet) established procedures and work packages for using participatory methodology in IA. This makes it also difficult to judge the quality of participatory-based assessments in this stage (van Asselt 2000). From our review of the scholarly literature on participation and from the first experiences with participation in Integrated Assessment, we aim to distil some building blocks for participation in IA. The present paper is meant to serve as an introductory methodological paper on participation in IA and as source of inspiration for those who would like to include a participatory dimension in their assessment endeavours.

Chapter 2 provides an overview of our selection of participatory methods found in the literature. The different methods will be described in terms of the historical context and rationale, the goal, the tools and techniques employed, the participants and a stepwise general description of the method. Thereafter, experiences with participation in IA are discussed (Chapter 3). In the concluding Chapter, we evaluate the state-of-the-art of participation in IA and we will sketch some challenges for further research.

2. Participatory Methods

2.1 History of participation in a nutshell

Participation as research method in science or as scientific endeavour is not new. Focus groups, for example, have been applied in market research since the seventies, while consensus conferences have been applied in technology assessment (for example on the issue of predictive genetic research). Gaming approaches have been prominently in use for training purposes (e.g. military and business games). Teaching and training games for environmental management have been around since the 80s.

Participation has roots in the following scientific disciplines:

- Political science
- Anthropology
- Sociology
- Psychology
- Philosophy
- Social geography
- Business sciences

In the late 1930s social scientists began investigating alternatives to interviewing as the dominant method of gathering information. The quest for alternatives was inspired by concerns on the excessive influence of the interviewer and the limitations of predetermined, closed questions. The respondent was limited to the choices offered and the findings could be unintentionally influenced by the interviewer. It was considered a challenge to find ways that would allow the interviewer/moderator taking on a less directive role thereby enabling the respondents to comment on the areas deemed to be most important according to the respondent themselves. During World War II, alternative interviewing strategies were applied to groups, as a means of increasing military morale. These processes can be seen as the first examples of so-called focus groups. Building upon these experiences, focus group interviewing was quite extensively applied in market research, organised by those that develop or manufacture new products in order to understand the thinking of the consumers.

In the 1960s social scientists started to investigate participation with respect to policy and decision-making. Public administration research in the 1960s highlighted that while representative democracy is a form of participation, it has significant deficiencies because it presents the majority view and it is therefore limited with respect to the range of values and preferences that it can elucidate. As a response, social scientists organised participatory initiatives, in order to address the short-falls of democracy; hereby focussing on empowering people. These methods were extensively applied in developing countries to oppose the prevailing top-down mode of decision-making. In recent years research on participation in science got more focussed on gaining support for decisions and enriching assessments with lay-knowledge and opinions. The latter focus is inspired by social scientific theories on social-constructivism, post-modernism and post-normal science arguing that science is socially constructed and that science should not have the monopoly of knowledge. These theoretical strands demand new methodologies and a more societal orientation of science. To aspire to the idea of 'democratisation' of knowledge, science needs to include multiplicity,

admitting reasonable perspectives of stakeholders and the relevance of local and contextual knowledge. These ideas have resonated in the Integrated Assessment community. Although ideas for using participatory approaches in integrated and environmental assessment have been proposed already in the late 70s (Holling 1978 (revision 1990)) and 80s (Brewer 1986), the broader IA community seeks to seriously apply such methods in the assessment endeavours only rather recently.

2.2 A closer look at participatory methods

Before focussing on different participatory approaches, it is necessary to define the key term 'participation'. The dictionary definition of participation involves (Oxford dictionary second edition):

- the action or fact of partaking, having or forming part
- the fact or condition of sharing in common (*with* others, or with each other)
- the active involvement of members of a community or organisation in decisions which affect their lives and work.

The scholarly use of the notion 'participation' aspires to this common use of the word. The social science literature on participation features many definitions on participation. These have in common that they refer to the participation in assessment or decision-making processes of those directly or indirectly involved in, affected by, knowledgeable of or having relevant expertise on the issue at stake.

Building upon our literature review, we distinguish five categories of potential participants related to public policy issues:

- *Government*
- *Citizens*
- *Interest groups,* such as non-governmental organisations (NGOs)
- *Business*
- *Scientific experts*

Citizens, interest groups and business are participants who express values, preferences and contribute to non-scientific knowledge. In the literature these actors are often also referred to as stakeholders. Usually, such stakeholders are supposed to play an active role in participatory processes. They are invited to express their knowledge, feelings, values and perspectives pertaining to a specific issue. Representatives of governmental institutions and scientific experts are not always actively involved in assessment processes. Their roles differ according to the particular method. They often testify in the process without actively participating in the deliberation. In some cases they are present, and take part in the discussion, while in others they are observing. In cases where the decision-makers are not present at the participatory sessions, they may obtain output of the participatory process by means of a report summarising policy recommendations or a citizens' report. Scientists can participate in participatory processes because of their knowledge deemed to be relevant to the issue at stake. They can either be invited to participate in a particular part of the program to share their knowledge, or they can participate in the whole process as full participants.

The notion 'participatory methods', also referred to as interactive or deliberative methods, is used as an umbrella term embracing a variety of methods and approaches employed to enhance participation in assessment as means to different ends. In this paper we use the following definition:

> *Participatory methods are methods to structure group processes in which non-experts play an active role and articulate their knowledge, values and preferences for different goals.*

The above definition implies that we focus on participation organised, and thus imposed, by analysts. Secondly, participatory methods is confined here to group methods; although interviews can be used as means to articulate knowledge, values and preferences of non-experts, so that interview data can serve as a way to involve stakeholders' views in assessment processes, interviewing is not a participatory method per se. Participatory methods as discussed in the heart of this working paper refer to a specific type of methods to organise stakeholder involvement in assessment and decision-making processes, while interviewing is a standard social science technique that can also be used in the context of stakeholder involvement.

In the context of Integrated Assessment, integrated assessors are the initiators and organisers of participatory processes. If the IA researcher acts as process manager, facilitator or moderator, s/he is not a participant in the sense of the above definition. Process management of participatory processes usually involves facilitation as well as analysis. The facilitator plays an essential role in the process, guiding all participants through discussions to an end point, without expressing his or her own view. The analyst studying the interactive process does not play an active role in the process itself, but observes and analyses the discussion, the reactions of the participants, and the role of the moderator.

Building upon our literature review, we conclude that it is possible to categorise the various existing participatory methods according to the goal of application. Participatory methods are sometimes justified on arguments inspired by the nature of democracy (see, for example, (Kasemir et al. 1997). As Ravetz (Ravetz 1997) states "policies for managing sustainability will be effective only if they have the moral support of a great mass of people". It is therefore argued that assessments should comprise the opinions and attitudes of stakeholders and citizens. So the idea of participation is by some understood as a way to democratise science and to empower citizens. On the other hand, participation can also be understood as a way to improve the quality of Integrated Assessments by enriching the knowledge base with contextual knowledge and stakeholder opinions. In such a context, participants are consulted and the output is used as advice. In the latter case, participatory processes are used to inform decision-making processes; the goal of such application of participation can be described as 'advising'. In the latter case, participation is part of the decision-*support* process, while in the case of democratisation, participation is a way of organising the decision-*making* process, as an alternative to traditional top-down modes of decision-making. In addition to 'democratisation' and 'advising' two other goals of participatory processes can be distinguished, i.e. 'mapping out diversity' and 'reaching consensus':

- *Mapping out diversity* – participatory methods that seek to uncover a spectrum of options and information. They enable a group to disclose information (making tacit knowledge explicit) or test alternative strategies in a permissive environment.

- *Reaching consensus* – participatory methods that seek to define or single out one option or decision. They enable a group to reach an informed decision on an issue.
- *Democratisation* – participatory methods that enable participants to employ their own knowledge to create options for tackling (policy) issues that directly concern them. The output has weight in the decision-making process (it can be binding)
- *Advising*– participatory methods that are used to reveal stakeholders' knowledge, values and ideas that are relevant to the process of decision-making. The output is used as input to the decision-support process.

Reaching consensus and *mapping out diversity* can be seen as opposite poles: mapping out diversity can be characterised as a process focussing on divergence, while, on the contrary, *reaching consensus* seeks convergence through compromise. *Democratisation* and *advising* can also be considered as two ends of one axis. Both deal with the fundamental question of the context of the participatory process of "what weight is attached to the output of the participatory process?". In the first case, participation is meant to be part of the *decision-making* process, while in the second case participation is used as tool in *decision-support* (policy analysis). The first axis ranging from reaching consensus to mapping out diversity can be characterised as aim in terms of targeted output, while the second axis democratisation – advising expresses the deeper why in terms of aspiration and motivation.

The methods described further in this Chapter are: focus groups, scenario analysis, policy exercises, citizens' juries, consensus conferences, participatory planning, and participatory modelling (group model building). We clustered these methods according to goals, using the matrix sketched by the two axes discussed above (see Figure 1). Policy exercises, for example, assist in mapping out diversity and they are used as tool in policy analysis. One should realise that it was not always easy to cluster them univocally as the goals of the methods are defined differently in various literature sources and they are sometimes described on a very high level of abstraction.

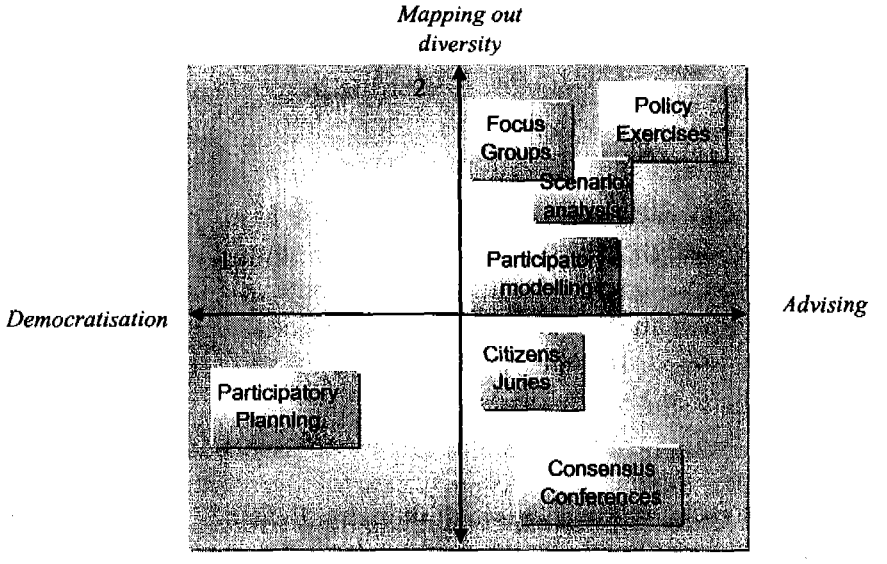

Figure 1. Categorisation of participatory methods described in this chapter.

The upper right quadrant referring to methods that aim at democratisation through mapping out diversity remained empty. It can be argued that this is the case, because we focussed on participation imposed by scientists/analysts. This empty quadrant may be associated with participatory processes organised by stakeholders themselves, such as mass demonstrations that had the aim to map out the diverse arguments for protest[7].

In the next paragraphs, each method will be described along the following methodological aspects:
- the basic rationale
- history
- the goal of the process
- the number and type of participants
- process design (stages, tools and techniques, the groupings of participants)

The methods are described in general terms, and where possible drawn from several case study examples. While the features of a method can be described in general terms, many details (from number of participants to the goal) are case-specific and context dependent. The choice for a specific participatory approach not only depends on the goal of the participatory process, but also on more practical issues such as: resources in terms of time, budget and capabilities of staff, and the target group of participants that will be invited. In this paper, the focus is on the general aspects of participatory methods.

The methods will be described one by one, starting with the advising methods that aim at mapping out diversity, i.e. focus groups, scenario analysis, and policy exercises. Next, participatory modelling, citizens' juries and consensus conferences, methods that aim at convergence, are discussed. Finally participatory planning primarily aiming at democratisation is introduced.

2.3 Advising methods aimed at mapping out diversity

a) Focus Groups

General definition

A focus group is a planned discussion among a small group (4-12) of stakeholders facilitated by a skilled moderator and is designed to obtain information about preferences and opinions in a permissive, non-threatening environment. Group members influence each other by responding to ideas and comments in the discussion, with the consequence that a more natural articulation unfolds (Krueger 1988). In focus groups, scientists play the role of facilitator or observer. They are usually not actively involved as full participants.

History and rationale

During World War II, first focus groups were applied as a means of increasing military morale. Following that, most applications of focus group interviewing were in market research organised by those that develop or manufacture new products to enable them to understand the thinking of the consumers. They are now considered as a crucial step in shaping the marketing strategy for products. It should be noted that in current practise of

[7] Discussion at FIRMA meeting, Barcelona, March 2001 (website: http://www.cpm.mmu.ac.uk/firma/)

marketing large numbers of focus groups are used, and that statistics are applied to the output. However, this use of focus groups can no longer be considered as participatory methods that aim to involve stakeholders, but serves primarily as a data collection method. Focus groups were initially not developed to serve as representative, enabling statistical generalisation.

Focus groups are used at various stages in the development of programs, products or services. Krueger (Krueger 1988) describes the following applications of focus groups:

- Needs assessment
- Testing new ideas
- Market research into how customers make decisions relating to the purchase and use of certain products.

Besides, focus groups can be used in relation to other methods, for example as follow up to a mail-out survey (interpreting data) and generating information for questionnaires. Furthermore, focus groups are becoming increasingly popular as a tool in modern governance: both Clinton and Blair use(d) focus groups to test ideas and proposals. The focus group technique is also growing in popularity among social scientists, evaluators, planners, and educators (Krueger 1988).

Attitudes and perceptions are shaped, at least partly, in interaction with other people. More traditional information gathering methods, such as individual interviews, assume that individuals do know what they feel, which make them less adequate in the context of novel or controversial issues. Individual methods furthermore presuppose that individuals form opinions in isolation. Social scientists have noted that people often (need to) listen to other opinions before they form their own viewpoint. Evidence also indicates that people do influence each other with their comments and that in the course of a discussion the opinions of an individual may shift (Krueger 1988). Stewart (1990) refers to this as the ***synergistic effect***: i.e. respondents react and build upon the responses of other group members. The focus group method builds upon these insights concerning the formation of attitudes and perceptions. A focus group enables viewpoints that might not have been discovered in individual interviews. The focus group setting also allows to analyse how shifts in opinions occur and what the influencing factors are in these processes.

The permissive group environment gives individuals license to divulge emotions that often do not emerge in other forms of questioning. This permissive environment is created through selecting a group of participants who all have something in common, but who are also strangers to each other. When people have something in common they are more inclined to communicate. If they are strangers to each other and unlikely to see each other again, they are usually more open in expressing their thoughts and opinions. Through the nature of questioning in focus groups and also the focus group give rules the interviewer should subscribe to, the moderator is less in a position of power and in principle encourages all type of comments by all participants.

Goal

The general goal of the focus group methodology is to:

Uncover diverse information about values and preferences pertaining to a defined topic and why they are held by observing the structured discussion in an interacting group.

It is also useful to describe the goal of a focus group by describing what is **not** its aim. Following (Krueger 1988):

Focus groups are not intended to develop consensus, to arrive at an agreeable plan, or to make decisions about which course of action to take.

Issue

The focus group methodology is best used in exploratory research where relatively little is known about the issue (Stewart and Shamdasani 1990). The issue is often qualitative.

Process design

Participants

About 4 to 12 people are participating in a focus group. Depending on the research question, the group is either selected as homogenous or heterogeneous group (in terms of ideologies, profession, age, sex, nationality and so on of the members) (Jaeger, 2001). Statistical representation is not aimed at; the aim is rather to achieve an in-depth understanding of a particular issue as it is understood by the group. In the literature, participants are generally referred to as citizens or interest groups. They are selected because they have certain characteristics in common, relating to the topic of the focus group. Within one project, focus groups can be conducted several times with different groups of participants with similar profile to identify trends and patterns in perceptions.

The online focus group is a new type of focus group. For online focus groups, generally 8 to 10 people are invited to join for a specified period of time (90 minutes or 2 hours) in a specialised chat room. Here they can view text, graphics, sounds, video or multimedia for evaluation and testing. On the day of the focus groups, observers can watch the group in action and send private messages to the co-moderaters as the group is progressing. An advantage of an online focus group is that complete transcripts of the session are available directly after the conclusion of the group. This makes it a good research method when quick answers are required (SurveySite: http://www.surveysite.com/newsite/docs/onlinefocus.htm).

Tools and techniques

The main tool employed in focus groups are the *focussed questions*. The open-ended questions are developed and placed in logical sequence in the participation phase, which takes considerable reflection. However, they should appear to be spontaneous (Krueger 1988). In addition tools such as *brainstorming* and *synectics* have also been employed *(Stewart and Shamdasani 1990)*. Brainstorming techniques, involve the generation of ideas, approaches or solutions without regard to costs, practicality or feasibility. They require a creative, non critical environment. The term 'synectics' refers to gaming techniques which provide the context for viewing problems from new or unusual perspectives often through the use of role playing. These gaming techniques have been used in business organisations as a means for generating ideas for new products and services. In focus groups, it can be used to gain new insights by removing participants from their usual frame of reference into a hypothetical situation that enables them to view the problem from various perspectives. This unfamiliar environment forces participants out of habitual problem-solving modes and into more creative and innovative modes of analysis. Other techniques employed are collages and paintings to be made by the participants as non-verbal way to express their opinions and views.

Main Activity

The focus group may involve discussions for one day only or cover a period of several days. One session generally consists of several hours (1-3) of focussed group discussions around

the prepared open-ended questions. The process usually begins with an introduction round, some general questions and then focuses on some more specific issues. The moderator emphasises the similarities of the participants at the beginning to promote disclosure. Discussions usually take place among all the group members; sometimes there may be a sub-group division to perform specific tasks (such as making a collage).

Figure 2. A focus group session.

Tools and techniques: pre-formulated questions

Pre-formulated questions are used as tools in the focus group (but also in the consensus conference and the citizens jury) to extract specific information required for the assessment. In the case of focus groups the questions may be a means to extract information from non-scientists to be used in scientific assessment whereas in the cases of consensus conferences and citizens juries the questions are a means to extract information from experts that is then assessed by non-scientists. In the consensus conference method, the questions are shared among the participants prior to the participatory event, in contrast to focus groups where the questions are designed to form part of a spontaneous discussion. It is not clear whether the witnesses in the citizens jury method know of the questions before the hearings. In the focus group open-ended questions in language understandable to the stakeholders (non-scientists) are used as a tool to structure the discussion. Efforts are taken to ensure the process runs as if it were a spontaneous group conversation. The focus questions are developed only after an in-depth analysis of the defined issues and sequences and memorized the questions in logical order (Krueger, 1988). In the consensus conference, the questions are formulated by the lay panel (non-scientists) and given to the experts prior to the conference. During the conference the experts deliver their answers in the form of presentations. The questions are the result of discussions among the lay panel based on information about the subject matter and the salient questions in the current public debate (Joss and Durant, 1995). In citizens juries (Smith and Wales, 1999) the questions are formulated by the jury based on the type of information they require in order to respond to the 'charge' that is assigned to them by the organizers. The questions are used to structure the hearings where the jury cross examines the witnesses in a setting analogous to a legal jury. For technical issues the witnesses (scientific experts) are advised not to use expert jargon. For non-technical or sensitive issues, the question and answer sessions are often carried out in smaller groups to minimize intimidation.

b) Scenario analysis

General Definition
Scenario analysis is an interactive process engaging a group in a process of identifying key issues, *creating and exploring* scenarios in order to learn about the external environment and/or integrating the insights into the decision-making of the organisation. The free-format approach enables the exchange and synthesis of ideas and encourages creative thinking.

Rationale and historical context
Scenario analysis originated as a military planning tool after the Second World War. Since General Electric and Royal Dutch/Shell adopted the practice in the late 1960s, the approach has been used regularly in strategic decision support in commercial organisations. Since then the application of scenario analysis has diverged to many sectors of the business community from ICT to beverages, consumer durables to financial services. In the past two decades, government institutions have also increasingly adopted scenario analysis in strategic policy making processes.

The use of scenario analysis has traditionally been for planning purposes. In the past fifteen years, however, this has become more diffuse. Nowadays its application varies from planning to teambuilding, vision development to conscience raising and communal learning. Electrolux, for example, has used scenario analysis to identify new commercial opportunities, AMD to think through tactics regarding the launching of new chip technology, and Ericsson to explore the future of the telecommunications industry[8] (Ringland 1998; Gertner and Knetz 2000).

A typical feature of contemporary scenario analysis is the involvement of decision-makers and important stakeholders in the scenario development process. The involvement may be limited to a single interview, but it can also involve participating in several workshops that may run for several days at a time.

The scenario analysis methodology described here is based on the *scenario analysis* concept (also known as *Scenario Planning* or *Scenario Learning*) developed by Royal Dutch /Shell, and later by Global Business Network[9]. Scenario analysis involves two elements: the construction of alternative scenarios relevant to a particular organisation and the integration of the content of these into the organisation's decision-making. Scenarios are developed in sets of usually three or four to study how an organisation or one of its strategic options would fare in each future set. Although many business, governmental and consulting organisations have developed their own particular approaches to crafting scenarios, in general the scenario learning methodologies incorporate each of the following elements into the scenarios:
- driving forces are forces that shape and propel the story described in a particular plot.
- logics provide the explanation of why specific forces or players behave as they do.
- the plot contains a story that connects the present to the end state.
- the end state is a description of what would happen at the end point of the time horizon.

The method was designed to challenge the mind-set of participants by developing plausible alternative futures, and establishing a dialogue between members usually from within an

[8] Also based on meetings with Ericsson.
[9] www.gbn.org.

organisation. It facilitates the free-ranging exchange of ideas, perceptions and concerns. Scenario analysis is an aid to understand how the world might unfold and how that understanding can be used in strategic planning for an organisation.

Goal

The goal of scenario analysis is to:

"...explore the range of available choices involved in preparing for the future, test how well those choices would succeed in various possible futures and prepare a rough timetable for future events." (Fahey and Randall 1998)

Brainstorming

Brainstorming is a commonly known technique for the creative generation of ideas, approaches or solutions without taking into account constraints such as cost, practicality or feasibility. The blue-sky nature of the technique requires an atmosphere conducive to creative and free-format expression. Participatory brainstorming is an essential step in scenario analysis and is also often employed in focus groups. In order to create optimum conditions for creative thinking the members of the group are asked not to criticise, discard or disparage any ideas generated by others (Fahey *et al*, 1998b). Instead they are encouraged to build on the ideas of others by suggesting embellishments, improvements and modifications (Stewart and Shamdasani, 1990). The emphasis of the exercise is on the quantity of ideas produced, as the greater the number of ideas generated, the higher the probability that at least some are valuable. Brainstorming can be done verbally but also written, for example in a 'post-it session'. An important factor is that the generated ideas are visible and accessible to the group, so that participants can directly interact on it.

Group support facilities

The Group Decision Room is an example of a software supporting tool to perform brainstorming in a very interactive way, usually generating ideas quicker than in 'traditional' settings. Group support facilities came into fashion in the mid 1990s to support brainstorm sessions and decision-making processes through computer software. It allows large numbers of people to participate in strategic brainstorm sessions simultaneously. The software can be adapted to suit specific needs. For example, anonymity of input can be arranged so that all ideas are treated equally. In this way the potentially negative influence of organizational hierarchies on the process is avoided. The software is often used on location in so called group decision rooms. Consulting firms typically use this technology offering their software and the related accommodation as part of their services. It is also possible to use the technology independently of a physical location whereby allowing group processes to be run efficiently and free of geographical constraints.

Issue

The methodology is most appropriate for addressing complex issues whose futures are shrouded in uncertainty, where decision-making is generally based on subjective, non-quantifiable factors and where the establishment of dialogue among key actors is necessary to formulate strategic plans for the future.

Process

Participants

The team is composed of people with a thorough knowledge of the organisation concerned and/or the issues to be addressed and often including people from different levels of the organisation's hierarchy. In addition participants from outside the organisation, for example

original thinkers with unorthodox views, are frequently included. Scenario analysis processes within governments usually involve external stakeholders as well.

Tools and techniques

Brainstorming

Brainstorming exercises are used to surface a vast array of ideas associated with the issues. The exercise is meant to be creative and for this reason rules such as that no idea is immediately disparaged or discarded are applied.

Main activity

The first element of scenario analysis is an interactive team process of creating building blocks for the scenarios. This process is generally carried out in a two-day workshop away from the usual working environment. The second element, the development of compelling scenario stories from this initial material through background research exploring the implications of the stories is less participatory by nature and usually performed by a small team of scenario analysts. In view of the focus of the current report on participation, we will concentrate on the scenario workshops themselves.

The first step in the process is to identify the key issues or questions relevant to the organisation and the time frame associated with the focal issue(s). This is followed by a brainstorming exercise to surface ideas associated with the issues under concern. From this brainstorming, driving forces and key trends are identified by clustering the brainstorm ideas into common themes. Often these are social, cultural, technological, economic, environmental and political, featuring the most significant events in the external environment; they will drive the plots of the scenarios and determine their outcome. A variety of procedures is developed for arriving at scenario plots from the key trends and driving forces. In general in the following way: 1) the driving forces and key trends are prioritised to determine those that are most important and uncertain; 2) these provide the themes for the plots; 3) a variety of scenario plots is then created from this limited number of selected themes; 4) once the themes are identified the group fleshes out the skeleton of each scenario – tracing the narrative line from a beginning to an end.

The follow up to the workshop output involves a period of interim research and reflection, writing up the scenarios and exploring their implications. The important driving forces, trends and uncertainties are researched.

c) Envisioning'[10] workshops

General Definition

Envisioning workshops are meetings that involve discussion among a range of actors, with the aim of developing visions and proposals for technological needs and possibilities in the future (Street 1997). The basis for such workshops is a *set of prepared scenarios* which put forward possible future arrangements or conditions surrounding a particular issue. The group of 18-22 participants discusses and criticises the scenarios, creates common visions, identifies barriers to those visions and develops plans of action. The envisioning workshop can be seen as a

[10] The method is referred to as Scenario workshops in the literature. The name has been changed for the purposes of this working paper to avoid confusion with other methods of similar name.

variant of the scenario learning methodology. The main difference is that in envisioning workshops scenarios have been developed in advance and are used as input for the discussion, while in scenario workshops the participants themselves develop the scenarios.

Rationale and Historical context

Envisioning workshops have their basis in Technology Assessment (TA). TA is the activity of describing, analysing and forecasting likely effects of technological change, the main purpose of which is to provide an input into technology policy making (Street 1997). TA emerged from the need for critical reflection of the negative effects of a particular technology development (Grin et al. 1997). TA contains several elements of forecasting: technology forecasting and social, economic and political forecasting. Such forecasts do not state what the future will be, but they look at the opportunities that exist for shaping it.

Predefined scenarios

Sets of scenarios formulated by experts (or derived from previous scenario studies) are used to engage participants in discussion about the future. They provide a more concrete context for discussing issues in the future that are more often abstract. Such scenarios are 'snapshots' of possible futures often taking the form of expressive descriptions of everyday life in a future time paying particular attention to issues that the workshop aims to address [Street, 1997] The scenarios are not intended to be prescriptive but they provide a starting point for discussion in 'envisioning workshops'. They serve as a tool for creating and comparing different visions of the future and developing a set of actions. Although these predefined scenarios may be constructed in a similar way to those employed in role playing or gaming exercises, they serve an entirely different purpose. The participants do not use them to assume roles and act out the future but as a means to stimulate thinking and as a context to engage in discussion about the future.

Traditionally, technology assessments were science-centred, performed by analysts and handed over to decision makers in the form of desk studies. This proved to be largely ineffective due to various reasons. One reason is that technology development paths usually result from the interaction between actors who all have their own perspective and approach for dealing with their fellow actors and technologies. A desk study analysing the interaction among actors does not adequately address this, despite taking into account various perspectives because the interaction among actors is more than the sum of the individual actors' actions (Grin et al. 1997). Furthermore, traditional scientific approaches are unable to deal with the uncertain nature of many environmental problems, which are problems with high decision stakes and high systems uncertainties. Envisioning workshops aim to encourage a critical evaluation of scientific institutions and try to incorporate citizens' views into technology policy by creating an environment where a group of heterogeneous participants can discuss, explore and evaluate different policy options related to technology. So far, the envisioning workshop approach has been applied in only a limited number of situations, for example in the field of urban ecology.

Goal

The goal of envisioning workshops is to bring together a range of people and to stimulate them to put forward their view of arrangements for future developments and to look how those arrangements can be brought about and by whom (Street 1997). Envisioning workshops are used to create an environment where all participants (scientists and non scientists) play an equal role in the generation and exchange of ideas.

Issue

Envisioning workshops are most suited to broad, interdisciplinary current and socially oriented subjects, which entail an assessment of a choice between different types of technology where differences are important and where exchange of professional expertise and insight may create new knowledge.

Process

As this is a relatively new method there are not enough examples upon which to base a generic description. For this reason the process will be described based on the experiences with the envisioning workshop project, 'Sustainable Urban Living in the Coming Decades' which took place as part of the Value II programme of the Commission of the European Communities (CEC), which aims to stimulate the dissemination and exploration of knowledge resulting from specific Community R&D programmes. In this context initiatives were developed to strengthen the interface between research and society. In particular the above envisioning workshop project explored new ways for bringing technological developments more in line with sustainable environment and future plans of society. There was an international workshop involving participants from four European cities (in Corfu, France, the UK and the Netherlands), which was followed by four local workshops held in each of the cities (see Box) (for more detail see Street, 1997).

UK envisioning workshop in Preston.

The participants formed a heterogeneous group of 18-20 local representatives: local policy makers, local citizens, representatives from the private sector, and technological experts in water, waste, and energy or with a knowledge of the situation in the local area.

Prior to the workshop, the participants received four 'scenarios' or snapshots describing divergent possible futures for their local area. The 'scenarios' are expressive descriptions of how everyday life might be in 2010, indicating how individual problems may be solved at that time (such as arrangements for energy, water and waste recycling). The workshop itself consisted of two consecutive days, and followed an intensive programme of discussions and exercises in a mixture of plenary and group sessions. The plenary sessions were chaired by a facilitator, who played a key role throughout the workshop in focussing participants' discussions, helping to clarify ideas, and structuring the workshop so as to bring out the main points and help to take it forward. Further chair-people were involved in the group sessions.

In an opening plenary session the participants were introduced to the aims of the workshop, and provided with background information on the current arrangements for waste, water, energy and living in the local area. A video of similar local environmental initiatives carried out in Denmark was shown as a stimulus for discussion, providing a source of ideas about possible ways of tackling environmental issues. The remainder of the workshop was spent creating visions (images or snapshots of the future), and looking at ways of turning these into reality.

Participants spent the first day developing their own scenarios- formulating visions of how they see sustainable living in the future. Initially they worked in homogeneous sub-groups, i.e. a local citizens group, a policy makers group, a technology experts group and a private sector representatives group. Within the groups the participants worked in pairs and 'interviewed' each other about how they saw future life. Each pair built up a vision that they presented to the rest of their sub-group. The various visions were then discussed, specific points clarified, overlaps and differences identified. In this way a common vision was developed within each group. The prepared scenarios were used to enhance the visions- using checklists of major points from each scenario to adjust each vision.

The sub-groups then presented their visions in a plenary session, where they had to 'sell' them through the use of slogans, pointing out the benefits and advantages of various arrangements. The facilitator guided the group through the difficult process of discussing similarities and differences between visions, clarifying details and drawing up a list of common threads and suggestions. In this way a common vision of future urban living evolved.

The second day of the workshop was spent looking at specific ways of achieving this group vision. The focus was on *how* that was going to be achieved (i.e. the role that technology) and *who* would take responsibility. The participants were divided into four mixed sub-groups, each taking on a different theme: water, waste, energy and urban living. The groups discussed how to achieve the objectives for their particular theme. They began working individually writing a minimum of five ideas on cards that would help meet the objectives. They were advised to point out specific technologies although ideas for social organisation were also allowed. Individuals presented their ideas to their sub-group, and after a discussion, the groups voted for the top five ideas. Each group then produced a poster of what they saw as the five most valuable and feasible ideas for dealing with the challenge facing their particular theme area.

In a plenary session, the theme groups presented and explained their top five ideas. A further voting session took place, and an overall 'top five' was produced – five suggestions which would help meet the challenges to urban sustainability. The facilitator took the participants through a question and discussion session which looked at the feasibility of the chosen ideas, the main obstacles to their realisation, the level of action required (local, national, international), the actors implicated and finally recommendations for various players.

d) Policy Exercises

General definition

The term 'policy exercise' refers to a general method providing a context within which a heterogeneous group of participants synthesises and assesses knowledge from various sources and in which ideas (policy options) can be explored. A policy exercise is a creative process in a gaming atmosphere employing a variety of tools and techniques, most commonly models and scenarios to explore alternative futures (Brewer 1986). It is designed as an interface between scientists and decision-makers (Toth 1988). In policy exercises a complex policy issue or system is represented by a simpler one with relevant behavioural similarity (Parson, 1996). By observing the simpler one it is possible to learn about the complex reality. This representation resides partly in the participants who often assume roles or play themselves and interact through negotiation, and partly in the use of tools such as models designed to provide a framework for exploring the particular issue. The participants are displaced from their usual context into a hypothetical situation in order to free them from their normal frame of reference stimulating creative thinking and new insights (Parson 1997). A policy exercise does not necessarily yield new knowledge but rather a new, better-structured view of the problem (Geurts and Duke 1999). The participants learn to concentrate on the main problem and not on irrelevant details. The gaming environment stimulates learning as it allows those holding specific information to share it within a permissive game setting (Brewer 1986).

Policy exercises differ from the other participatory approaches in that the participants do not explicitly take part in the assessment process. For scientists a policy exercise is a way to get information on human behaviour and human interactions in negotiation processes and policy preferences necessary for the assessment. For the participating decision-makers a policy exercise is a deliberate procedure in which goals and objectives are systematically clarified and strategic alternatives are invented and evaluated in terms of the values at stake. The exercise is for them a preparatory activity for effective participation in official decisions (Toth and Hizsnyik 1998).

Rationale and historical context

The policy exercise methodology has its roots in political-military simulation games. The complexity, uncertainty and high stakes involved in military war-fare demanded techniques that would account for non-quantifiable but consequential factors, such as political ones. These exercises were developed to explore questions that were outside the capability of analytical tools (i.e. simulation models) but that needed to be integrated into thinking and analyses (Brewer 1986).

Variations of the policy exercise have been applied by businesses in developing competitive corporate strategy, and in other institutions in teaching and training. They have also been used as research tools in the policy sciences for studying foreign policy crises and emergency management.

More recently policy exercises in various forms have been used in different research fields and thematic contexts. For example civil servants, administrators and managers together in a gaming method to reorganise information systems; top researchers and policy makers from diverse political systems to participate in policy exercise sessions aided by models and scenarios to develop international environmental policy; policymakers, doctors and other stakeholders in exploring fundamental changes in the national health systems (Geurts and Duke 1999).

Examples of policy exercises in IA are climate policy exercises (Parson 1996) and RIVM's SusClime-exercises (de Vries 1995). Both efforts made use of IA models, respectively a 'tailor made' version of the GCAM- model (Edmonds et al. 1994a; Edmonds et al. 1994b) and a preliminary version of the TARGETS model (Rotmans et al. 1997).

SusClime is a simulation game to explore long term futures. It has been developed to communicate some basic insights about the long term dynamics of a simplified world with people, economic production, energy use and emission impacts. The intended users are interested lay people and experts alike who aim at more insight and communication about the (perceptions of) economic development of human societies under source and sink constraints. It also serves as a way to explore the viability of a much lager strategic planning exercise. SusClime can be run as a simulation game by means of a gameboard for each country. Each country has three ministerial roles Population, Economy and Energy and environment. Each minister gets a role description (de Vries 1995).

Goal

The following general goal of policy exercises is derived from (Geurts and Duke 1999):
The goal of policy exercises is to integrate knowledge from various sources, explore alternative future developments and evaluate new policy ideas in order to obtain a better structured view of complex problems. Policy exercises aim to identify poorly understood topics and questions and to make discoveries. The goal of policy exercises is to increase problem solving but not to provide the solution.

Issue

The policy exercise methodology is most appropriate when issues or values at stake are ill understood, ambiguous or contested (Brewer 1986). They are particularly suited to issues where some of the most salient features concern behavioural strategy or values (Parson 1997). This type of method is particularly useful to explore issues where opinion formation has not taken place.

Process

Participants

A policy exercise usually involves a heterogeneous group of 10-15 individuals selected on the basis that they can contribute skills, perspectives and concerns about the general problem. In most cases the exercises involve direct interaction between both decision-makers and scientific experts. In some cases stakeholders are involved but this largely depends on the issue. The general attitude sought for members of the policy exercise is one of critical imagination.

Tools and techniques

There are numerous forms of policy exercise such as gaming/simulation; combinations of gaming/simulations and computer simulation models; combinations of computer simulation models and structured workshops. These various methods have common elements. They require intensive preparation including scenario construction. They often involve simulation models as well. Models aim to imitate the behaviour of complex systems. They are used to support discussions by simulating the response of the system to decisions made by the participants. They offer insight in relevant trends and provide quantitative information. A computer-model can be used as a consulting device or as tool to convert the negotiated agreements into a new 'state of the world' (Van Asselt et al. 2001). It should be noted that models are used in policy exercises to support and not to guide the discussions. Overemphasis on models can cause a stumbling block to creative, exploratory thinking. Rules for policy exercises are developed as recognisable descriptions for action and negotiation (de Vries 1993). The challenge is to create a realistic situation, which can easily inspire participants to play their roles. The policy exercise occurs within the bounds of the situation and the roles of the participants.

There are a number of other common elements in policy exercises. Direct interaction between policy-makers, stakeholders and researchers is required. Some methods are needed to clarify and integrate different perspectives. This is important and requires good facilitation. The process must be flexible with the participants orchestrating the process. The environment must be such that participants are at ease and do not feel threatened. Summing up, these methods try to establish a relationship between policy and science. They can be described as a new vehicle for dialogue which can complement the traditional 'scientific report' in order to improve the learning and assimilative process of the actors involved, and also of the decision-makers.

Cap Gemini, DHV, Gemeentewerken Rotterdam, Haskoning, IVM, Logisterion and Resource Analysis have developed a role game on policymaking with regard to the spatial planning of the Netherlands in 2005-25. The name of the game was 'sprekend Nederland' (The Netherlands is speaking). The aim of the role game is to support interactive policymaking on spatial planning. In the game the following roles are played: public and private investors, pressure groups, and bureaucrats permitting grants. The game is supported by computer software that translates the outcomes to a map of the Netherlands 2025. The software facilitates the discussion: it makes a lot of information and expertise of the people involved explicit. Some test cases have been carried out, for example in June in 1997 when about 100 participants played the game in 10 groups (in Amsterdam) (Resource Analysis 1997).

Main activity

Many variations of the policy exercise process are known. The general procedure is one where the participants assume roles in a controlled gamed environment and engage in intense

role play gaming about the central issue. Policies are formed and the impacts of these are traced either by supporting models or simply following the course of the simulation. The policies are reconsidered in an evaluation performed by the whole group and the next round of the game takes place. The emphasis is on making different renditions of a complex setting, not on concentrating intellectual energies on just one (Geurts and Duke 1999).

A general feature of the process is that the participants are usually involved throughout the process from the beginning through to evaluation (Geurts and Duke 1999). During this process the activities of the group are a 'closed shop', that is that the outcomes are not for external dissemination. Among the members of the exercise there must be a mutual agreement of respect for the other members and for the collective endeavour (Brewer 1986).

The first stage is one of information and data collection about the technical and factual details of the problem as well as the perspectives, values and opinions surrounding the issue. This involves intensive scientific preparation to discover as much about given problems as possible. This step involves direct interaction between participants to clarify as openly as possible differences of opinion affecting perceptions of the problem.

Next comes the phase of tool development, for example models. It often happens that existing models tailor-made for the policy exercise are used (see for example (Parson 1997; Parson and Fisher-Vanden 1997)). In some cases the tasks are divided e.g. experts write scenarios or develop model tools based on relevant knowledge and the policy makers use them in the following step to create strategies.

Mental mapping, phenomenography and supporting software

Mental mapping means making explicit the mental models of persons. Mental mapping is also referred to as phenomenography. Phenomenography is a research method for mapping the qualitatively different ways in which people experience, conceptualise, perceive and understand various aspects of, and phenomena in, the world around them. In mental mapping modelling techniques are used in a conceptual way to elicit knowledge from participants and groups. A great variety of hardware and software supports has been developed for eliciting and structuring knowledge of individuals or groups. For example MAXTHINK or MORE provide a set of flexible text processing and sorting utilities that can help both to elicit and organize verbal concepts. When projected in front of a small group, these software programs can be used to support group brainstorming, acting as a sort of infinitely flexible 'electronic flipchart'. DAVID and DESIGN are modeling tools that can help in the conceptualization or problem definition phases of a modeling project where causal loops are being either generated or discussed by a group. STELLA is a very powerful model-building tool that allows modelers to create models at a conceptual level very different from what had been possible previously using conventional simulation languages such as DYNAMO and DYAMAP. Richmond and Peterson have developed gaming interfaces for STELLA. Using these interfaces, users may interact directly with the simulation model, often without having to come to grips with or understand the structure of the system under study. However the potential of these software tools for model conceptualization in groups has not yet been tested (Vennix,1996).

2.4 Convergence methods aiming at decision-support

e) Participatory modelling[11]:

General definition

The term 'participatory modelling' or 'group model building' refers to the active involvement of model-users in the modelling process. There is a difference to the extent to whether the participants are really modelling themselves, or whether the participants provide input to the modelling endeavour. In some cases, the aim is to build a conceptual model, sometimes facilitated by visualisation software, while in other cases the goal is to develop a computer model. Participatory modelling thus refers to the whole spectrum of developing simple conceptual models to building complex computer models. Costanza and Ruth (1998) see a development from emphasis placed from the model development at the core towards facilitating problem structuring methods and group decision support by means of models.

Rationale and historical context

The original idea behind participatory modelling was that model building is an inherently subjective process. Participatory modelling is a way to recognise that and to deal more effectively with it in an intersubjective manner. Costanza and Ruth (1998) argue that participatory modelling can help to build mutual understanding between science, policymakers and stakeholders, it can solicit input from a broad range of stakeholder groups and it can contribute to maintaining a substantive dialog between members of these groups. Consensus building is an essential component in group model building processes.

An approach that fits under the heading of participatory modelling is adaptive ecological modelling (Holling 1978 (revision 1990)), (Costanza and Ruth 1998). The aim is that the crucial choices in the model are co-designed by the user community in the design phase. Costanza and Ruth designed a three step modelling process:

- The first stage is to develop the basic model structure and to make decisions about the functional connections between the variables. In this stage consensus building and involving a broad representation of stakeholder groups affected by the problem is essential.
- In the second stage more detailed and realistic attempts to replicate the relevant dynamics of the system are made. It is still critical to maintain stakeholder involvement and interaction in this stage through the exchange of models and with regular workshops and meetings to discuss model progress and results.
- The third stage is focused on producing scenarios and management options based on the earlier scoping and research models.

Participatory modelling approaches usually stem from system dynamics. The modelling part functions as a tool in a broader group process. The idea behind it is that people have difficulty viewing 'the whole'. A system's point of view is helpful to 'lift' team members to the system's level and to create a holistic view in a team. Vennix (Vennix et al. 1996) developed several methods for participatory modelling - ranging from the use of system's concepts

[11] See also (Akkermans 1995; Eden 1989; Eden and Ackermann 1996).

(qualitative or conceptual system dynamics) to the building of computer models (quantitative system dynamics and simulation) that simulate the behaviour of complex, messy problems - and applied them in several contexts. They state that there is not one best method to conduct group model building; they prefer to think about participatory modelling as a flexible method where a facilitator can make a selection from a toolbox which contains several techniques to guide the process (Geurts and Vennix 1989).

Process

An application of the use of conceptual modelling techniques is provided by ICIS. In several policy processes on sustainable development (for example, the plan of the surroundings of Province of Limburg (Provincie Limburg 2000), (Rotmans et al. 1999a), city of Maastricht (ICIS 1999), reconstruction of the rural areas in North Brabant (Telos 2000)), ICIS uses a conceptual 'triangle model' to structure group thinking (see Box). The basic triangular concept functions as a structuring tool to bring knowledge and information from several domains together in a group process. The conceptual modelling work is meant to facilitate effective and efficient communication between participants from a variety of backgrounds and sectors. In the participatory modelling process, the participants structure all important policy issues in relation to the central topic and they explore the integrated effects of different policies.

Figure 3. Participatory modelling.

Working with the SCENE-model

The triangle- or SCENE-(SocioCultural ENvironmental and Ecological) model developed by ICIS is a conceptual model developed for operationalising the concept of sustainability in strategic policy development processes. It serves both as a tool for communication between scientists and policymakers and between policymakers of different sectors, as well as a tool for evaluating different policy options with regard to sustainability in a broad sense. A first phase for using the SCENE-model in policy processes is to develop a version of the SCENE-model for a specific issue or a specific region. This is a highly participatory process, consisting of the following phases:

Introduction of SCENE-concept
First of all the basic philosophy behind the SCENE-model will be introduced. The SCENE-model consists of three capital forms (ecological, economic and social-cultural capital), and each capital form consists of several stocks and flows, visualised by a triangle with blocks and arrows. Furthermore, the magnetic toolbox, consisting of magnetic stocks (you can write on) and flows will be introduced.

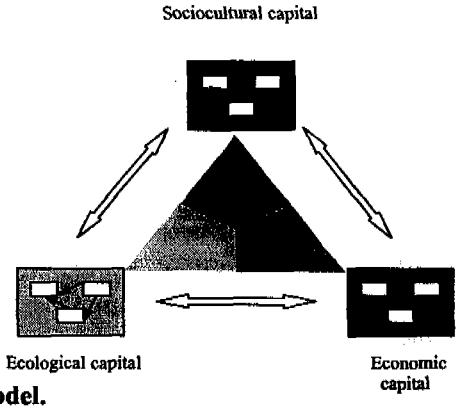

Figure 4. The SCENE model.

Selection of stocks
The next phase focuses on the selection of important stocks that have to be taken up in the conceptual model. The participants write stocks on magnets and stick them to the capital form it belongs to.

Scoring session
The final selection of stocks can be made by means of a scoring session, in which the participants value the different stocks by capital form in order to arrive at a balance in stocks by capital form. For each capital form a score form had been developed, which each participant can fill in. Only those stocks each member of the group values low will not be taken up in the model. Therefore even if only one participant finds a stock important, this stock will be taken up in the model. This procedure is applied because of the representativeness of the group of participants; it is important that they can find their own ideas back in the model. In this way broad support and ownership is created for the model.

Selection of flows
After the selection is made for the stocks, the flows are selected in the same way as the stocks. In this selection process, each member of the group of participants is asked which relations (flows) exist and can exist between the selected stocks.

Visualisation
The output of the discussion sessions is a magnetic SCENE-model of stocks and flows. The magnetic output will be transformed into a digital representation of the model.

Scientific evaluation and reflection by participants
The version of the SCENE-model made by the participants will be structured and evaluated scientifically. Thereafter the participants will reflect on the adjusted model.

Figure 5. A working session with the SCENE model.

f) Citizens' Juries

General Definition

The citizens' jury method is a means for obtaining informed citizen input to policy decisions. A citizens' jury is a group of randomly selected people, representing a microcosm of their community (in the broad sense of the word), who go through a process of informed deliberation based on information from several perspectives and ultimately make public their conclusions on a specific (policy) issue (Crosby 1995) (Smith and Wales 1999).

Rationale and Historical Context

The citizens' jury (see also (Renn et al. 1995)) is intended to provide a response to the growing democratic deficit in contemporary societies (Smith and Wales 1999). This deficit is claimed to occur when policies are worked out *for* rather than *with* the "politically marginalised", systematically excluding their perspectives. Citizens' juries are based on the rationale that given adequate information and opportunity to discuss, such a jury can be trusted to take decisions regarded as legitimate and fair on behalf of the community (Coote and Mattinson 1997), even though in terms of training and experience many people are professionally more competent than they (Crosby 1995).

Four features of the citizens' jury methodology are meant to facilitate democracy. The first is *representativeness* through random selection of participants balanced on characteristics (e.g. age, gender, education, race, geographic location and attitude to the question at hand). The second is *reasonableness* through hearings constructed to provide the jurors with information from several perspectives in an unbiased atmosphere. The third is *concern for others* through the promotion of mutual respect among the jurors and for the points of view presented to them. Finally, *legitimacy* through considering the diverse audience for whom the process is constructed and trying to gain their participation and respect (e.g. through transparency of the process and results) (Smith and Wales 1999).

Citizens' juries have been performed since the 1970's in the US and Germany (Smith and Wales 1999). They were developed by the Jefferson centre in the US which was set up as an independent body for the purpose of developing ways to improve democracy (Crosby 1995).

The juries have been organised with between 12 and 24 people to provide recommendations for issues such as state level agricultural policy, health care, water, welfare as well as for candidate ratings in elections. While they have made some contributions to decision making, they did not yet make a substantial impact on national policy making processes.

The process of citizens' juries is similar to 'planning cells' which were initiated in Germany at around the same time (Crosby 1995). Whereas citizens juries are typically run with a group of 12-24 participants, planning cells involve a number of groups each with 25 participants running concurrently. Planning cells have been used for issues such as town planning, local and national energy policy and information technology. More recently, various institutions in the UK (for example local government, health authorities, the independent Television Commission) have used the citizens' juries methodology to engage local citizens or to reach decisions on contentious and current issues (Smith and Wales 1999).

Goal

The general goal of the citizens' jury methodology is to:

"incorporate knowledge of the type that is usually absent in decision-making processes by creating the conditions for informed political deliberations between a representative group of citizens" (Smith and Wales 1999).

Crosby gives a helpful clarification of what the goal of a citizens' jury is **not:**

"citizens' juries do <u>not</u> enable citizens to dialogue directly and in a meaningful way with those who govern them" (Crosby 1995).

Issue

Citizens' juries are most suited to issues where a selection needs to be made from a limited number of choices. The process works better on value questions than technical issues (Crosby 1995).

Process

Participants

Citizens' juries involve the jury themselves, a group of 12-24 *stakeholders,* and a number of *experts* often called 'witnesses', who are called to provide information related to the issue. In planning cells, a variation of the citizens jury, around 25 people participate in each 'cell' which are run in a series (up to 500 people can be involved in total). The members of the citizens' jury can be seen as 'ordinary people without special training' (Smith and Wales 1999). Their role is to formulate judgements through learning and interaction to contribute to decision-making while having no ultimate responsibility for the decisions made. The members of the jury are randomly selected from a population appropriate to the scale and nature of the problem. Selection is based on several characteristics typically age, gender, race, education, geographic location and attitude to the question at hand (Smith and Wales 1999). The group is theoretically supposed to represent a microcosm of community including its diverse interests and subgroups. Despite significant efforts to achieve such a microcosm, practical and conceptual problems remain pertaining to the ability for such small groups to adequately represent the interests of others. For example to what extent are the jurors able to think, reason, feel or act like the wider group which they represent? For example, do women

jurors represent all women in the wider community? Because of these conceptual and practical problems a citizens' jury can only be seen to represent the community *symbolically*.

Witnesses are selected on the basis of their expertise or because they represent affected interests. Selection is often done by a steering group, consisting of people having no vested interest in the outcome. The witnesses are selected so that the information presented to the jurors comes from several points of view and is presented in a way that is fair to the concerned parties (Crosby 1995). Often additional witnesses are called in by the jurors themselves.

Citizens' juries involve a moderator whose role it is to facilitate the discussions and to encourage an ethos of mutual respect to guide the decision making process (Crosby 1995).

Tools and techniques
The main technique employed in citizens' juries are the question and answer sessions between the jurors and the witnesses.

Main Activity
In order to avoid biases, a steering group consisting of stakeholders, independent from the organising institution takes on the task of selecting the 'charge' (question to be addressed by the jury), organising the agenda, inviting witnesses, and selecting information. Alternatively a pre-jury focus group can be organised by the organising authority (for example local or national governments) to evaluate the charge. Another way to reduce bias is to give the juries the power to alter the charge and call new witnesses as they deliberate and learn about the issues under consideration (Crosby 1995) (Smith and Wales 1999). The charge usually involves a clear statement which is to be examined as well as a few brief follow-up questions to be answered by the jurors during their deliberations (Crosby 1995).

A typical citizens' jury takes 4-5 days. The process usually begins with agreeing on 'rules of conduct' for the jurors, for example 'jurors should not talk over each other, jurors should encourage and help each other' to ensure smooth running of the process. Such rules are most effective when they are made up by the jurors themselves. The main activity is deliberation within the jury based around the charge and the information obtained from the witnesses. In larger juries, subgroups are often formed to focus deliberations on different aspects. To reduce the number of dominant individuals in smaller group discussions, the composition of the small groups is often rotated or alternatively, all the dominant individuals are put in one group. The process should allow space for disagreement and allow participants to work through differences. Even though juries accommodate majority/minority decisions, an expectation of consensus can create a barrier to critical dialogue with particular perspectives dominating the agenda and defining the consensus. Following the process of deliberation among themselves, the jurors produce a decision or provide recommendations in the form of a citizens' report. The sponsoring body (e.g. government department, local authority) is required to respond to the report either by acting on it or by explaining why it disagrees with it. The jurors are given adequate time to deliberate and should have the option of conducting their deliberations in private (Smith and Wales 1999).

g) Consensus Conferences

General definition

A consensus conference is a public enquiry centred around a group of citizens (10-16) who are charged with the assessment of a socially controversial topic of science and technology. These lay people put their questions and concerns to a panel of experts, assess the experts' answers, and then negotiate among themselves. The result is a consensus statement which is made public in the form of a written report directed at parliamentarians, policy makers and the general public that expresses their expectations, concerns and recommendations at the end of the conference (Joss and Durant 1995).

Rationale and historical context

The consensus conference emerged about 25 years ago as a tool of medical technology assessment in the USA. Many European countries adopted this model for similar purposes and developed it further. In the mid 1980s the Danish parliamentary office of technology assessment began to use consensus conferences to inform policy on science and technology issues. In the late 1980s this Danish Board of Technology introduced an important change by experimenting with the replacing of one of the expert panels by a lay panel of non-experts. Since then, consensus conferences are associated with public enquiries involving lay people. Such consensus conferences new style have also been applied in the UK and the Netherlands (Grin et al. 1997).

The idea behind a consensus conference is to take discussion about contentious, or potentially contentious, areas of science and technology beyond the traditional debate amongst experts and special interest groups, i.e. to broaden the range of participants so as to include members of the general public and their points of view. This is seen to be important because many areas of science and technology directly influence the general public. Furthermore, increasing the basis of public understanding of science and technology may lead to increased public support. The lay panel has no special knowledge or vested interest in the subject area but pursues the topic from the point of view of 'ordinary citizens'. The fact that the assessment exercise is led by lay people helps to make the debate understandable to the general public; but, even more significantly it serves to introduce into the debate priorities and perspectives that may be radically different from those of the various expert communities and interest groups already involved in the area (Joss and Durant 1995).

Goal

The goal of the consensus conference is to broaden the debate on issues of science and technology to include the view points from non-experts (Joss and Durant 1995). The aim is to arrive at a consensus opinion upon which policy decisions can be based.

Issue

Socially controversial science or technology issues on a national scale level, which depend on expert contribution for clarification (Joss and Durant 1995).

Process

Consensus conferences are used within Denmark in the context of informing national policy. The organise is the Danish Board of Technology Assessment[12]. The process of consensus

[12] See: http://www.tekno.dk/eng/.

conferences described below is based on the experiences of more than 10 consensus conferences.

Participants
The main participants in the consensus conference are the 10-16 *citizens* that make up the lay panel. They are selected to create a group of non-experts with no vested interests with regard to the conference topic, but representative of several attitudes towards the issue. The group is balanced on age, gender, education, occupation and area of residence. The lay panel participants are selected from respondents to advertisements about the consensus conference in regional and national newspapers. The respondents send in a brief written description of themselves, their knowledge of the topic and their motivations for participating (Joss and Durant 1995).

Also a number of *scientific experts* is involved. They can be scientific experts or representatives of interest organisations. They are abreast of the latest knowledge and have a good overview of the topic. The organisers select the members of this expert panel on the basis of the wishes voiced by the lay panel. The expert panel is composed so that essential opposing points of view and professional conflicts are visible within the conference.

Tools and techniques
The main tools in the consensus conference are the series of 8-10 key questions and a number of sub-questions. These are formulated by the lay panel and are based on the information provided to the lay panel during the preparatory weekends, the lay panels' own reading and knowledge and the tracking of the present public debate. The experts receive the questions in advance of the conference in order to prepare their answers carefully. During the consensus conference the experts each give a presentation responding to the key questions (Joss and Durant 1995).

Main activity
The conference itself is an intensive 3-day programme, with expert presentations, questions from the lay panel, and discussion sessions between the members of the lay panel. A facilitator who is also non-expert in the issue chairs these sessions. The entire conference (except the lay panel discussion sessions) is open to the public. It is preceded by two preparatory weekends at four months and one month prior to the conference. The preparatory weekends are for the lay panel to prepare for the conference.

During the first preparatory weekend the main objective for the lay panel is to identify key questions to be addressed at the consensus conference and to indicate the type of experts that the lay panel would like to address the questions to. A speaker is invited to give a basic presentation on the topic to initiate discussion, while brainstorming sessions reveal the lay panel's expectations, worries and questions in relation to the topic. The aspects appearing in discussions and brainstorm sessions form the point of departure for continued discussion on the key questions.

The main activities in the second preparatory weekend are further discussions, one or two short presentations based on the wishes of the first weekend and finalisation of the key questions. The sessions alternate between group and plenary sessions and are lead by the facilitator. The wording of the questions is finalised before the end of the weekend. There is also opportunity to comment on the composition of the expert panel selected by the organisers

based on the wishes of the lay panel expressed in the first preparatory weekend. The finalised questions are forwarded to the agreed panel of experts in preparation for their presentations at the conference.

At the consensus conference itself, during the first day, the invited experts respond to each of the lay panel's key questions. They deliver their answers in short presentations of 20-30 minutes, highlighting key areas where knowledge is lacking, and possible solutions. This is followed by an opportunity for the lay panel to ask a few additional questions for clarification. If time permits, the experts add to their presentations important points which they believe the lay panel should consider. In the course of the day, the conference can hear up to 15 presentations. During the evening of the first day, the lay panel meets on its own and decides which aspects of the key questions have been explained sufficiently and which need further clarification. On this basis, they compile the questions that should be asked of the experts on the second day.

On the second day, the lay panel poses supplementary questions to the experts for clarification. In some cases, the audience may pose additional questions and react on the experts' answers. This second day, the facilitator acting as chairperson plays an important role: s/he is charged with focusing the attention of the experts on the questions and repeating them if no clear answer is given. The afternoon and evening of the second day is used by the lay panel to prepare the final document. Using the key questions as a basis, the lay panel writes down argumentative evaluations and recommendations concerning measures related to the central topic. Writing the contents of the final document is carried out in subgroups, alternating with plenary sessions. The preparation of the final document is a process in which, through an open discussion, every effort is made to attain the largest consensus between the lay-panel members on actions to be recommended. Minority opinions are only allowed when the process reveals very wide differences of opinion.

The lay panel presents the final document at the conference at the third day. The experts are then allowed to correct technical errors and misunderstandings, but they may not alter the actual content. Finally the experts and the audience have an opportunity to address questions to, and to discuss the conclusions with the lay panel.

2.5 Methods for democratisation

h) Participatory planning

General definition

Participatory planning tools and techniques enable participants to influence and share control over development initiatives and decisions affecting them. The tools promote sharing of knowledge, building up commitment to the process and empower the group to develop more effective strategies (WorldBank year unknown).

Rationale and historical context

The traditional approach in development work is an 'external expert stance' where the assessors place themselves outside the local system that they are investigating. The local non-experts (local citizens, decision-makers, or interest group representatives) are considered to be

sources of information from which the experts collect information, assess it and convert it into a development strategy or project. This strategy or project usually requires behavioural changes on the part of the local people. However, this expert-based approach usually does not enhance the desired social change. This failure is due to two reasons: 1) it is difficult for the intended users to learn the value and rationale of new social behaviours specified by an expert as they have not been through the same learning process as the experts, and 2) the strategies often fail to address the problem because experts external to the local system, miss possibilities, opportunities that are obvious to those within the system (WorldBank year unknown).

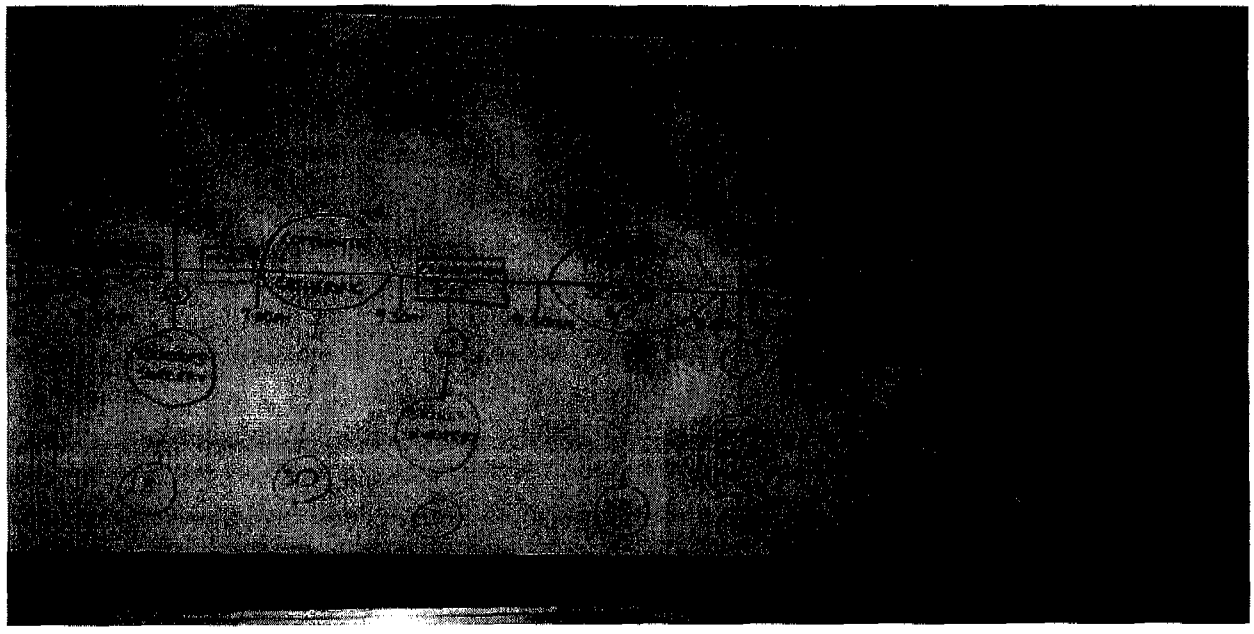

Figure 6. A planning map.

The failure of the external expert stance approach led to experimentation with exercises where the local stakeholders generate and internalise information in a social learning process. In such exercises stakeholders invented the social practices that they are willing to adopt and social change was stimulated. These participatory approaches allow local stakeholders to make informed commitments to the project.

The participatory planning methods developed by the World Bank fall into two classes, depending on the type of actors they attempt to reach:

- *workshop based* methods that engage powerful, high-level decision makers, experts and interest group representatives, for example government officials, technical experts (i.e. forestry, conservation, energy, water) and representatives from NGOs. These actors either affect the outcome of the project or are directly affected by the project. It is critical to get these relatively powerful people on board in order not to alienate them or provoke opposition which may result only in compounding the problem.
- *community based* methods that engage citizens (often poor and disadvantaged) in dialogue to address issues at the community level. It is important to engage these people in the development process as their social status usually leaves them without voice in decision making, about issues directly affecting them.

Goal
The main goal of the World Bank participatory planning techniques is to

"... level the playing field between different levels of power, various interests and resources and to enable different participants to interact in an equitable and genuinely collaborative basis. To achieve a shared decision (or consensus), build up commitment to and ownership of this decision, and empower individuals to address problems which affect them (WorldBank)."

Participatory planning is thus a process through which actors and stakeholders influence and share control over development initiatives and the decisions and resources which affect them.

Issue
The issues addressed in participatory planning involve a wide variety of development problems. For example, improving the national electricity supply, or selecting a type of well that is best suited to the needs of the local community.

Process
The tools and techniques, and outline of process used in these two classes of methods are described using selected examples. Workshop-based methods will be described using 'Appreciation – Influence – Control' (AIC) and 'Zielorientierte Projectplanung' (ZOPP) (translated as 'Objectives Oriented Planning') as examples. The Community-based methods will be described using Participatory Rural Appraisal (PRA) as an example.

a) Workshop-based methods: 'Appreciation – Influence – Control' (AIC)
This method aims to formulate action plans by creating a learning-by-doing atmosphere, enabling participants to collaboratively design projects to address specific problems. The methods encourage social learning, promote ownership of the outcome and establish a working relationship between the participants involved.

Participants
The participants are a relatively heterogeneous group, usually of high-level decision makers with technical experts and sometimes stakeholder representatives from interest groups.

Tools and techniques
Symbolic representations such as drawings, collages or cartoons are non-verbal (visual) techniques designed essentially to communicate experience and understanding of the issue. Each participant produces his/her own symbolic representation and presents it to the group. These representations overcome language differences (either national or ethnic or in terms of technical language), and literacy differences and elicit creative thinking.

Main activity
In the process social, cultural and political factors together with technical and economic factors that may influence the issue are considered. The aim is to identify a common purpose, recognise the range of stakeholders relevant to that purpose and provide a framework for pursuing the problem collaboratively. As the name suggests, three phases are distinguished: Appreciation, Influence and Control.

- Appreciation- this is the listening phase, often involving a brainstorming technique or round-table discussion with the aim to appreciate the realities and possibilities of the situation by sharing ideas from the diverse backgrounds present at the workshop. The

facilitator ensures that there is a non-critical atmosphere, in which all ideas are valued equally. In this way all the participants regardless of their official status are treated as equal. This phase is carried out in small heterogeneous groups to allow interaction and learning among people who do not normally interact. At the end of the appreciation phase the ideas are summarised into main overarching themes.

- Influence – this is the dialogue phase, where the participants explore the logical and strategic options for action as well as the subjective feelings and values that influence the selection of strategies. They discuss the themes in relation to priorities necessary for change needed to address the issue and the potential influences these changes could have.
- The final step is the Control phase where the planning takes place. This phase is carried out in homogeneous groups. It enables participants to take responsibility for choosing a course of action in the light of information learned during the process.

Every phase in the planning process includes one or more workshops.

b) Workshop- based methods: Objectives Oriented Planning (ZOPP)

The process is a project management method that encourages participatory planning and analysis throughout the project cycle in a series of ZOPP workshops. The workshops engage participants in setting priorities and planning for implementation and monitoring. The main output of the process is a project planning matrix which the participants have built together.

Participants

The participants in this process are the members of the team involved in a specific project. They are usually a collection of interest group representatives (development workers, World Bank staff), local or national decision makers, and sometimes technical experts.

Tools and techniques

1) Visual planning tool: Project Planning Matrix

The project planning matrix (ppm) is a framework that is completed during the process. It essentially summarises along two axes each aspect (or task) of the project and the indicators that will signal completion of each aspect.

2) Tree diagrams

Tree diagrams are visual tools that organise information in a treelike scheme. The scheme narrows down and prioritises problems, objectives, or decisions by including patterns of influences and outcomes of certain factors.

Main activity

The building of a project planning matrix is a phased process. The process begins by identifying all the parties who may be affected in some way by the issue that the project is set up to address. The next step is to evaluate the impact the project may have on them. Then the issue is analysed by means of construction of a 'problem tree', which is developed through brainstorming about problems related to the issue, clustering and prioritising these, identifying the cause(s) and the consequences if the problem is not solved. The next step is to make an 'objective tree', that is a mirror image of the 'problems tree' as it indicates what the future will look like by solving each problem. It is constructed by articulating clustering and prioritising desired solutions and evaluating them in terms of whether they are attainable. This creates a series of objectives. The next step is to formulate a project strategy for achieving the objectives. The information obtained in the exercises is arranged into a project planning matrix.

c) Community based methods: Participatory Rural Appraisal (PRA)
These methods are defined by their use of interactive tools to involve local stakeholders in the assessment of their own needs, setting of priorities and drawing up plans of action. The participants are usually local people; for this reason local materials and visual tools are used to bridge literacy gaps. The participants experience empowerment through having their contributions valued.

Participants
The participants in a PRA exercise can be a heterogeneous or homogeneous group composed mainly of local citizens and some local governmental decision-makers.

Tools and techniques
1) Verbal techniques
Storytelling: the purpose is to share information of a qualitative nature about historical events, changing patterns, and their associated impacts (social, economic, health etc.). It essentially provides a historical context for discussing the issue. The stories are often written or drawn as chronologies of events to refer back to in later stages.

2) Visual techniques
Mapping: the purpose of drawing maps is to give an overview of the current situation by providing a spatial context for discussing the issue. It is often used as the foundation upon which more focussed discussions can be built. The advantage of mapping is its ability to quickly foster discussion and analysis. Furthermore it stimulates thinking in terms of site-specific solutions. Examples of maps are social maps (to discover where the participants live), health maps (map of the body to indicate where people do not feel well), demographic maps, resource maps of village lands and forests, maps of fields, farms and home gardens, and thematic or topic maps for water, soils, and trees.

Diagramming: this involves establishing sequences of events, changes and trends representing causes and consequences (Chambers 1997). Diagrams or calendars of seasonal patterns illustrate the major changes that affect a household, community or region within a year, such as those associated with climate, crops, labour availability and demand.

Preference ranking: this is a tool to elicit preferences for various options or indicate desirable outcomes. Using counters (made from local materials such as seeds or stones) the participants can allocate votes to different options.

Main activity
The aim of this process is to enable local participants to appraise, analyse and address a particular issue through recognising and sharing their own knowledge. It is a highly interactive process that employs a variety of verbal and visual tools to discuss the problem from as many different angles as possible, each time building upon the output from the previous step. The iterative nature of the exercise enables participants to continuously shift priorities, rethink strategies and invent new options as the problem is viewed in new ways.

The particular issue determines which combination of PRA tools are used and in which order. In general it is advised to begin with mapping techniques, because they involve all participants, stimulate discussion and enthusiasm and generally deal with non-controversial

information. They also provide an overview of the current situation. Subsequent to this, diagramming can be used to provide information about trends and flows. Building on this preference ranking exercises can be used to focus on the planning stage.

SEAN

SEAN stands for Strategic Environmental Analysis. It is a toolkit for participatory planning in developing countries, developed by SNV (semi non-governmental organisation). The rationale behind SEAN is participatory and 'people centred'. This implies:

- The widest possible participation by all stakeholders and actors involved within the region and between institutional levels
- Capturing values, knowledge and ideas of all stakeholders and actors
- Openness and understanding the views of all relevant actors
- Debate and mediating conflicts
- Working together on solutions
- Ensuring an equitable approach to development

Strategic Environmental Analysis (SEA) aims to address environmental issues at an early stage of decision making, while being integrated with economic, social and institutional assessment methodologies, in order to contribute to the formulation of a development strategy in which environmental issues are fully integrated (mainstreaming environmental care into development planning). Participation can be interpreted as a mutual process of implementing SEAN, with exchange between all participants at various phases in the SEAN process.

The SEAN itself consists of ten steps, grouped around four clusters which provide guidance to participants in clarifying the complex issues involved. All the steps must be completed, but the attention given to each step and the degree of detail required can vary considerably according to the type of the SEAN application, external conditions and working modalities. The steps can be grouped into four clusters (see Figure below):

Participants in the SEAN process include first of all the owner (of the final product), possibly assisted by a reference group, a moderator, a core SEAN team (consisting of local people) and representatives of relevant actors (including government structures, NGOs, donors, local groups, etc).

SNV has defined five process phases of a SEAN. In each phase different participants play a role. In the following the different phases will be described in terms of the goal of the phase, time that is needed, and the participants included.

Phase 1: Initiation and preparation of SEAN process (some months- a year before SEAN starts). The group participants consists of funding agencies, SEAN experts, moderator and decision makers. The goal of this phase is to raise awareness and explore the conditions to use SEAN, and to identify the participants at various levels.

Phase 2: Introduction and scoping workshop (workshop of 5-7 days). The group participants consists of 20-30 participants, including stakeholders and actors, a SEAN expert, and a moderator. The goal of this phase is to learn the SEAN methodology, networking, arriving at agreement on key issues and gaps of knowledge (in this phase the focus is on scoping of step 1-8 of SEAN, and the introduction on steps 9-10). The output of the process consists of a workshop report (identified key issues).

Phase 3: Field work on identified issues (on average 6 weeks). The group participants consists of the SEAN core team and third parties (consultants, NGOs, students, development institutions etc). The goal of this phase is to perform field work, desk work and studies focussed on key issues identified in phase 2 per sector, target group, region or/and actor (output of the phase are in depth elements of steps 1-8, and inputs for steps 9-10). The output of the process consists of a fieldwork report with recommendations for a strategic plan. In this phase policy makers are informed.

Phase 4: Planning (2-4 days). The group of participants is comparable to the group of phase 2, but more decision makers and representatives of major actors, a SEAN expert and a moderator are present. Goal of the phase is to define input for a strategic plan for sustainable development (final check elements of steps 1-8, application of step 9).

Phase 5: Follow-up and monitoring (timing undetermined). This phase is performed by local institutions in collaboration with the co-ordinating institution and moderator. The main activities are meetings and workshops to inform different actors, to set up a monitoring system and to institutionalise the SEAN (step 10).

Most SEAN experiences have so far been applied to sectoral plans and programmes and existing regional development plans (mainly in the sectors of energy, transport and waste management). Examples are the following projects:

- Zinbabwe: Integration of environmental care into development policies
- Ghana: Integration of environmental issues into SNV policy and local policy
- Benin: Strategy for national committee on sustainable development

(see also www.seanplatform.org)

(SNV (1999), A presentation of Strategic Environmental Analysis and the SEAN toolbox, The Hague, The Netherlands)

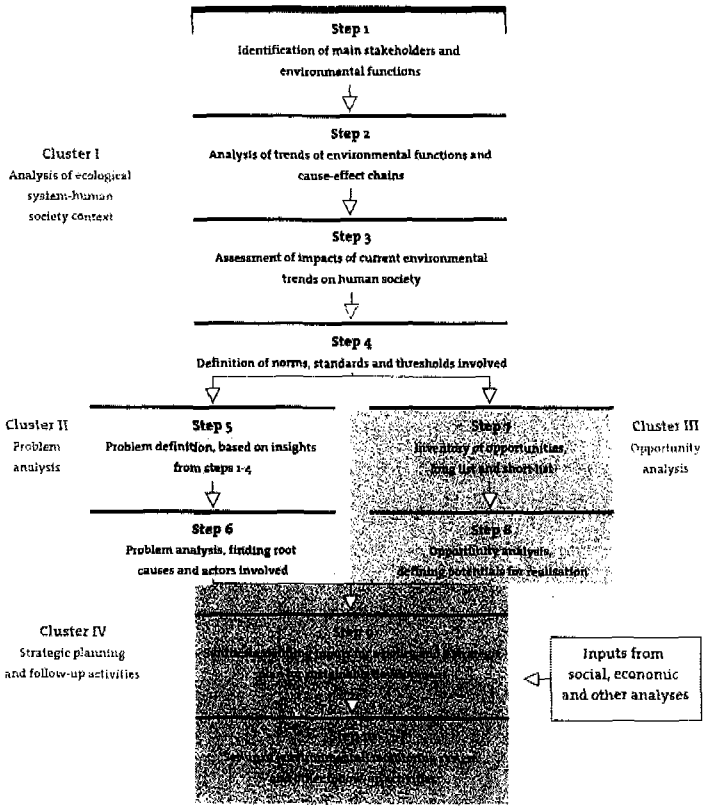

Figure 7. The steps in SEAN.

2.6 Process design

In using participatory methods in practice, special attention should be paid to the *design* of the participatory process. It has become clear that the descriptions of the methods as found in the literature in general do not pay much attention to the following practical design issues:

- Recruitment of participants
- Description of the tasks and roles of the participants
- Description of the tasks and roles of the facilitators
- Planning of participatory meetings
- The set-up of the program of the meetings themselves
- Supporting materials
- Expected output of the process
- Data collection techniques

In the following, we have tried to address these issues building from our understanding as informed by practitioners and our own experiences with applying participatory methods. This discussion is consequently meant as a first shot across the bows.

Recruitment

A first step in recruiting is to identify which participants to invite. The group composition of a participatory process depends on the central issue, and the goals of the project and the process. In some projects a homogenous group of participants is needed, in others a more heterogeneous group of people (different perspectives, different ages, different domains, different relations to the issue etc.). Furthermore the number of participants can vary according to the goal, the available budget and time.

In case of sampled groups, many standard techniques known from quantitative approaches can be applied, such as random selection from existing lists (phone books etc.) or quota selection (Kasemir et al. 1997). To invite participants with specific knowledge and backgrounds, random selection is not the most effective way. In this case it is best to involve different networks, keep up with newspaper articles (to select relevant people and opinions in the field) and other media. Overall, it can be said that in case of complex issues a representative group of participants will involve actors proportionally selected from the economic, the social-cultural and the environmental domain. Actors will be representatives of business, NGOs, governments, universities and consultants. In some cases also citizens, or other people not representing a specific interest (like artists and journalists) can be important for the process. Because they are to a certain extent outsiders to the issue, they can add new, sometimes surprising, points of view to the process. This can be especially important in participatory processes that have an exploratory character.

The procedure of recruitment should provide the potential participant with the basic information that allows for deciding whether to participate or not. The following motives can be relevant in deciding whether or not to participate (Kasemir et al. 1997):

- Personal interest in the topic
- Opportunity for social contacts
- Opportunity to get informed
- Curiosity
- Financial incentives

- Logistics (place, time, duration)
- Trust in the person who recruits
- Trust in the interviewing organisation
- Trust in the sponsor of the project

Following the ULYSSES experience (Kasemir et al. 1997), the following recruitment criteria should be taken into account in order to get a heterogeneous group of participants:

- Place of residence
- Age
- Gender
- Occupation and level of education
- Income
- Attitudes towards the subject

Recruiting by phone

A full-scale recruiting by phone may comprise the following steps (Kasemir et al. 1997):

1. Pre-information by letter (mostly not done)
2. First recruitment interview by phone
3. If interested in participation: mailing of a letter with general information about the project (for instance: purpose, sponsor, organiser, reimbursement, anonymity, time, place), a registration form and a return envelope. This mailing should be sent directly after the phone call.
4. If registration is not sent back: second phone contact.
5. Last phone-call to remind people about the event, the day before discussion.

The actual group composition is an important factor. If, for example, the business sector was absent during the process, the end product will possibly less reflect market arguments, than it would have been the case if business people had been there. If participatory methods are used to map out diversity, it seems to be important to get a heterogeneous group consisting of people with economic, social-cultural, ecological, and/or institutional backgrounds. Furthermore, in such cases the group should be heterogeneous with regard to the types of actors (business life, societal organisations (like NGOs), government and experts). Experiences from the VISIONS project and the NOP-water project (see next chapter) however, have shown that this is difficult to realise such a balanced heterogeneous group. Each sector and type of actor decides on different grounds whether or not to participate. All should therefore be approached differently. Furthermore, some participants consider participation as a form of compulsory labour when they are not financially compensated.

Official invitations for any kind of participation should be sent well in advance. Here also, different types of participants should be approached differently. High-level people often have busy schedules and should be invited well in advance (several months) and should be reminded a few weeks before the actual event takes place.

Information material should be provided to the participants a few weeks in advance. In some cases, however, it is purposively decided not to give any information beforehand in order to prevent a-priori bias.

Description of the tasks and roles of the participants

The tasks of the participants in a participatory process can vary considerably. It depends on the goal, available time and financial budget, which tasks the participants will have to fulfil.

The role of the participants can vary from a rather passive to a very active role. In case of a passive role, participants are invited to the process to discuss the central issue in a group of people. No preparation is needed. In case of an active role, participants have next to a discussing role, tasks such as writing a report (for example with findings), preparing presentations, formulating questions for experts, making collages and so on. Furthermore, preparations may involve studying the central issue and formulating statements.

Description of the tasks and roles of the facilitators of the process
Participatory processes also differ according to the facilitation of the process. Facilitators can have different roles (Kasemir et al. 1997):

- The expert
- The convener
- The discussant
- The professional
- The advocate
- The chairperson
- The leader
- The entertainer

It depends on the goal, the issue and the type of participants which facilitator suits for the participatory process. Furthermore some basic skills can be defined for the facilitators:

- being attentive to all comments, this also means that a facilitator should stimulate the more quiet people to express their opinion on the central issue
- short term memory: this means that a lot of knowledge and values are expressed in short time periods. The facilitator should be able to have a good overview of the different opinions (perspectives on the central issue) during the process.
- conversation skills: the facilitator should be able to stimulate the discussion by asking questions, giving short summaries on appropriate moments so that all the participants receive new food for thought
- being unbiased by giving all the group members an equal voice in the discussion

The *facilitator* is the most important success or failure factor for creating a 'permissive environment'. Effective leadership is essential if the group is to accomplish its purpose. The facilitator is responsible for the process and not for the content of the discussion. S/he should be in tune with the purpose of the group, and s/he must also have the necessary skills to guide the process effectively. To that end, a facilitator is well-trained in group dynamics, s/he has excellent interview skills and s/he should be able to guide but not dominate the discussion. The facilitator should not make judgements or use body language that may communicate approval or disapproval (Krueger 1988).

To run the sessions, usually more group moderators are necessary. They need to have different skills as they could take over several roles, such as a convenor, facilitator, expert or participant. Moderators should make the capacity in which the citizens are invited to participate explicit as well as clarifying the subject area to be covered. The moderator should have certain skills, like good listening-skills and highly developed facilitation skills. The moderator should be tactful and friendly, rather than overpowering people, observing the mood of the groups, not overloading sessions, keeping debates open but not open-ended, and trying to enjoy the exercise.

Planning of more than one participatory meeting
If a participatory process involves more than one meeting, it is wise to pay special attention to the planning of the meetings in the whole participatory process. Attention should be paid to:

- the *programs of the separate meetings*: For example, in a participatory process it could be decided that the first meetings have a divergent character: this means that in these meetings the discussions are broad and have a brainstorming character. The discussions are rich: all the perspectives of the participants are illuminated. Thereafter, in the following meetings, the discussions have a convergent character. Decisions have to be made according to the material that has been gathered during the process.
- the *time between the meetings*. Participatory meetings can take place in some days without a break. It is also possible that more time (varying from some days to some weeks or even months) is needed between the meetings (so-called digestion time); participants can use such breaks to reflect on the outcomes, and to ask colleagues, family members, friends, etc. for their opinion in order to get new ideas for the next meeting.
- The *composition of the group over time*. It is possible that the composition of the group will change in time, i.e. not the same people are invited per meeting. For example in divergent phases, the composition of the group is broad, while in convergent phases it may be effective to work with smaller more homogenous groups.
- ...

The set-up of the program of the meetings and the use of supporting material
Checkpoints according to the set-up of the program are:

- Duration of the meetings: can vary from some hours to some days spread over a longer time period
- Time slot of the meetings: evening sessions, during working hours; during the work-week or in weekends
- The place: in well-known surroundings or not; anyway the location should reflect the type of atmosphere that is needed in view of the goal of the process, the type of participants and the participatory method used

The choices made with regard to the set-up of the program depend on the type of participants aimed at (busy people or not) and available time and budget.

During the process supporting materials can be used, such as:

- Expert lectures: for example to give some information on the central issue
- Computer simulation model: as a supporting tool to stimulate and structure the discussion
- Video film: to stimulate the discussion
- Maps: for example geographical maps in case of a discussion on a specific area
- Fact sheets
- Pictures
- ...

Output
Material processed by participants during the process involve:

- Collages
- Reports
- Questions for experts
- ....

It mainly depends on the goal and the type of participants which output is attainable in the end of the process. Some participants are used to write reports in daily life, while others find this difficult and prefer for example making collages.

Data collection techniques

During the process, data must be collected by some observers, or the facilitator him/herself to allow for systematic analysis and/or use of the participatory process in decision-support or decision-making. On the one hand information is gathered on the participants' values, opinions and knowledge (contents). On the other hand, information is gathered on the group dynamics themselves and behaviour patterns (process), such as insights into:

- *the way people interact with each other* (is the discussion dominated by one or more persons, how is the atmosphere in the group, do people want to convince each other or do they accept each others opinions and viewpoints? Do the participants listen to each other or do they communicate different languages?).
- *argumentative structures and change of opinions/argumentation over time.*
- *the way the facilitator operates in the group* (see also the needed skills of a facilitator).
- *the way the participants make use of the supporting material,* for example the computers (do these tools have a supporting role or not?).
- *the way the output has been developed* (in case of writing a report/making a collage and so on: who made the products, the whole group, or just some key members?).

Not only information on the contents but also on the process is needed to be able to value the quality of the output.

Standard tools for gathering data in participatory processes are (Kasemir et al. 1997):

- Audio taping (completeness of verbal data)
- Video taping (completeness: verbal and non-verbal information is available)
- Transcripts (completeness of verbal data)
- Notes of facilitator and observer(s) (direct perception is written down both of verbal and non-verbal impressions, however, it is a subjective selection of information, it is difficult to be complete: criteria for writing notes must be well-known before the process starts)

Furthermore *evaluation tools* can have added value for the participatory process. Examples are interviews and questionnaires that are used during or after the process to record the participants' impressions, opinions and criticism.

2.7 Summary

Table 1 Summary of participatory methods

Method	*Goal/ output*	*Process: key features*	*Process: tools & techniques*	*Parti-cipants: No.*	*Participants: Type(s)*	*Duration*	*Task participants*
Focus Groups	▪ Information about values and preferences ▪ No consensus	▪ Structured, focussed discussion ▪ Permissive group environment. ▪ Synergistic group effect	▪ Focussed questions ▪ (Brainstorming) ▪ (Synectics) ▪ On-line discussions	4-12	▪ *Selected citizens* – Homogeneous on certain characteristics – Unfamiliar with each other ▪ *Moderators*	1-3 hours per session	Give opinion on topic
Scenario analysis	▪ Identify key issues ▪ Explore imaginable futures ▪ Scenario 'plots'	▪ Free format: creative, imaginative ▪ Interactive ▪ No idea disparaged	▪ Brainstorming ▪ Developing storylines/ stories	5-10	▪ *Stakeholders* – Representatives with special interests – Original/ 'free' thinkers with little affiliation to the topic ▪ *Experts* ▪ *Decision-makers*	Varies	▪ Identify key issues ▪ Structure information ▪ Craft scenarios
'Envisio-ning' work-shops	▪ Share views of future ▪ Evaluate how desired future situations can be achieved ▪ Formulate recommendations for actors identified as responsible ▪ Exchange of professional and local insights	▪ Current and socially oriented issues entailing choice between different technology options	▪ Prepared 'scenarios' snapshots of future situations	18-20	▪ *Decision makers* - (policy makers) ▪ *Stakeholders* - Citizens - Interest groups ▪ *Scientific experts* – (technological)	3 hours – several days	Use predetermined scenarios to think about the future and generate possible policy options
Policy Exercises	▪ Explain alternative future developments ▪ Test out policy ideas ▪ Better structured view of problem ▪ Integrate knowledge from different sources ▪ Increase capability for problem solving	▪ Gaming ▪ Ill understood issues ▪ 'Closed shop'	▪ Scenarios ▪ Computer simulation models ▪ Gaming/role playing	Depends on issue and technique	▪ *Decision makers* ▪ *Scientific Experts* ▪ *(Stakeholders)*	Depends on issue and technique	Simulate process related to policy issue

Method	*Goal/ output*	*Process: key features*	*Process: tools & techniques*	*Parti-cipants: No.*	*Participants: Type(s)*	*Duration*	*Task participants*
Participatory modelling	▪ involving model-users in the modelling process (users as co-designers) ▪ facilitating problem structuring methods and group decision support	▪ No fixed format, facilitator makes a selection from a toolbox of several techniques to guide the process	▪ visualisation software ▪ conceptual (system dynamics) methods ▪ quantitative (system dynamics) methods	▪ Depends on issue and techniques	▪ Model co-designing process: model-users, i.e. decisionmakers and stakeholders ▪ Problem structuring process: decisionmakers (governmental and commercial)	▪ Depends on issue and techniques	▪ Provide input on the modelling process with regard to structure and contents
Citizens' Juries	▪ Incorporate values and preferences into decision making ▪ Informed political deliberations ▪ Policy recommendation	▪ Analogous to legal juries. ▪ Witness hearings ▪ Deliberation within the jury ▪ Selection of policy options	▪ Witness hearings	12-24 per session	▪ *Stakeholders* (Citizens) – Heterogeneous group-representation ▪ *Experts* ('Witnesses') ▪ Scientific and non scientific (NGOs, governments)	4-5 days per session	Pass judgement on a policy issue on the basis of witness hearings
Consensus Conferences	▪ Incorporate public values and opinions into policy decisions ▪ Reach consensus	▪ Intense discussion of scientific issues by non experts ▪ Issues that require clarification on technical details ▪ Structured and formal debate open to the public	▪ Key Questions	10-16[13]	▪ Citizens (lay panel) - Representatives of several perspectives on the issue ▪ Scientific experts (expert panel)	2 days preparation, 3 days conference	Reach a consensus opinion on which policy decisions can be based
Participa-tory planning	▪ Empower groups to influence decisions that affect them ▪ Exchange knowledge and experiences ▪ Build commitment and ownership towards the decision/ initiative	▪ Level playing-field/ no hierarchy ▪ Discursive process ▪ Address specific problems ▪ Tools to bridge literacy/ language gaps	▪ Verbal: - Storytelling ▪ Visual: - Maps/ Ranking - Tree diagrams - Project planning matrix - Symbolic representation	Depends on issue & technique	▪ Workshop-based methods - *Decision makers* - *Technical experts* - *(stakeholders)* Interest group representatives ▪ Community based methods - *Stakeholders* (Local citizens) - *Decision makers* (Local government officials)	Depends on issue and technique	Simulate process related to policy issue

13 10-16 lay panel members; as many experts as required

3. Participatory methods in IA

While Chapter 2 provides a general overview of participatory methods, the focus of this chapter is on the first experiences with participation in Integrated Assessment. Representative past and current Integrated Assessment projects that have employed or employ a substantial participatory component are discussed (Table 2). The aim of this description is to get insight into which participatory methods are used and why. We do not aim to comprehensively describe the participatory dimension of these projects (which is anyway a research endeavour on its own, because not all processes are well documented). The current Chapter is meant to explore experiences as a first step towards systematic evaluation of participation in Integrated Assessment.

Table 2. Integrated Assessment projects, participatory component and co-ordinating institute.

IA project	*Co-ordinating institute*	*Participatory component*
RAINS (1983 – now)	International Institute for Applied Systems Analysis	Participatory modelling
MBIS (1995 – 1999)	Environment Canada	Scientist stakeholder workshop
IMAGE / Delft Process	National Institute of Public Health and the Environment, The Netherlands	Scientist-policymakers workshop (dialogues)
QUEST (1994 – now)	University of British Columbia	Participatory modelling
ULYSSES (1996 – 1999)	Darmstadt University of Technology	Focus groups
VISIONS (1998 – 2001)	International Centre for Integrative Studies	Scenario learning
COOL (1999 – 2001)	Institute for Environmental Studies	Scientist stakeholder workshop (dialogues)

The following reasons to apply participation in IA have been found in the IA scholarly literature:

- To facilitate **mutual learning** by establishing a communication process between scientists and non-scientists (government, citizens interest groups and businesses)
- To formulate relevant **societal questions** for the IA research agenda
- To **enrich the assessment** with the knowledge, values, preferences, judgements and perspectives of non-scientists (and scientists)
- To create **commitment, ownership, legitimacy and support** for the outcome of the assessment and to come to **policy recommendations**

If we compare these reasons with the general goals associated with participatory methods (see Chapter 2), we can conclude that participatory methods are usually applied in Integrated Assessment as approach to decision-support: consultation of the stakeholders and using their knowledge is the main ambition. If democratisation arguments are employed, it is more about democratisation of science than about empowerment of stakeholders in decision-making processes. From the above it follows, that participatory methods are employed both to map out diversity as well as to reach consensus. We can thus expect that primarily participatory methods from the two right quadrants of the matrix are used in Integrated Assessment.

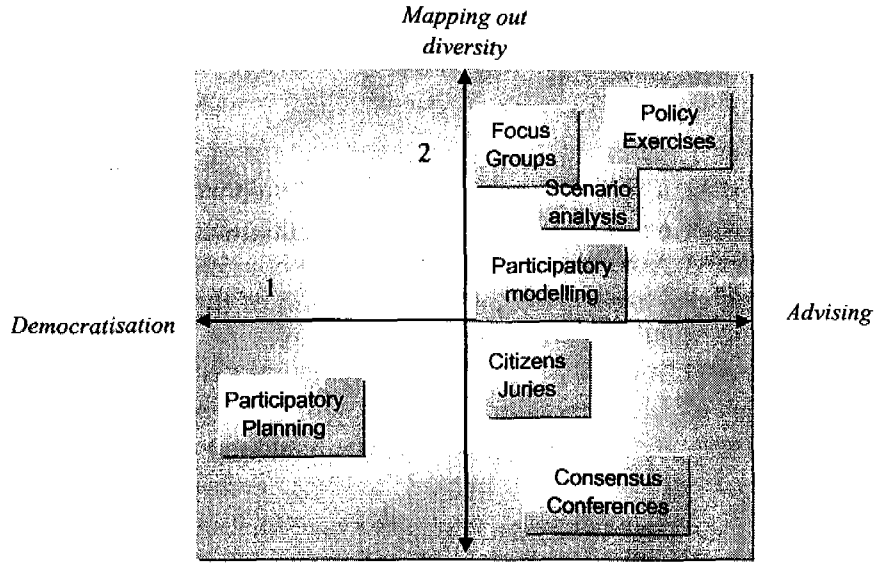

Figure 8. Categorisation of participatory methods.

3.1 RAINS

RAINS (Regional Air Pollution Information and Simulation model) is an Integrated Assessment effort aimed at "helping governments to identify scientifically sound, cost-effective policies to combat air pollution" (IIASA 1998). RAINS helps producing scenarios that can be used to estimate acid rain damage and cost-effectiveness of policy alternatives. RAINS can be used on (inter-) national, regional, and city-scales.

RAINS may primarily appear to be a modelling effort, and, in the beginning, it may have been such. However, RAINS is more than a modelling effort alone. As Amann et al. put it (Amann et al. 1995 (Online Version 1999)):

> "Although Integrated Assessment is more than 'operating an integrated model', it is frequently so that IA has been identified with building a large model. We would like to stress that in our view IA is a process rather than a model building effort alone. The model is one of the tools for IA, certainly not the IA itself. However, one of the major steps is frequently the construction of an integrated model."

In 1983, RAINS started as an IIASA project. Now, it is an Integrated Assessment process performed by "hundreds of scientists around the world." The RAINS model has played a major role in the policy process on long-range transboundary air pollution. All negotiating parties in the international treaty on sulphur emissions (the 1994 Oslo Protocol) have accepted RAINS as an integral part of their negotiations (Gough et al. 1998; Gough et al. 1999). The development of the RAINS model is an ongoing effort. Recently, modules for ozone formation and particulate matter have been added (IIASA 1998), and a version aimed at use in South-East Asia had been developed (Shah et al. 2000). This last effort also enables a comparison between Europe and Asia in terms of acid deposition damages.

RAINS features two distinct participatory aspects. First, RAINS is an effort performed by scientists alone. During the RAINS development process, a number of review meetings were held to evaluate the ongoing modelling process. Apart from scientific experts, also policy makers and other intended users participated on those meetings. They enabled policy makers

to provide significant input for the model design. Consequently, RAINS can be regarded as an example of a participatory modelling exercise (IIASA 1998).

The RAINS model is explicitly meant to act as a policy support tool. This is reflected in the way RAINS has been, and still is, used. RAINS is used in the process of arriving at transboundary air pollution abatement strategies. This process primarily involves negotiations by policy makers. RAINS, as being accepted as a sound and useful piece of scientific research by all negotiating parties, plays an important part in these negotiations (Hordijk 1991a; Hordijk 1991b). Consequently, a number of scientists involved in the RAINS endeavour could play a major role in the process. In other words, the process of arriving at policy strategies can be characterised as a participatory process involving scientists and negotiating parties. The negotiators provided information on politically feasible policy options, and scientists provided information on cost-effectiveness of those options (IIASA 1998).

3.2 Mackenzie Basin Impact Study (MBIS)

The MBIS-project[14] was a climate change impact assessment focusing on Northwest Canada. It was a six-year collaborative research project which began in 1990 and was supported by the Canadian government, B.C. Hydro, the University of Victoria, Esso Resources Ltd. and others. The purpose of the study was to look at the effect which climate change might have on the Mackenzie Basin, its lands, waters, and the communities that depend on them. It was designed to be a scientist-stakeholder collaborative, with 30 research activities on various topics of climate change impact ranging from permafrost and water levels to forest economics and community response to floods. These aspects were integrated using models, themes and participatory methods. While integrated assessment models (IAMs) have played an important role in the analysis of mitigation options for climate change, the methods for representing and valuing the impacts of climate change are less well developed. Also, IA of climate change has focussed on global scale IAMs, while regional adaptation has received considerably less attention. The project was intended to address these deficiencies by providing a framework for producing an IA of climate change impacts for regions and countries by paying attention to the needs of stakeholders who may be affected by the impacts of climate change. If the stakeholders are not part of this process, choices made by the researchers alone can often arouse suspicion among stakeholders who may have different visions of the future, or different perceptions of processes operating at their scale for their sector or region.

Scientist-stakeholder collaboration was defined as: "the inclusion of stakeholder participation in the formation of research questions, generation of new information, and the discussion on results and recommendations". Researchers together with stakeholders designed this participatory dimension of the project. It can be broken down into three parts: a working committee, integration workshops, and a final workshop 'round-table'. The project leader organised a *steering committee* composed of scientists and stakeholders with an interest in the issue, either because of the topic or the study area, or both. Government and non-governmental stakeholders were involved. The role of the *steering committee* was threefold:

- to define critical issues and regions within the study areas for the IA to focus on
- to identify scenarios for the IA

[14] For more information on the Mackenzie Basin Impact Study see (Cohen et al. 1997; Cohen 1997) and http://www.msc-smc.ec.gc.ca

- to review and rank proposals for sectoral and cross-sectoral research activities within the IA

Integration workshops were held to complement the integrated modelling exercises. In these workshops scientists and stakeholders could express their views on how climate change might affect the region. The project culminated in a *final roundtable* where stakeholders could respond to the research results. This round-table discussion was based on the "so what?" and "what should be done?" type of questions.

Figure 9. MBIS workshop.

The project highlighted that a scientist-stakeholder collaboration presents an opportunity for stakeholders to acquire some ownership of the assessment. It encouraged the development of interdisciplinary approaches to research, and provided common ground for linking scientific expertise ("what if") with stakeholders' knowledge ("so what" and "what should be done"). The second observation deals with the roles of models in the process. The regional modelling exercises did not attract much attention among the stakeholders. In view of the use of models, communication between modellers and stakeholders is very important, so that stakeholders have the opportunity to evaluate whether they think that their values, preferences and perceptions are adequately included.

3.3 IMAGE and the Delft Process

IMAGE (Alcamo 1994b; Rotmans 1990) stands for Integrated Model to Assess the Greenhouse Effect. The model is developed at the Dutch National Institute of Public Health and the Environment (RIVM), to study forcing and feedback in the society-biosphere-climate system. The IMAGE 2 model has been developed with the aim of supporting climate policy development. In Figure 10 a schematic overview is given of IMAGE 2.

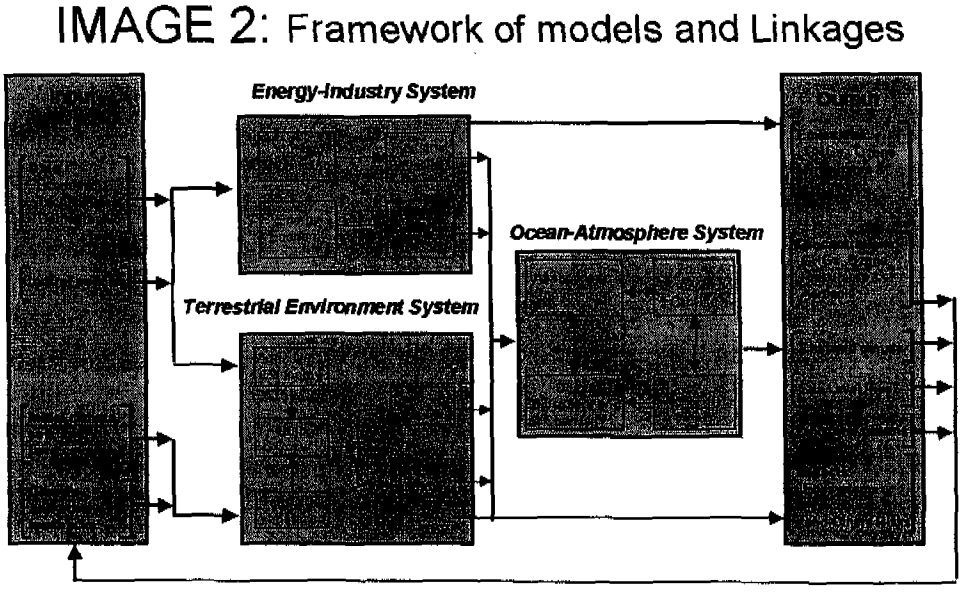

Figure 10. Schematic overview of IMAGE 2.

The 'Delft Dialogue Process'[15] involved a series of seven workshops held in Delft in The Netherlands from 1995 till 1999, where Framework Convention on Climate Change delegates met with the IMAGE modelling team. From 1995 till 1997 RIVM and SEPA (Systems Engineering and Policy Analysis, Delft University, the Netherlands) held five workshops to provide a platform for bilateral learning and dialogue between policy makers and environmental scientists to enhance the potential contribution of the IMAGE 2 model to the policy process. Scientists of RIVM and SEPA decided to explore the application of the IMAGE 2 model for policy analysis and to focus it on the issues being debated and negotiated in the context of the Framework Convention on Climate Change (FCCC). They indicated that policy makers could provide the team with important guidance on directing the development of the IMAGE 2 model and its applications to greater policy relevance. The workshops were intended to be a mutual learning process.

Although the Delft process was not communicated as a focus group approach it has some striking similarities with this participatory method: the model, developed by a group of researchers was evaluated by a group of potential end-users (the policymakers). Furthermore in accordance with the focus group methodology set out in Chapter 2, the group of policy makers were homogenous on a particular aspect (they all had environmental backgrounds). It is interesting to note that the development of the model (in the Delft process) was not an interactive process in which policymakers had an equal role as the researchers. The policymakers had a reflective role; they reacted on the model and the scientists adjusted the model accordingly. Although the model was not fully *developed* in a participatory way, the process used some ideas from participatory modelling as will be explained below.

[15] For more information see (Alcamo 1994a; van Daalen et al. 1997).

Policymakers from different world regions were invited for the workshops, each of which lasting two days. The intervals between the workshops offered the IMAGE-team time to address new information needs and allowed keeping track of new emerging issues in the policy debate. For the first three workshops about 30 participants were invited. Approximately 15 participants actually attended these workshops (excluding the IMAGE team and the organising team from SEPA). At the fourth workshop more than 30 external participants from 10 different countries were present. At the final workshop the number of participants was deliberately limited to 15 in order to maintain an atmosphere for open, informal and fruitful discussions. At each workshop a number of participants entered the process for the first time. It is interesting to note that the group of policy makers was rather homogenous (most had an environmental background) despite the climate change issue having a multi-disciplinary character.

Each workshop had the same general structure. During the first day and a half, the analytical work that had been performed using the IMAGE 2 model, was presented by the IMAGE team, and discussed during plenary sessions. In order to elicit requests for further analyses and priority setting of these analyses the Group Support Facility (GSF) at SEPA was used. The GSF is a computerised meeting facility, equipped with special software (GroupSystems).

In the first workshop the IMAGE team presented the IMAGE 2 model and some analyses which were thought to be relevant to policy makers, i.e. various long term emission reduction scenarios. Policy makers reacted that these analyses did not adequately address their needs and that their concerns were more related to the necessity of actions on the short term. In the second workshop the IMAGE team presented some analyses of short term protocols. These showed that the long-term climate forecasts are rather insensitive to the differences in the short-term protocols, but depend to a large extent on the assumptions which are made over the period from 2020 to 2100. The participants felt a different approach was needed. Therefore it was decided to implement the concept of '*safe landing*' in the IMAGE model (see Box).

The concept of safe landing is an analogy, comparing the climate problem to the task of flying in an aeroplane and landing it safely at the airport. In order to land safely an aeroplane should stay within a flight corridor guiding it to the landing strip. With respect to the climate problem this refers to first establishing critical ceilings (of the landing strip) – in terms of the absolute temperature increase, the rate of temperature change, sea level and other indicators - that provide the difference between a 'safe' and a 'dangerous' situation (unacceptable consequences). By working backwards, these critical targets can then be translated to emission boundaries for the short term (cf. flight corridors) (Rotmans 1993; Leemans 1998).

In the third workshop the IMAGE team presented the implementation of the safe landing concept. The Safe Landing Analysis was well received by the policymakers and it was concluded that more insight was needed in the regional impacts of various safe landing trajectories. In the next workshop the IMAGE team presented an interactive version of the Safe Landing Analysis, allowing participants to evaluate their own selection of values for the climate indicators and including the possibility to change future climate goals and assess the impact of technological change. In the discussion it was stated that policy makers need a better scientific basis for determining acceptable values for climate indicators, finding ways to deal with all the uncertainties involved in the climate policy issue and for assessing the dynamics of technological innovation. In the fifth and final workshop, the IMAGE team presented a new regionalised version of the Safe Landing Analysis and a comparison of

various safe landing approaches. The policy makers appreciated the new features of the Safe Landing Analysis, but is was felt that its outcomes were less transparent. The end of the fifth workshop was to carry out a scenario exercise, using the Interactive Scenario Scanner (ISS).

The course and contents of the Delft workshops were determined by a combination of what participants are interested in (determined by policy context and group composition) and the capabilities for offering analytical support (determined by the IMAGE 2 model and expertise of IMAGE group).

Most of the participants were able to switch from their regular role of formal representatives of their country or interest group to a more open and informal discussion style necessary for the mutual learning aimed at with the workshops. At the start of the Delft process, policy makers were still open to, and searching for, new information and arguments they could use in the ongoing debate on climate change at different levels and in different settings. While the direct coupling to the policy process provided focus, it also led to a lack of interest for more fundamental issues. Many participants had an interest in exploring and sharpening the arguments in favour of short-term action. Problems with model complexity and lack of transparency were avoided by focusing on outcomes rather than on the model itself.

The Group Support Facility was mainly employed to set priorities and create a working list for the IMAGE team, which was used to determine the programme for the next workshop. In the first workshop GSF was used to generate ideas. Participants were not very positive about this: there was little feedback and discussion of ideas in this workshop. At the next workshops, participants were not again asked to produce a list of requested analyses, but they were invited to write down the most important requests for analyses that came up during the discussions. These requests were presented on the computer to the participants, who were asked to add a limited number of missing analyses. The complete list was then discussed, after which the participants were asked to prioritise the list by anonymous electronic voting. The participants appreciated this use of the GSF. During the fourth workshop however the number of participants was too large for the GSF.

Some characteristics of the workshops were: a flexible set-up in terms of timing and contents, an iterative nature of the workshops, question (policy makers) – response (modellers) set-up of the interplay and congruence with the timing of the policy process.

3.4 QUEST

QUEST[16] is an Integrated Assessment model with the look and feel of a game. It is a scenario generation and evaluation system, intended to encourage thinking about sustainability in a regional context (Rothman et al. 2001). QUEST is an acronym for Quite Useful Ecosystem Scenario Tool. QUEST is developed at the Sustainable Development Research Institute, University of British Columbia. The underlying assumption is that a computer simulation game is a good way to communicate model results.

The QUEST system was first applied to the Lower Fraser Basin, a region in British Columbia, Canada, including Greater Vancouver and the Fraser Valley. This resulted in the LFB-

[16] For further information see (Rothman et al. 2001).

QUEST computer model. With LFB-QUEST, users can develop integrated scenarios for the Lower Fraser River Basin. They can make assumptions on uncertain model variables and use policy options to achieve a desired future. In this way, they get to know concepts like the complexity of integrated decision-making and the inherent scientific uncertainties involved.

Through QUEST, single users or groups of users can explore different possible future scenarios in terms of their social, economic and environmental characteristics and consequences. The goal is to acquaint users with the complex realities of decision-making, specifically the uncertainties involved, necessary tradeoffs, and role of subjective values. Thus, the information it provides must reflect the issues and uncertainties inherent in trying to understand complex human and natural systems at the regional scale. QUEST actively involves the user in scenario creation and evaluation in the format of a computer game.

The QUEST approach focuses on learning through scenario construction rather than on scenario results. Previous experience in modelling sustainable society futures led to the realisation that it was the act of creating scenarios, which involved complex discussion and negotiation of inputs based on consideration of tradeoffs and potential consequences that led to real learning about the issues involved. One of the ideas behind developing QUEST in the form of a game was to communicate scientific results and complex topics like regional planning in a user-friendly way and to interest the general citizenry (Rothman et al. 2001). The participatory approach chosen in QUEST reflects ideas and techniques associated with both scenario learning and policy exercises.

The decision to develop a game-like tool put the emphasis in the modelling process on the communication of results. Questions about what the user would like to see appear on screen provided leads for the model, as well as questions about what the user would want to be able to manipulate. The modellers and programmers constantly kept in mind what the user would see and do with the model. However, the QUEST research team did not use a structured participatory process to explore the users' needs. The QUEST endeavour can therefore not be characterised as participatory modelling. However, the model was shown to many people, also visitors visiting the research institute. Through their enthusiasm, the research group had every visitor see and try QUEST, and each of those visitors could, and did offer further advice on development. This way, users' needs were taken into account as a guiding principle for implementing the various model features. The downside of this approach is that it provides less concrete suggestions for future modelling exercises.

3.5 ULYSSES

ULYSSES - short for Urban Lifestyles, Sustainability and Integrated Environmental Assessment - was a European research project on public participation in Integrated Assessment. It was a three-year project that run from 1996 to 1999. The project was co-ordinated by Darmstadt University of Technology, Germany, and was supported by the European Commission, DG XII, RTD Programme Environment and Climate, area "Human Dimensions of Environmental Change". The research team comprised researchers from ten research institutions in eight European countries.

The aim of ULYSSES[17] was to design Integrated Assessment-focus group procedures allowing interfaces between expert models and lay participants, especially citizens. The project thus explicitly used the focus group method as a basis for the IA endeavour. IA focus groups have been conducted in Barcelona, Venice, Athens, Zurich, Frankfurt, Manchester and Stockholm. In the IA focus groups, selected citizens debated about climate change and mitigation options. They were supported in their deliberations by access to expert information. The expert information supplied was usually in the form of IA computer tools (models, information system). ULYSESS tested the IA focus-group for the topic of climate change in relation to urban life styles. Within the ULYSSES project more than 50 IA focus groups have been conducted with in total of more than 250 discussion sessions involving more than 300 citizens differing with regard to social stratification and environmental attitudes.

The major methodological innovation of ULYSSES was to explicitly and systematically develop participatory procedures for Integrated Assessment which combine the rationality of computer models with the rationality of social discourse. The focus group methodology was chosen as a model for this because it enables preferences, perceptions, attitudes, values and behaviours to be observed in a dynamic setting. Central in ULYSSES was triggering conversations as to be able to learn from the course of the discussion and from the resulting dynamics of opinion-formation.

Each focus group involved 6-8 people in five sessions that lasted around 2.5 hours. The groups were guided through the process by a group moderator (who facilitated discussions in general) and a model moderator (who facilitated sessions using the computer models). The set up of the room is displayed in Figure 12. The participants were selected so as to obtain a group with participants from the same place of residence (i.e. metropolitan area) balanced in terms of age, occupation and education, income, and attitudes towards the environment.

The IA focus group methodology as developed in ULYSSES involved three parts. The first part engaged the participants in creating collages about their perceptions of climate change in the year 2030 (see for some examples Figure 11). This activity was followed by a general discussion. In the second part, computer models were introduced and demonstrated by an expert, followed by a discussion on climate and energy issues. During the session the participants were confronted with both global and regional IA computer tools – i.e. IMAGE scenarios, TARGETS (Rotmans and de Vries 1997), ICAM (Edmonds et al. 1996), Polestar (Raskin et al. 1995), Impacts, Options, CO2 lifestyle indicators (Schlumpf et al. 1999) - that addressed impacts of policy decisions and lifestyles on climate change. The participants also discussed regional policy goals and options, particularly with regard to climate issues. In the third part the participants collectively formulated their group conclusions and in most cases documented them in so-called citizens' report.

[17] For more information about the project see http://zit1.zit.tu-darmstadt.de/ulysses/ and (Kasemir et al. 1997), (Van Asselt and Rotmans 2001).

Figure 11. Examples of collages produced by the focus groups.

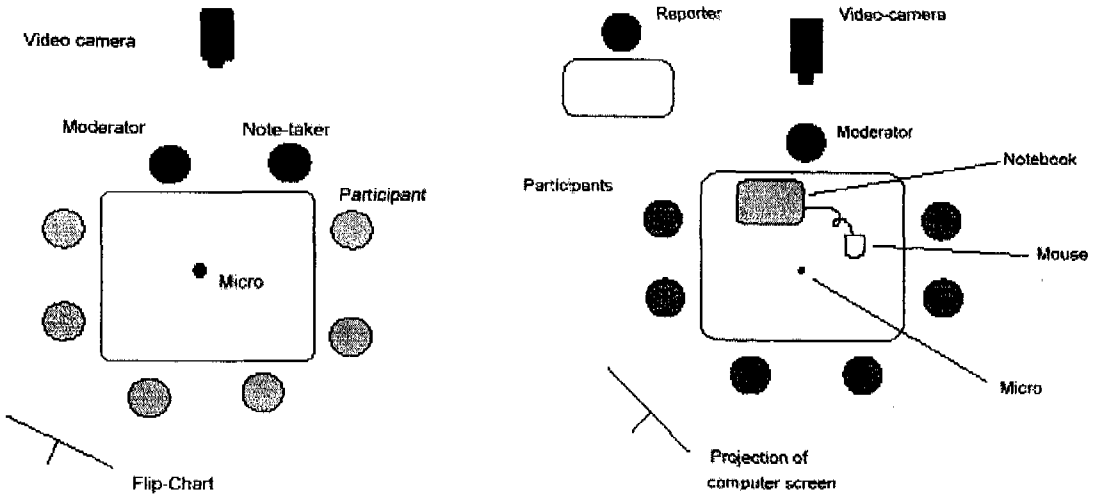

Figure 12. Set up of the rooms during the focus groups.

The project highlighted a number of aspects of participation. The first involves the relationship between the moderator and the group. Credibility and trust are largely dependent on interpersonal skills and the ability to communicate in a way that maintains interest, clarity and a human dimension. The second concerns the expert versus non-expert interface. An explicit acknowledgement of the validity of many different kinds of expertise and a consistent internal coherence of the expertise presented are two essential conditions for a productive lay - expert dialogue (Kasemir et al. 1997; Marchi et al. 1998). The third observation concerns the nature of the output produced by the participants. While the groups were not required to reach a consensus view, each group report showed a high level of consensus and very few contradictory suggestions were found between reports. Finally concerning facilitation, it is advisable to have different persons to realise the tasks of group moderation and model moderation. The distinction of roles ensures that the group moderator is not perceived to have more knowledge than the participants.

Some important lessons from ULYSSES can be drawn for future research projects involving participation (Berk et al. 1999). One is that it is important to keep in mind that lines of

argumentation count rather than the statements or conclusions itself. Revealing the lines of argumentation facilitates the learning of the participants from each other. The set up of the IA focus groups is meant to support debates instead of settling them. This is a major lesson because in most peoples minds discussions have the goal to settle debates. Furthermore an important lesson from the ULYSSES project is that it was noticed that it is very important for the participants to have insight in the conditions and the scope of their personal and group involvement in the process. This is not only because the participants will be more motivating, but it is also useful for the process when the participants have a feeling of ownership over the process.

3.6 VISIONS

Integrated visions for a sustainable Europe (referred to as VISIONS) is an Integrated Assessment project under the auspices of DG Research and Development (formerly known as DGXII, Fourth Framework Programme, Environment and Climate, Theme 4, Human Dimensions of Environmental Change). The overall research theme is to combine and test scientific tools and techniques as to assist the process of policy making for sustainable development in Europe. The VISIONS project[18] aims to provide a point of reference and practical tools for key decision-makers and stakeholders. The main objective of VISIONS is to create a set of alternative scenarios for future sustainable development paths, up to 2020 and 2050 for Europe as a whole and for three regions in Europe (North-west region of the UK, Venice (Italy), and the Green Heart (Netherlands)). The European and regional scenarios have been developed independently, employing participatory methods. The scenarios are linked to create integrated visions for Europe addressing both European and regional outlooks and interests (see Figure 13). The visions will be used to formulate a set of policy recommendations for sustainable development in Europe.

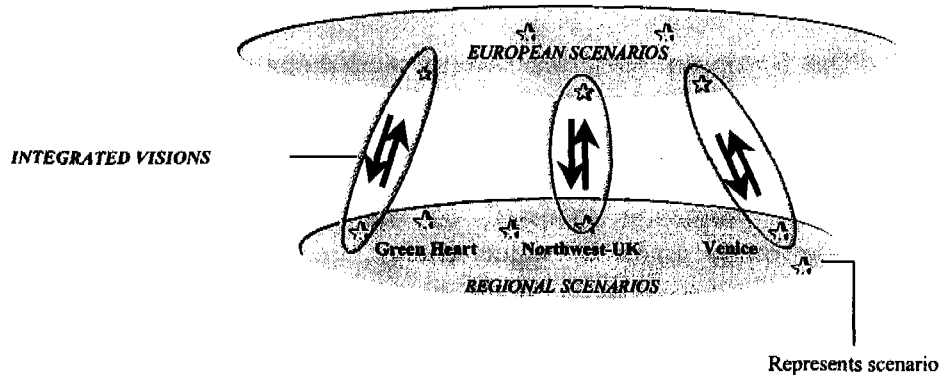

Figure 13. VISIONS; European and regional scenarios integrated into visions.

The scenarios from which the visions are created are based on a backbone of ideas developed in interactive workshops, which bring together representatives from the different scientific disciplines, and in particular stakeholders from the policy, business, and NGO communities. The *scenario analysis* method has served as the main source of inspiration, adapted and applied in the VISIONS project at the European level and in two of the regions (the Green

[18] For a more detailed discussion of the VISIONS project see: Rotmans et al (2001a), Rotmans et al. (2001b), Rotmans et al, (2000), and the VISIONS-website: http://www.icis.unimaas.nl/visions.

Heart and the Northwest UK[19]). The Venice scenarios are based on IA focus groups and in-depth interviews. In Figure 14 the different participatory and analytical tools are visualised. Below the experiences from the development of the European and the Green Heart scenarios will be described.

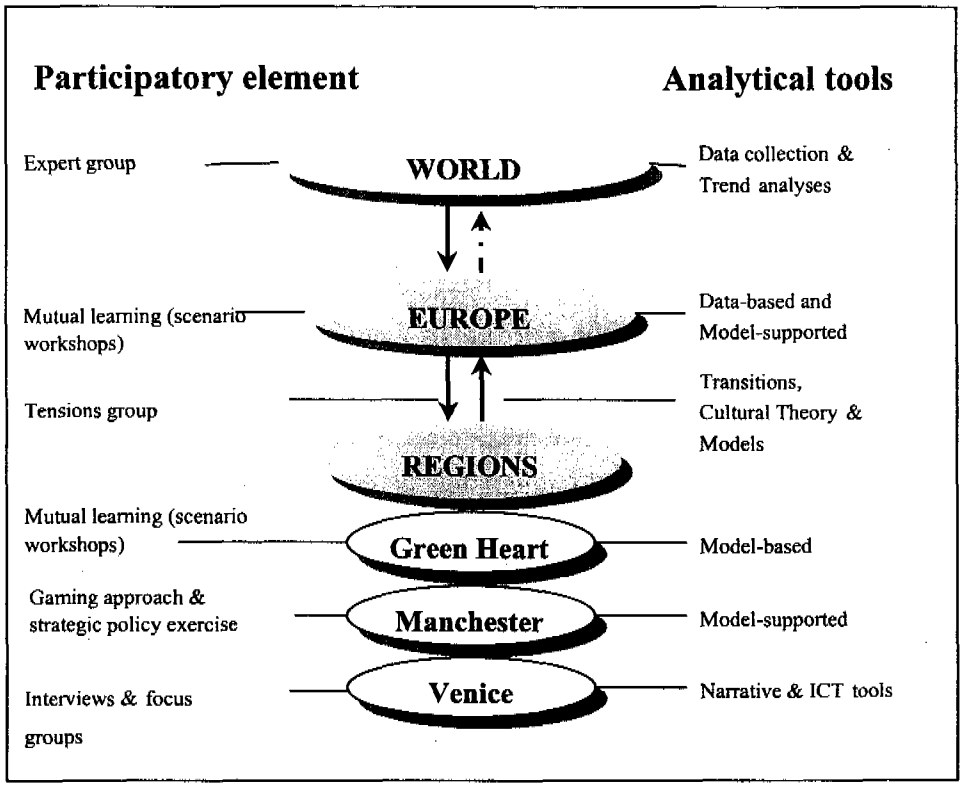

Figure 14. Integrated framework for participatory methods and analytical tools in the VISIONS project.

European scenarios

For the development of the European scenarios several workshops were held. The first workshop was held over 2 consecutive days bringing together 25 participants from countries in Western Europe. The goal of the workshop was to produce a set of unique and novel 'storylines' based on issues that European stakeholders believed to be crucial in the context of sustainable development. The workshop focussed on the current trends and future developments relevant to the broad topics of water, energy, environment, transport, and economics as well as the role of actors such as NGOs, governments, business, and society. The participants were selected to form a balanced group composed of representatives and expertise in the fields mentioned above, for example, representatives from the policy, business, and NGO communities and those with backgrounds in economics, environment and social-cultural studies. In addition 'free thinkers' (people from creative backgrounds or non-interest groups e.g. journalists) were selected to participate to bring creative insights into the process and to prevent sole interest exchange.

The approach adopted at the first European workshop was broken down into the following steps (see also Rotmans et al. 1999b):

[19] The NW-Uk scenarios are more based on the envisioning variant of the scenario workshops.

Expert input on the issues and topics for the workshop ▼ **Brainstorming** on related key issues	Plenary
▼ **Identifying key variables** from the outcome of the brainstorm	Sub-groups (6-8 particiapnats)
▼ **Developing storylines** based on the key variables ▼ **Iterative enrichment** of the storylines	Research team

The expert input was both a catalyst and provided a kind of check for the content of the process. A number of participants had been approached prior to the workshop to give a short presentation (10-15 minutes) on one of the workshop topics. In order to get as many ideas as possible from the brainstorming session, the participants were asked to write their ideas down in one or two key-words on small pieces of paper (post-its) and stick them onto a brainstorm wall. Key variables were identified by arranging the 220 issues into clusters of common features. The resulting 11 clusters were each given a label that most readily reflected the common feature or key variable. These were then shared and discussed with the participants.

The development of storylines took place in smaller sub-groups (with 6-8 participants), each guided by a facilitator. The composition of the sub-groups had been carefully considered beforehand in order to create a balance of perspectives, expertise and nationality. The rationale behind was to allow people who under normal circumstances may not have the opportunity to interact to work together and to avoid a bias in expertise that may lead to single issue or narrow storylines. A storyline is 'a sequence of events, linked in a logical and consistent manner'. The facilitators urged the participants to use the brainstorm issues to consider what might happen (not what could or should happen) over the scenario period. The brainstorm issues were structured into cause-effect chains of events leading from the present day up to 2050. Dates (years) were attached to each event in the chain. At the end of this two-hour session each group had developed 2-3 sketch storylines which were then presented in a rounding-off plenary session. The second day of the workshop was devoted to enriching the storylines by exposing them to further expert input and participant discussions and deliberations.

After the workshop the storylines were used to built scenarios by clustering them into groups with common drivers. From these the scenarios were built up in phases that progressively enriched, rephrased, reinforced and refined the narratives. The output of the process are three diverse, concise and multifaceted scenarios for Europe up to the year 2050. Those scenarios were discussed with the participants in two follow-up one-day workshops. Also an expert meeting was held where people with specific knowledge could give their input to the scenarios.

Green Heart scenarios

Three integrated scenarios for the Green Heart region were developed, describing developments from the present up to 2050. The scenarios are titled: 'Technology Rules', 'Europe Leading' and 'Water Guids' (De Niet et al. 2001). Furthermore a Cellular Automata (CA) model for the Green Heart was developed. The three Green Heart scenarios were transformed into input for the model, and the narrative scenarios translated to an increase or

decrease in land use, policy restrictions, suitability issues, relationships between different land uses and/or adaptations to the transport network.

The model gives the user the ability to play with the scenarios, make changes and adaptations to input, create a landuse image for each year (2000 - 2050) and evaluate the outcomes. The user has nine indicators for evaluating the results; these indicators provide basic information on ecological, economic and social aspects. The indicators are: Job potential, Built-up area, Contiguity of jobs, Open space, Fragmentation of nature, Nature area, Recreational potential, Social-cultural potential and Contiguity of housing. These indicators provide an initial rough guide and evaluation tool, but can never substitute a more detailed (scientific) investigation.

Three workshops were held for the development of the scenarios. For the Green Heart the stakeholders were representatives of ministries, provinces and municipalities, societal organisations (e.g. NGOs), research institutes, universities and agencies, and individuals with specific interests. The stakeholders provided the detailed information for creating the scenarios and building the model. Besides stakeholders the team also drew on the (scientific) literature to provide background information on the Green Heart, to identify important trends and to provide information to back up the developments described in the scenarios. Also an expert group was used to evaluate a draft version of the scenarios to discover the strong and weak points in the scenarios.

For each workshop a discussion paper was prepared to provide the stakeholders with background information on the goals of the project and workshop, as well as information for discussion. At the first workshop held in November 1998, the focus was on identifying trends and indicators for the Green Heart. This successful initiative resulted in an overview of important indicators and trends, which was subsequently used to create the scenarios. The second workshop was held in May 1999 and focused on creating storylines for the future of the Green Heart, 2000 - 2050. The methodology used was similar to the one used for the European storylines. These storylines, of which six were created, formed the basis for the development of the scenarios. The third and final workshop, aimed at getting feedback from the stakeholders on the scenarios and model developed, was held in September 2000. Workshop participants indicated the importance of the model in visualising developments and presenting a complete picture of the future. They felt that it could also play an important role in the discussions between different groups, e.g. policy-makers with the Green Heart inhabitants.

Working with stakeholders contributed much more than an add-on reward to the project outcomes and the development of scenarios. The stakeholders helped to indicate important trends for the Green Heart region and useful indicators to monitor these developments. Furthermore, the stakeholder workshop in which we developed the so-called storylines, also provided the basis for the development of the scenarios. The storylines, the backbone of the scenarios, contain the new and unexpected elements and give the final scenarios their surprising character. However, it was difficult to draw together stakeholders to participate in a series of workshops. This point deserves extra attention if people want to involve stakeholders in other projects.

Conclusion

The project highlighted a number of aspects of participation. The first concerns the difficulties encountered by applying the scenario analysis approach. In the VISIONS case the participants

were drawn from a broad range of organisations to form a heterogeneous group, while scenario analysis is usually applied to rather homogeneous groups. This created difficulties in specific tasks that required reaching a compromise. Secondly, it was difficult to recruit high-level stakeholders. Even the fact that extensive existing networks were available did not make the recruitment any easier. This is quite relevant in the face of the growing interest in participation: paradoxically, participation is becoming increasingly important and participants are scarce. The third insight concerns brainstorming. The technique used has advantages over those where participants simply call out ideas. It encourages a permissive, non-judgmental atmosphere where all participants have an equal voice. It does, however, have certain drawbacks in that some key-words cannot express what the participants want to say and requires further explanation for which there was no room in the programme.

3.7 COOL

COOL (Climate OptiOns for the Long term)[20] is an Integrated Assessment project supporting the development of long-term climate policy in the Netherlands in a European and global context. The project runs for about 2.5 years, from January 1999 to June 2001. During the project participants enter into a dialogue with scientists to analyse and evaluate policy options and develop strategic visions.

The project has two aims:

- to investigate options for a long-term climate policy strategy in the Netherlands in an international context,
- to contribute to the development of participatory methods for Integrated Assessment.

Why does the COOL project use participatory methods? First of all, the project is about climate change, an issue with many uncertainties about what knowledge is relevant for understanding and addressing the issue. It also is an issue thought of as something that will happen in the future, so not of direct concern for the most near future. Another problem is the difficulty to project global problems to a local scale. In the COOL dialogues it is tried to give the participants the freedom to address their own policy question, while keeping in mind the larger context. Without integrating the different viewpoints of different stakeholders, environmental policy runs the risk of getting stalled in the early implementation phase.

The project sets up dialogues in which policymakers, stakeholders and scientists assess options for long-term climate strategies. The stakeholders elaborate long-term strategies for realising a 50-80% CO2 emission reduction by 2050. By using many different participants, a range of experiences and insights is included in the process and taken into account when designing effective strategies. Given the diversity of viewpoints, the project does not strive for consensus. Instead, it hopes to improve understanding of differences by putting them in perspective, and to broaden understanding of the scientific and technical dimensions of the problem, and to develop common frameworks for analysing and evaluating policy options, embracing different perspectives on the climate problem. Participation in the project thus aims at mapping out diversity.

[20] For more information on COOL see: (Berk et al. 1999) and the COOL-website: http://www.wau.nl/cool/

The dialogues are performed at three different levels, the national (Dutch) level, the European level and the global level. In the national dialogue the participants are divided over four different sector-groups, industry, agriculture, traffic and transport and built environment. The groups consist of eight to ten people from a certain sector of the Dutch economy that represents various interests from society. On the European level there are two sector-groups, transport and industry/energy. The global dialogue is primarily directed at stakeholders involved in devising international climate policies within the context of the UN-FCCC, including representatives of environmental and industrial NGOs. The global dialogue aims at exploring critical policy issues relevant for developing effective long-term control of the problem of climate change, through international strategies.

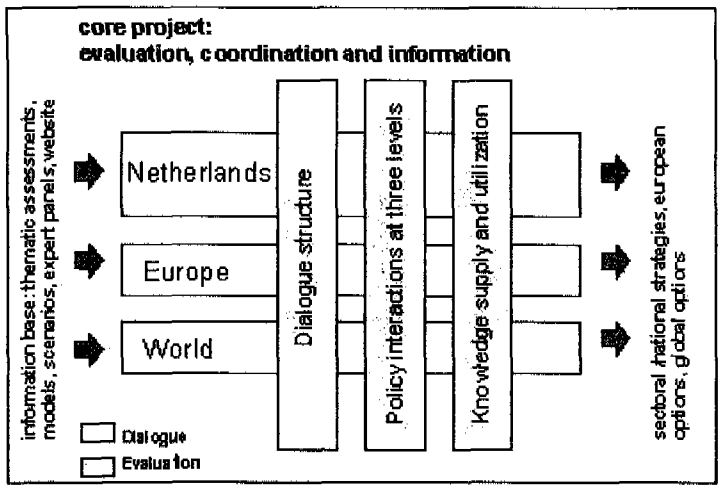

Figure 15. The structure of the COOL project (Source: http://www.wau.nl/cool/).

The sector-groups are given two feasible future scenarios developed by the project team, reflecting a future in which the emission of greenhouse gases has been drastically reduced. The scenarios are discussed in the sector-groups and adjusted and refined for their respective sectors. They then discuss the steps that must be taken to achieve these scenarios, assuming that the present situation is the starting-point. In the end, the sector-groups formulate a strategic vision indicating which decisions should be taken and which constraints should be imposed to achieve the scenarios. In doing so, although not explicitly acknowledged, the participatory approach adopted can be characterised as scenario learning employing predefined scenarios.

During each session the participants can formulate questions. It is also possible to invite external guests to give a view on a subject. The COOL project tries to stimulate ownership of the results of the project through having a participant instead of a project team member chairing the meetings.

3.8 Participation in Integrated Assessment

This Chapter discussed first experiences with of the use of participatory methods in Integrated Assessment through discussing some representative IA projects making use of participatory processes. Some applications of participatory methods in smaller-size endeavors have therefore remained out of sight; examples are participatory sensitivity analysis (van der Sluijs and Schulte Fischedick 1997; van der Sluijs 1997), uncertainty-in-perspective workshops (Van Asselt et al. 2001; Van Asselt 2000) and pilot policy exercises on climate change (Parson 1997).

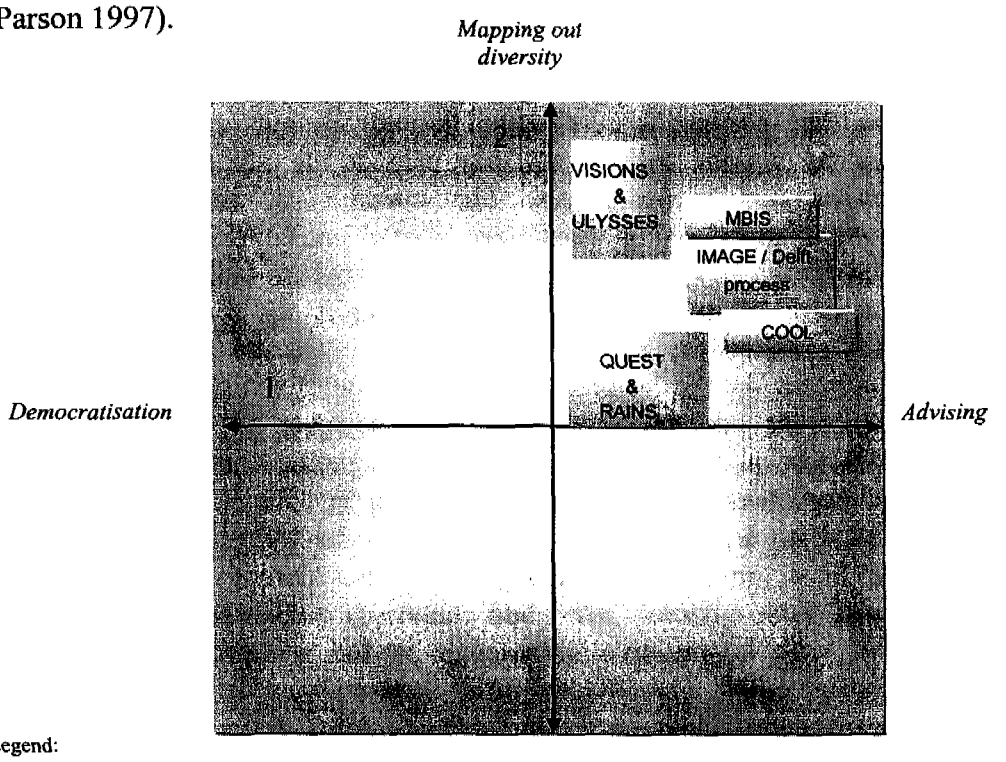

Figure 16. Categorisation of IA projects.

The summarizing overview below (Table 3) illustrates that scenario learning, focus groups, policy exercises and participatory modelling have already been used in Integrated Assessment, either consciously or unconsciously. To our knowledge, participatory planning methods have not yet been applied, which is no surprise taking into account the decision-support (advising) aim as overall goal of using participation in Integrated Assessment. Nevertheless, ideas from participatory planning may be interesting in contexts were empowerment is anyway needed as first step towards participation, such as in the case of future IA-projects in developing countries. Policy exercises have been used in an exploratory manner in prototype settings, but not in full scale IA-projects.

Table 3. Methods used in IA projects.

Methods	*Used in Integrated Assessment*
Scenario learning	Used in full scale IA projects
Focus groups	Used in full scale IA projects
Policy exercises	Used in exploratory way
Participatory modelling	Used in exploratory way
Participatory planning	Interesting for IA projects in developing countries
Consensus conferences	Promising for IA projects
Citizen juries	Promising for IA projects

Citizen juries and consensus conferences, either as main overall approach or in specific stages of the participatory process, seem interesting to apply in Integrated Assessment endeavours for converging purposes. The consensus conference through its interactive question and answer sessions between lay people and experts may provide an opportunity for mutual learning between scientists and non-scientists. The citizen jury method sets up a communication process where knowledge is transferred from scientific experts (witnesses) to stakeholders (the members of the jury), where it is synthesised by the stakeholders and then transferred to decision-makers. There is little formal opportunity for mutual exchange of knowledge. The questions produced by the lay panel at the consensus conference can be considered as societal questions for the IA research agenda. One of the aims of the citizens jury is to select solutions for predetermined questions, however as a by-product the methodology may uncover new questions for the IA research agenda. The questions that the jurors formulate and ask the witnesses may provide a basis upon which to distil the salient issues concerning citizens about a particular issue as input for the IA research agenda. The assessment is performed by a group of non-scientists that are representative of different attitudes towards the issue. Both citizens' juries and consensus conferences allows for the integration of qualitative with quantitative knowledge as the scientific information is evaluated in the light of social values. The citizens' juries furthermore offer the potential for a rich assessment as it is performed by a group of non-scientists that represent a 'microcosm' of the community: a range of perspectives and knowledge backgrounds. However the fact that the citizens jury -analogous to a legal jury- must come to a common agreement on the issue at stake may limit the richness of the outcome. This may lead to circumstances where participants compromise their view in order to resolve differences and produce an output.

From the discussion of IA projects involving participation, an additional participatory approach has been identified which has not yet been described in the scholarly literature on participation. In the MacKenzie basin study, in the IMAGE-Delft process, and in the COOL project scientists – stakeholders workshops are used. This participatory method can be defined as:

"the inclusion of stakeholder participation in the formation of research questions, generation of new information, and the discussion on results and recommendations through a series of structured, but open dialogues sessions involving stakeholders and scientists".

In this workshop approach, a heterogeneous group of stakeholders (usually the ones affected by impacts) and scientists make their knowledge, in these particular cases on regional impacts of climatic change, explicit. The group of participants consists of scientists of different disciplines that are experts on the central issue and various stakeholders, primarily decision-

makers, (environmental) NGOs and stakeholders. The example of the MBIS demonstrates that the workshop-based approach can be used for *mutual learning* between scientists and stakeholders. A workshop involves an introduction and explanation of the work to be done, a central part in which the group does the exercises (either in subgroups or as plenary) and a plenary closure, in which the results of the exercises are presented and discussed (van Asselt 2000). The example of the Delft process shows that group software can be used to support performing the workshop tasks. The concerns and issues raised by the participants in response to the information from the scientists can lead to new ideas for *societal questions* for the IA agenda. Furthermore, the methods in scientist-stakeholder workshops are designed to elucidate values and perspectives and different types of knowledge (from different disciplines) in order to *enrich the assessment*. It depends on the way the results of discussions are being worked out whether the participants involved feel *committed* to the outcome of the assessment made in the end of the process.

4. Conclusion and Discussion

The purpose of this paper has been to give an overview of the participatory methods in view of Integrated Assessment. Participation in IA has not yet matured to the degree that the procedures are etched in stone. Nor are the individual approaches crystallised enough that applying an approach can be done through employing a standard checklist. Now Integrated Assessment is increasingly considered as necessarily participatory, we felt that a review of the current state of affairs is warranted. To our knowledge, this paper is one of the first attempts to structure the participatory methods available in such a way that it provides a methodological basis for thinking on, discussing about, and learning from participation in Integrated Assessment.

This paper does not aim to judge the various participatory methods nor the first experiences with participation in Integrated Assessment in terms of quality. From the review of the participatory methods found in the scholarly literature, we conclude that policy exercises, scenario analysis and participatory modelling in principle comply with the aims of Integrated Assessment endeavours. Consensus conferences and citizens juries have useful features that can be adopted in participatory approaches in Integrated Assessment. Focus groups have explicitly been applied in IA. However, the features of the method, it can be argued that the use of IA focus groups in view of mutual learning and enriching the assessment is, however, somewhat limited, for the following two reasons:

1) IA focus groups are homogenous (i.e. citizens)
2) scientists and other stakeholders than citizens are not involved in the participatory process.

From the overview of IA projects involving participation, an additional participatory approach has been identified which has not yet been described in the scholarly literature on participation, i.e. scientist-stakeholder workshops.

While the current paper may help in answering the question 'which method to use and when', it is important to note that practical aspects such as time and budget constraints to a certain extent determine the selection of the method. Furthermore, the selection of participants and the design of process are crucial. Important choices related to participants are the choices how many, how to recruit the participants, the participants' profile (for example educational level and professional background) and payments and contracts for participation. In case of the process design, important decisions pertain to the duration and phasing of the whole process, the planning of each meeting, the use of supportive tools (for example models), the type of facilitation, the tasks assigned to the participants in the process (can vary from discussing to writing reports), and the way in which process data is gathered (by minutes, audio-taping, video-taping, process drawings, and so on).

An important observation derived from our study is the fragmented nature of participation as research field. Interdisciplinary overviews are lacking and common platforms, forums or hubs of substance where information is concentrated are absent, whether as formal organisations or informal webs of practitioners in participation. Secondly, the participatory approaches differ in degree maturation. Scenario analysis, for example, is a well-established and developed approach. Within this approach it is perhaps the aspect of envisioning workshops that is least developed yet, although even here the philosophy and procedural framework are fairly clear. This contrasts with the rather broad category of scientists-stakeholder workshops, for

example. This is a fluid, not yet well-defined approach. More experience needs to be gained. Finally, building upon the previous observations, it is obvious that participation in IA is an extremely dynamic and pioneering field. That is why there is a clear need to exchange knowledge on participation among Integrated Assessment researchers in order to arrive at tested and peer-reviewed practices and procedures. With this paper, we have tried to stimulate constructive, high-level, and in-depth discussions within and beyond the International Centre for Integrative Studies (ICIS) on participatory methodology. The aim is that this working paper can serve as point of reference for those who would like to become professionals in participation.

However, we would like to conclude this paper with a warning. There is the risk that participation is getting a buzz-word, not only in Integrated Assessment as well as in neighbouring field. The associated danger is that participation is applied without a systematic discussion of pros and cons and a conscious choice of methodology. Participation is not a 'just-do-it' process, but a process that requires social scientific knowledge and craftsmanship. Before starting with participation, the goals of participation should be discussed in terms of desirable output and needed input, which then scope the process design. There are some disadvantages or even dangers associated with participatory processes:

- non-participants: participatory processes aim at informing the decision-making process with societal voices, what if some important actors or individuals are not interested or not willing to participate in participatory processes
- dominant participants: dominance by one or more individuals may corrupt the process
- mismanagement of expectations: participants have expectations about the process that probably cannot be fulfilled with the consequence that at the end of the day participants are frustrated which may in some cases be more problematic than lack of involvement in the assessment process
- entrapment of participants by experts; the participatory process is solely used as 'validation' of research results (self-justification)
- co-option of experts by stakeholders
- 'perverse' or biased results due to bad facilitation, poor process or purposeful manipulation
- lack of transparency, both for participants and for peers not involved in the participatory process themselves
- insights, ideas, recommendations, etc. generated by the participatory process are not taken up in the assessment or decision-making process
- participatory processes are time-consuming, which may be at the expense of systematic and thorough analysis of the process' outputs, research on substantive issues and the actual assessment of the policy relevant topic.

Participation in Integrated Assessment necessitates learning-by-doing and trial-and-error. In order to be able to learn and to mature as community the least that is necessary is transparent documentation and communication on:

- the reasons why participatory processes are or were applied
- whether the actual participatory process satisfied the aims, and if not, why?
- methodological choices
- the course of the actual process, to allow use, evaluation and re-analysis by peers (i.e. satisfying the criteria that conclusions can be reproduced by another scientist)
- lessons learned

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