



Knowledge
for Climate

Position paper on collaborative action re- search: foundations, conditions and pitfalls

Key Deliverable 1A
Theme 7: Governance of adaptation



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Theme 7: Governance of adaptation

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1 Short summary

This position paper serves as an introductory guide to designing and facilitating an action research process with stakeholders in the context of climate adaptation. Specifically, this is aimed at action researchers who are targeting at involving stakeholders and their expert knowledge in generating knowledge about their own condition and how it can be changed.

The core philosophy of our research approach can be described as developing a powerful combination between practice-driven collaborative action research and theoretically-informed scientific research. Collaborative action research means that we take guidance from the hotspots as the primary source of questions, dilemmas and empirical data regarding the governance of adaptation, but also collaborate with them in testing insights and strategies, and evaluating their usefulness. The purpose is to develop effective, legitimate and resilient governance arrangements for climate adaptation. Scientific quality will be achieved by placing this co-production of knowledge in a well-founded and innovative theoretical framework, and through the involvement of the international consortium partners.

This position paper provides a methodological starting point of the research program ‘Governance of Climate Adaptation’ and aims:

- To clarify the theoretical foundation of collaborative action research and the underlying ontological and epistemological principles
- To give an historical overview of the development of action research and its different forms
- To enhance the theoretical foundation of collaborative action research in the specific context of governance of climate adaptation.
- To translate the philosophy of collaborative action research into practical methods;
- To give an overview of the main conditions and pitfalls for action research in complex governance settings

Finally, this position paper provides three key instruments developed to support Action Research in the hotspots: 1) Toolbox for AR in hotspots (chapter 6); 2) Set-up of a research design and action plan for AR in hotspots (chapter 7); 3) Quality checklist or guidance for AR in hotspots (chapter 8).



2 Samenvatting

Dit overzichtsdocument dient als een gids om een actie-onderzoeksproces te ontwerpen en te faciliteren in samenwerking met belanghebbenden binnen de context van klimaatadaptatie. Het is met name gericht op actie-onderzoekers die direct betrokkenen en hun expertise willen inzetten om kennis te ontwikkelen over hun eigen (probleem-)situatie en hoe deze situatie verandert kan worden.

Het belangrijkste gedachtegoed van ons onderzoeksprogramma kan worden omschreven als het ontwikkelen van een krachtige combinatie van praktijkgedreven (samenwerkend) actie-onderzoek en theoretisch geïnformeerd wetenschappelijk onderzoek. Samenwerkend actie-onderzoek betekent dat hotspots in belangrijke mate sturing en invulling geven aan de onderzoeksvragen, dilemma's en empirische data in het kader van de governance van klimaatadaptatie. Het betekent daarnaast ook dat onderzoekers en direct betrokkenen in de hotspots samenwerken in het testen van inzichten en strategieën, en het evalueren van hun bruikbaarheid. Het doel is om effectieve, legitieme en veerkrachtige strategieën voor klimaatadaptatie te ontwikkelen. Wetenschappelijke kwaliteit zal bereikt worden door de coproductie van kennis in een goed onderbouwd en vernieuwend theoretisch raamwerk en door de betrokkenheid van internationale consortium partners.

Dit overzichtsdocument biedt een methodologisch startpunt voor het onderzoeksprogramma 'Governance van Klimaatadaptatie' en heeft als doel:

- Het verhelderen van de theoretische grondslagen van actie-onderzoek en de onderliggende ontologische en epistemologische principes;
- Het geven van een historisch overzicht van de ontwikkeling van actie-onderzoek en verschillende verschijningsvormen;
- Het versterken van de theoretische grondslagen van actie-onderzoek in het kader van de 'Governance van Klimaatadaptatie';
- Het vertalen van het gedachtegoed van samenwerkend actie-onderzoek naar praktijkmethoden;
- Het geven van een overzicht van voorwaarden en valkuilen van actie-onderzoek in complexe governance settings

Tot slot, presenteert dit overzichtsdocument drie belangrijke instrumenten om (het opzetten van) actie-onderzoek in de hotspots te ondersteunen: 1) Een gereedschapskist ('toolbox') voor actie-onderzoek; 2) Een voorbeeldontwerp en actieplan voor actie-onderzoek; 3) Een lijst met kwaliteitscriteria / richtlijn voor actie-onderzoek



3 Extended summary

This paper serves as an introductory guide to designing and facilitating an action research process with stakeholders in the context of climate adaptation. Specifically, this is aimed at action researchers who are looking to involve stakeholders and their expert knowledge in generating knowledge about their own condition and how it can be changed. The purpose is to develop effective, legitimate and resilient climate change adaptation strategies.

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This paper provides a methodological starting point of the research program 'Governance of Climate Adaptation' and aims:

- To clarify the theoretical foundation of collaborative action research and the underlying ontological and epistemological principles
- To give an historical overview of the development of action research and its different forms
- To enhance the theoretical foundation of collaborative action research in the specific context of governance of climate adaptation.
- To translate the philosophy of collaborative action research into practical methods;
- To give an overview of the main conditions and pitfalls for action research in complex governance settings

The core philosophy of our research approach can be described as developing a powerful combination between practice-driven collaborative action research and theoretically-informed scientific research. Collaborative action research means that we take guidance from the hotspots as the primary source of questions, dilemmas and empirical data regarding the governance of adaptation, but also collaborate with them in testing insights and strategies, and evaluating their usefulness. Scientific quality will be achieved by placing this co-production of knowledge in a well-founded and innovative theoretical framework, and through the involvement of the international consortium partners.

The principle of actively involving stakeholders in our research on the governance of climate adaptation is important for several reasons. The first reason is that stakeholder involvement and 'buy-in', or ownership, is crucial for identifying acceptable trade-offs, for negotiating distributions of costs and benefits and for reaching consensus about the research findings and recommendations (Ashby, 2003). During processes of climate change adaptation, the understanding needed for consensus and compliance requires new knowledge to be generated by research in order to achieve stakeholder 'buy-in' and often needs to include expertise drawn from other stakeholder groups (Irwin, 1995). This form of ownership often needs to be established across a range of institutions and levels of decision-making (Martin and Sutherland, 2003).

A second reason for involving stakeholders in research is that their involvement is key to coping with the complexities and uncertainties related to impacts of climate change on society and the ecosystem, by bringing in a wider range of perspectives on needs, impacts and options, and having them deliberated openly. At the same time, by engaging with complex governance systems, researchers are better able to understand their dynamics.

The issue of great complexity and uncertainty poses important challenges to governments, particularly in finding their most appropriate role in the field of climate adaptation. They try to find answers on questions like: which instruments can we use, which policy options are available, how do we have to organize governance processes and which legal room for manoeuvre do we have? Instead of studying these considerations, action research can be a method to help officials by finding the right answers.

A third reason is to use collaborative action research in the emerging field of 'governance of adaptation' is that this field is still in its infancy (Termeer et al. 2011). Governments are still thinking about what they have to do and how they have to do this. So, there is not much opportunity for reconstructive research, for in-depth surveys or multiple case-study research when we want to know more about the governance of adaptation. We have to focus our research on practices which are emerging.

Fourth, because the theory of governance of adaptation is under construction, it is very helpful to organize short, iterative cycles of observation, analysis and adjustment. Action research is highly useful to combine initial theory testing and theory development. It provides in recurring learning cycles in which empirical fieldwork and theoretical reflection follow each other.

Taking into account above considerations it becomes clear that more research is needed on the foundations, conditions, pitfalls and added value of action research within the context of climate change adaptation.

This methodological paper functions as a methodological framework underlying many of the projects of the work packages or our research program 'Governance of Climate Adaptation'. It develops and reflects upon the methods of collaborative action research. It aims to enhance the theoretical foundation of collaborative action research in governance, to translate the philosophy of collaborative action research into practically applicable methods and tools, to support its application in the projects, and to reflect upon the pitfalls and opportunities.

Finally, this position paper provides three key instruments developed to support Action Research in the hotspots: 1) Toolbox for AR in hotspots (chapter



- 6); 2) Set-up of a research design and action plan for AR in hotspots (chapter 7);
- 3) Quality checklist or guidance for AR in hotspots (chapter 8).



4 Introduction

4.1 Purpose of this paper

This paper serves as an introductory guide to designing and facilitating an action research process with stakeholders in the context of climate adaptation. Specifically, this is aimed at action researchers who are looking to involve stakeholders and their expert knowledge in generating knowledge about their own condition and how it can be changed. The purpose is to develop effective, legitimate and resilient climate change adaptation strategies.

This paper provides a methodological starting point of the research program 'Governance of Climate Adaptation' and aims:

- To clarify the theoretical foundation of collaborative action research and the underlying ontological and epistemological principles
- To give an historical overview of the development of action research and its different forms
- To enhance the theoretical foundation of collaborative action research in the specific context of governance of climate adaptation.
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4.2 Important definitions

Some definitions of important concepts used throughout this paper are described here.

Adaptation to climate change is defined by Adger et al. (2005, p.78) as: “An adjustment in ecological, social or economic systems in response to observed or expected changes in climatic stimuli and their effects and impacts in order to alleviate adverse impacts of change or take advantage of new opportunities. Adaptation can involve both building adaptive capacity thereby increasing the ability of individuals, groups, or organisations to adapt to changes, and implementing adaptation decisions, i.e. transforming that capacity into action. Both dimensions of adaptation can be implemented in preparation for or in response to impacts generated by a changing climate.”

Governance of climate adaptation: Climate proofing the Netherlands is not only a technical issue but also a demanding matter of governance. The specific complexities of adaptation governance call for new advanced governance knowledge. Governance is defined as the interactions between public and/or private entities ultimately aiming at the realization of collective goals. A governance arrangement is the ensemble of rules, processes and instruments that structure these interactions. This programme will develop and test governance arrangements that can contribute to realizing adaptation options, and to increasing the adaptive capacity of society. These arrangements should be effective, legitimate and resilient.

Collaborative action research: The core philosophy of our research approach can be described as developing a powerful combination between practice-driven collaborative action research and theoretically-informed scientific research. Collaborative action research means that we take guidance from the hotspots as the primary source of questions, dilemmas and empirical data regarding the governance of adaptation, but also collaborate with them in testing insights and strategies, and evaluating their usefulness. Scientific quality will be achieved by placing this co-production of knowledge in a well-founded and innovative theoretical framework, and through the involvement of the international consortium partners.

Stakeholders: In this paper stakeholders includes all persons, groups and organizations with an interest or “stake” in an issue, either because they will be affected or because they may have some influence on its outcome. This includes individual citizens and companies, economic and public interest groups, government bodies and experts. Public includes all non-governmental stakeholders. In the program Governance of climate adaptation the stakeholders mainly include civil servants, decision-makers and politicians.



4.3 Reading guide

In the following chapter we will address respectively foundations, conditions and pitfalls of collaborative action research (chapter 5), Furthermore, this paper includes four key instruments developed to support Action Research in the hotspots: 1) Toolbox for AR in hotspots (chapter 6); 2) Set-up of a research design and action plan for AR in hotspots (chapter 7); 3) Quality checklist or guidance for AR in hotspots (chapter 8).



5 Foundations, conditions and pitfalls of action research

This chapter intends to clarify the theoretical foundation of action research, with a specific focus on collaborative action research and its relevance for the governance of climate adaptation. Before focusing on collaborative action research this chapter will give an historical overview of the development of action research and its different forms (5.1.1), and the underlying ontological and epistemological principles (5.1.2). It will then elaborate on four different approaches to action research (5.2), levels of action research (5.3) and why collaborative action research is of particular importance for the governance of climate adaptation (5.4). This chapter ends with an overview of the main conditions and pitfalls for action research in complex governance settings (5.5). In the following chapter we will translate the philosophy of collaborative action research into practical methods (Chapter 5).

5.1 Conceptual background of action research

For research into social phenomena there is increasing interest in "action research" in various forms. In this process the researcher enters a real-world situation and aims both to improve it and to acquire knowledge (Checkland and Howell, 1998). Since the 1990's it became more and more difficult to identify the main thrust of action research, since there have been a number of different interpretations of the term action research, but also a variety of different terms, such as action learning, action research, action inquiry, participatory action research and collaborative action research (Eden and Huxham, 1996). All of them share the aim of building "theories within the practice context itself and test them through intervention experiments" (Argyris and Schon, 1991).

The need for practical, useful research that informs management practice is well established. For a number of reasons, action research is well suited to provide actionable knowledge (Coghlan & Brannick, 2002). Action research provides relevant knowledge due to the involvement of practitioners and because the research is carried out in the relevant context itself. Due to the involvement of practitioners, rich data can be gathered relatively easily. It provides rich data due to the involvement of practitioners. Because data are gathered in context, the research results are valid in that context. The involvement of practitioners enhances the development of actionable knowledge, while scientific researchers in action research tend to guard the development of theoretical knowledge. Action research projects often use both qualitative and quantitative methods,

and can provide both theoretical and practical insights (Reason & Bradbury, 2010).

Action research aims to contribute both to the practical concerns of people in an immediate problematic situation and to further the goals of social science simultaneously (Gilmore et al., 1986). In other words, there is a dual commitment in action research to study a system and concurrently to collaborate with members of the system in changing it in what is together regarded as a desirable direction. The twofold ambition of developing practically relevant and scientifically sound knowledge requires the active collaboration of researcher and client, and thus it stresses the importance of co-learning as a primary aspect of the research process (Gilmore et al., 1986). Action research involves utilizing a systematic cyclical method of planning, taking action, observing, evaluating (including self-evaluation) and critical reflecting prior to planning the next cycle (O'Brien, 2001). Of course, not all problems and research topics require the same standard approach. Each action research program requires tailor made arrangements, which take - amongst others - into account situational conditions regarding the content of the issues, relationships, and commitments.

5.1.1 Differences and similarities with other research approaches

Action research is characterized by its aim to contribute to social action, by the participatory role of stakeholders, and by the fact that research is mostly carried out in situ. Action research thus has several similarities with case studies, and ethnographic research. It shares with those methodologies the element of the research being carried out in situ (in the midst of the action). It shares with ethnography and participant observation the element of the researcher participating in the activities and developments that are being studied. A main difference with both approaches is that action research aims to contribute to social action, which is not necessarily a goal in case studies and ethnographies. These two aim at understanding and knowledge development, but they need not be aimed at actionable knowledge. Another difference is that in action research there is not only participation of the researcher in stakeholders' activities, but also participation of stakeholders in research activities.

	Action research	Classic case study	Classic ethnography
In situ research	Yes	Yes	Yes
Aim of social action	yes	no	No
Researcher participates in	Yes	Sometimes	yes



action			
Stakeholders participate in research	Yes	No	No

5.1.2 Roots and theoretical sources of action research

Action research has a rich history with several origins. Action research can be traced back to the social experiments that Kurt Lewin carried out in the 1940s (Lewin, 1946). Lewin's research on organizational change and social democracy explicitly aimed at social action. Other origins of action research can be seen in the Marxist idea that the main goal is not understanding the world but rather changing it (Reason and Bradbury). Paulo Freire's work on counterhegemonic knowledge development together with oppressed people, is one of the early forms of action research that is rooted in Marxist ideas. It has informed later participatory research aimed at emancipation and liberation of the underprivileged. Such research has been developed and implemented in for example participatory rural appraisal, educational research, and feminist research in different fields of practice (Reason and Bradbury, 2001). Another main source of action research is psychotherapy, where action research has been used to develop forms of mutual inquiry and self-help. Also within the fields of organizational change and leadership, there is a history of action research. Under the flag of action research and action science, scholars such as Argyris (1985) and Torbert (1989) have built upon Lewin's work.

In theoretical terms, action research draws on many sources. It builds on critical theory, humanism, feminism, constructionist theory, systems thinking, and complexity theory (cf. McIntyre, 2008; Reason and Bradbury, 2001). For example critical theory informs action research in the sense that it aims at social change, and that it attends to power relationships influencing both practitioners and researchers in their practices and institutions (see e.g. Kemmis, 2001). Constructionist theory has added the idea that people learn most effectively by doing, and engaging in action. Constructionist theory stresses that learning is about constructing ideas by the one who learns, rather than teachers transmitting knowledge to pupils. Systems thinking is a grounding of action research when it comes to propagating holism and critiquing reductionist approaches (e.g. Checkland and Holwell, 1998; Flood, 2001). Systems thinking has brought forward that solving problems in (complex) systems requires an understanding not only of the separate components of a system, but also their interrelationships and their relation to the whole. Feminist theories have added to emancipator goals of action research through their focus on making visible structures of domination, and aiming to raise consciousness about those structures among men and women (McIntyre, 2008).

On the basis of a diverse theoretical approaches and fields of practice, action research has grown into a fully developed orientation towards inquiry. Within the action research orientation, several approaches have blossomed which we will discuss in the next subsection.

5.2 Five approaches to action research

In this section we discuss five approaches to action research: co-operative inquiry, participatory action research, action inquiry, appreciative inquiry and learning evaluation (cf. Ludema et al. , 2001; Reason, 2003; Edelenbos and Van Buuren, 2005). These five approaches within action research represent the most common forms of action research and include much of the variety of orientations within action research, although admittedly we exclude approaches such as research partnerships, critical ethnography, rapid rural appraisal, critical action research and community-based participatory research.

Within the family of action research scholars there are different orientations towards the main goal of action research (empowerment, transformation, social action in general), the role of those involved (from practitioners to co-researchers), the role of critique (focus on critique or on appreciation and positive development). These different orientations can be traced back in five main approaches to action research: co-operative inquiry, participatory action research, action inquiry, appreciative inquiry and learning evaluation (cf. Ludema et al. , 2001; Reason, 2003;). In the section below we draw extensively on the work of Reason and Bradbury (2001; 2003). We also draw extensively on Edelenbos and Van Buuren (2005) to explain learning evaluations.

Co-operative inquiry

In co-operative inquiry everybody who is involved in the research is a co-researcher and also a co-subject. As a co-researcher everybody involved has a role in generating ideas, designing and managing the research, interpreting the results and drawing conclusions (Reason, 1999). As co-subjects everybody engages in the activity under research (ibid.). Co-operative inquiry can be applied as a form of democratic research with the explicit aim of co-operative inquiry to make research a democratic activity, giving both the practitioners and researchers a say in the research. As Reason argues it can be used to help 'ordinary people regain the capacity to create their own knowledge' (p207). In that case co-inquiry aims at emancipation (Reason, 1999). However, co-inquiry can also be used for more pragmatic reasons such as the enlargement of the research capacity or the enhancement of the learning of everybody involved by being actively involved in the research process. One feature of co-operative



inquiry is that the divisions between 'researcher' and 'practitioners' or between 'researcher' and 'subject' becomes blurred.

Participatory action research

Participatory action research stresses political aspects of knowledge development (see e.g. Reason and Bradbury, 2001; McIntyre, 2008). It aims at conscientization and enlightenment, but it also goes further in aiming at empowerment, and liberation from oppression (Fals Borda and Rahman 1991). Researchers conducting action research in the tradition of PAR explicitly choose sides, they do not aim to take a neutral or objective stance.

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One starting point of participatory action research is that it aims to improve the position of certain (disadvantaged) groups in relation to institutionalized power. In the field of climate change participatory action research could for example aim at giving certain groups which tend to be overlooked or suppressed a say in climate change projects, for example farmers, fishermen or citizen groups. It often has an explicit ideological goal. A second starting point of PAR is that it starts from the lived experiences of people (Reason, 2003). The (experiential) knowledge of the groups that are being researched is highly valued. This brings us to the third starting point of genuine collaboration, which is rooted in the traditions of the people involved. Thus the traditions, interests and ideas of the participants in the research are to be respected and honored.

Action Science

Action science and action inquiry aims to develop effective action in the sense that it contributes to the transformation of organizations and communities (Reason, 2003). An important issue in action science is identifying "the theories that actors use to guide their behavior" (Reason, 2003: 273). In the context of governing climate change this could refer to for example the policy theories that actors use (the theory about the relations between the problem, the means or policy instruments, and the outcomes). Thereby the action researcher tries to discover both the 'espoused theories' that actors claim to follow, and the theories-in-use that are actually being followed. The theories in use can be reconstructed by reflecting on action. Argyris and Schön have argued that such reflection can be aimed at action strategies (single loop learning) but also at the mechanisms and variables that underly action (double-loop learning). As is the case with other forms of action research, action science takes place in the midst of the action developed by the organizations and communities that are being studied.

Appreciative inquiry

Researchers engaging in appreciative enquiry start 'unconditional positive questions' in order to gain understanding of successes and best practices (Ludema et al., 2001). Appreciative inquiry thus differs from critical approaches that are problem oriented and focused on deficits. Similar to other forms of action research, appreciative inquiry aims to contribute to social action. Different from other approaches in action research, is that it assumes that the most effective way of contributing to social action is to inquire into moments of exceptional enthusiasm, excellence, innovation, and beauty (Cooperrider and Srivasta, 1987; Ludema et al, 2001). The idea is that positive elements are crucial to the vitality of organizations and networks, and by researching and understanding those one can effectively understand, sustain and enhance such vitality (ibid). Focusing on critique and problems is seen as a detour, which also runs the risk of being demotivating. Appreciative inquiry asks such questions as 'what do you value most about your organization?', 'what are best practices within your program?' (Ludema et al., 2001).

Learning evaluation

Learning evaluations aim to improve policies and projects as they unfold during implementation. Thus learning evaluations are an ex-durante form of evaluation, differing from ex-ante or ex-post evaluations (cf. Scriven 1991). In the context of governing climate adaptation, an advantage of ex-durante evaluation is that it is suitable for monitoring policies during the implementation, thus providing information that can directly be used to adapt the ongoing policy process.

Learning evaluations have a function of assessment, but also learning. Crucially, learning evaluation is a participative form of evaluation; users (the evaluated) and executors of evaluation (evaluators) shape the evaluations in close interaction and consultation. An important element is the existence of frequent cycles of observation, conclusion and (re)action. Observation and conclusion are not the end of an evaluation. A dominant element in the role of an evaluator is to be a "reflective practitioner" (Schön 1983).

The evaluator is closely involved in the process of policy-making and in a way even a part of it. The evaluator does not relate to his environment in an impersonal manner. In uncertain and unique situations, for which standard solutions are not available, he needs to contribute to this policy context where he is part of the policy practice in a reflexive way. The evaluator is in constant interaction with the actors he is evaluating. They must respond to the intermediate conclusions after which the evaluator will determine their effects.



Alkin (1990, 74) calls this “situated responsiveness”. This makes the learning evaluation a type of action research. Action researchers are clearly oriented on helping the policy practice they investigated and making a contribution to its improvement together with the actors involved (Stringer 1996; Greenwood and Levin 1998; Wadsworth 2001, 52).

5.3 Levels of action research

There are not only various approaches to action research, but there are also different levels of “intensity” with regard to action research. This intensity has to do with two factors:

- the extent to which researchers and practitioners interact with each other;
- the extent to which researchers are actually involved in their object of empirical research.

With regard to the level of interaction we can distinguish four levels of interaction:

1. information: researchers inform practitioners about what they are going to do and about their results;
2. consultation: researchers consult practitioners about their main choices and about the validity of their results;
3. co-decision: researchers and practitioners jointly decide about research questions, methods, and the way in which the results are formulated;
4. co-production: researchers and practitioners work together in executing the research process from start till end.

Although some variation is possible in the field of action research, it is fair to say that the minimum level of interaction before we can speak about collaborative action research is consultation, but in many cases co-decision is necessary to realize real forms of collaboration and effective interaction which maximize joint learning.

With regard to the extent to which the researchers involved in practice, we can distinguish between five levels:

1. observation: there is no actual intervention but only (unobtrusive) observation of what is going on;

2. investigation: practitioners are explicitly mobilized to generate relevant empirical material, together with researchers;
3. reflection: based upon their analysis researchers give their feedback to practitioners in order to improve practice;
4. intervention: researchers develop theory-based interventions in order to test hypotheses and assumptions;
5. experimentation: the research has a (quasi-)experimental character in which practitioners can shape an empirical situation in line with their theoretical assumptions and can imitate processes they want to investigate.

Again, action research implies more than observation. However, there is huge variety when it comes to the other levels. There are many forms of collaborative investigation like brainstorming, focus group meetings and group model building (see also chapter 6). The learning evaluation can be seen as a form of collaborative action research on the level of reflection. Reframing is a clear example of intervention as level of involvement. And experimentation as a method reflects the most far-reaching level of involvement.

5.4 Why is collaborative action research important for the governance of climate adaptation?

The core philosophy of our research approach can be described as developing a powerful combination between practice-driven collaborative action research and theoretically-informed scientific research. Collaborative action research means that we take guidance from the hotspots as the primary source of questions, dilemmas and empirical data regarding the governance of adaptation, but also collaborate with them in testing insights and strategies, and evaluating their usefulness. Scientific quality will be achieved by placing this co-production of knowledge in a well-founded and innovative theoretical framework, and through the involvement of the international consortium partners.

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across a range of institutions and levels of decision-making (Martin and Sutherland, 2003).

A second reason for involving stakeholders in research is that their involvement is key to coping with the complexities and uncertainties related to impacts of climate change on society and the ecosystem, by bringing in a wider range of perspectives on needs, impacts and options, and having them deliberated openly. At the same time, by engaging with complex governance systems, researchers are better able to understand their dynamics.

The issue of great complexity and uncertainty poses important challenges to governments, particularly in finding their most appropriate role in the field of climate adaptation. They try to find answers on questions like: which instruments can we use, which policy options are available, how do we have to organize governance processes and which legal room for manoeuvre do we have? Instead of studying these considerations, action research can be a method to help officials by finding the right answers.

A third reason is to use collaborative action research in the emerging field of 'governance of adaptation' is that this field is still in its infancy (Termeer et al. 2011). Governments are still thinking about what they have to do and how they have to do this. So, there is not much opportunity for reconstructive research, for in-depth surveys or multiple case-study research when we want to know more about the governance of adaptation. We have to focus our research on practices which are emerging.

Fourth, because the theory of governance of adaptation is under construction, it is very helpful to organize short, iterative cycles of observation, analysis and adjustment. Action research is highly useful to combine initial theory testing and theory development. It provides in recurring learning cycles in which empirical fieldwork and theoretical reflection follow each other.

Taking into account above considerations it becomes clear that more research is needed on the foundations, conditions, pitfalls and added value of action research within the context of climate change adaptation.

5.5 Conditions for successful action research

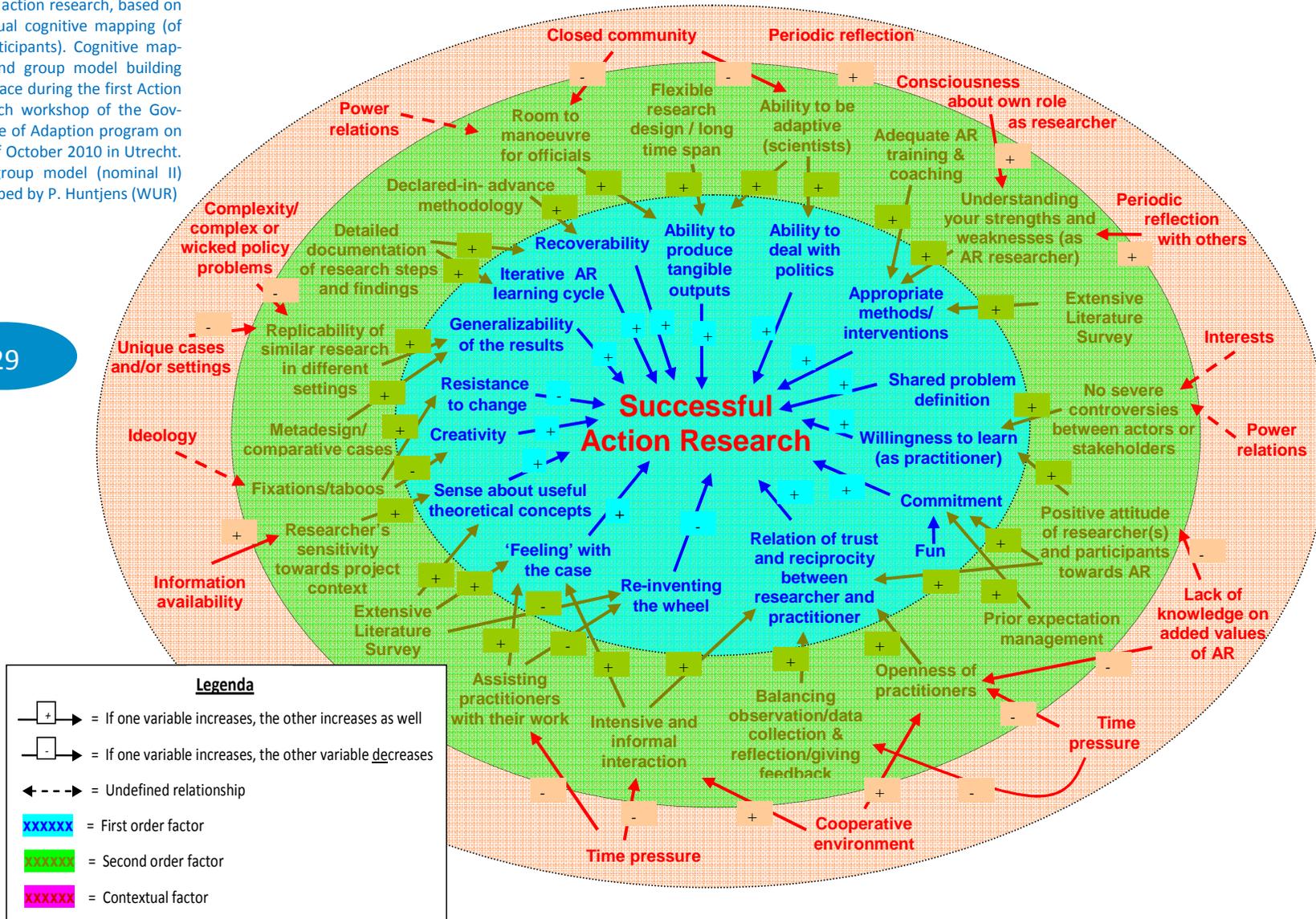
Based on extensive literature review and an action research workshop we have identified a number of conditions for successful action research. An overview of the constellation of such conditions has been provided by a group model (see

figure 1), developed during the first Action Research workshop of the Governance of Adaption research program on 27th of October 2010 in Utrecht.



Figure 1: Group model on successful action research, based on individual cognitive mapping (of 14 participants). Cognitive mapping and group model building took place during the first Action Research workshop of the Governance of Adaption program on 27th of October 2010 in Utrecht. Final group model (nominal II) developed by P. Huntjens (WUR)

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A number of key conditions are considered in more detail below.

5.5.1 Commitment from participants

Commitment from the participants (both scientists and practitioners) is one crucial condition for successful action research. There are several aspects considered to increase commitment: a positive attitude of participants towards action research, based on knowledge on its added values and/or earlier beneficial involvement. Such a positive attitude increases openness and commitment to action research. Furthermore, before engagement in an action research process it is important to provide participants with a realistic picture of what to expect from action research (in terms of outcomes and process), but also its conditions and pitfalls. When becoming more aware of these aspects it may also result in fun to participate, which again leads to more commitment. In an ideal process of collaborative action research, representatives of all stakeholder groups would participate in choosing the topic of inquiry to help ensure passion and broad based support for it (Newman and Fitzgerald, 2001).

5.5.2 Appropriate methods/interventions

There are different ways of deciding which method is most suitable for action research in the hotspots:

- Tailor-made to research question(s) and/or objectives;
- Tailor-made to hotspot characteristics, e.g. cultural, historical or socio-economic circumstances;
- Tailor-made to stakeholders' preferences or capacities (e.g. level of willingness to participate in action research, political sensitivity, willingness to speak about controversial topics, level of education, etcetera);
- Tailor-made to researcher's preferences or capacities (e.g. feeling comfortable with either plenary group work or bilateral interviews)

It is recommended that the final choice in methods is based on a consideration of all aspects mentioned above, and may well be a combination of them. It mainly depends on the researcher's understanding of his/her own strengths and weaknesses, research objectives and 'feeling' with the case (e.g. by means of a case literature survey and (prior) interaction with involved actors).

5.5.3 Appropriate role of the action researcher

Directly linked to above considerations is the importance of an appropriate role of the action researcher. Upon invitation into a domain, the outside researcher's role is to implement the Action Research method in such a manner as to produce a mutually agreeable outcome for all participants, with the process being maintained by them afterwards. To accomplish this, it may necessitate the adoption of many different roles at various stages of the process (adopted from O'Brien, 2001), including those of planner, leader, catalyzer, facilitator, teacher, designer, listener, observer, synthesizer and reporter. Also, different roles can be divided within a team of researchers. For example one researcher in a team may take up a role as facilitator of a change process, while another researcher from the same team may fulfill a more reflective or supervisory role.

According to O'Brien (2001) the main role of an action researcher is to nurture local leaders to the point where they can take responsibility for the process. This point is reached when they understand the methods and are able to carry on when the initiating researcher leaves.

In many Action Research situations, the hired researcher's role is primarily to take the time to facilitate dialogue and foster reflective analysis among the participants, provide them with periodic reports, and write a final report when the researcher's involvement has ended (O'Brien, 2001).

It will be necessary to think about that dual role and to negotiate carefully entry into the situation and his or her role in relation to that of participants. Work to effect change and "improvement" (as judged by people in the situation) can then ensue, with the researcher, however his or her role is defined, also committed to continuous reflection on the collaborative involvement and its outcomes (Checkland and Howell, 1998).

5.5.4 Recoverability

Action researcher need to be rigour in their action research methodology, leading to scientifically sound research. Recoverability will help to justify the generalization and transferability of results from AR (or case study) research. Recoverability is based on a declared-in-advance methodology (encompassing a particular framework of ideas) in such a way that the process is recoverable by anyone interested in subjecting the research to critical scrutiny (Checkland and Howell, 1998). Hence, a a serious organized process of AR can be made to yield defensible generalizations.

In summary, action researchers investigating social phenomena must at least achieve a situation in which their research process is recoverable by interested outsiders. In order to do this it is essential to state the epistemology (the set of ideas and the process in which they are used methodologically) by means of which they will make sense of their research, and so define what counts for them as acquired knowledge (cf. Checkland and Howell, 1998).

5.5.5 Ethical Considerations

Because action research is carried out in real-world circumstances, and involves close and open communication among the people involved, the researchers must pay close attention to ethical considerations in the conduct of their work. Richard Winter (1996) (In: O'Brien, 2001) lists a number of principles:

- “Make sure that the relevant persons, committees and authorities have been consulted, and that the principles guiding the work are accepted in advance by all.
- All participants must be allowed to influence the work, and the wishes of those who do not wish to participate must be respected.
- The development of the work must remain visible and open to suggestions from others.
- Permission must be obtained before making observations or examining documents produced for other purposes.
- Descriptions of others’ work and points of view must be negotiated with those concerned before being published.
- The researcher must accept responsibility for maintaining confidentiality.”

To this might be added several more points (O'Brien, 2001):

- Decisions made about the direction of the research and the probable outcomes are collective
- Researchers are explicit about the nature of the research process from the beginning, including all personal biases and interests
- There is equal access to information generated by the process for all participants
- The outside researcher and the initial design team must create a process that maximizes the opportunities for involvement of all participants.

5.5.6 Room for reflection

Action research implies that the researcher engages in the processes that he or she studies, and that the researcher is committed to and involved in action that adds to problem solving in practice. Although the researcher must be committed to facilitating change and dealing with practical problems, it is important that the researcher plays a role that is different from the role of practitioners, otherwise the added value of the researcher becomes less. One of the points where researcher may be of value is where they bring in new ideas and where they are able to reflect on the ongoing processes. One condition that facilitates such reflection and feedback by researchers is the opportunity to distance themselves physically and mentally from the ongoing processes on a regular basis, for example by regularly leaving the hotspot and working in the buildings of their university regularly.

5.6 Pitfalls of action research

This section on pitfalls of action research starts with the notion that all the conditions mentioned above may be considered pitfalls when framed as conditions which were not taken into account in the set-up and implementation of an action research methodology.

Nevertheless, we also feel it is necessary to highlight some commonly referred to pitfalls in action research as listed below. Below list is not all inclusive.

5.6.1 Lack of balance between action and research

As we emphasized in section 5.2 both action and research are crucial components of action research. A common pitfall in action research is to concentrate too strongly on either action or research, and also neglect one of both components. An overemphasis on action however easily leads to lack of reflection, superficial treatment of problems and lack of scientific results, while an overemphasis on research leads to a lack of change in practice, and academic learning which is too far removed from practice to be meaningful in practice.

5.6.2 Disqualifying 'old' frames of reference

Fixations can be typified as holding on too long to meanings, relationships, or rules of conduct that were effective as a reaction to ambiguity in the more or

less recent past (Termeer and Kessener, 2007). These rigid rules of interaction might block further development. However, the disqualification of 'old' frames of references is an easy way to block any further participation and collaboration of persons holding these frames. By emphasizing the historical and contextual systematic character of former rules of interaction it is possible to respect the involved participants and prevent disqualification of their 'old' frames of reference (Termeer and Kessener, 2007). This might remove the defensive reactions that usually contribute particularly to locking up the existing frame even more firmly (Termeer and Kessener, 2007).

5.6.3 Communication and language problems

For action researchers it is important to be familiar with the assumptions of action research and also use language in accordance with those assumptions when communicating with participants (Werkman et al., 2009). One common pitfall in this respect is the use of unfamiliar terminology without providing adequate definition. Continuous reflection on behaviour and use of language and its effects on the process only becomes possible in a cooperative environment with intense and informal interaction. It might help to speak of a 'joint trajectory of learning and improvement' instead of action research, a term which is often associated with a time-consuming, and relatively top-down, process (Werkman et al., 2009).

5.6.4 Incomplete configuration of problem owners

It is important that all problem owners in the system are involved during action research or at least the actors who are part of the system in which the problem is created (Werkman et al., 2009). An incomplete configuration of problem owners might lead to misperceptions and lack of information on the problems to be solved. This might also lead to interventions which are not effective. Hence, inclusion of actors who create boundary conditions, e.g. time, resources and opportunities for reflection and learning, are important to make action research successful. Action research should be embedded in an organisation or governance system (Werkman et al. (2009).

5.6.5 Misunderstanding of complex social relationships between participants

Eversole (2003) probes the complexity of social relationships which underlie the apparently straightforward concept of participation. Eversole argues for

greater attention to “development relations”: the way that various actors in the development process relate to one another, and how these relationships directly influence project success. Key principles of power, motivation, legitimacy, and trust emerge to assist practitioners in understanding complex social relationships and managing the pitfalls of participatory development (Eversole, 2003).

6 A toolbox for collaborative action research in hotspots

6.1 General information on the toolbox

This chapter provides an overview of methods & tools that can be used in action research. This overview is probably far from complete, but our intention is to show a variety of tools appropriate for collaborative action research on the governance of climate adaptation.

Action Research is more of a holistic approach to problem-solving, rather than a single method for collecting and analyzing data (O'Brien, 2001). Thus, it allows for several different research tools to be used as the project is conducted. The distinction between method and tool is often obscure, but in general we can state that a method may include different tools (e.g. the method of group model building usually includes cognitive mapping and nominal group technique).

The suitability of a specific method depends on its characteristics – e.g. the expertise and facilities needed, the intensity of interaction that it allows and the level of formality – and on the demands of the process at a given time – e.g. objectives and intended level of participation, background of the stakeholders and the available budget and expertise. Tools and methods should only be used if their possibilities and limitations are well understood and if these match with current requirements and available resources!

Some tools presented below are often used in combination, such as cognitive mapping (section 5.3.7), nominal group technique (5.3.15) and group model building (5.3.12).

In many ways, these tools serve as a heuristic device, not specifically requiring or producing a right answer, but instead promoting a more integrated and meaningful process of dialogue as needed by an adaptive governance approach.

6.2 Toolbox overview

Table 1 shows an overview of methods & tools that can be used in action research. The toolbox includes a quite a number of methods and tools that are also used in a non-action research context, albeit not embedded in an action research methodology, or they are used as practical tools for knowledge elicita-

tion and/or process facilitation by consultants, policy-makers, NGOs and other practitioners. As a result, this overview is probably far from complete, but our intention is to show a variety of tools which are, in our view, suitable for action research on the governance of climate adaptation.

In the following section (5.3) we will provide more details and relevant literature for each specific tool/method.

Table 1: Overview of action research tools and methods (more details and references are provided in section 6.3)

Name of tool or method suitable for AR	Short description
Agent-based modeling (ABM)	Agent-based models in their most basic sense, represent how human or organisational actors in the system ontology interact with each other, in causal, structural or other relationships (Hare, 2003).
Appreciative Inquiry (AI)	AI is a form of action research that attempts to create new theories/ideas/images that aide in the developmental change of a system (Cooperrider & Srivastva, 1987.). The research aims explicitly to analyse good or best practices.
Backcasting	Backcasting is a method to develop normative scenarios and explore their feasibility and implications. Important in the sustainability arena, it is as a tool with which to connect desirable long term future scenarios to the present situation by means of a participatory process.
Bayesian Belief Networks (BBN)	Bayesian Belief Networks are often applied as participatory decision support systems to address uncertainty in natural resources management.
Brainstorming	Brainstorming is a group creativity technique designed to generate a large number of ideas for the solution of a problem.
Card sorting	A simple technique where a group of subject experts or "users", however inexperienced with design, are guided to generate a category tree.
Cognitive mapping / mind mapping	A mental map of a person's knowledge / one's internal representation of the experienced world. Transformation from tacit to explicit knowledge. Representing concepts and knowledge
Delphi Technique	This technique can be used with groups who cannot be brought together into the same room for some reason or another. It is a technique for distant group work aimed at prioritizing goals and ideas or problems within a system (Delbecq et al., 1975; Hare, 2003)
Experimentation	The experimental method is a systematic and scientific approach to research in which the researcher manipulates one or more variables, and controls and measures any change in other variables
Focus Group meetings (FGM)	Focus groups are widely defined as meetings to obtain public understandings on a distinct area of interest in a permissive environment (Morgan, 1997).
Foresight	Foresight is a tool for developing visions, understood as possible future states of affairs that actions today can help bring about (or avoid). Foresight is a non-deterministic, participatory and multidisciplinary approach. It can be envisaged as a triangle combining "Thinking the Future", "Debating the Future" and "Shaping the Future".
Group model building (GMB)	GMB is a methodology for facilitating 'deep involvement' of a group of individuals in the building of a model of a particular management system, in order to improve group understanding about that system, its problems and possible solutions, which will directly or indirectly lead to better management decisions or interventions (Hare, 2003)
Integrated Assessment	IA is an interdisciplinary process that combines, interprets, and communicates knowledge from diverse scientific disciplines in order for cause-effect interactions of a problem to be evaluated from a synoptic

	perspective with two characteristics: (i) it should have added value comparable to single disciplinary oriented assessments; and (ii) it should provide useful information to decision makers (Rothmans and Van Asselt, 1996).
Learning Evaluation	Evaluation method focused on ex-durante evaluation of complex processes and regularly interaction about preliminary findings with evaluated people. Focus is on organizing a process of joint learning and to maximize the utilization of the evaluation results (Edelenbos & Van Buuren, 2005).
Multi-stakeholder dialogue (MSD)	A Multi-Stakeholder Dialogue (MSD) aims to bring relevant stakeholders or those who have a 'stake' in a given issue or decision, into contact with one another. The key objective of an MSD is to enhance levels of trust between the different actors, to share information and institutional knowledge, and to generate solutions and relevant good practices.
Nominal Group Technique (NTG)	NTG is used to structure group work aimed at gaining consensus on priority setting and/or highlighting topics of importance in the management system
Participant observation	Research method whereby researcher participates in the processes that he observes and analyses. The researcher takes an active role in the process, not only with the aim to add to the process but also in order to understand the process by experiencing and participating in it.
Reframing	Reframing is an intervention stimulating participants to go beyond their own frame of reference and to approach a problem or relation from a different perspective. It is possible to use such intervention when processes are stagnated on content and/or social relationships. Another option is to start the process with reframing (Termeer, 2004).
Role Playing Game (RPG)	A Role Playing Game (RPG) is a type of game in which the participants assume the roles of characters and collaboratively create stories (Waskul & Lust, 2004). Participants determine the actions of their characters based on their characterization, and the actions succeed or fail according to a formal system of rules and guidelines.
Shadowing or Institutional ethnography (IE)	Shadowing entails a researcher closely following a subject over a period of time to investigate what people actually do in the course of their everyday lives, not what their roles dictate of them. Behaviors, opinions, actions, and explanations for those actions are reflected in the resulting thick, descriptive data.
Value-based assessment procedures / value analysis	Often used for solving multi-objective mathematical problems, but has an underexplored potential for decision support in complex environments > for optimization of a larger number of objectives (often combined with multi-criteria analysis).

6.3 Description of methods & tools

In alphabetical order:

6.3.1 Agent-Based modelling

Agent-based models in their most basic sense, represent how human or organisational actors in the system ontology interact with each other, in causal, structural or other relationships (Hare, 2003).

For an overview of agent-based models in environmental modelling see Bousquet & Page (2004) and Hare & Deadman (2004).

6.3.2 Appreciative Inquiry (AI)

Appreciative Inquiry is a form of action research that attempts to create new theories/ideas/images that aid in the developmental change of a system (Cooperrider & Srivastva, 1987.) The key data collection innovation of appreciative inquiry is the collection of people's stories of something at its best. These stories are collectively discussed in order to create new, generative ideas or images that aid in the developmental change of the collectivity discussing them (Bushe, 1998).

AI utilizes a cycle of 4 processes focusing on:

- DISCOVER: The identification of organizational processes that work well.
- DREAM: The envisioning of processes that would work well in the future.
- DESIGN: Planning and prioritizing processes that would work well.
- DESTINY (or DELIVER): The implementation (execution) of the proposed design

Appreciative Inquiry suggests that we look for what works in an organization. The tangible result of the inquiry process is a series of statements that describe where the organization wants to be, based on the high moments of where they have been. Because the statements are grounded in real experience and history, people know how to repeat their success (cf. Hammond, 1998).

Relevant literature

Cooperrider & Srivastva, 1987; Hammond, 1996; Newman and Fitzgerald, 2001; Bushe, 1998; Bushe & Kassam, 2005; Head, 2000

More information can be found on: IA Commons portal:
<http://appreciativeinquiry.case.edu/>

6.3.3 Backcasting

Backcasting is a method to develop normative scenarios and explore their feasibility and implications. Important in the sustainability arena, it is as a tool with which to connect desirable long term future scenarios to the present situation by means of a participatory process.

The method is used in situations where there is a normative objective and fundamentally uncertain future events that influence these objectives. The

central question of backcasting: "if we want to attain a certain goal, what actions must be taken to get there?"

Relevant literature

Hekkert et al., 2007; Holmberg et al., 2000; Brandes and Brooks, 2005

Practical applications in water management:

- 1) The Soft Path for Water in a Nutshell (Brandes and Brooks, 2005)
- 2) Currently being used in a PhD-research (2009-2012) on adaptive water governance: Tom van der Voorn, University of Osnabruck, Germany

6.3.4 Bayesian Belief Networks (BBN)

A BBN is a decision support system based on Bayes' rule of probability. The nature of the technique enables identification of gaps in data or knowledge in the system, leading to an inability to meet some of the goals of the WFD (Bromley, 2005; Henriksen et al, 2007).

Practical applications in water management and climate adaptation:

In the Newater-project (www.newater.info) two BBNs have been developed for the Upper Guadina Basin in Spain. UGB. One at a regional scale covering the entire UGB, the other at farm scale (Zorrilla et al, 2007). The regional network is designed to investigate hydrological, social and economic impacts of the Plan for the Upper Guadiana (PEAG, 2008) at the scale of the Mancha Occidental Aquifer. In contrast, the farm scale network concentrates on the impact of the plan at single farm level. Results show that with the full implementation of the Special Plan, there is a 40–75 per cent chance of aquifer recovery before 2027 (deadline established by the WFD). However, full implementation of the plan will lead to a certain reduction of current agrarian economic production, which may be important for small vineyard farms.

6.3.5 Brainstorming

Brainstorming is a group creativity technique designed to generate a large number of ideas for the solution of a problem.

Many variants available: nominal group technique (often used in GMB), group passing technique, team idea mapping method, electronic brainstorming, directed brainstorming, individual brainstorming, question brainstorming.

For brainstorming techniques see:

<http://www.businessballs.com/brainstorming.htm>

6.3.6 Card sorting

A simple technique where a group of subject experts or "users", however inexperienced with design, are guided to generate a category tree. There are different types: Open card sorting, closed card sorting, reversed card sorting, online remote card sorting.

Method:

- 1) A person representative of the audience is given a set of index cards with terms already written on them.
- 2) This person puts the terms into logical groupings, and finds a category name for each grouping.
- 3) This process is repeated across a population of test subjects.
- 4) The results are later analyzed to reveal patterns.

Relevant literature

Isendahl et al., 2010; Nielsen, 1995 and 2004; Maurer and Warfel, 2010; Maurer, 2009

Application on dealing with uncertainties in adaptive water management (Isendahl, 2010; Isendahl et al., 2010)

6.3.7 Cognitive mapping / mind mapping / mental mapping

Mental models are the personal internal abstraction of the world used by sentient creatures to aid and govern activity and decision making (Evans, 1988). Mental models are "a relatively enduring and accessible but limited internal conceptual representation of an external system whose structure maintains the perceived structure of that system" (Doyle & Ford, 1998). That is, mental models are the models we have in our heads to understand the world by. The art of group model building is to elicit the mental models of the participants and concert them into graphical models (see section 5.3.12 for more info on group model building).

In short: A mental map of a person's knowledge / one's internal representation of the experienced world. Transformation from tacit to explicit knowledge. Representing concepts and knowledge.

Relevant literature

Tolman, 1948; Lynch, 1960; Huntjens, 2010; Haase et al., 2011; Hobbs et al., 2002; Özesmi et al., 2004

For practical applications in water management and climate change adaptation (see Huntjens, 2010; Haase, et al., 2011).

6.3.8 Delphi Technique

This technique can be used with groups who cannot be brought together into the same room for some reason or another. It is a technique for distant group work aimed at prioritizing goals and ideas or problems within a system (Delbecq et al., 1975; Hare, 2003).

The project team develops, after an initial investigation into the system, a questionnaire which each of the participants fills out. Essentially this asks participants to comment on and/or expand on a series of goals, ideas, or problems and to rank them. The project team then analyses the responses, collates a new set of knowledge in the form of a new questionnaire and sends it back to the participants. The second time the participants answer the questionnaire, they are effectively acting as peer reviewers for the collated opinions of the group, and so the consensual knowledge of the group is further refined and returned to the project team which collates the new refinements into a final document representing the consensus view of the group (Hare, 2003).

6.3.9 Experimentation

The experimental method is a systematic and scientific approach to research in which the researcher manipulates one or more variables, and controls and measures any change in other variables.

More information can be found on: <http://www.experiment-resources.com/experimental-research.html#ixzz13TG9EAex>

6.3.10 Focus Group meetings (FGM)

Focus groups are broadly defined as meetings to obtain public understandings on a distinct area of interest in a permissive environment (Morgan, 1997). In a relaxed atmosphere, a group of six to eight people share their ideas and perceptions. Within a smaller group, the participants usually feel that they have a larger influence on the discussion, and it is easier to tempt reticent participants to contribute.

Relevant literature: Morgan, 1997; Hirsch et al., 2010

Application in water management:

Participatory Research for Adaptive Water Management in a Transition Country – a Case Study from Uzbekistan (Hirsch et al., 2010)

6.3.11 Foresight

Foresight is a tool for developing visions, understood as possible future states of affairs that actions today can help bring about (or avoid). Foresight is a non-deterministic, participatory and multidisciplinary approach. It can be envisaged as a triangle combining "Thinking the Future", "Debating the Future" and "Shaping the Future".¹

¹ The FOR-LEARN Online Foresight Guide:

http://forlearn.jrc.ec.europa.eu/guide/0_home/index.htm

6.3.12 Group Model Building (GMB)

Group Model Building was first introduced by Jack Vennix (1999). Group Model Building (GMB) is a method for facilitating 'deep involvement' of a group of individuals in the building of a model of a particular management system, in order to improve group understanding about that system, its problems and possible solutions, which will directly or indirectly lead to better management decisions (Hare, 2003). When using such a method, the model itself is not the product of the process; the product is the generation of common understanding among the model builders during the process. To express it another way, it is the group process involved in identifying system ontology (the concepts and components of a system), problems, causes, consequences and solutions within the framework of model building, rather than the model itself, that is responsible for the main outputs of the GMB, namely: 1) **team learning**: the development of knowledge and understanding within the group of system facts and problems through the exchange and discussion of each other's perspectives on the system. This concept is similar to concepts in participatory management such as social learning. The development of a "shared social reality" within the group during team learning leads to: **consensus formation**: the development of a common group consensus on system problems and their solutions. As Vennix stresses, this consensus is neither a forced consensus, nor a compromise, but a jointly shared set of beliefs. Such consensus leads to: **improved acceptance of management decisions**: the members of the group are more likely to take up "ownership" of the management proposals or decisions made by the group and support their

implementation. Through the team learning, the consensus building, they will become more committed to the group's chosen path of action.

An example of a model (on action research) based on Group Model Building has been provided in chapter 5 (figure 1). This specific GMB started with a contrived method for knowledge elicitation called individual cognitive mapping (Hare & Pahl-Wostl, 2002). Cognitive mapping extracts what is important to a person about a management issue; their world view/ontology. This triggered participants' own reflection and gently pushed participants to share their own knowledge, views and ideas. It stimulated participants to take a more active role than they were used to in regular workshops. At the same time, participants during this GMB workshop gained a sort of ownership of their cognitive maps and were committed to include their own views and ideas in the following group model building. For receiving an equal input from all participants, a round-robin fashion was used in which each participant presented one factor to the rest of the group. The group then decides whether it should be included or not. In general, we can state that the workshop itself facilitated a social learning experience amongst participants on issues related to action research. The resulting model shows a holistic overview of different perspectives and factors related to successful action research, but also identified some complex interdependencies between different factors or different elements in a methodology for action research.

Group Model Building has been used for participatory assessments of complex governance systems related to water management and climate change adaptation. Based on a comparison of three GMB processes in an European, Asian and African river basin, Haase et al (2011) concludes that involving stakeholders in the analysis of water management barriers and potentials is both necessary and ambitious. Particularly the resulting models of the three processes show that GMB helps to look systematically at the integration of different knowledge frames, conflicting attitudes and ideas of what is wanted and needed. Furthermore, Haase et al (2011) shows that GMB does not necessarily lead to the implementation of a new water management but it offers important new insights what stakeholders think about 'their basins', which is an indispensable starting point to reshape the prevailing water management regime.

Relevant literature

Huntjens, 2010; Haase, et al., 2010; Hovelynck, et al., 2010; Vennix, 1999; Rouwette et al., 2000; Zagonel and Rohrbaugh, 2007; Wolfenden, 1999; Stave, 2002; Exter, 2004; Hare et al., 2006.

6.3.13 Integrated Assessment

Parker et al (2002) remark that that there is no generally agreed upon definition of what constitutes integration or, more specifically, what is Integrated Assessment. It is commonly seen as an interdisciplinary process that combines, interprets, and communicates knowledge from diverse scientific disciplines in order for cause–effect interactions of a problem to be evaluated from a synoptic perspective with two characteristics: (i) it should have added value comparable to single disciplinary oriented assessments; and (ii) it should provide useful information to decision makers (Rothmans and Van Asselt, 1996). More specifically, Parker et al (2002) state that ‘in Integrated Assessment, a variety of stakeholders, scales, disciplines and models are integrated for the consideration of integrated environmental issues’. Not all of these elements are required in a specific case, but an essential feature of Integrated Assessment is that multiple forms of integration are combined. The resulting complexity of the used tools and their interactions can impede successful application. A logical next step is to embed them in a sophisticated software shell, commonly referred to as a Decision Support System (DSS).

6.3.14 Learning evaluation

Learning evaluation requires an open and investigative evaluation style, which is different from more judgmental evaluations (cf. Edelenbos and Van Buuren 2005). This because there is no actor (including researchers or evaluators) who can claim to know the absolute truth or the only rational solution in wicked and contested governance processes such as the governance of climate change. As Edelenbos and Van Buuren (2005: 594) put it “Each representation of reality is normative, and neither policy maker nor evaluator has a prerogative on the truth. To execute a meaningful evaluation, it is crucial to have agreement between various parties.” Thus learning evaluation as a tool is aimed at joint learning and shared meaning making.

Carrying out learning evaluation in concordance with ideas of action research means that the evaluation aims to be useful to the stakeholders. Stakeholders therefore have an important say in the development and execution of the evaluation. This means that the evaluation must be responsive to their information needs. This requires a certain methodological flexibility instead of implementing a methodology and inquiry-plan that is rigidly defined by the evaluator.

The role of the evaluator is to facilitate the development of meaningful ideas and insights, together with the stakeholders. Multiple sources of knowledge may play a role in learning evaluation, including for example disciplinary

knowledge of the evaluator, but also experiential knowledge of stakeholders. It is unwise to exclude certain sources of knowledge on beforehand. Rather, the actors should together come to an agreement about what are valuable and valid sources of knowledge in the project.

But learning evaluation is not only a tool for developing knowledge as such. The evaluator may take a more action oriented role of a change manager or facilitator of change as well. In that case the evaluators try to translate the outcomes of the learning process continuously into meaningful action. Hereby the evaluator can take a more facilitating or a more steering and directive role, but it is important to make sure that there is wide support for the changes among the stakeholders.

As we discussed learning evaluation is more about and open inquiry that develops during the process than it is about a closed assessment of pre-set goals. Edelenbos and Van Buuren (2005: 595) give useful insight into what this means in terms of the kind of questions that are posed (see table XX).

Table 5.3.14: Inquiry and Assessment Evaluation (Source: Edelenbos and Van Buuren 2005: 595)

<i>Inquiry Evaluation</i>	<i>Assessment/Audit Evaluation</i>
Inquiry: to seek	Assessment/Audit: to check
Starts with the questions: How are we going? Is it working? In what ways? What do we think of this service?	Starts with the questions: Have we done what we set out to do? Is this service, activity, meeting its objectives? What is its value?
Asks the comparative questions: What are we doing and is that good or bad?	Asks the comparative questions: What did we set out to achieve, and what are the signs we have done this?
The questions are “opening up” questions, implying the need to build theory from diverse sources	The questions are narrowing down questions, implying the need to test theory from preexisting sources

6.3.15 Multi-stakeholder Dialogue (MSD)

A Multi-Stakeholder Dialogue (MSD) aims to bring relevant stakeholders or those who have a ‘stake’ in a given issue or decision, into contact with one another. The key objective of an MSD is to enhance levels of trust between the different actors, to share information and institutional knowledge, and to generate solutions and relevant good practices. The process takes the view that all stakeholders have relevant experience, knowledge and information that ultimately will inform and improve the quality of the decision-making process as well as any actions that (may) result. With sufficient time, resources and preparation, an MSD can be a very effective tool for bringing diverse

constituencies together to build consensus around complex, multifaceted and in some cases, divisive issues.

Relevant literature:

Huntjens, 2010; Lebel et al., 2009; Svendsen & Laberge, 2005; Hemmati et al., 2002; Brown, 2000; UNDP, 2008

6.3.16 Nominal Group Technique (NTG)

Nominal Group Technique is used to structure group work aimed at gaining consensus on priority setting and/or highlighting topics of importance in the management system (Delberq et al., 1975). To overcome the problems of domination and marginalisation of the group members, the technique begins with a round-robin collection of participants ideas about a subject in private. This enables all participants' view to be collected fairly. Each participant's ideas are then presented for critical appraisal and discussion by the group in a facilitated group workshop. The ideas are then ranked in this workshop by the group using some form of voting/ranking system. The highest ranked idea is then set as the idea of highest priority and importance to the group. This technique in its pure form is good for getting groups to prioritise ideas belonging to a single theme, however, it does not work well for multiple themes and if quick decisions are required (Hare, 2003).

6.3.17 Participant observation

Participant observation is a research method based on the idea that the researcher participates in the processes that he observes and analyses. The researcher becomes one of the participants in the process, and with that he also becomes subject of his own research. The idea behind participant observation is that the researcher starts to understand the process exactly because he becomes part of the world that he studies, and because he experiences what it is to be part of that world. By participating in the processes the researcher also comes to establish relationships of trust and mutual respect with the other participants, which facilitates the collection of rich and good quality data (see also Wacquant, 1995). Participant observation is not necessarily aimed at instigating change and actionable research, but it may well be. As a participant the researcher may, like other participants, undertake activities to manage and steer the processes in which he or she participates. Because the researcher is not only a distant researcher, but an involved person with relationships with the other participants, he or she may actually succeed in exerting some influence on the process. Participant observation thus is not

only a research method, but it may also be used as a method to influence ongoing processes.

6.3.18 Reframing

Reframing is an intervention stimulating participants to go beyond their own frame of reference and to approach a problem or relation from a different perspective. It is possible to use such intervention when processes are stagnated on content and/or social relationships. Another option is to start the process with reframing (Termeer, 2004).

Reframing can be done, amongst others, in a more individual setting or in a reframing workshop in which participants are allowed to change their problem perception. Using a different analytical framework for structuring the problem may change the way in participants perceive the problem. The goal of a reframing workshop is to explore and create solutions that would otherwise not be considered. Such a workshop may have particular functions: 1) To share and understand viewpoints; 2) To understand others' constraints; 3) To reach convergence in problem perception (Source: Harmonicop, 2005).

6.3.19 Role playing games

A Role Playing Game (RPG) is a type of game in which the participants assume the roles of characters and collaboratively create stories (Waskul & Lust, 2004). Participants determine the actions of their characters based on their characterization, and the actions succeed or fail according to a formal system of rules and guidelines.

Role playing games can be linked to group model building. In this type of application, models can be represented in terms of role playing games wherein the participants are not simply observing the model from the outside, but actually embedded in the game as actors making decisions about management. Obviously the easiest

Barreteau, 2003; Farolfi, 2004; Heliö, 2004; Waskul & Lust, 2004; Dung et al., 2009; Abrami, 2009

For detailed game descriptions of RPG in water management see Abrami, 2009

6.3.20 Shadowing or Institutional Ethnography (IE)

“The art of being there but not being there”

Shadowing or Institutional Ethnography (IE) is a qualitative research technique that has seldom been used and rarely been discussed critically in the social science literature.

Shadowing entails a researcher closely following a subject over a period of time to investigate what people actually do in the course of their everyday lives, not what their roles dictate of them. Behaviors, opinions, actions, and explanations for those actions are reflected in the resulting thick, descriptive data.

In IE daily activity becomes the site for an investigation of social organization. Ground-rules need to be established in advance, covering such matters as which aspects of service provision should be considered, how the feedback should be handled and, importantly, who else should share in the discussions or see any report on the activity.

Relevant literature

Smith, 2001; McDonald, 2005, Quinlan, 2008.

6.3.21 Value-based assessment procedures / value analysis

Value-based assessment procedures are sometimes referred to as **Preference articulation techniques** (In Dutch: Belevingsonderzoek or belevingswaardenonderzoek).

Often used for solving multi-objective mathematical problems, but has an underexplored potential for decision support in complex environments > for optimization of a larger number of objectives (often combined with multi-criteria analysis) (Böhm, 2003).

Application in water management:

- 1) Watertekens-project, The Netherlands
- 2) Ongoing PhD-project by Filip Aggestam: ‘Value Based Assessment procedure’ and the use of Multi Criteria Analysis (MCA) in regards to transboundary water management and stakeholder interests.

7 Set-up of a research design and action plan for AR in hotspots

7.1 AR methodology

Bradbury and Reason (2003) regard action research not so much as a methodology but as an orientation toward inquiry. This orientation of inquiry seeks to create a quality of engagement, of curiosity, of question-posing through gathering evidence and testing practices.

The methodological approach of collaborative action research couples research with intervention at the different steps in the process. Collaborative research starts from a joint assessment among 'researchers' and 'researched' of how the central problems should be defined. In the case of this research program, hotspots will be invited to give their views from the start, to jointly develop an action research strategy with researchers and to participate in the interpretation of the results. This also includes planning and implementing actions (in this case for regional climate adaptation) and documenting how these actions proceed and what they result in, in order to take new and better-informed actions. For each project in the hotspots a project team will be set up with key stake-holders and researchers.

In summary, a research methodology concerns procedures used in making systematic observations or otherwise obtaining data, evidence, or information as part of a research project or study (Note: Do not confuse with "Research Design," which refers to the planning and organization of such procedures). An example of a research design for action research has been provided in section 6.3 where we present a stepwise process which will serve as a guide-line for organizing researcher (RS) – stakeholder (SH) interaction in the hotspot projects.

7.2 Iterative learning cycles

An AR project emerges through the unfolding of a series of events as the designated issue is confronted, and attempts at resolution by the participants in the process with the help of the action researcher (Coughlan and Coughlan, 2002). The second action cannot be planned until evaluation of the first action has taken place. In other words, for high quality action research a systematic method and orderliness is necessary to reflect about, and holding to, the research data and the emergent theoretical outcomes of each episode of cycle of involvement in the hotspot process (see also Eden and Huxham, 1996). Hence,

action research involves utilizing a systematic cyclical method of planning, taking action, observing, evaluating (including self-evaluation) and critical reflecting prior to planning the next cycle (O'Brien, 2001; Coughlan and Coughlan, 2002). An important element of this systematic cyclical method is that the outcome of data exploration cannot be defended by the role of intuitive understanding alone: any intuition must be informed by a *method of exploration* (cf. Eden and Huxham, 1996). This implies that researchers investigating social phenomena via AR must at least achieve a situation in which their research process is recoverable by interested outsiders (Checkland and Howell, 1998). A serious organized process of AR can be made to yield defensible generalizations (Checkland and Howell, 1998).

Within an iterative cyclic process as described above it is important to recognize that description will be prescription, even if implicitly so (Eden and Huxham, 1996). Figure 6.1 shows that action research is concerned with a system of emergent theory, in which the theory develops from a synthesis of that which emerges from the use in practice of the body of theory which informed the intervention and research intent (cf. Eden and Huxham, 1996). Theory building, as a result of action research, will be incremental, moving through a cycle of developing theory to action to reflection to developing theory, from the particular to the general in small steps.

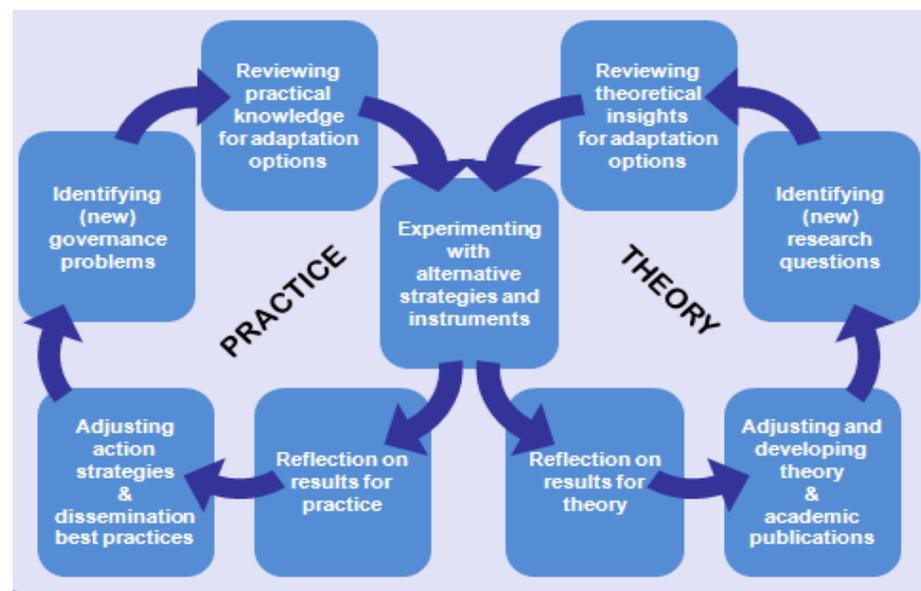


Figure 6.1 - A systematic cyclical method for action research in the hotspots

7.3 A stepwise process for conducting action research

The methodological approach of collaborative action research couples research with intervention at the different steps in the process. Collaborative research starts from a joint assessment among 'researchers' and 'researched' of how the central problems should be defined. In this case, hotspots will be invited to give their views from the start, to jointly develop an action research strategy with researchers and to participate in the interpretation of the results.

This also includes planning and implementing actions (in this case for regional climate adaptation) and documenting how these actions proceed and what they result in, in order to take new and better-informed actions. For each project in the hotspots a project team will be set up with key stakeholders and researchers.

Concretely, the following stepwise process will serve as a guideline for organizing researcher (RS) – stakeholder (SH) interaction in the hotspot projects. To facilitate cooperation, researchers can be based at a hotspot organization for a period of time.

Step 1: (RS+SH) Confirmation of the mixed project team and initial problem assessment: In the first step it is necessary to identify the governance problems together with the stakeholders in the hotspot, next to identifying the research questions. An important output of this step is a match between knowledge demand (from the stakeholders) and knowledge supply (from the research team), based on the initial problem assessment. In other words, the practical and theoretical cycle (in figure 6.1) are now initiated, with identification of governance problems (in the practical cycle) and identification of research questions (in the theoretical cycle) as a points of departure.

Step 2: (RS) Review of relevant knowledge and collection of baseline data: In action research, directly observable behavior is an important source of data for the action researcher. Observation of the dynamics of groups at work – for example, communication patterns, leadership behaviour, use of power, group roles, norms, elements of culture, problem solving and decision making, relations with other groups – provide the basis for inquiry into the underlying mechanisms and their effects on the work and life of these groups (Schein, 1999, In: Coughlan and Coughlan, 2002).

Step 3: (RS+SH) Collaborative design of options (= action planning), combining practical and theoretical knowledge: The AR steering group and the senior management set who does what and a time schedule: key questions involve: What needs to change? In what parts of the organization? What types of change are required? Whose support is needed? How is commitment to be

built? How is resistance to be managed? These questions need to be answered as part of the change plan.

Step 4: (RS+SH) Implementation of strategies: the change plan being collaboratively agreed upon (as an output of step 3) is now being implemented.

Step 5: (RS) Monitoring of implementation process and results: ideally, those involved in the AR cycles are continually monitoring each of the steps, inquiring in what is taking place, how these steps are being conducted, and what underlying assumptions are operative. The steering group which is managing the whole project may not have time to engage in a lot of introspective monitoring and may resist efforts to push it into doing so.

Step 6: (RS+SH) Joint evaluation of practical results: This evaluation step is key to learning

Step 7: (RS) Data analysis and conclusions

Step 8: (HS+SH) Discussion of lessons for practice and remaining questions in workshop

Step 9 (alternatively): Based on evaluation a new cycle of action planning might be started, before moving to step 10.

Step 10: (RS) Presentation and publication of results in national and international scientific fora

In sum, stakeholders will be involved and supported during project implementation in the following ways:

- 1) stakeholder will be involved in defining project questions and outcomes;
- 2) workshops and training sessions for stakeholders will be organized about the results
- 3) researchers will act as sparring partners for stakeholders
- 4) stakeholders will have access to the 'governance helpdesk';
- 5) through direct consulting specific practical issues will be tackled
- 6) exchanges between national and international hotspots will be organized for mutual learning and benchmarking

8 Quality checklist or guidance for AR in hotspots

Taking into account the literature review and considerations in the previous chapters this final chapter is intended to provide some guidance in order to improve the quality, and thus the validity, of action research. Ofcourse, no one action research project can be 'perfect' in the sense of responding to all the issues we note. Some concerns are simply more pressing in particular contexts (Reason & Bradbury, 2010).

Reason & Bradbury (2010) suggested that there are five interrelated issues, which provoke choice points in action research. Questions of quality and validity in research involve encouraging debate and reflection about these issues among all those involved. Reason and Bradbury (2010) posit the following questions as key issues for the quality of AR:

Is the action research:

- Explicit in developing a praxis of relational participation? Put differently, does the AR sufficiently reflect the co-operation between the action researcher and the practitioners involved?
- Guided by reflexive concern for practical outcomes?
- Inclusive of a plurality of knowing?
 - o Ensuring conceptual-theoretical integrity?
 - o Embracing ways of knowing beyond the intellect?
 - o Intentionally choosing appropriate and scientifically accepted research methods?
- Worthy of the term significant? ? The practical and scientific significance of the project is an important quality in action research. The bottom-line question here is whether the AR contributes to a better life and world for us and others.
- Emerging towards a new and enduring infrastructure? Put differently, does the project lead to enduring changes? Here one might take into account "the three manifestations of work: for oneself ('first-person research practice'), work for partners ('second-person research practice') and work for people in the wider context ('third-person research practice')".

On the basis of the research reported in the literature (e.g. Checkland and Howell, 1998; Eden and Huxham, 1996; Reason and Bradbury, 2010; and others) and our own experience (see also Eshuis and Stuiver, 2005; Huntjens, 2010; Termeer, 2004; Van Buuren and Edelenbos, 2004; Werkman et al 2009), we conclude that scholars in action research need to meet certain requirements, listed below (adjusted from Zuber-Skerrit & Fletcher, 2007):

- practice-oriented (improving practice);
- participative (including in their research all stakeholders and others who will be affected by the results of the research);
- focussed on significant issues relevant not only to themselves but also to their community/organisation or fellow human beings in the wider world;
- using multiple perspectives of knowing, triangulation of appropriate methods and theories, and connecting their own judgements to discussion in the current literature
- rigour in their action research methodology, leading to scientifically sound research. Recoverability will help to justify the generalization and transferability of results from AR (or case study) research; recoverability is based on a declared-in-advance methodology (encompassing a particular framework of ideas) in such a way that the process is recoverable by anyone interested in subjecting the research to critical scrutiny (Checkland and Howell, 1998)
- creative, innovative, contributing something new to knowledge in theory and practice within and across systems;
- explicit about their assumptions so that readers and examiners may use appropriate criteria for judging the quality of their work; and
- reflective, critical, self-critical and ethical

Effective execution of the learning evaluation also requires certain skills from the evaluator (cf. Edelenbos & Van Buuren, 2005):

- it is important to be explicit about the cast of the evaluation team. As we mentioned earlier on we experienced a role conflict. At the one hand you must show involvement and commitment. On the other hand you must maintain distance in order to guarantee (scientific) independence. We ourselves experiences difficulties in performing both roles. We were wearing so many different hats that it sometimes seemed like we needed different heads. We found the solution in distinguishing roles within the evaluation team. Some members got more an evaluation-counseling role with commitment to the program, other members took more part in the evaluation research at a safe distance of the program. This turned out relatively well in practice. It is important however to keep short communication lines between the two groups within the evaluation team;
- is also important that you keep an open mind and a flexible approach as an evaluator. Sometimes we thought to have made important observations, but needed to adjust those observations because the program practice changed according to our feedback information. It therefore seemed that we had to readjust and to rewrite our conclusions all the time;

- moreover, it is important to develop a negotiating style of evaluation (compare also Guba and Lincoln 1989; Stufflebeam, 2001; Abma, 2001). At times we had to negotiate between the top down views of the government agency and the bottom up views of the citizens. The wishes of the civil servants and the interest of the citizens with respect to environmental policy sometimes seemed contrary. Especially the expert view of the civil servants dominated at times; at those times we stressed that stakeholder involvement meant that those wishes of the citizens needed to be heard and be assessed. At the end we got ourselves in a mediating process between what civil servants and citizens wanted. Our experience was that the civil servants of the program team were more willingly than the civil servants working in 'normal office' who stayed at a certain safe distance from the program and were less committed to take the wishes of the citizens seriously.

The learning evaluation is not the simplest way to conduct an evaluation study. However, when the right conditions are present and when it is carefully carried out, it can improve public policy programs. We hope that our report of our experiences with the learning evaluation contributes to further development of evaluations that are carried out on the borders of science and practice.

A more detailed kind of checklist is provided by Eden and Huxham (1996) in setting out 15 characteristics of action research. A summary of these 15 characteristics has been provided in appendix I.

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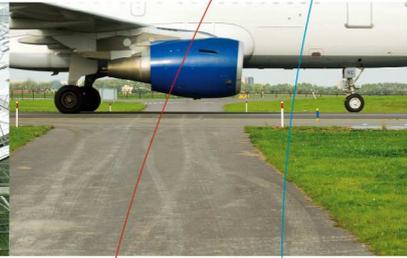
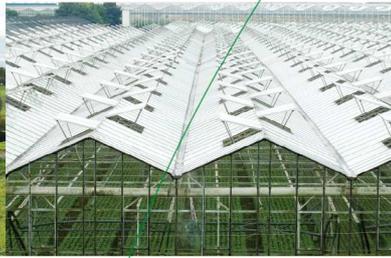
Appendix I

15 characteristics of action research (From: Eden & Huxham, 1996)

1. The researcher intends to change the organization; AR demands an integral involvement by the researcher in an intent to change the organization. This intent may not succeed – no change may take place as a result of the intervention – and the change may not be as intended. This is saying that AR must be concerned with intervening in action; it is not enough for the researcher simply to study the action of others (this may be valid as management research but does not count as action research)
2. Generality: there must be implications beyond the specific situation; AR is an approach which can build and extend theory of more general use and must be applicable beyond the specific situation > this requires the ability of the researcher to characterize or conceptualize the particular experience in ways which make the research meaningful to others.
3. Action research seeks theory as an explicit concern; as well as being usable in everyday life, action research demands valuing theory, with theory elaboration and development as an explicit concern of the research process. Uitgewerkt als deelproducten relevant voor de klant en theoretische deelproducten (bv wetenschappelijke artikels).
4. Any tools, techniques, or models developed need to be linked to the research design; AR demands that the research output explain the link between the specific experience of the intervention and the design of the tool or method; it is this explanation which is a part of theory generation.
5. Emergent theory will emerge from both data and initial theory;
6. Theory building will be incremental and cyclic; theory building, as a result of action research, will be incremental, moving through a cycle of developing theory to action to reflection to developing theory, from the particular to the general in small steps (see also Grounded Theory by Glaser and Strauss, 1967).
7. Presentation should acknowledge prescription and description; what is important for action research is not a (false) dichotomy between prescription and description, but a recognition that description will be prescription, even if implicitly so. Thus presenters of action research should be clear about what they expect the consumer to take from it and present it with a form and style appropriate for this aim.
8. There will be an orderliness in approach; for high quality AR high degree of systematic method and orderliness is required in reflecting

about, and holding on to, the research data and the emergent theoretical outcomes of each episode of cycle of involvement in the organisation.

9. Exploration of data and theory building should be explainable to others; thus the outcome of data exploration cannot be defended by the role of intuitive understanding alone: any intuition must be informed by a method of exploration.
10. Later reporting is part of theory exploration and development; The full process of action research involves a series of interconnected cycles, where writing about research outcomes at the later stages of an action research project is an important aspect of theory exploration and development, combining the processes of explicating pre-understanding and methodical reflection to explore and develop theory formally.
11. 1-10 are necessary but not sufficient for valid AR; i-x are related to internal validity of AR, xii-xv are related to external validity, that is, they are concerned with the degree to which the results may both be justified as representative of the situation in which they were generated and have claims to generality.
12. It is used where other methods are not appropriate; it is difficult to justify the use of action research when the same aims can be satisfied using approaches (such as controlled experimentation or surveys) that can demonstrate the link between data and outcomes more transparently. Thus in action research, the reflection and data collection process – and hence the emergent theories – are most valuable focused on the aspects that cannot be captured by other approaches.
13. Triangulation is used if possible; Triangulation of research data refers to the method of checking their validity by approaching the research question from as many different angles as possible and employing redundancy in data collection (Denzin, 1989). The principle is that if different approaches lead to the same conclusions our faith in the validity of those conclusions is increased. Triangulation to check the validity of data is as important in action research as in other forms of research. However, action research provides also a uniquely different interpretation of the concept of triangulation > a lack of triangulation (e.g. differences in perspectives and interpretations in time) acts as an effective dialectic for the generation of new concepts.
14. History and context are given due weight; the previous two topics have been largely about external validity in the specific project context. This topic focuses on the problems of generalizing beyond that. The role of context, and the different interpretations of it, is a most important requirement of action research.
15. Dissemination of findings goes beyond those involved in a study.



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