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LEARNING AND CHANGE IN AND THROUGH ACTION- ORIENTED RESEARCH

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Introduction

Learning is a process involving changes in knowledge, practices, and aspirations, also potentially influencing the institutional setting in which actors operate. Learning takes place in and through communication. It can be observed in interaction and in this way inform research that is aiming for inclusive innovation. In this chapter, we tap into our personal experiences with action research

approaches for stimulating learning and transformative change, considered as sources of inspiration for researchers (interested in) engaging in action research.

Undertaking action-oriented research is a pathway ridden with challenges. It is hard to develop a good understanding of the factors influencing learning processes, or the links between learning processes and outcomes. Intervening is also not simple. Scholars tend to overstate the value of organised learning settings, while learning is often unduly assumed to be merely progressive and positive (Reed et al., 2010; Van Mierlo and Beers, 2020). Moreover, researchers are rarely supported by their institutions to conduct this kind of research (Fazey et al., 2018). These challenges call for transparency regarding the guiding conceptual notions and underlying theories, as well as empirical evidence of relations between interventions, learning, and the outcomes of action research.

In this chapter, we show how learning can provide a relevant entry point for inclusive innovation and transformative change and also how important a system perspective is for dealing with complex issues. Three well-elaborated methodologies that the authors have helped develop are presented and discussed: Companion Modelling, Visual Problem Appraisal, and Reflexive Monitoring in Action. The methodologies have been applied extensively in a diversity of domains; in small projects as well as in large programmes. They all recognise the importance of participation of actors with diverse perspectives and interests in the inclusive process of research, learning, and change. The methodologies are described in terms of methodological design, actor participation, and researcher roles, as well as in terms of their proven value in problem situations.

System perspectives in action-oriented research

Action research ideally concerns iterative cycles of action–observation, reflection, and planning, which are used together to understand and improve practice. Action-oriented research traditions all focus on learning of the present to act for the future by creating new ideas, building relationships to overcome societal challenges, and experimenting for societal transformation. Stakeholders are involved in the research to learn about a situation in its interconnectedness in order to define actions for desired societal change. Many traditions thus explicitly embrace a system perspective.

The word ‘system’ comes from a Greek verb meaning ‘to stand together’ and refers to the interconnection or relationships of things. Considering that the whole is greater than the sum of the parts, from a systems perspective, phenomena need to be understood as an emergent property of an interrelated whole (Flood, 2010). Systems thinking began in the 1940–50s, when scientists of different disciplines realised they were looking at similar phenomena and could benefit from an integrated system perspective. They engaged in ‘hard system’ research, which included studying functions and relationships between sub-systems, and also the effect of amplifying and balancing feedback loops; this was done in order to gain insight into the system dynamics and to find options for reaching a certain goal. Around

the 1960s, epistemological awareness grew, and Checkland (2000) introduced 'soft system thinking' based on the social constructivist paradigm. In this perspective, 'a system' refers to a way of thinking about the connections between things after making a boundary judgment that defines 'the system of interest.' The purpose of soft system thinking is, with the aid of methodological tools and facilitation, to exchange knowledge and perspectives of stakeholders involved so as to enhance learning (a) about the human activity systems that offer insight into the problem situation; and (b) actor's perspectives, values, and interests to create change. In this way, proposals for change can be defined based on a change of mindsets and on the accommodation of interests (Checkland, 2000; Senge et al., 1999).

Soft system thinking focuses on meaning construction and the changing of mindsets, but it barely touches upon economic and political structures in the world determining the dominance of some mindsets and actions over others (Jackson, 1991), or those that distort meaningful dialogues and social transformation (Flood, 2010). In the 1980s, critical system thinking emerged putting concerns about power relations and inclusive and fair innovation on the agenda. Critical system thinkers embrace four major commitments (Jackson, 1991; Ulrich, 1983): critical awareness, by questioning one's own assumptions and values and/or exploring the empowering effects of research methodologies; social awareness, by considering the acceptability of social rules and practices with a given society; human emancipation, by expressing a concern for people's well-being and fair development; and theoretical and methodological complementarity.

Soft system thinking, particularly—and to a lesser extent critical system thinking—have influenced ideas of action research (Greenwood and Levin, 2007). Reason and Bradbury (2001) distinguish three types of inquiry and learning related to systems thinking: single-loop learning concerns fact-finding about system dynamics to know what action leads to a valued goal; double-loop learning concerns an inquiry into actors' values, beliefs, and assumptions through dialogue leading to changed thinking and strategies; in third-loop learning, the purposes, identities, and the understanding of a situation as a whole (biophysical and societal system) are questioned and changed.

In good action research, these types of inquiry (fact-finding, dialogues, and whole system analysis for societal transformation) are interwoven. Hence, the task of action-oriented researchers—facilitating multi-level, social learning and change—is a delicate one, as they engage in 'systemic self-reflective scientific inquiry' (McKernan, 1996, p. 5). 'Self-reflective' means here the sense of being aware of one's own position, partial view, and preferred action; while 'systemic' considers the interconnectedness of issues, people, perspectives, and actions when exploring problem situations and action for change.

Companion Modelling

Since 1996, a group of agronomic, water, forest ecology, and social modelling scientists have applied a participatory modelling approach called Companion

Modelling (ComMod) (Bousquet et al., 2007). ComMod researchers embrace soft system thinking and the subjectivity of knowledge, and engage in iterative action research through initiating and facilitating social learning for NRM (Barreteau, 2003; Bousquet et al., 2007). Social learning refers to a process in which groups from different backgrounds, knowledge, and interests share perspectives to attain a more comprehensive knowledge on the issue-at-stake; gain insight into each other's perspectives and concerns; and develop mutual trust and commitment; all in order to arrive at convergent views for action (Röling, 2002).

Central to the ComMod approach is participatory modelling (see Figure 7.1). A model is a simplified representation of a system, which is built to discuss the relevance of the representation for the different stakeholders and subsequently to simulate and learn about the behaviour of the system. After a first scoping, local stakeholders are invited to formulate the issue-at-stake. After in-depth research of the social and biological system dynamics, scientists develop a conceptual model of the issue and translate this into a Role-Playing Game (RPG): natural resources (water, agricultural fields, forest, products, etc.) are located on the more-or-less abstract game board, and the various types of players are assigned an amount of resources (fields, money, labour, etc.) to play out their respective livelihood strategies. Game rules represent resource-use practices, farm practices, crop prices, while chance cards introduce contextual events. Every game round then simulates an agricultural season. RPGs allow multiple stakeholders to observe and better understand each other's behaviour, to examine the effects, and to react. In a game, players can easily swap roles and test the effect of alternative options for problem solving. As RPGs are time-consuming, ComMod

FIGURE 7.1 Soft system methodology of ComMod Collective (adapted from ComMod, source: <https://www.commod.org/en>)

scientists design a related Agent-Based computer Model (ABM) to simulate the long-term trade-offs of the proposed alternative practices in different scenarios.

The aim of modelling and RPGs is to enhance social learning and action. First, the RPG is used for stakeholders to mobilise their knowledge and to criticise and adapt the conceptual model of the NRM dynamics ‘to make it realistic.’ Then participants are encouraged to gain understanding of the situation of different types of actors, the rationality of their behaviour, and underlying norms and values; but also to gain an overview of how different practices and processes interrelate and work out at higher system levels (e.g. community, watershed level, etc.). RPGs are iterated with individual interviews and focus group discussions to stimulate and monitor the learning of players and stakeholder group/organisation representatives, as well as the interaction with their constituencies. The first RPG focuses on the actual NRM situation, but then stakeholders are asked to propose new options for change. Adapted RPGs (and ABMs) are prepared to explore these scenarios with the stakeholders, assess trade-offs for the different actors and the collective, and to agree on what actions to take.

All ComMod researchers engage in the action research: they initiate dialogue and learning with stakeholders related to NRM; closely study and analyse the effect of their intervention on learning, underlying beliefs and values, relationships, engagement, and action; and design the next steps for facilitating further communication and learning for more inclusive NRM. Care is taken to give voice to the concerns of the marginalised and to show consequences of scenarios for their livelihood. ComMod opts for a collaborative research approach, which means that researchers put themselves on equal footing in the knowledge exchange process. They share power in the definition of the problem and decision-making on the change process, while being responsible for the design of the research and communication process (Probst et al., 2003). An important principle for them is to be aware of, and transparent about their research and societal aims (Barreteau, 2003).

The approach developed by CIRAD in France has been applied globally to better understand the forces driving the evolution of farm and livelihood systems and natural resource use (Bousquet et al., 2007); as a tool to support mediation of resource conflicts (D’Aquino, 2003); and as a normative reflection and action for equitable, sustainable NRM (Barnaud et al., 2010). In the last decade, researchers in agriculture and the NRM domain have become increasingly interested in ‘serious gaming’ and applying ComMod.

In an in-depth evaluation of ComMod, participants underscored that learning has taken place, and individual farming practices—such as mulching or borrowing money—changed. This, however, did not lead to a change of policies as defined by the authorities involved (Barnaud et al., 2010). In consequence, researchers started recognising the influence of power asymmetries as well as the need for more reflection on the empowerment of marginalised groups and bottom-up policy processes within a political-institutional context. ComMod researchers were called upon to pay more attention to this context and its influence on process outcomes (Hassenforder et al., 2019). Several of them have

begun using a critical system approach; strategically selecting stakeholders and designing knowledge sharing processes aiming for empowerment of marginalised actors while engaging in advocacy and informal mediation for fair and sustainable solutions.

Visual Problem Appraisal

Visual Problem Appraisal (VPA) is a film-based learning strategy used to enhance a multi-stakeholder analysis of complex issues and facilitate the development of action plans. VPA is used in workshops and creates a learning environment to 'meet' diverse stakeholders through watching filmed narratives. VPA is: (a) a learning strategy, (b) concerned with complex and wicked problem settings, (c) used for problem analysis and policy design, (d) focused on dialogue and participation, and (e) to enhance the participation of stakeholders—primary stakeholders who are socially segregated or at a distance from stakeholders in power or at a physical distance, as well as secondary stakeholders who are the decision makers and future practitioners.

The material core of a VPA learning strategy is a VPA set, which consists of a series of filmed interviews or portraits (between 20 and 30), complemented with documentaries in relation to a complex issue. These filmed narratives are produced in a specific film style with ethnographic and deliberative qualities, thereby providing a diversity of perspectives on the contextual and perceived reality of individual stakeholders. These filmed interviews and the accompanying documentaries offer VPA learners a chance to explore the complex and conflictive arena of problems such as coastal zone management, HIV/AIDS and rural development, and climate change adaptation.

VPA emphasises the positioning of various stakeholders. It combines soft systems thinking with critical systems thinking in the sense that the methodology articulates power positions and addresses unequal access to having a voice and making a difference. It does so by letting the stakeholders share their own perspective on parts of the system and the system as a whole. It is therefore used in the policy domain to gain insight into the different perspectives on a complex issue-at-stake. In higher education, VPA is used in training programmes for transdisciplinary problem analysis, policy design, and stimulating systems thinking in general.

Participants in a VPA workshop go through a three-tier programme: scoping, stakeholder consultation, and developing options for action (see Figure 7.2). The scoping stage varies from a quick scan to a desk study, starting with a kick-off meeting. Once participants have a basic idea of the VPA process, they first watch a documentary which explores subject-matter knowledge. Reflective forms guide this scoping. Participants answer reflective questions about their personal objectives (whether their questions were answered or not). The facilitators then provide procedural feedback on these reflective forms. These forms allow the learners and facilitators to assess and reflect on the knowledge gained, searching for individual accountability in the unfolding of the learning process.

FIGURE 7.2 Flow chart depicting the VPA process (adapted from Lie and Mandler, 2009, p. 16)

VPA films are extended narratives, with only the interviewees on screen, in long steady frames, and filmed on location and during activities in their daily environments. The interviewees tell their story, filmed in such a way that the audience experiences the role of interviewer. Reflective forms guide the process: each team must convince the facilitators about the appropriateness of the selected interviewee before they can ‘meet him or her.’ After each interview, teams fill in a form articulating their actions and decisions as a basis for the feedback session with facilitators. In the final stage, the learners analyse and structure the information encapsulated in the interviews and formulate recommendations for action.

Various VPAs are used in the policy domain as well as in different programmes at various universities in the Netherlands and abroad. The motivation of using VPA for enhancing learning about complex problems in transdisciplinary settings is fuelled by the facts that VPA can (a) bring overlooked stakeholders into the classrooms and place them next to policy makers, (b) address learning about various stakeholder positions, (c) create a safe space for learning, and (d) profit from the additional value of the visual (Witteveen and Lie, 2018).

The impact of VPA has mainly been explored in higher education. Course evaluations indicate that the diversity of learning activities is appreciated; the

students gain insights into complex issues and transdisciplinarity, experiencing VPA as challenging but safe. A major repositioning over the years concerns aspects of reality that are no longer considered as a simulation because the reflexive actions by VPA users are not simulated but real ‘since it [VPA] allows students to experience and reflect differently on their common images and on their usual behaviour when meeting farmers, fishermen and women’ (Witteveen, Put, and Leeuwis, 2010, p. 53; Witteveen and Lie, 2018).

In the governance domain, the impact of the VPA AIDS & Rural Development in Sub-Saharan Africa and the VPA Kerala’s Coast was evaluated by participating researchers (see <https://www.visualproblemappraisal.org/>). The space for dialogue and learning was positively evaluated in diverse international and intercultural settings; the impact in terms of action and relevance for filmed stakeholders was also evaluated positively, albeit only assessed in the short term. The facilitation is highlighted in evaluations, as facilitators need expertise with the methodology to be daring and confident for supporting ‘learning on the edge.’

Reflexive Monitoring in Action

Reflexive Monitoring in Action (RMA) is an integrated methodology for addressing complex problems by encouraging innovating groups or networks to work towards aligned institutional changes, i.e., system innovation (Van Mierlo et al., 2010). Reflection and learning are interwoven in the process of change. Appointed reflexive monitors stimulate recurrent collective reflection in the network and the design and adaptation of actions targeting a future system change. In this way, while facing the everyday struggles of an ongoing transformative change process, system innovation initiatives are expected to increase their reflexivity—that is, their ability to interact with and affect the institutional setting in which they operate. It can be recognised as the emergence of new aligned practices and new associated rules enabling these practices, within the initiative and in wider networks (Beck et al., 1994; Beers and Van Mierlo, 2017).

Learning as a social, reciprocal process may thus occur in different locations (see Figure 7.3): among diverse actors involved in a local experiment or project (1); among such initiatives (2); at a more global level, for instance in a large policy programme (3); and between the local and the global level (4).

In order to monitor and stimulate the learning processes from the perspective of system innovation at these places, existing theories were adapted. To observe learning in regular project meetings, for example, a model was developed combining learning theories from Natural Resource Management and educational studies. The model suggests that learning in the context of system innovation interweaves: (1) new knowledge about problems or solutions; (2) relevant partners or opponents; and (3) which actions to take (Beers et al., 2016). Learning thus enables taking coordinated physical actions and influencing the process of (system) change.

Every (research) activity associated with reflexive monitoring is also a dedicated intervention to encourage reflection and learning. It involves a series of activities, preferably in iterative cycles: observation, analysis, reflection, and

FIGURE 7.3 Places of learning in system innovation initiatives (adapted from Beers et al., 2019)

design and adjustment of actions. The monitoring is often an assigned role and responsibility of ‘reflexive monitors’ who act as analysts, sparring partners, process managers, and much more. This role could be performed by a researcher, consultant, policy maker, or by anyone else who is able to reflect, listen, and actively observe, summarise and integrate, handle diversity, and introduce relevant theories in a clear way. Specific RMA tools complement well-known research activities such as conducting interviews and process facilitation. The dynamic learning agenda, for instance, helps to link long-term aims to concrete perspectives for actions by putting challenges that arise on the agenda, as well as keeping track of how they are addressed and changed (Van Mierlo et al., 2010).

In principle, monitoring activities are—as far as possible—conducted collectively by all actors involved in the initiative, and as far as circumstances allow, embedded in activities that were already planned by the initiators. For instance, regular project meetings or other social encounters can be observed and reflected upon; or gatherings of value-chain actors can be designed to include analysis of the institutional setting so as to decide how to grasp windows of opportunity.

Over the past decade, the methodology has been applied in a diversity of domains including sustainable agriculture, health, international development, the knowledge infrastructure, and education for sustainability. RMA stimulated the diverse participants to reframe issues and problems, redesign strategies,

grasp windows of opportunity, enhance collaboration, and overcome stagnation in the change process in projects like *Telen met Toekomst* (Farming with Future) in the Netherlands and Primary Innovation in New-Zealand (Fielke et al., 2017).

There are also examples of RMA becoming part of local and national policy making in the Netherlands and Belgium, as well as of education activities regarding sustainable development in schools and systems for policy analysis and evaluation. Most of all, it has supplemented the repertoire of many academic and applied researchers across the world. For the Dutch Research Institute for Transitions (DRIFT), for instance, it has become a visible element of their work, mainly by helping put flesh on a key component of transition management.

The above results indicate the emergence of new practices within system innovation initiatives, occasionally spilling from the initiatives' boundaries into their wider networks. Signs of new associated rules enabling these practices showcase the reflexivity of the methodology; albeit, an evaluation has shown that learning in a system innovation initiative does not necessarily increase its reflexivity (Beers and Van Mierlo, 2017). Initiatives were found to operate in three different modes depending on the extent to which they share an orientation towards structural change with their institutional environments. Also, only in a few situations did learning pave the way for systemic change in context. Still, in the rest, reflexivity within the institutional setting preceded learning in the initiative; either by providing room for fundamental change, or by limiting it and hindering change. This all underlines the dependence of action research success on external developments.

Reflection

How does action-oriented research instigate learning, inclusive innovation, and transformative change? Table 7.1 provides an overview of the core features of the three action-oriented research strategies applied by our group. The nature of their methodological design and concrete activities is diverse; ranging from multi-step approaches to develop potential scenarios in multi-stakeholder groups; to a film-based strategy in which learning is stimulated by mediated participation of stakeholders; to the monitoring of an ongoing process of (system) change. Despite this, they also build on similar basic ideas. Here we ponder their value for learning and systemic change from a bird's eye view.

System perspectives acknowledging and addressing complexity

Addressing complex problems on the basis of a system perspective is at the heart of the three methodologies. They all acknowledge the complexity of invasive biophysical and societal issues by taking their emergent properties as a starting point, as well as the inherent uncertainty and their contested nature because of competing claims, various positions and concerns, and diversity in backgrounds and knowledge.

TABLE 7.1 Overview of the three action-oriented research methodologies

	ComMod	VPA	RMA
Methodology	A structured process of joint-demand articulation, problem survey, a role-playing game, and simulation model to explore future NRM scenarios. Agreement on goals and actions. Community development through iterative cycles of problem identification, exploration, and actions.	Uses a staged process of preparing for, watching, and reflecting on filmed narratives of stakeholders in a complex problem. Learners understand various stakeholder positions and are expected to develop recommendations for actions.	Flexible, tailor-made interventions (from feedback on planned activities to workshops) to stimulate collective reflection on effects of actions in the light of a desirable future and the institutional setting. Iterative cycles <i>ex dure</i> the process of change to increase the capacity to work on system innovation.
Temporality	Initiated when NRM problem is flagged. Through iterative problem formulation, exploration scenarios, and dialogue for action, sustainable and inclusive NRM and community development is pursued.	One-off cyclical event ranging from a one or two-day workshop to a full course. Situated at the moment in time that the stakeholders were interviewed. Connects to contemporary and future situation.	Ideally during the course of system innovation initiatives. Backcasting from desired long-term future situation.
Inclusion of actors	Diverse local stakeholders involved in a NRM problem, or other related problem forwarded. Different types of NRM users in community and related policy makers.	Primary stakeholders presenting individual perspectives and realities on a complex problem. Secondary stakeholders, decision makers, and future practitioners watching the filmed interviews.	Groups or networks of innovators: with researchers, consultants, policy makers, and other professionals; rarely also civil actors.

(Continued)

TABLE 7.1 (Continued)

	<i>ComMod</i>	<i>VPA</i>	<i>RMA</i>
Roles of researchers	Design conceptual model and game, with relevant socio-ecological knowledge. Facilitate and monitor learning and negotiation around scenario explorations and towards inclusive, sustainable NRM.	Dual role researchers: build a video set as VPA producers or learn from the videos as audience	Social scientists or experienced consultants in a variety of roles, as team partner operating 'from a distance.'
Documented impact	Learning about issue, others' perspectives, and community preferred future. Changed individual practices. Community level propositions for new policy rules.	Learning about issue and others' perspectives (including disadvantaged actors). Research ethics in practice. Learning about the relevance of public participation for transformative and inclusive action.	Adaptations of actions and changes in understanding and practices in concrete innovation trajectories. Changes in practices and rules of pursuing transformative change (monitoring and evaluation, research, and policy making).

While all methodologies build on soft system thinking, there are also interesting differences: VPA builds primarily on a critical system perspective by contrasting deprived actors with (future) decision makers; RMA combines soft system thinking with a touch of hard systems thinking when analysing social and institutional dimensions of a complex problem, thus also addressing the persistency of problems; ComMod combines soft with hard system thinking by paying attention to the biophysical dimension regarding the ecological system surrounding the endangered natural resources because of which natural scientists are included in the research process. Diversity in the key roles of researchers is partly related to these differences, with VPA being primarily process oriented. Interventions in ComMod and RMA navigate also on the basis of desirable futures and plausible directions of the change process.

Valuing the group for learning and action

Learning about novel information, such as other actors' perspectives and experiences by bringing together—directly or indirectly—multiple actors in a group setting is key to all three strategies. To stimulate collective learning, VPA and ComMod involve both actors experiencing a problem and actors who are expected to have the responsibilities and means to address this problem. The main aim is to develop a richer perspective on the complex issue and a mutual understanding of stakes, based on which actions could be envisioned and designed. RMA, in contrast, works primarily with the actors involved in a system innovation initiative who have already started to take action; this enables the monitoring of physical actions and their effects on the change process, while other relevant actors are regarded as part of the context targeted by the initiators. Most importantly, this way of thinking rearranges the participation-philosophy of action research: actors are not invited to participate in research, but researchers are allowed to participate in change processes.

In all cases, the (proposed) actions are related to who, exactly, are involved in the research project or change initiative. They thus build, by definition, on a selective group's ideas, knowledge, and aspirations. This points to the importance of reflection on the consequences of the selection of participants, as well as on the exclusion of multiple other actors.

Direct changes, but intangible impact

The evaluation of the impact of the methodologies shows that much learning about the participants' perspectives, the targeted system, and possible solutions, has taken place and several practices have changed. The research activities did not lead to the envisioned fundamental system changes during the research. One explanation is that system changes can hardly be expected in the short time span of a research. Another is that learning does not necessarily lead to actions and a change of practices and institutions; it may even just be follow-up on other changes instead of being their prelude (Beers and Van Mierlo, 2017). The relevance and results of action-oriented research depend on the kind of change

pursued, the resources available, and the existence of numerous preconditions including the expectations regarding research and researchers. Modesty regarding their own expectations to evidently contribute to systemic change characterises researchers embarking on the path of action-oriented research. Nonetheless, the induced changes in thinking and acting can be seen and treated as preliminary preparations for wider change.

The essence of facilitation and monitoring

Action-oriented research can operate as a catalyst in change processes. The desirable direction and the reference frame for the interventions should be defined in a flexible, collaborative process and adapted on the basis of recurrent reflections in the group. Whether this happens is highly dependent on the quality of facilitation and monitoring, thus putting researchers in a delicate role. While being actively engaged in the process of learning from change-oriented actions and changing research practices which are often part of the complex problems in modern society (Fazey et al., 2018), researchers should also take sufficient distance in order not to pursue individual goals and be acceptable as a facilitator or monitor to a diversity of actors. The presented methodologies show some of the ways in which these stakes could be balanced; from structured role descriptions to a high variety of roles that build on explicit principles.

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