CHAPTER 6

Accompanying Transformation-Oriented Research: Contributions, Relations and Methods

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6.1 Introduction: Transformation-oriented and Accompanying Research

There has been far too little progress in overcoming socio-ecological problems and shaping a sustainable future in terms of scale and speed. Societal transformations, as fundamental changes in socio-ecological and socio-technical systems towards more sustainability and justice, are thus high on scientific and political agendas (e.g. Patterson et al., 2017; https://www.ipbes.net/transformative-change; Scoones et al., 2020; United Nations General Assembly, 2015). Transformational sustainability research is concerned with understanding and developing solutions to persistent socio-ecological problems, with a focus on intentionally shaping

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societal change (Fazey et al., 2018; Wiek & Lang, 2016). There are various approaches to transformation-oriented research, including among others real-world, urban living or transformation labs, transition management, adaptive socio-ecological systems management, backcasting and transition experiments (McCrory et al., 2020; Wiek & Lang, 2016). Jointly, approaches aspire to make tangible contributions to benefit societal transformations towards sustainability (Schäpke et al., 2018a, b). They address problems in complex systems in future-oriented and participatory ways, aiming to catalyse learning and innovation via the integration of various kinds of knowledge (Caniglia et al., 2020).

Transformation-oriented sustainability research has roots in pragmatism (Caniglia et al., 2020). Here, the generation of knowledge is action-oriented and motivated to enable insights on how to tackle real-world problems. Knowledge is created in a transdisciplinary process that links action, reflection and capacity building (Caniglia et al., 2020). It is most effectively co-produced in context-based, pluralist and goal-oriented processes (Norström et al., 2020), hosted in spaces for social learning and interaction (Wittmayer & Schäpke, 2014). Accordingly, the design and facilitation of processes of knowledge co-production and integration become core activities in transformation-oriented sustainability research (Miller, 2013; Wittmayer & Schäpke, 2014). Processes are marked by constant iteration and adaptation, taking up new insights as well as unfolding needs and demands of participants.

Transformation-oriented research faces several challenges. This includes to design research processes oriented towards continuos emergence and iteration (see Regeer et al., this volume, Chapter 3). Decisions on adaptation should be well informed and aware of their implications for research and practice, which can be hard to foresee in daily research practice. Furthermore, developing overarching insights from transdisciplinary research, including on its processes and impacts, is inherently difficult, not least as engaged researchers have to balance the rigorous generation of knowledge and demands to appropriatly facilitate the process (Belcher & Halliwell, 2021; Schäpke et al., 2024). Moreover, transformation-oriented research such as in the form of real-world laboratories (RwLs) is still new to many researchers and a highly complex task, which in parts is at odds with disciplinary traditions and their good practice standards (Defila & Di Giulio, 2018a; Verwoerd et al., 2020). Challenges call for support of researchers engaged in

transformation-oriented research, including in knowledge development, process facilitation and decision-making.

Here, I present accompanying research—namely, research that accompanies and researches others' research—as a possibility for complementing and supporting transformation-oriented research in transdisciplinary knowledge co-production and process reflexivity. Accompanying research can generally be applied to support science and research of various kinds. In my view, the specifics and challenges of transformation-oriented research make the complementary use of accompanying research particularly beneficial. To make my contribution more specific and tangible, I focus on accompanying research for RwLs. RwLs are characterized by transdisciplinary experimentation, aiming to research and contribute to the transformation of society. Thus, they can function as an ideal-typical example of transformation-oriented sustainability research (Schäpke et al., 2018b) and to discuss related accompanying research.

So, what is accompanying research and how can it benefit transformation-oriented sustainability science? What methods does accompanying research use and how does it relate to those being accompanied?

Following this introduction the chapter *first* outlines the objectives and contributions of accompanying research, and *second* goes on to elaborate on how to conceive and structure the relationships between accompanying research and relevant stakeholders, including necessary balancing acts. Together, objectives and relationships make it possible to describe and design the functioning of accompanying research (Defila & Di Giulio, 2018a). Conceptual reasoning is further complemented with suitable methods to deploy accompanying research, aiming to provide hands-on guidance. In the *third* section, and to deepen considerations, I present and discuss a case study of accompanying research to the Co-Creative Reflection and Dialogue Space (CCRDS) from UNFCCC climate conferences. The chapter ends with a concluding discussion.

Concerning methods and data, elaborations on objectives and relationships build on a synthesis of insights published by experts in accompanying research (including Defila & Di Giulio, 2018a; Freeth & Vilsmaier, 2019; Weith et al., 2019 and others) and on the wider literature on transformation-oriented research. I also include reflections based on my experience in the accompanying research of RwLs, including 14 so-called BaWü Labs from Baden-Württemberg in Germany, taking place

from 2014 to 2018. The CCRDS case study combines self-reflection, reflections in the CCRDS team, and considerations of academic studies.

6.2 Understanding Accompanying Research and Its Contributions

Accompanying research accompanies and researches the research activities of third parties and is therefore characterized by the relationship to other people's research (Fiedeler et al., 2010). These may be the research activities of a single research project, for example, the various real-world experiments of a RwL, or different research projects within a research programme (Defila & Di Giulio, 2018a; Weith et al., 2019). Accompanying research is usually conducted by individuals who are not directly involved in the research activities being accompanied, but who are in engagement with them, observing, documenting, and thus being able to shape an ongoing process of reflection (von Wehrden et al., 2019). In this sense, accompanying research is independent research despite being related to others' research (Defila & Di Giulio, 2018a).

Accompanying research has different objectives, depending on the subject in question and the sponsor, be it a single research project, or the funding body of for instance an entire funding line. It can provide the funding body with further insights into the funded programme—or help those involved in a transformation-oriented research project to better understand it and its impact. This could include the 'reflexive generation of new knowledge' (Weith et al., 2019, p. 294), knowledge management, or communication and networking for the accompanied research.

For Freeth and Vilsmaier (2019) the promotion of learning processes of accompanied research teams lies at the centre of their approach to formative accompanying research. They distinguish learning about, with and for the team: *learning about* refers to the generation of transferable insights about the accompanied research; *learning with* occurs in the role of a team member of the accompanied research; and *learning for* aims at strengthening the research project and its results through interventions in the research process. In sum, accompanied research can inform, shape, and improve the research process[1] (Freeth & Vilsmaier, 2019).

[1] At times, accompanying research is called formative accompanying research, as it supports the improvement of the accompanied research in some form. I avoid introducing a formal distinction between formative and 'regular' accompanying research and treat both

How to obtain a structured overview of the various possible contributions and their implications for designing accompanying research? Based on many years of experience, Defila and Di Giulio (2018a) propose two main contributions of accompanying research: *research and knowledge generation* as well as *procedural support*. These functions can be designed differently, depending on the specific objectives, competencies and funding of the accompanying research (ibid.). I next discuss the two generic types of contributions and their implications for design and suitable methods.

6.2.1 Research and Knowledge Generation

> This concerns the question: What scientific and practical knowledge is/shall be generated by the accompanying research (Defila & Di Giulio, 2018a)?

Three types of new knowledge that accompanying research generates are distinguished (ibid.).

Knowledge about fundamental topics of the accompanied RwL or RwL funding programme (K1): Here, the accompanying research generates complementary knowledge and fills possible thematic knowledge gaps (Defila & Di Giulio, 2018a). Accordingly, RwL accompanying research could be commissioned by the project leadership to contribute knowledge to a thematic area that is identified as particularly relevant in the course of the project, but which is not adequately covered by the existing sub-projects. A hypothetical example might include a RwL experimenting with autonomous driving for mobility transitions that has a rapid need for new knowledge on upcoming legal issues restricting autonomous driving, but lacks the resources to develop this knowledge. Another possibility is, that the funding agency decides that an additional topical area not covered by the originally funded RwLs is in need of research (Deflia & Di Giulio 2018a). The contribution of such fundamental knowledge is conceivable if the accompanying research starts the project with open capacities and has sufficient knowledge and competencies in the new topic area. This is unlikely to be a common situation. The accompanying research will itself often have a set research agenda, and lack in-depth

as broadly synonymous, generally assuming some form of support from accompanying to accompanied research.

expertise on specific topical areas of RwLs, but rather have capacities on process facilitation, reflexivity and knowledge integration per se. For this reason, this contribution will not be discussed in further depth. Suitable *methods* would be diverse, depending on the topic in question, and not specific to doing accompanying research.

Knowledge of processes within a RwL or RwL funding programme (K2): This knowledge is acquired from a (partly) independent perspective (Defila & Di Giulio, 2018a). The accompanying research takes on the role of critical, analytical research that aims to gain insights into activities of the RwL or programme. For example, it collects and structures methods for conducting experiments within a RwL or synthesises related success factors (Bergmann et al., 2021). Insights gained can support the design, orientation and optimization of an (upcoming) RwL and its processes (Freeth & Vilsmaier, 2019). As Defila and Di Giulio (2018a) point out, to develop K2 knowledge it is helpful if the accompanying research has specific expertise on observed scientific processes and aspects—for example, on methods of transdisciplinary research as used by RwLs (Defila & Di Giulio, 2018a, see also Bergmann et al., 2021).

Suitable *methods* are required to collect and compare data from different parts of the project, such as different experiments, or various RwLs of a funding line. In my experience, this includes literature reviews, surveys, different types of interviews, group discussions as well as the analysis of metadata, e.g. from project proposals, result documents of sub-projects or experiments or similar 'grey' literature. This may include socio-scientific data and their analysis, as well as technical-scientific data, for example on resource consumption or ecological indicators related to the project. An exchange with the members of the RwL team about (interim) results—such as in workshops—enables the research results to be compared with practical experience and to learn together (Bergmann et al., 2021). To facilitate and structure the comparison and synthesis of findings from different projects or experiments, an overarching analytical framework may be used (e.g. Luederitz et al., 2017; von Wirth et al., 2019; Williams & Robinson, 2020). Borrowing from reflexive monitoring in action, process tracing, reflexive process description or timeline and eye-opener workshops are some of the methods used to go more deeply into reflecting on the processes in a transdisciplinary project (van Mierlo et al., 2010). Given their co-creative character, these methods are suitable for the following knowledge contribution as well.

Integrated knowledge on topical and/or procedural aspects (K3) is generated in collaboration with and between different RwL stakeholders. Here, the accompanying research acts as a designer and facilitator of a 'continuous and systematic process of integration' (Defila & Di Giulio, 2018a, p. 99). The objective is to create synergies by linking knowledge bases from different activities and sub-projects (Defila & Di Giulio, 2018a) and to enable a joint learning process. Here, accompanying research can include meta- and comparative studies and generate cross-case knowledge (Weith et al., 2019). The corresponding competences for the organization of an inter- or transdisciplinary knowledge integration process should be available in the accompanying research team (ibid.).

In my experience, appropriate *processes and methods* often include the organization and structuring of events or series of events (e.g. workshops, seminars, conferences, regular project meetings) for exchange, joint learning, reflection and knowledge integration. The events serve the goal-oriented exchange and collective exploration of the (jointly defined) topics and issues. The starting point for generating cross-cutting insights should be the clarification of issues and questions of common interest, as well as the thematization and documentation of mutual expectations (Defila & Di Giulio, 2018a).

Depending on the objectives and the state of knowledge, the exchange may be more open and explorative and/or more goal- and result-oriented. A combination of open and result-oriented phases can be a good way to combine learning, new insights and securing the results. Elements for presenting existing knowledge (e.g. the status of work) are also part of this. The exchange could be organized internally or involve external actors (e.g. final conferences, thematic workshops), depending on the need for (additional) knowledge, confidentiality or publicity, as well as existing organizational resources. Examples from the BaWü Labs include a combination of events for broad and for focused exchange. We combined larger conferences, oriented towards broad public participation and aiming to raise interest in the research programme and RwLs as a new approach, with more focused symposia that connected actors from RwLs and experts on transformative research to discuss specific topics (for examples of events see Schäpke et al., 2017; Wagner et al., 2016). Events can additionally serve to create publicity and communication opportunities (see next section).

If the accompanying research is part of the RwL team and its regular working meetings, spontaneous interventions such as by mirroring back observations or information from surveys to team members are also possible (Freeth & Vilsmaier, 2019). This can advance learning and co-operation processes in the RwL (Freeth & Vilsmaier, 2019, see section on dynamic balance of accompanying research). Field notes, participant observations or simple daily reflection emails to a colleague are methods to track observations and to bring them to joint consideration in appropriate situations (Klassen et al., 2021; Wittmayer et al., 2014).

An important step for the generation of integrated knowledge is the creation of joint products that concretize and document the process of generating knowledge. Depending on the objective and time horizon, the documentation might include position or discussion papers, books or thematic booklets as well as result reports or press releases, blogs, podcasts or an internet presence. Accompanying research can either exclusively organize the process without taking on a content-related role (Defila & Di Giulio, 2018a) or contribute content, for example, in the form of own chapters or forewords to publications (Defila & Di Giulio, 2018a; for publication examples see Defila & Di Giulio, 2018b, 2019, Schäpke et al., 2018a). Weith and colleagues (2019) also cite joint authorship of accompanying research with other project stakeholders as an effective way to integrate knowledge. Co-authorship with multiple authors, including practitioners, is often said to be challenging with regard to coordination and motivation, for instance. In my experience, this can be alleviated if the publication process finds ways to acknowledge verbal and in-workshop contributions, multiple contributions are managed by drawing on digital knowledge management tools and there is a stringent, well-coordinated writing process (for a process example with more than 170 authors see Fazey et al. [2020]).

In addition to scientific publications, Weith and colleagues (2019) emphasize the role of practice- and policy-oriented publications, such as policy recommendations. These may be developed with less time investment or at least published without the often long publication processes of academic journals. In addition, they are highly relevant in terms of the societal impact of RwLs and similar formats. Scientific and practice-oriented publications can be built up synergistically (Weith et al., 2019). If accompanying research is involved in terms of content, a clearly delineated

role in the publication is advisable in order not to jeopardize the critically independent role in the project (*see section on a dynamic-balanced accompanying research*).

6.2.2 *Process-Related Contributions of the Accompanying Research*

> This concerns the question: Which further activities are/ shall be implemented to support the research process of the accompanied research (Defila & Di Giulio, 2018a)?

In addition to knowledge generation, accompanying research can also bring further additional benefits to an accompanied project, such as a RwL. This might be, for example, communication, public relations and networking, including the dissemination of knowledge about the RwL and its results (Defila & Di Giulio, 2018a). For this, there might be different publications, such as editing thematic booklets, anthologies or websites and blog entries. Other possibilities are the organization of events involving an (interested) public and/or relevant experts or joint appearances at conferences (Defila & Di Giulio, 2018a; Schäpke et al., 2017). Accompanying research can also initiate the formulation of core results or policy recommendations and communicate them (Weith et al., 2019, see section on **K2** and **K3** above for relevant methods). In addition to this external communication, Weith and colleagues (2019) cite internal communication as a possible contribution of accompanying research, for example, in the context of (co-)designing RwL internal events.

Coaching and consulting of the RwL participants are another contribution of the accompanying research, such as on the possibilities of meeting emerging challenges (Defila & Di Giulio, 2018a). This is also a central aspect of the formative accompanying research approach developed by Freeth and Vilsmaier (2019). It can function to enhance reflexivity and informed decision-making in the accompanied project (Klaassen et al., 2021; van Mierlo et al., 2010). As RwLs are (still) novel for many researchers and practitioners, and working in them is highly complex, such support should be planned for and requested at the outset of a project to secure possibilities (Defila & Di Giulio, 2018a). Coaching and consultation can take place on an ad hoc basis at the request of project participants, as well as through regular dialogue and reflection workshops

(see Defila & Di Giulio, 2018a for an exemplary format). While accompanying research can and should openly communicate the offer of coaching and consulting, it should then be based on the needs and demands of the project participants and based on the agreement of a clear framework.

A third area cited by Weith and colleagues (2019) is knowledge management. Here, the accompanying research can make contributions to the synthesis of the findings of the RwL and offers them to third parties for use in a structured manner via digital, openly available platforms, for example. For this, permanent financing of the underlying infrastructure is crucial (Schneidewind et al., 2018). Within RwL projects, it is conceivable that the accompanying research gets involved in the collection and structured storage of results from sub-projects and experts via databases internal to the project (see Table 6.1 for an overview on contributions).

Table 6.1 Contributions of accompanying research to transformation-oriented sustainability research, related methods and formats

Type of contribution	*Exemplary methods and formats*
Critical-analytical knowledge on processes of one or several RwL(s) (K2) Objectives: • Overarching insights into various activities of the RwL (and its' experiments) • Enable orientation, design and optimization of the processes of RwLs	Collection, critical analysis and comparison of data through: • Literature analysis, surveys, interviews, group discussions, (literature) analysis of metadata and 'grey' literature • Analysis of socio-economic, ecologic or technical data • Discussion and comparison of the results with the RwL team in workshops, etc. • Process tracing, reflexive process description or timeline and eye-opener workshops

(continued)

Table 6.1 (continued)

Type of contribution	*Exemplary methods and formats*
Integrated knowledge from the collaboration with different RwL actors (K3) Objectives: • Generate synergies by connecting knowledge assets from different actors and activities and enable a common learning process • Integration of various knowledges to co-produce shared understanding of RwL content and processes	• Organisation and structuring of internal, external or public events, e.g. workshops, seminars, conferences, project meetings • Mirroring back observations to team, based on field notes, participant observation, surveys, daily reflection emails • Organisation/ Co-creation of joint products with a scientific and/or socio-political target group: e.g. position or discussion papers, books, result reports, press releases, blogs, podcasts, websites, strategy papers, policy recommendations
Additional contributions of the accompanying research	
Communication, public relations and networking	• Publications (see K2) • Organization of external and internal events (see K3)
Coaching and consulting	• Regular dialogue and reflection workshops • Ad hoc consulting • Participation in internal project events as a critical observer or friend
Knowledge management	• Synthesis of the findings of the RwL (see K2) • Digital platforms • Project internal databases

Based on Defila and Di Giulio (2018a) in strongly adapted form, complemented by Freeth and Vilsmaier (2019), and Weith et al. (2019), methods based on multiple sources and the author's experiences. See main text for detailed references

6.3 Relationship with the Actors

This includes the question: What is/ shall be the nature of the relationship with the researchers/ stakeholders/ other projects and/or the funding body (Defila & Di Giulio, 2018a)?

Accompanying research has a special role within a research programme or project, as its objective, function and mode of operation are defined in relation to the activities being researched and accompanied (Fiedeler et al., 2010, cited in Defila & Di Giulio, 2018a). Defila and Di Giulio (2018a) discuss various types of relationship, three of which are presented here as being of particular relevance to RwL accompanying research.[2] These are:

- **(Sub-)Projects as research object**: The accompanying research has the processes and results operated by other actors of the RwL as the object of consideration in order to generate new knowledge (K2). In doing so, the accompanying research depends on the cooperation of those who are responsible for the RwL project research. Simultaneously, to a certain extent the latter also become the research object (Defila & Di Giulio, 2018a). At the same time, the accompanying research learns a lot of what happens in the RwL, which corresponds to a '*learning about*' the RwL in Freeth and Vilsmaier (2019). In order not to jeopardize the collaboration, Defila and Di Giulio (2018a) strongly advise to observe the principle of informed consent and to ensure anonymity and confidentiality.
- **Create the framework for the cooperation** of the other members of the RwL: Especially for the generation of integrated knowledge (K3), the accompanying research can invite the other team members to cooperate, even without making substantial content contributions (Defila & Di Giulio, 2018a). This corresponds to a '*learning for*' the RwL according to Freeth and Vilsmaier (2019). Here, the accompanying research has only an indirect influence on the quality of the results. This requires a solid process design to facilitate high-quality results as well as to adapt the objective of the cooperation to the capacities and interests of the RwL team (Defila & Di Giulio, 2018a).
- **Content-related collaboration** with the members of the RwL team: Likewise for the generation of integrated knowledge (K3), the

[2] The two types of relationships not discussed in depth are: (a) no specific relationship to the projects, with the accompanying research barely running in parallel to other projects in the same funding line; and (b) RwL as data sources for the accompanying project, without further interaction or collaboration (see Defila & Di Giulio 2018a).

accompanying research can also make its own content-related contributions, building on the design of the collaboration of the RwL team (Defila & Di Giulio, 2018a). This depends on having the appropriate competencies and corresponds to a '*learning with*' and '*learning for*' the RwL according to Freeth and Vilsmaier (2019). Therefore, a solid process design is important as well as assuring joint interests in and mutual benefits from the collaboration (Defila & Di Giulio, 2018a). Negotiating explicit and shared goals for the cooperation helps to secure this.

6.3.1 A Dynamically Balanced, Appropriately Related and Reflexive Design of Accompanying Research

The relationship between the accompanying researcher and the other members of the research team will be marked by three balancing acts, and should be designed according to three core practices (Freeth & Vilsmaier, 2019):

First, this includes a balance between (more distanced) *observation* and (more involved) *participation* (Freeth & Vilsmaier, 2019). Oriented towards the core practice of "**dynamic proximity**", the accompanying research will continuously seek to find the 'right' distance to the accompanied project (Freeth & Vilsmaier, 2019, p. 62). For example, the accompanying research should be close enough to the research process to see the details and distant enough to see the bigger picture. Similarly, it should be close enough to identify opportunities "for team reflection, but not too close that this happens solely" at the suggestion of the accompanying researcher (Freeth & Vilsmaier, 2019, p. 62).

Second, Freeth and Vilsmaier (2019) suggest a balance of *scientific curiosity* and *feeling responsible* and care for the success of the research process. The core practice here is ***critical (self-)reflexivity*** towards one's own roles, interests and influences (ibid.). In this balance, the accompanying research remains attentive in 'research mode' on the one hand, but waits for the right time to investigate so as not to disturb the team's research processes. They feel care for the research project and its members and the effect of the accompanying research on it, but without becoming overly engaged and

"overinvested in the team's research success" (Freeth & Vilsmaier, 2019, p. 63).

Third, the authors strike a balance between "*impartiality* and *investment*" (Freeth and Vilsmaier, 2019, p. 64). Impartiality means trying to be aware of one's own interests, but not taking sides, for example, in decisions about research project activities (ibid.). Involvement here describes openly taking a position when the accompanying researcher's own interests are directly affected. Here, accompanying research can be based on the core practice of ***appropriate relatedness***: it on occasion explicitly contributes as a quasi-independent observer, rarely introduces perspectives based on its insider experience of the project and often assumes a mediating position that supports an open exchange of different views in the project (Freeth & Vilsmaier, 2019).

Freeth and Vilsmaier (2019) emphasize that the role of the accompanying research, and also the way it shapes the three balancing acts, should be dynamically changeable in the course of the research project. While in some situations an observing, impartial role characterized by scientific curiosity may better support the participants' cooperation and learning, in other situations taking a stronger position and actively assuming responsibility may be more appropriate (ibid.).

In my experience, accompanying research to the BaWü Labs was marked by seeking to maintain the right balance and to enable dynamic proximity. At a higher level, accompanying research was offered by two different teams that had different focuses and operated in slightly different ways. This included a team from Basel University, who had a stronger focus on facilitating knowledge integration and systematic dialogues between the labs, offering coaching and consultancy (Defila & Di Giulio, 2018a). A second team, of which I was part of, comprised Leuphana University, the Institute for Social-Ecological Research (ISOE) and the Wuppertal Institute. It focused more strongly on developing overarching insights based on observations and surveys, systematic literature work and catalysing exchange between the labs with wider expert circles (Bergmann et al., 2021). Accordingly, both teams found different answers to the three balancing acts, for instance of being scientifically curious but not feeling (too) responsible, of observing and/or participating, and between investment and impartiality. As outlined by Defila and Di Giulio (2018a), these answers and related positioning corresponded to the differences in

contributions sought. From a wider perspective, I assume that setting up an accompanying research in the form of different teams is a good way to clarify expectations and to offer accompanied projects and funders a range of contributions and relationship options.

6.3.2 Accompanying Research Is Not Evaluation

Accompanying research differs from classical evaluation or assessment of a research project. While the accompanying research does aim to gain overarching insights, including those based on comparative analysis, it does not take on an evaluative role on the basis of its own findings (Bergmann et al., 2021; Defila & Di Giulio, 2018a; Weith et al., 2019). Providing an evaluation of, for instance, achievements and failures of the accompanied project could fundamentally jeopardize the trusting cooperation with the accompanied research project. This is particularly true when insights are made available to others, such as the funder. Related conflicts of interest, including relations of responsibility and loyalty to actors with different interests, are difficult to resolve. As a rule of thumb, accompanying research should therefore maintain its independence, especially in relation to actors outside 'their' real-world labs (e.g. the funding agency) (Defila & Di Giulio, 2018a).

At the same time, it is conceivable that the accompanying research supports the process of reflexivity and self-assessment of those being researched (Freeth & Vilsmaier, 2019; see also van Mierlo et al., 2010). Accordingly, accompanying research provides the accompanied project with information on processes and performance, possibly acting as a 'critical friend'. In this function, accompanying research overlaps with a project's internal reflexive monitoring and evaluation (Klaassen et al., 2021; Verwoerd et al., 2020). It aims to be sufficiently close to fully understand the issues encountered, but with sufficient distance to legitimately and critically reflect on the process (Klaassen et al., 2021, p. 233). Overall, the accompanying researcher should bring in the insights of their own assessments, for instance on difficulties of collaboration in the observed research project, in balanced ways and based on prior agreement with the other team members (Freeth & Vilsmaier, 2019, see previous section, cf. also Defila & Di Giulio, 2018a).

In my experience with the BaWü Labs, the novelty of the RwL approach, including a high level of political and scholarly interest, may have led to a very clear need to distinguish between accompanying

research and evaluation. This corresponds to the idea of establishing a safe niche space, to try out and test innovations as well as enable learning and improvement, while avoiding immediate 'market' selection pressure (Smith & Raven, 2012). In other situations, with less external interest and political sensitivity, boundaries might be drawn differently or less strictly (see examples of reflexive evaluation above). Transparency regarding the aims and relationships as well as continuous expectation management are advisable in any case (see Table 6.2 for an overview on relationships).

Table 6.2 Overview on types of relationships between accompanying and accompanied research actors

Type of relationship	*Practices and aspects to consider*
RwL process and results as object of observation in order to generate knowledge about processes of the real-world lab (K2)	• Principle of informed consent • Preservation of anonymity and confidentiality
Provide the framework for cooperation among members of the RwL to generate integrated knowledge (K3)	• Solid process design • Adaptation to the capacities and interests of the real-world lab team • Inter- and transdisciplinary process competence of the accompanying researchers
Content collaboration with RwL teams to generate integrated knowledge (K3)	• Solid process design • Adaptation to the capacities and interests of the real-world lab team • Inter- and transdisciplinary process competence of the accompanying researchers • Content competence of the accompanying researchers
Balancing acts, between: a. Observation and participation b. Scientific curiosity and feeling responsible c. Impartiality and Investment	Core practices guiding balancing acts: a. Dynamic proximity b. Critical (self-)reflexivity c. Appropriate relatedness

Based on Defila and Di Giulio (2018a), Freeth and Vilsmaier (2019), and Weith et al. (2019); complemented by Bergmann et al. (2021), Schäpke et al. (2018b), and Wamsler et al. (2020). See main text for detailed references

6.4 Accompanying the 'Co-creative Reflection and Dialogue Space'

6.4.1 Background of the Project

From 2019 to 2023 I was part of an inter- and transdisciplinary research and practice team that repeatedly offered an experimental and co-creative reflection and dialogue space (the 'Co-Creative Reflection and Dialogue Space', or CCRDS) at the UN Framework Convention on Climate Change (UNFCCC) conferences of the parties (COPs), specifically COP 25–28 (Mar et al., 2023; Wamsler et al., 2020, Bruhn et al., this volume, Chapter 7). The CCRDS was led by the Research Institute for Sustainability, Helmholtz Centre Potsdam (RIFS), and realized in cooperation with partners including Lund University, the University of East Anglia, Chalmers University of Technology and Freiburg University. Further partners came from various civil society organisations, international organisations and research bodies. Over the course of the two weeks of each COP, the CCRDS was located in the official 'blue zone' and was part of the side-event programme paralleling the negotiations.

As a co-creative effort, the CCRDS and its partners offered a total of more than 100 workshops to experiment with multiple forms and formats of communication. The focus was on enabling reflection, co-creation and dialogue (see Bruhn et al., this volume, Chapter 7). The overall aim of the CCRDS was to support a more relational and transformational culture of communication and collaboration at the COPs (Schäpke et al., 2023). Participants included negotiators as well as observers coming from many countries and geographical regions. Overall, the CCRDS efforts received very positive feedback from participants, highlighting its capacity to establish a safe, relational and reflexive space (ibid.).

As transdisciplinary and transformation-oriented efforts, the workshops as well as the CCRDS engagement more at large were objects of research. I was part of a small, varying group running the research. During COP 25 and 26, this group included researchers from partner universities of the RIFS, while during COP 27 and 28, it comprised both a RIFS researcher and partners from universities. As researchers, we sought to explore the current culture of collaboration at the conferences, to identify desirable changes from the point of participants, not; and most importantly, to understand and assess ways to change the communication culture. The latter primarily related to assessing the CCRDS workshops

and the CCRDS more broadly. We designed and applied a mixed-methods approach. With some variation, the research design combined surveys, semi-structured expert interviews, participatory observation and reflective sessions in the team (Wamsler et al., 2020).

6.4.2 *Contributions and Relations*

In retrospect, my role in the team can be described as accompanying research, in that I was generally independent from the RIFS team facilitating the CCRDS and the workshops. The objective of the accompanying research was to support the generation of ***knowledge about processes in the CCRDS (K2)*** (Table 6.3). Related research questions included: How do the participants perceive the workshops and the applied methods? What possibilities for improvement do they see? To what extent is the CCRDS a good example of a desirable new culture of collaboration? We drew on participant observation as well as expert interviews with workshops hosts and COP decision-makers, complemented with participant surveys. Research had a longitudinal character, covering various COPs.

In addition, the accompanying research retrospectively aimed at generating **integrated** ***knowledge about the object of observation of the CCRDS (K3)***, i.e. the current and the desirable future culture of COP collaboration and communication. This included research questions such as: How can the current culture of communication and collaboration be characterized? Which role do relations of (dis)trust play to enable or restrict climate action? What underlying mindsets are prevalent in the present culture and how should this be different? Here, data contributions included surveys from participants and expert interviews with decision-makers from various organizations at the COPs. Furthermore, it included setting up joint reflection meetings as well as collaborative publications to integrate insights from different actors engaged in the CCRDS. Again, research had a longitudinal character, covering various COPs.

The CCRDS and related accompanying research had a strongly collaborative approach, meaning that there was a distribution of tasks, for example, between workshop facilitation and related research. Yet, during the process and when gathering results, everybody worked closely together. Roles and relationships as well dynamically evolved.

The forms of relationship between me as accompanying researcher and the other members of the team were diverse (see Table 6.3 for details).

Table 6.3 Accompanying research to the Co-Creative Reflection and Dialogue Space

Dimension to structure and design the accompanying research	
Aimed for contribution	*Methods and tools*
Knowledge about the process (K2): Understand and assess the CCRDS and its workshops	• Shared reflection sessions • Participant observations • Expert interviews with workshop hosts • Surveys from CCRDS participants
Integrated Knowledge about the topic of the CCRDS (K3): Understand and assess need for and ways towards a transformative communication culture at COPs	• Expert interviews with COP decision-makers • Surveys from CCRDS participants • Collaborative scientific publications • Collaborative policy/practice-oriented publications
Relationships to actors	**Practices and principles**
CCRDS as object of observation in order to generate knowledge about its processes and workshops (K2)	• Principle of informed consent from all partners • Preservation of anonymity and confidentiality of workshop participants and external workshop hosts • Co-development of publications with CCRDS team • Framework setting standards for joint publications
Provide the framework for cooperation among members of the CCRDS to generate integrated knowledge (K3)	• Develop overarching research design, including definition of conceptual frameworks and units of analysis, adjusted to practice needs/ understandings • Assure solid overall process design • Framework setting standards for joint publications
Content collaboration with CCRDS teams to generate integrated knowledge (K3)	• Develop concrete tools, including guidelines for integrative reflection, data collection • Co-create solid overall and in-depth process design and quality assurance

In part, they were oriented towards seeing the ***CCRDS as an object of research***, when aiming to be rigorous in the research design, or attending workshops as participating researcher. In part, it leant more towards ***setting up a framework or workshops for collaboration*** among CCRDS team members on specific areas of mutual interest. Lastly, it included

guiding ***content-oriented collaboration*** on shared areas of interest, by providing research tools and instructions and co-leading shared publication processes (results include Fraude et al., 2021; Mar et al., 2023; Wamsler et al., 2020). Beyond this, the relationship between accompanying and accompanied research sometimes became blurred, such as when I provided feedback on workshop design, or was ad hoc supporting the realization of the CCRDS and specific workshops.

These plural relationships had ups and downs. They were benefical, for instance in allowing for immersive understandings of ongoing processes. Yet, they were also challenging due to the blurring of roles and the recurrent need to clarify the allocation of tasks and expectations. This also meant that communication was multifaceted. On the one hand, it often took place in the form of a very open and trusting exchange that as well allowed to address personal needs and challenges, building on joint reflection sessions and ad hoc meetings. On the other hand, it was content-oriented and task-driven, such as in the development of research tools or joint publications. These varying relationship and related tasks were partly clarified in advance, and partly emerged during the process.

6.4.3 Reflections on the Balancing Acts

Reflecting the CCRDS accompanying research experience through the lenses of the balancing acts and related core practices of dynamic proximity, critical (self-) reflection and appropriate relatedness (see Freeth & Vilsmaier, 2019) is instructive.

Dynamic proximity relates to the need of balancing participation and observation (ibid). Therefore, we as the wider CCRDS team at a higher level agreed on main areas of responsibility (research or facilitation) and related decision-making capacities. Furthermore, and given that the CCRDS team established an open and co-creative working culture, the overall relation in the team can be described as rather close and fluid (i.e. proximate). I was able to participate in workshops, which was one of the highlights of working with the CCRDS team, allowing me to gain in-depth, first-hand insights. To not unsettle the workshop aims and facilitation, participation should, however, be based on prior agreement with the workshop hosts and be made transparent to the other participants (e.g. active participation vs. participation as observer).

Critical (self-)reflexivity of one's own roles, interests and influences when balancing scientific curiosity and 'feeling responsible' (see Freeth &

Vilsmaier, 2019) proved to be rather challenging, particularly in the heat of the moment at climate conferences. Generally, a practice of team reflection and individual self-inquiry supported reflexivity and the continous evolution of the CCRDS design, its aims as well as given roles and responsibilities. A repeated challenge related to finding appropriate ways to assure that research and data collection actually took place, without disturbing the wider CCRDS process. This included finding good moments to ask participants to complete surveys or give interviews, fitting the flow of the workshops. Furthermore, it included asking colleagues for help to, for instance, collect data in a packed workshop programme and a very hectic overall conference, which makes self-organisation and coordination central.

From experience, allowing procedures to evolve gradually, can reduce unnecessary stress, as can institutionalizing continuous points of exchange with further team members to make sure that learning and iteration (can) actually happen. The practical aspects of conducting research proved very important (e.g. placing surveys visibly on site), to make research happen (easily) and free up capacities for participation. Developing an appropriate level of aspiration on what can be achieved, including a 'plan B', and embracing the idea of skilful improvisation, is helpful in ensuring appropriate accompanying research work under emergent and 'imperfect' conditions.

Appropriate relatedness, balancing impartiality and 'putting oneself (and one's research demands) first' (see Freeth & Vilsmaier, 2019), was a daily practice (and struggle). The CCRDS team established flat hierarchies and decision-making procedures, including to openly discuss accompanying research's and CCRDS's processes. It was at times difficult for me to bring in my perspective on various aspects of the CCRDS process, while abstaining from getting (too) engaged and taking positions in decisions beyond the domain of the accompanying research. This specifically occurred when a decision seemed particularly important for the course of the overall project, and/or I had strong opinions regarding what I deemed a good or bad idea. The established open communication culture made it possible to (often) bring up possible tensions and difficulties and resolve them. Relations with the CCRDS RIFS team thereby were constantly being re-negotiated. While generally beneficial, from my perspective the varying roles also created difficulties, leading to insecurity about appropriate action, misunderstandings and lack of planning security. A practice of constant (self-)reflection, negotiation and adaptation of

tasks and roles is influenced by personal strengths and preferences and requires supportive conditions that give room for reflection and understanding. In my view, a middle ground between flexibility and adaptation and continuity is advisable.

Lastly, there is an inherent tension in working in a co-creative and dynamic process and environment, and the need for the prior planning and arrangement of research, including in relation to data-collection. COPs are likely to be chaotic and hectic, and we witnessed not only strict and ever-changing COVID-19-related regulations but also last-minute information policies on the part of the organizers, or challenging event organization.[3] Accordingly, as an accompanying researcher you and your work not only depend on the decisions of the project being researched (here the CCRDS), but you are also affected by wider developments influencing the accompanied project. In part, the dependence of the accompanying research can be mediated by adapting its aims, but it might as well lead to lasting research difficulties or even the (partial) failure of the accompanying project. Implications of dependencies and possible remendiations and changes should be made transparent and (where suitable and possible) agreed upon with the accompanied project team.

6.5 Concluding Remarks

Accompanying research is a promising complement to transformation-oriented research and its innovative and challenging research formats, offering a wide range of options for additional benefits. It can be used to support the generation of knowledge from transformation-oriented research both with regard to its procedural dimension (e.g. how to successfully do transformative research) and in relation to underlying topical aspects (e.g. how do social systems transform). Beyond knowledge generation, accompanying research has the capacity to enhance the actual performance of transformation-oriented research, including by providing opportunities and inputs to increase reflexivity, iteration and adaption of the accompanied research.

[3] As an example: although we had arranged and substantially paid for a professional pavilion set up during one of the COPs, on arrival on site, our pavilion was basically non-existent and the local organizers had very limited capacity to set it up any further, requiring our constant improvisation and new skills.

In this chapter, I drew on existing scholarship to present a differentiation of contributions accompanying research can make and showed a variety of methods to put this into practice. This includes different contributions to research and knowledge generation, as well as procedural support. Building on existing scholarship, I also presented possibilities for shaping the relationship between accompanied and accompanying research and discussed various balancing acts required to shape transparent and effective relationships that are accepted by the various actors. The different contributions and the forms of relationships can be used to reflect and design accompanying research work. I used them to both reflect experiences from accompanying the BaWü Labs (Baden-Württemberg, Germany), as well as the Co-Creative Reflection and Dialogue Space manifested at UNFCCC COPs. The differentiation of contributions of accompanying research as well as of the relationships with stakeholders, underlying balancing acts and core practices, proved to be highly useful dimensions for the reflection of experiences.

Looking ahead, these dimensions are promising in terms of orienting the design of accompanying research for future transformation-oriented research projects. This could include considering the knowledge contributions to be achieved, and related methods and processes. The reflection of possible relationships to the various stakeholders including the consideration of necessary balancing acts can inform decisions to shape relations, set expectations and foresee possible tensions and challenges. This process should include a reflection and exchange between accompanying and accompanied research on the contextual conditions that enable or constrain relationships of dynamic proximity and balancing observation and participation. Successful accompanying research—as does research more generally—depends on appropriate framing conditions, including funding. Given the inherent challenges of transformation-oriented research, and the urgency of understanding and working towards transformation, accompanying research in its various forms holds strong potential to be both an effective and meaningful contribution.

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References

Belcher, B., & Halliwell, J. (2021). Conceptualizing the elements of research impact: Towards semantic standards. *Humanities and Social Sciences Communications, 8*(1), 183. https://doi-org.vu-nl.idm.oclc.org/10.1057/s41599-021-00854-2

Bergmann, M., Schäpke, N., Marg, O., Stelzer, F., Lang, Sußmann, N., et al. (2021). Transdisciplinary sustainability research in real-world labs: Success factors and methods for change. *Sustainability Science*, *16*(2), 541–564. https://doi-org.vu-nl.idm.oclc.org/10.1007/s11625-020-00886-8

Caniglia, G., Luederitz, C., von Wirth, T., Fazey, I., Martín-López, Lang, D. J., et al. (2020). A pluralistic and integrated approach to action-oriented knowledge for sustainability. *Nature Sustainability*. https://doi-org.vu-nl.idm.oclc.org/10.1038/s41893-020-00616-z

Defila, R., & Di Giulio, A. (2018a). What is it good for? Reflecting and systematizing accompanying research to research programs. *GAIA—Ecological Perspectives for Science and Society*, *27*(1), 97–104. https://doi-org.vu-nl.idm.oclc.org/10.14512/gaia.27.S1.17

Defila, R., & Di Giulio, A. (2018b). *Transdisziplinär und transformativ forschen*. Springer. https://doi-org.vu-nl.idm.oclc.org/10.1007/978-3-658-21530-9

Defila, R., & Di Giulio, A. (2019). *Transdisziplinär und transformativ forschen. Eine Methodensammlung*. Band 2. Springer. https://doi-org.vu-nl.idm.oclc.org/10.1007/978-3-658-27135-0

Fazey, I., Schäpke, N., Caniglia, G., Patterson, J., Hultman, J., Wyborn, C., et al. (2018). Ten essentials for action-oriented and second order energy transitions, transformations and climate change research. *Energy Research and Social Science*, *40*. https://doi-org.vu-nl.idm.oclc.org/10.1016/j.erss.2017.11.026

Fazey, I., Schäpke, N., Caniglia, G., Hodgson, A., Kendrick, I., Young, H. R., et al. (2020). Transforming knowledge systems for life on Earth: Visions of

future systems and how to get there. *Energy Research and Social Science*, *70*. https://doi-org.vu-nl.idm.oclc.org/10.1016/j.erss.2020.101724

Fiedeler, U., Nentwich, M., Simko, M., & Gazso, A. (2010). What is accompanying research on nanotechnology? *NanoTrust Dossiers*, *11*(July), 1–5. epub.oeaw.ac.at/ita/nanotrust-dossiers

Fraude, C., Bruhn, T., Stasiak, D., Wamsler, C., Mar, K., Lawrence, M., et al. (2021). Creating space for reflection and dialogue: Examples of new modes of communication for empowering climate action. *GAIA-Ecological Perspectives for Science and Society, 30*(3), 174–180. https://doi-org.vu-nl.idm.oclc.org/10.14512/gaia.30.3.9

Freeth, R., & Vilsmaier, U. (2019). Researching collaborative interdisciplinary teams. *Science & Technology Studies*, *33*(3), 57–72. https://doi-org.vu-nl.idm.oclc.org/10.23987/sts.73060

Klaassen, P., Verwoerd, L., Kupper, F., & Regeer, B. (2021). Assessment of responsible innovation. In E. Yaghmaei & I. Van De Poel (Eds.), *Assessment of responsible research and innovation. Methods and practices*. Routledge.

Luederitz, C., Schäpke, N., Wiek, A., Lang, D. J., Bergmann, M., Westley, F. R., et al. (2017). Learning through evaluation—A tentative evaluative scheme for sustainability transition experiments. *Journal of Cleaner Production*, *169*. https://doi-org.vu-nl.idm.oclc.org/10.1016/j.jclepro.2016.09.005

Mar, K. A., Schäpke, N., Fraude, C., Bruhn, T., Wamsler, C., Lawrence, M. G., et al. (2023). *Learning and community building in support of collective action: Toward a new climate of communication at the COP. July 2022*, 1–12. https://doi-org.vu-nl.idm.oclc.org/10.1002/wcc.832

McCrory, G., Schäpke, N., Holmén, J., & Holmberg, J. (2020). Sustainability-oriented labs in real-world contexts: An exploratory review. *Journal of Cleaner Production,* 277. https://doi-org.vu-nl.idm.oclc.org/10.1016/j.jclepro.2020.123202

Miller, T. R. (2013). Constructing sustainability science: Emerging perspectives and research trajectories. *Sustainability Science, 8*(2), 279–293. https://doi-org.vu-nl.idm.oclc.org/10.1007/s11625-012-0180-6

Norström, A. V., Cvitanovic, C., Löf, M. F., West, S., Wyborn, C., Österblom, H., et al. (2020). Principles for knowledge coproduction in sustainability research. *Nature Sustainability, 3*(3), 182–190. https://doi-org.vu-nl.idm.oclc.org/10.1038/s41893-019-0448-2

Patterson, J., Schulz, K., Vervoort, J., van der Hel, S., Widerberg, O., Barau, A., et al. (2017). Exploring the governance and politics of transformations towards sustainability. *Environmental Innovation and Societal Transitions, 24*, 1–16. https://doi-org.vu-nl.idm.oclc.org/10.1016/j.eist.2016.09.001

Schäpke, N., Bergmann, M., Stelzer, F., & Lang, D. J. (2018a). Labs in the real world: Advancing transdisciplinary research and sustainability transformation: Mapping the field and emerging lines of inquiry. *GAIA, 27*(1), 8–11. https://doi-org.vu-nl.idm.oclc.org/10.14512/gaia.27.S1.4

Schäpke, N., Stelzer, F., Caniglia, G., Bergmann, M., Wanner, M., Lang, D. J., et al. (2018b). Jointly experimenting for transformation? Shaping real-world laboratories by comparing them. *GAIA*, *27*. https://doi-org.vu-nl.idm.oclc.org/10.14512/gaia.27.S1.16

Schäpke, N., Stelzer, F., Marg, O., Bergmann, M., Miller, E., Lang, D. J., et al. (2017). Urban BaWü-Labs: Challenges and solutions when expanding the real-world lab infrastructure. *GAIA*, *26*(4). https://doi-org.vu-nl.idm.oclc.org/10.14512/gaia.26.4.19

Schäpke, N., Beyers, F., Fraude, C., Mar, K., Schroeder, H., Lawrence, M. G., et al. (2023). *Research and practice to scale co-creation and reflection* (Issue November). https://publications.rifs-potsdam.de/rest/items/item_6003201_2/component/file_6003202/content

Schäpke, N., Wagner, F., Beecroft, R., Rhodius, R., Wanner, M., Parodi, O., et al. (2024). Impacts of real-world labs in sustainability transformations—Forms of impacts and ways to create it, associated challenges and methodological advances. *GAIA—Ecological Perspectives for Science and Society*, *SI*.

Schneidewind, U., Augenstein, K., Stelzer, F., & Wanner, M. (2018). Structure matters: Real-world laboratories as a new type of large-scale research infrastructure: A framework inspired by Giddens' structuration theory. *GAIA—Ecological Perspectives for Science and Society*, *27*(1), 12–17. https://doi-org.vu-nl.idm.oclc.org/10.14512/gaia.27.S1.5

Scoones, I., Stirling, A., Abrol, D., Atela, J., Charli-Joseph, L., Yang, L., et al. (2020). Transformations to sustainability: Combining structural, systemic and enabling approaches. *Current Opinion in Environmental Sustainability, 42*, 65–75. https://doi-org.vu-nl.idm.oclc.org/10.1016/j.cosust.2019.12.004

Smith, A., & Raven, R. (2012). What is protective space? Reconsidering niches in transitions to sustainability. *Research Policy, 41*(6), 1025–1036. https://doi-org.vu-nl.idm.oclc.org/10.1016/j.respol.2011.12.012

United Nations General Assembly. (2015). *Transforming our world: The 2030 agenda for sustainable development*.

van Mierlo, B., Regeer, B., van Amstel, M., Arkestejin, M., Beekman, V., Leeuwis, C., et al. (2010). *Reflexive monitoring in action. A guide for monitoring system innovation projects*. Wageningen University and Vrije Universiteit Amsterdam

Verwoerd, L., Klaassen, P., Veen, S. C. Van, & Regeer, B. J. (2020). Combining the roles of evaluator and facilitator: Assessing societal impacts of transdisciplinary research while building capacities to improve its quality. *Environmental*

Science and Policy, *103*(November 2019), 32–40. https://doi-org.vu-nl.idm.oclc.org/10.1016/j.envsci.2019.10.011

von Wehrden, H., Guimarães, M. H., Bina, O., Varanda, M., Lang, D. J., Lawrence, R. J., et al. (2019). Interdisciplinary and transdisciplinary research: Finding the common ground of multi-faceted concepts. *Sustainability Science, 14*(3), 875–888. https://doi-org.vu-nl.idm.oclc.org/10.1007/s11625-018-0594-x

von Wirth, T., Fuenfschilling, L., Frantzeskaki, N., & Coenen, L. (2019). Impacts of urban living labs on sustainability transitions: Mechanisms and strategies for systemic change through experimentation. *European Planning Studies, 27*(2), 229–257. https://doi-org.vu-nl.idm.oclc.org/10.1080/09654313.2018.1504895

Wagner, F., Schäpke, N., Stelzer, F., Bergmann, M., & Lang, D. J. (2016). BaWü-labs on their way: Progress of real-world laboratories in Baden-Württemberg. *GAIA*, *25*(3). https://doi-org.vu-nl.idm.oclc.org/10.14512/gaia.25.3.21

Wamsler, C., Schäpke, N., Fraude, C., Stasiak, D., Bruhn, T., Mundaca, L., et al. (2020). Enabling new mindsets and transformative skills for negotiating and activating climate action: Lessons from UNFCCC conferences of the parties. *Environmental Science and Policy, 112*, 227–235. https://doi-org.vu-nl.idm.oclc.org/10.1016/j.envsci.2020.06.005

Weith, T., Rogga, S., Zscheischler, J., & Gaasch, N. (2019). Beyond projects: Benefits of research accompanying research: Reflections from the research programme Sustainable Land Management. *Gaia*, *28*(3), 294–304. https://doi-org.vu-nl.idm.oclc.org/10.14512/gaia.28.3.10

Wiek, A., & Lang, D. J. (2016). Transformational sustainability research methodology. In H. Heinrichs (Ed.), *Sustainability science* (pp. 31–41). Springer. https://doi-org.vu-nl.idm.oclc.org/10.1007/978-94-017-7242-6_3

Williams, S., & Robinson, J. (2020). Measuring sustainability: An evaluation framework for sustainability transition experiments. *Environmental Science & Policy*, *103*(October 2019), 58–66. https://doi-org.vu-nl.idm.oclc.org/10.1016/j.envsci.2019.10.012

Wittmayer, J. M., & Schäpke, N. (2014). Action, research and participation: Roles of researchers in sustainability transitions. *Sustainability Science*, *9*(4). https://doi-org.vu-nl.idm.oclc.org/10.1007/s11625-014-0258-4

Wittmayer, J. M., Schäpke, N., van Steenbergen, F., & Omann, I. (2014). Making sense of sustainability transitions locally: How action research contributes to addressing societal challenges. *Critical Policy Studies*, *8*(4). https://doi-org.vu-nl.idm.oclc.org/10.1080/19460171.2014.957336