

Beyond projects: benefits of research accompanying research

Reflections from the research programme *Sustainable Land Management*

In manifold ways science and practice are working together to find solutions for sustainable land management. New research programmes on this topic generate a large variety of single project results. Accompanying research projects will realize additional value by merging and synthesising the results from these projects and by supporting the generation of new knowledge for science and society.

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Abstract

For many actors in science and policy, the additional value of research accompanying research projects remains open. Referring to a recent publication in *GAIA* that introduces a typology for accompanying research (AR), this article discusses the central issues, content, processes and ongoing challenges in an AR project accompanying the German research programme *Sustainable Land Management*. The important value of AR can be seen in communication, networking, the reflexive generation of new knowledge and knowledge management based on trust building and competence. AR also exhibits great potential for research on cross-cutting issues in research programmes and has special significance for meta-studies on different research projects taking place under similar funding conditions. However, additional analyses are necessary for a better understanding of the outcomes and impacts of AR and to create wider appreciation and acceptance.

Keywords

accompanying research, knowledge integration, land management, transdisciplinarity

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In a recent article in *GAIA*, Defila and Di Giulio (2018) note that there is hardly any scientific discourse regarding research on accompanying research (AR). Although AR is frequently implemented alongside large third-party-funded research programmes for several years (Defila and Di Giulio 2016, UFZ 2012), there is no commonly accepted definition of AR, and there is a general lack of clarity.

The concept of AR refers to the tradition of technology assessment (Grunwald 2010) but has continuously changed. Often, the term AR is used in EHS (environment, health and safety) or ELSA (ethical, legal, and socio-economic aspects) studies, including complementary research on science and cultural-sociological aspects such as risk perception and communication. Non research activities such as networking, outreach and education are also referred to (Fiedeler et al. 2010). Finally, the concept of responsible research and innovation (RRI) has gained increased relevance and can be regarded as a new framework for AR (von Schomberg 2013, Zwart et al. 2014).

New objectives in science policy – meaning a shift from focusing on technological innovations and their possible implications to a broader approach that seeks solutions to grand societal and sustainability challenges – might change the demands on AR. We draw upon sustainability sciences and the conceptual understanding used in that broad field, and refer to Defila and Di Giulio (2018, p. 98): “Accompanying research projects to research programs are additional projects funding agencies decide to fund” with the expectation of additional value. As noted by von Wehrden et al. (2019, p. 882), AR is “research done by individuals not engaged in the research activities, but who are capable of interacting with it, observing it, and documenting it, so that a constant and cumulative reflection process occurs”.

We define AR as a science-policy interface-driven form of science that places AR activities in relation to other projects in a mutually shared funding environment (e. g., research programmes, funding guidelines). AR is thus a separate research project within a funding programme – and additional to the “normal” research projects – that can have very different functions.

TABLE 1: Accompanying research (AR) projects in the research programme *Sustainable Land Management* (2010 to 2017).

AR PROJECT MODULE A		AR PROJECT MODULE B	
	<i>Interactions between land management, climate change and ecosystem services</i>		<i>Innovative system solutions for sustainable land management</i>
led by	Andreas Werntze, Ralf Seppelt (Helmholtz-Centre for Environmental Research – UFZ Leipzig, Germany)		Thomas Weith, Klaus Müller (Leibniz Centre for Agricultural Landscape Research – ZALF, Müncheberg, Germany)
focus	<ul style="list-style-type: none"> ■ patterns and indicators of land use, ecosystem services and greenhouse gas emissions ■ method development and analysis of trade-offs from land use ■ reporting of case study findings and up-scaling of results 		<ul style="list-style-type: none"> ■ approaches to sustainable land management in Europe ■ successful approaches to transdisciplinary research ■ creation of knowledge, dissemination and implementation activities

To capture the specific nature of AR, Defila and Di Giulio (2018) suggest a typology based on their own experience. They propose three dimensions that characterise AR in comparison to other forms of research: 1. the type of knowledge that is produced, 2. the relationship to the involved actors, and 3. process-related tasks. Through the combination of these dimensions, Defila and Di Giulio (2016, p. 18) derive three types or functions: AR as a supplement (complementary), AR for research on ongoing processes (meta), and AR for the reinforcement of synergy and diffusion (integration-oriented or synthesis). These categories mainly serve an analytical purpose because AR will rarely “show one of these types in pure form, but combine elements of more than one type” (Defila and Di Giulio 2018, p. 103). In this paper we analyse an AR project as a combination of all three functions with a focus on meta-analysis to provide the basis for synthesis. This understanding of AR can be distinguished from closely related concepts such as “evaluation research”, “implementation research”, “process consultancy”, and “action research” with regard to the objective, the methodological approach and the scale level (cf. Kämäräinen 1999, Christensen et al. 2016).

In our paper, we adopt the typology suggested by Defila and Di Giulio (2018) and help to fill the empirical gap by providing insights from an AR project that accompanied 13 transdisciplinary research projects in Germany on sustainable land management (SLM). The aim is to clarify and illustrate the specific benefits of AR and to discuss appropriate framework conditions. This study is of special relevance not only to achieve the full potential of AR but also to avoid misunderstandings of the role of AR. Our experiences indicate that AR is caught between the attribution of being a service provider for others and the postulation of being scientifically excellent. We will focus on the following research questions (Q1–Q3) in revisiting the typology of Defila and Di Giulio (2018): Q1. What are the benefits of AR? Q2. What difficulties does AR face? Q3. Which strategies can be applied to address these challenges?

The findings are based on a self-reflective evaluation (cf. Buizer et al. 2015, Defila and Di Giulio 2018). The evaluation team consisted of the core team members of the AR project with eight years of experience in the AR process. The first step was to define the self-evaluation procedure considering the central framework conditions for a self-evaluation (DeGEval 2004): an open-ended process, clarity about the task, one’s own decision-making authority, one’s own publication authority, transparency, mutual trust, and

the necessary resources for the evaluation process. The technical standards applicable to evaluations were considered valid: utility, feasibility, propriety and accuracy (DeGEval 2004).

The team then reviewed the statements on and by the AR project. The key document was the final report of the AR project (ZALF 2018). Further documents produced by the AR project over eight years, including 29 event protocols, 106 publications, eight interim reports, six working papers as well as conference proceedings and publications in generally accessible media, were also consulted. In addition, we considered the assessments of the external support group and interview statements from two doctoral theses.

In a next step, to derive independent conclusions, three discussion rounds were conducted within the evaluation team. Only consensual statements were documented. These were then structured according to the categories of Defila and Di Giulio (2018) along with additional literature sources on the results and role of AR projects (Bock et al. 2012, UFZ 2012, Schliep 2013, Küpper et al. 2014, Kundolf et al. 2016). A more complex evaluative research process (cf. Hoffmann et al. 2017) was impossible due to limited resources.

The accompanying research of the research programme *Sustainable Land Management*

The research programme *Sustainable Land Management* was launched by the German Federal Ministry for Education and Research (BMBF) to generate knowledge “for sustainable land management decisions and to provide relevant strategies for action as well as suitable technologies and system solutions” (BMBF 2008). It was split into two focus issues: *Module A* included research on the “interaction between land management, climate change and ecosystem services” and had an international orientation, while *Module B* was dedicated to “innovative systems solutions for sustainable land management”, with model regions located in Germany.

In the period from 2010 to 2017, 25 transdisciplinary joint research projects were funded, twelve in *Module A* and 13 in *Module B* (table 1). Both modules were complemented by an AR project. Although exchanges between the two AR projects were frequent, each AR developed and pursued strategies and methods independently. Our analysis will focus on the AR project in *Module B*.



Box 1 shows an extract from the funding organisation's call documenting its expectations and pre-structuring the task areas of the AR. It shows that in addition to supportive and communicative activities and networking, original scientific knowledge generation and knowledge transfer were expected.

The joint projects of *Module B* comprised different types of land use, landscapes, actor networks and institutional settings. They focused on the following issues:

- settlement development, including housing, commercial areas and infrastructure,
- cultural landscape development,
- energy, mobility and supply chain management,
- zero-emission communities (towns and villages), and
- bioenergy.

The projects took integrative, interdisciplinary and regional perspectives into account, which enabled them to address the demands placed on land and natural resources. Research was oriented towards implementation and transfer. Transdisciplinarity was mandatory for funding. Thus, the joint projects consisted of two to 16 organisations that met with local and regional stakeholders for three to five years. Nearly all German regions were represented.

The term "SLM" was uncommon in the German context. It was largely utilised by international development organisations (UNDP, World Bank *asf.*) as a normative concept. The BMBF delegated the assignment for further conceptual clarification to the funded projects. Thus, substantial work to address the question "What is SLM?" was predetermined in *Module B* (figure 1).

Reflecting on the benefits of eight years of accompanying research (Q1)

For the presentation of, and reflection on, the various process activities and benefits of the AR project (*Module B*) in the research programme *Sustainable Land Management*, we refer to the categories proposed by Defila and Di Giulio (2018) along three dimensions: 1. generated knowledge, 2. relationship to other actors, and 3. process-related tasks.

Generated Knowledge

According to Defila and Di Giulio (2018), AR may produce three different kinds of scientific knowledge. The first (K1) refers to *knowledge on the topic* of the research programme. The second (K2) refers to *knowledge about processes* taking place in the research programme. The third (K3) refers to collaboratively produced knowledge by the AR and the project groups on either K1 or K2.

K1 – knowledge on sustainable land management

The title and issue of the research programme were deliberately set as an open conceptual frame by the funding agency. Due to the broad range of scientific communities and topics, the basic ideas and definitions of SLM were highly diverse and incoherent (Weith et al. 2010). This observation became apparent as early as the

BOX 1: Requirements for the accompanying research (AR) project of the research programme *Sustainable Land Management*, as defined by the funding agency in the announcement of the research programme (BMBF 2008)

Main goal

The AR "addresses organizational and subject-specific issues. Preparing a synthesis of the results yielded by the regionally oriented projects and providing for their coordination across different topics [...]"

Specific activities:

- "overarching analysis and synthesis of the findings of the various regional research collaborations
- processing the project results for different target groups (scientific community, general public, land use community, political community and decision-makers)
- ensuring subject-related coordination within the BMBF funding measure and with relevant activities of the Helmholtz Association, the German Research Association (DFG) and other funding organizations [...]
- preparation and organization of working meetings, discussion forums and status seminars
- preparation and provision of information material regarding the funding priority (PR material, homepage, etc.) and networking with other national and international research activities
- supporting the BMBF in its coordination activities within the framework of European *ERA-Net* projects in the area of land use research"

first networking events. Thus, the AR attempted to specify the concept of SLM and to find overarching principles by considering the topic from a meta-level perspective.

Given the plurality of conceptions and the fact that an integrated, general definition of the term was not of high importance to the funded projects, we pursued a two-fold strategy:

- We partly investigated the topic of SLM in a *complementary way*; that is, we conducted research activities with no special interaction with the accompanied projects. Key elements of those activities were systematic literature reviews of scientific articles and non scientific documents and the production of ten discussion papers on SLM-related, cross-cutting issues (e. g., the conceptual design of knowledge management in SLM, a planning studies' perspective on SLM, legal perspectives on SLM).
- We also investigated SLM in an *integrative way* (see below *knowledge K3*) as we gathered actors' perspectives on the projects based on the question "What does SLM mean to you?". We discussed and displayed the replies in two formats: 1. we put the question at the top of the agenda of the first status conference in 2011 that included actors from all the joint projects, and 2. we compiled the key results and the replies from the project coordinators in an extra discussion paper on "What is SLM?" (Weith et al. 2013), which we fed back to the projects and the funding agency.

In sum, our activities revealed the diversity of scientific positions and presented SLM as an approach that can serve as either an analytical or normative guide in (transdisciplinary) science. The AR project enabled the linking of topics and approaches from

the accompanied projects to produce a comprehensive conceptual framework with an inductive approach (cf. UFZ 2012, p. 8). In addition, through the display and communication of viable access points to SLM, the AR project supported the structuring of “fuzzy” interpretations.

K2 – knowledge about transdisciplinary research approaches and innovation processes

The knowledge K2 is characterised by turning the research programme into the object of scientific investigation. From the outset, two topics were of special interest for process-related investigations: 1. the implementation of *transdisciplinary research approaches*, which was a requisite for funding, and 2. the development of *innovative systems solutions*, which was a normative goal of the funding agency.

Therefore, one objective of the AR was to investigate how scientists and practitioners of AR projects interpret and implement these requirements. We strongly emphasise that it was not our aim to evaluate or even control the activities of the joint research projects. In contrast, our aim was an independent research interest to better understand how to design successful transdisciplinary innovation processes and generate land-based sustainability solutions.

For this purpose, two PhD projects worked on the abovementioned issues (Zscheischler et al. 2017, 2018, Besendörfer 2018).

In retrospect, we can state that AR offers privileged access to the field and enables scientists to gain insights into internal processes that are usually a black box (Zscheischler et al. 2017) while simultaneously retaining a neutral perspective towards the research objective. In this context, AR again reveals its potential for meta-studies on processes in different research projects under similar funding conditions (Zwart et al. 2014, Krause and Schupp 2019, in this issue).

K3 – integrated knowledge about topics

We initiated an iterative process of exchange, mutual learning and the creation of new cross-cutting results among all project members (scientists and practitioners from different disciplines) from the outset. We sought to synthesise different experiences and stimulate reflections beyond disciplinary scopes and individual horizons (cf. UFZ 2012, p. 8).

The *kick-off conference* in 2010 and the first *status conference* in 2011 can be seen as crucial initial moments for the identification of cross-cutting issues. These issues were extracted by means of interactive conference formats (e.g., open space, world café) and then served as starting points for further mutual activities, such as the formation of thematic *working groups*. These working groups met on a regular basis (table 2, p. 298) and supported cooperation and exchange among projects. AR served as both a preparatory service agency and a facilitator. We provided cooperation oppor-

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FIGURE 1: Sustainable land management: finding solutions for conflicts of interest (e.g., between housing and agriculture).



TABLE 2: Overview of the initiated sustainable land management (SLM) working groups.

TOPIC	GOALS	DURATION	MEETINGS	REPRESENTED PROJECTS
modelling in SLM	defining modelling and data input necessities	2011	1	11
inter-/transdisciplinarity/ participation in SLM	understanding concepts and discussing approaches	2011	1	12
communicating SLM	communication activities from the funding measure perspective	2013–2014	4	8
governance in SLM	a systematic overview of governance perspectives and measures included in the funding measure	2012–2014	3	9
indicators of SLM	the development of a minimum set of SLM indicators	2012–2013	3	13

tunities and co-organised and documented the meetings together with the initiators to minimise the effort required by the representatives of the accompanied projects to join the meetings. Every working group ended with a summarising statement about the cross-cutting topic. Responsibility for the publication of the results was given to the projects.

Additionally, we organised stakeholder sessions to stimulate cross-cutting knowledge production with relevance to overarching topics that practitioners felt were important in current societal debates. Three full-day workshops took place between April and June 2012: one with civil-society stakeholders (NGOs), another with business associations, and a third with professional associations. The AR used this method to integrate external knowledge and pre-normative perspectives and discuss them at an early stage of the funding measure to build networks of prospective target groups.

Finally, we conducted a series of one-day regional workshops in different regions of Germany during the final stage of the AR project. We identified regional land management-related challenges (such as suburban development in the Stuttgart region, Germany) and connected the results generated by the projects (*Module B*) and the AR project with local needs and policy agendas. The primary goal of the regional workshops was to enhance the outreach by communicating and disseminating the results of the research programme (see section below on *creating possibilities*). In addition, establishing connections with regional key actors generated further knowledge regarding regional demands and implementation activities.

At one regional workshop in Stuttgart in 2017, for example, inner city development and energy management were discussed in depth in addition to the presentation of the results of the funding measure. In both cases, regional representatives were interested in both the tools developed in the projects and the conceptual context developed by the AR project. They agreed to examine the usability of these tools in their municipal contexts.

Resume of accompanying research knowledge types in the case study

To preliminarily conclude, the AR project included all three types of knowledge. Figure 2 presents an overview of selected knowledge production activities (red and light green boxes) by the AR as well as involved actors and outputs during the funding term

(2010 to 2017). The figure displays the diversity of the measures taken and the outputs generated during the entire process. What appears as a coherent project management plan was actually a process that underwent a series of iterative loops and learning cycles.

Relationship to the projects and the funding agency: relationships, trust and outcomes

In the binary relationship between the funding agency and funded research projects, AR projects appear to be an extra actor that is added to the “usual staff” (Defila and Di Giulio 2018, p. 99). Depending on expectations and knowledge, AR is tasked with producing a “relational triangle” between the three actors (cf. Bock et al. 2012, Küpper et al. 2014, p. 45, Kundolf et al. 2016). Defila and Di Giulio (2018) introduced five types of relationships (R1 to R5) that reflect the intensity and the purpose of AR’s collaboration with the projects (table 3, p. 300). Relationships R1 and R2 indicate no interaction or the expectation of a mere data exchange. Relationship R3 represents a relationship where AR investigates the projects, which themselves become objects of research. Relationships R4 and R5 represent types of less or more intense collaboration: whereas AR sets the stage for collaborative knowledge production in relationship R4, it also contributes to integrated knowledge production in relationship R5. We will briefly discuss our own relationship to the projects and to the funding agency.

Relationship to the projects

The AR worked closely together with all 13 accompanied projects. Depending on the stage of the process, the openness of the projects, personal relationships, and mutual interests, the relationship could be categorised as R3, R4, and R5. During the first phase, it became apparent that many projects misconceived the role of the AR as either an evaluating agent of the funding agency or a “data grabber” (relationship R2). It took time to clarify the specific roles of the AR as an independent research project and a collaboration partner for cross-cutting topics.

After a first phase of intensive trust building, particularly conducting individual talks with the heads and managers of the accompanied projects, and the identification of cross-cutting topics, we realised an R4/R5 type of relationship. At the same time, a permanent relationship R3 was also noted due to the two PhD projects (see section *generated knowledge* above). This demanded some

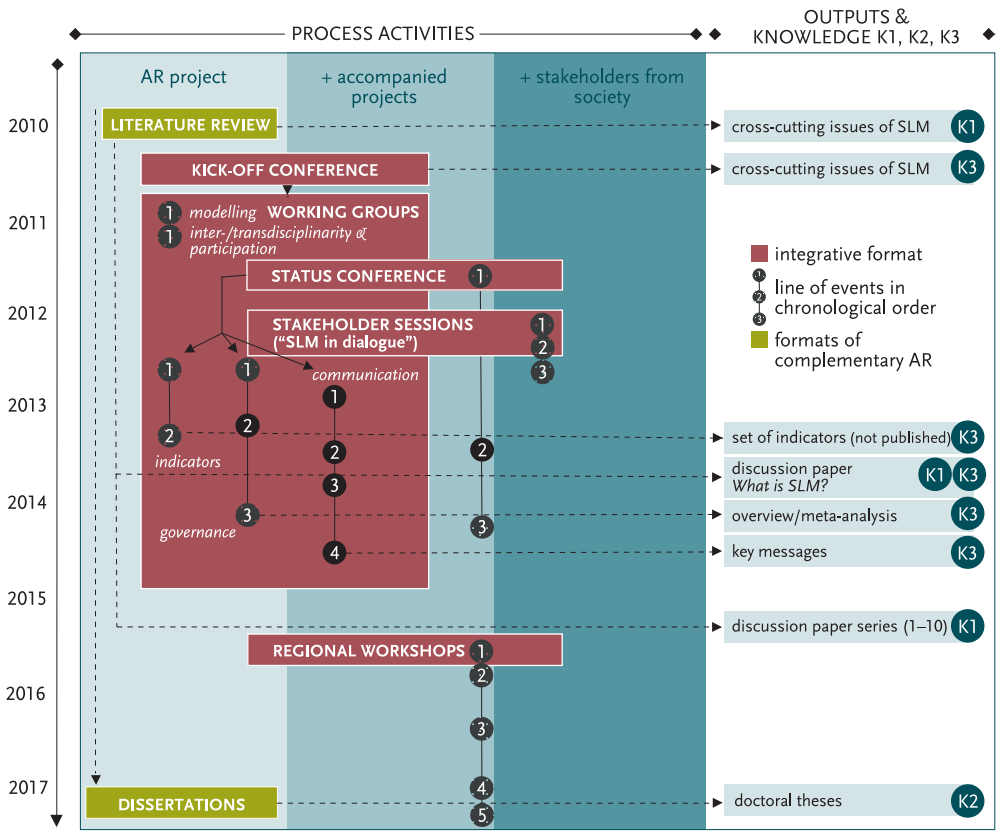


FIGURE 2: Overview of selected knowledge production activities in the accompanying research (AR) distinguished by involved actors and outputs over time. Red boxes show integrative activities, that is, formats that either integrated other project members and/or people from outside the funding measure *Sustainable Land Management*. Light green boxes indicate complementary activities performed by the AR project, that is, those without a specific interaction with other projects. Arrows show direct processual connections between activities and/or outputs. Numbers in/below red boxes show line of events in chronological order.

form of labour division within the AR project, that is, staff members who served as the continuous main contact people for specific projects and were responsible for providing “relationship maintenance” and particular topics to the projects.

Relationships R4 and R5 require considerable effort from both AR and the project members. Thus, our activities to generate knowledge K3, which required relationships R4 and R5, led to mixed feedback. First, we experienced scepticism among project members regarding the use of integrative methods, but this impression changed over time as we received increasingly positive feedback. Second, some project members were caught between transparency and confidentiality with regard to their own research questions and findings, which were often bound to the cross-cutting topics we identified. The crucial point, however, was how far integrative activities produce (perceived) individual and/or organisational added value. Many activities were initially associated with additional work for the projects. The joint projects’ resources were first and foremost devoted to their specific research activities and not to knowledge K3 production as an additional benefit.

Relationship to the funding agency

One part of the exchange and communication activities of AR comprised consultations and knowledge flows to the (intermediate) project management agency (Projektträger Jülich) and the funding agency (BMBF). These efforts included 45 formalised meetings and numerous informal consultations that could be charac-

terised as open and trustful. Nevertheless, the existence of different expectations and perspectives led to a number of critical issues. One of these was the extent to which the AR project should provide services for the research programme versus generating its own additional knowledge in the form of research results. As an example, we had to address the ambiguous relationship between science public relations and scientific knowledge production and knowledge transfer. Discussions oscillated between the desire of the funding agency to necessarily promote “success stories” and our desire to realise discourse and reflection about SLM in science and the public. We met this challenge by developing handy brochures with focused information, and, in parallel, scientific publications and articles for special interest media, an online web platform based on the current state of knowledge, and professional online learning modules. In addition, the results were incorporated into university teaching in various formats (courses, colloquia, lectures, winter school) to provide future topics for graduates in Germany and abroad.

In general, it was helpful to start the AR project half a year earlier than the accompanied research projects (cf. Griefshammer and Bergmann 2018). This gave us time to further develop and specify our concept and methods according to the requirements of the funded consortia. In retrospect, however, it would have been worthwhile to use this time to establish a stronger exchange with the funding agency regarding expected work priorities as well as the main goals and functions of AR.



TABLE 3: Overview of the relationships R1 to R5 between accompanying research (AR) and the projects (based on Defila and Di Giulio 2018, p. 100).

RELATIONSHIP	DESCRIPTION (DEFILA AND DI GIULIO 2018)	AR ROLE/RELATION TO OTHER PROJECTS
R1	no interaction	AR runs parallel to projects
R2	use of data/results of the projects	AR as a “data exploiter”; production of knowledge at the expense of the accompanied projects
R3	projects are object of research	AR as investigator (not evaluator)
R4	setting the stage for collaboration among projects	AR as a facilitator and supporter of collaborative processes; does not make its own contributions to integrated knowledge
R5	collaboration with the projects	AR as a facilitator and supporter of collaborative processes; it adds contributions to integrated knowledge

Creating possibilities: networking, community building, communication and transfer

In addition to knowledge generation (see above), the everyday activities of the AR comprised process-related tasks. According to Defila and Di Giulio (2018), different tasks can be incorporated, such as dissemination and outreach at the programme level as well as consultancy and coaching for other projects. Coaching and consultancy was not part of the AR in the programme *Sustainable Land Management*. Instead, we identified another substantial field of action for dealing with knowledge: knowledge management.

We define knowledge management as activities and processes that aim to enhance the effectiveness of knowledge (Kaiser et al. 2016). Consequently, we considered multiple internal and external communication activities as key tasks (see also Eppink et al. 2012, Fiedeler et al. 2010). We strived to form an expert community of SLM scientists and practitioners that transcended the limits of project borders. The AR took on the role of an intermediary that aimed to develop relationships and networks with, among, and between producers and users of knowledge (Parker and Hine 2013). In addition, we sought to instigate learning through communication and exchange among projects, affiliations and knowledge cultures.

Internal communication activities were covered by frequent meetings (figure 2) ranging from small-scale events (coordinator meetings, expert meetings, working groups) to large-scale events (status conferences with up to 500 people). We also implemented instruments of information dissemination, such as quarterly newsletters on activities in the joint projects, a web page, and a series of discussion papers (mentioned previously) that sought to connect internal and external perspectives.

External communication covered a wide range of activities at the interface of science, policy, and practice. With a focus on the integration of knowledge K3, we highlight three activities: first, the formulation of inclusive “key messages” for the programme level; second, co-authored publications; and, third, the setup of a web portal on SLM knowledge.

The diverse nature of SLM, with its multiple actors, target groups, subjects, and instruments, was challenging from the standpoint of communication. To identify overarching communicative messages to relevant target audiences, we conducted a working group (table 2) on the issue of communication together with proj-

ect members and communication experts. In interactive workshops, a set of “key messages” was collaboratively developed. During this process (four meetings in two years), cross-boundary learning processes on crucial questions (What does science have to communicate? Who do we address? What is common ground in SLM?) occurred as we exchanged embedded knowledge. The content for external communication and co-dissemination was also based on the internal integration of codified knowledge via co-authored publications in special interest media. Co-authorship with experts from projects turned out to be a recommendable measure in multiple ways. First, co-authorship is a good way to connect AR with project members via a “shared project” and to integrate different sectoral perspectives and knowledge regarding meta-questions. Second, in the competitive field of science, practice-oriented publications imply lower barriers to cooperation due to lower efforts than co-authored scientific publications in peer-reviewed journals. Third, co-authors had an extra incentive to collaborate because – with relatively little effort – this was an additional strategy for science-to-practice transfer, which was a key demand for projects in the research programme. Finally, in contrast to mere scientific publications, professional practice-oriented publications often communicate both an overview and specialised insights from scientific expert views. In this regard, co-authorships between the accompanied projects and the AR cover science and practice in a complementary fashion and attribute clear roles as experts provide insight knowledge on particular case studies and the AR discusses the topic in a broader context.

We also took a new path by pursuing alternative approaches to knowledge management by setting up a digital, open-access knowledge platform on SLM (*Wissensthek*) that assembled and categorised results from the research programme. We see great value in future AR projects merging and synthesising the results that have been produced in the projects and processing them into formats that prevent post-project amnesia. As a result of the perspective of AR, individual contributions to meta-issues can be blended to create an evidence-based synthesis (cf. Kaiser et al. 2016). Recently, the significance of evidenced syntheses has been outlined by different authors (Sutherland and Wordley 2018, Donnelly et al. 2018) as a means of assembling information in otherwise atomised areas of evidence. As indicated by Krause and Schupp (2019, in this issue), such digital knowledge platforms live and die by

the sustainability of their infrastructure. Because AR projects are temporary institutions, post-project information transfer to anticipated target audiences must be a crucial part of knowledge management strategies and should be addressed by AR and funding bodies (see next chapter).

Challenges in the course of the accompanying research project (Q2)

The AR project faced many challenges. They covered all areas of the project design. In the following, we briefly comment on some important issues that should be reflected on and discussed at the beginning of an AR-supported funding measure.

Ambiguity of crucial topics and terms: The main content-related problem surrounding discourse, discussion and external communication was the unclear definition of the terms “SLM” and “transdisciplinarity”. Both were core terms of the funding announcement (box 1). As a result, questions arose between the accompanied projects and the AR project regarding different approaches, target audiences, communicable products and options for implementation and transfer. The ambiguity of the term “SLM” resulted in miscommunication. Within the research programme, this confusion was unnoticed at first; after a two-year period, it was mostly resolved by a broad acceptance of the plurality of the concept, starting with a two-day status conference managed by the AR project.

Lack of clarity regarding communication outputs: Another challenge was related to questions of adequate and effective communication. Despite the development of a communication strategy and shared core messages, external communication actions remained multifaceted due to the variety of expectations among those involved (in terms of types of events, involved target groups, and communication products). Quite often, traditional communication instruments (e.g., brochures) were repeatedly requested, while unconventional communication formats for knowledge dissemination were not tested (Härtel et al. 2015, p. 302). Additionally, we found that an AR project affiliated with a research institution must undertake specific efforts to be noticed in political debates. Although an intermediate function between science and policy was created to increase impact, involvement in the political communication strategies of ministries and public agencies was challenging due to mismatches with the communication culture of ministries.

Dissents on the scientific character of AR: In the course of time, the AR increasingly manoeuvred itself into a dilemma: the more activities and products we launched to reach out to diverse audiences, the more scepticism about the scientific character of the AR project we raised among the accompanied projects and even within our own affiliation. This situation changed in part when we published “credible” scientific products, including 14 peer-reviewed journal papers that proved that our work was scientifically sound and backed by a theoretical or conceptual foundation.

Ambiguous transfer goals and criteria to measure them: In the second half of the AR project, questions and expectations about possible and desirable implementation and knowledge transfer activities arose. All along, it remained an open question to many participants of the funding measure what counts as “successful transfer”: Is it the inclusion of results into the political agenda processes of ministries? The participation of high-ranking representatives in regional workshops? Download quantities of digital guidelines and further education modules? Over-simplified models of science-to-practice transfer have been pervasive (Dilling and Lemos 2011). Existing scientific knowledge of context sensitivity, preconditions for change and innovation or the necessity of regional capacities should be put in place at the outset of AR activities. Therefore, we discussed the relationship models of Best and Holmes (2010) and the system models of Partidario and Sheate (2013), stressing the interactions in networks and the cultural embedding of transfer activities (Rogga et al. 2014). In the future, predefined transfer goals (what should actually be transferred to whom, and when and why?) would be a helpful asset.

Acceptance of reflexivity and recursiveness between science and practice: In this context, differing actor expectations also led to discussions about the need for reflexivity and recursiveness raised by the AR. Project members’ reflection on their own premises, procedures and results has been taken for granted as a means to measure the progress of knowledge in scientific discourses on integrative research formats. However, such readjustment of ideas, concepts and goals is confusing or even counterproductive for clear political communication as well as for practitioners’ standard project development routines. This was prominently displayed in discussions about the conception of status conferences (workshop character versus show-time event), AR’s selection of events in which to participate, and “product” development. At the same time, the combination of unpredictable coordination necessities and planned activities caused time-consuming processes and represented a considerable administrative burden for the AR. Along with ideas and concepts, regulatory conformity and verifiability against internal and external controls and auditing authorities had to be considered. In general, this is an area of tension that is well known when attempting to enable innovation within existing organisational regulations (Christmann et al. 2017).

Lessons learned (Q3)

We agree with Defila and Di Giulio (2018, p. 102) that trust and confidentiality are keys to successful cooperation between AR and accompanied projects (cf. Küpper et al. 2014, p. 45). The accompanied projects must be certain that openness and cooperation will not be harmful. This applies both to the content of the work (data sovereignty, availability and co-creation of results, publications) and to the discretion of the AR project in relation to the funding organisation. We needed several months to resolve the concerns of the funded projects about acting as a project control body.



TABLE 4: Added value of accompanying research (AR) projects. SLM = sustainable land management.

ANALYSED “ADDED VALUE”	SPECIFICATION	EXAMPLE AR SLM
new types of knowledge	■ creating new knowledge related to content of the funding measure	■ generating a framework for SLM; (complementary) scientific publications on additional topics
	■ realising new combinations of (project-based) generated knowledge	■ conceptualising governance of land and indicators for SLM (via workshops)
	■ generating additional knowledge regarding cross-cutting issues	■ PhD thesis on transdisciplinarity and innovation
	■ connecting newly generated knowledge with educational programmes	■ seminars and winter school; regional workshops
	■ reflecting on existing ways of implementation and transfer	■ developing new ways of transfer by reflecting on transdisciplinary co-creation approaches
new interrelations between actors	■ agenda setting for new topics	■ establishing knowledge management as an issue (<i>Wissensthek</i>)
	■ networking and exchanging with other funding measures, projects and AR projects in related fields	■ status conferences (for internal and external communication), meetings
process-related tasks	■ integration/involvement of a broad range of actor groups due to AR’s neutrality	■ regional workshops
	■ connection of medium- and long-term processes of knowledge management and implementation	■ support of the land use-related <i>European Research Agenda (ERA)</i>

As a consequence, we support the call for a strict separation of AR projects and evaluation activities that test project achievements (cf. Defila and Di Giulio 2018, p. 102). Conversely, the funding organisation needs confirmation that the AR project supports the research programme without reservations. Added value must be created in both directions – for the funder and for the funded projects. For a project, the presence of an additional cooperation partner, such as an AR, always requires extra effort. However, an AR can compensate for this by improving external communication, supporting implementation and transfer activities, and developing additional scientific results by synthesising and referencing accompanied projects’ findings.

To perform this task appropriately, the AR must be involved in various networks with scientific (e.g., International Society of City and Regional Planners, ISOCARP) and practice-related focuses (e.g., International Council of Local Environmental Initiatives, ICLEI). For example, at the Association of European Schools of Planning (AESOP), it was possible to hold a series of events on transdisciplinary work in land management. Status conferences, regional conferences and self-organised workshops were important for establishing initial contacts. These projects addressed a network of several hundred representatives and multipliers (ZALF 2017). Additionally, exchange among the AR projects of other funding activities should be realised (see UFZ 2012).

Networking requires time and resources, but it also creates benefits for influencing the political agenda in terms of both research policy and current societal discussions. With regard to research policy, the endorsement to the *Global Land Programme* as part of the *Future Earth* process was significant for the continuation of the discussion on effective processes and solutions in *Sustainable Land Management*. In addition, the results could contribute to the preparation and implementation of the *ERA-Nets Wood-*

Wisdom, Bioenergy and *RURAGRI*. Furthermore, the findings and experiences were incorporated into the call for proposals for new funding programmes at the European level under *Horizon 2020* (*INSPIRATION* project, see Nathaneil et al. 2018) and at the national level under the general funding programme *FONA 3 (Zukunftsstadt)*. Further network effects can be assumed due to the high number of stakeholder groups involved (as well as business associations, nature conservation associations, churches, and foundations) but were not explicitly investigated.

An interdisciplinary AR team that comprised experts with different areas of expertise (e.g., geography, planning, soil science, agriculture, economics, communication science) was of particular help to follow and partially influence the broad range of discussions about SLM. To face the challenge of producing scientific output on the one hand, and service-oriented outreach on the other, a stronger labour division within the AR seems recommendable.

Furthermore, we want to highlight one specific aspect of knowledge management. In addition to dealing with existing and newly generated knowledge from the accompanied projects, a major obstacle is keeping knowledge stocks permanently available to ensure the consistency and transfer of results (cf. UFZ 2012, pp. 9, 31, see also above). Unfortunately, neither libraries nor external funding sources are currently prepared for the *ex-post* acquisition of specific research programme-based knowledge collections. To date, the storage of practitioners’ experience, research results, websites, and datasets has often relied solely on the good will (and at the expense) of AR-hosting institutions. There are examples of creative and informative web-based knowledge platforms that inform people after the end of a project cycle (Griefshammer and Bergmann 2018), but an overarching strategy by funding institutions to avoid “data cemeteries” and ensure sustainable access to codified knowledge is still missing. Web-based, open-access re-

search data repositories (such as Zenodo) could present new perspectives for data availability and transfer beyond a fragmented and endless conglomeration of single publications. In any case, AR knowledge management in all its dimensions (see Kaiser et al. 2016) should be considered a task from the beginning.

Summing up the results, AR projects create specific additional value supplemental to the organisational issues mentioned above. Taking into account the three dimensions mentioned by Defila and Di Giulio (2018), the AR project facilitates new knowledge, realises new relationships between actors and organises new processes to include the knowledge of a variety of actor groups (table 4).

From our perspective, the most important added value of AR projects is provided by the combination of the three dimensions described in table 4. The generation of knowledge beyond case studies will be possible based on the broad involvement of different actor groups with differentiated goals and interests. This will also offer the option of overcoming fragmentation in generating solutions arising from selective knowledge production. While projects are primarily focused on small niche innovations, AR offers ways to support societal innovation and transformation processes.

Conclusions and outlook

Overall, the typology of Defila and Di Giulio (2018) supported our analysis to “capture the nature” of our AR project. The AR is closest to the *integration-oriented type*, in which collaboration between the projects and a number of extra-scientific tasks are central. In addition, the main elements of the *complementary type* (knowledge on the topic) and the *meta-type* (knowledge of processes) are included (Defila and Di Giulio 2018, p. 103).

As shown, the *integration-oriented type* of AR faces a number of challenges. Its intermediary function at the interface between academia and science policy frequently situates AR between conflicting interests. A main challenge arises from expectations of a service provider role on the part of the funding body (see section *relationships to the projects and the funding agency* above) and scientific knowledge production on the part of the affiliated scientific organisation. For future development of AR projects, further exchange regarding different approaches and methods (see *introduction* above) will be crucial to specify the roles and benefits of AR and to create wider appreciation and acceptance.

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Nachhaltigkeit

A-Z



W wie Wissenschaft

Die Wissenschaft treibt die globalen Krisen voran – gleichzeitig ist sie für deren Überwindung unverzichtbar. Markus Vogt reflektiert in seinem Essay diese Janusköpfigkeit der Wissenschaft und plädiert für eine Neujustierung des Verhältnisses zwischen Forschung, Klugheit, Moral und Gesellschaft.

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