THE
TRANSDISCIPLINARY
JOURNAL

GAiA

3 | 2020

ECOLOGICAL PERSPECTIVES FOR SCIENCE AND SOCIETY
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oekom verlag

GAIA is available online at *www.ingentaconnect.com/content/oekom/gaia*
www.oekom.de | B 54649 | ISSN print 0940-5550, online 2625-5413
GAIAEA 29/3, 137 – 208 (2020)

Meeting the challenge of (co-)designing real-world laboratories

Insights from the *Well-Being Transformation Wuppertal* project

As transdisciplinary and transformative research approaches, real-world laboratories (RwLs) come with many pitfalls. Their design and implementation place high demands on everyone involved, which means that realistically, things rarely go smoothly. The following Design Report *shares the lessons learned about establishing and adjusting communication and organisational structures in RwLs.*

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GAIA 29/3 (2020): 154 – 160

Abstract
What should we take into account when setting up real-world laboratories (RwLs)? In our analysis of the experience of (co-)designing three RwLs within the *Well-Being Transformation Wuppertal* research project, we examine both the origin of the project proposal and its implementation, from management, communication and inter- and transdisciplinarity to actor dynamics and recruitment criteria for staff. We especially highlight the effects of the initial co-design phase (project proposal) on the RwL's implementation, focusing on the challenges which arose and how these were addressed. We conducted 19 semi-structured interviews, analysed relevant project documentation and reflected on the research team's own experiences. The transdisciplinary and transformative dimensions of the RwL approach are the areas where significant lessons were learned. RwLs are unique in their extraordinarily strong need to balance different roles and resources, even as many of their challenges and solutions resemble those which also arise in transdisciplinary research. The uniqueness of RwLs lies in their objective to co-produce not only socially robust knowledge but also tangible real-world change through experimentation.

Keywords
co-design, co-production, real-world laboratory, roles of stakeholders, transdisciplinarity, transformative research, well-being indicators

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https://doi.org/10.14512/gaia.29.3.5
Submitted July 22, 2019; revised version accepted July 27, 2020 (double-blind peer review).

The *Well-Being Transformation Wuppertal (WTW)* project

According to several scholars, caring for individual and societal well-being should no longer follow predominantly economic considerations (Jackson 2009, Nordhaus and Tobin 1972, Stiglitz et al. 2009). In the city of Wuppertal (Germany), the history of profound structural transformations and the more recent socio-economic crises of traditional welfare, combined with an active civil society, make room for a new kind of well-being. From a transformative perspective, we aim for multidimensional and sustainable well-being that is decoupled from resource consumption. By well-being transformation we mean a transformation[1] of both the conceptual understanding and the level of well-being, taking the dimensions of the *OECD Better Life Index* as a point of departure for making this more tangible at a local level (Rose et al. 2017).

As well-being transformation is a complex societal challenge, we have to incorporate and address both interdisciplinary science and nonscience practice in our research processes and outcomes (transdisciplinary approach, Lang et al. 2012, Scholz and Steiner 2015), getting actively involved in tangible transitions (transformative approach, Schneidewind and Singer-Brodowski 2013, Schneidewind et al. 2016). Therefore, we teamed up with local nonscience actors in a research project – *Well-Being Transformation Wuppertal – An Urban Transition Laboratory for Sustainable Economics (WTW)* – to study how well-being can be transformed in Wuppertal (box 1, p. 156).

In *WTW*, the project team investigated and co-developed concepts of local sustainable well-being advancement by and for local civil society and municipal administration: it mapped relevant civil society initiatives, developed concepts for the integration of refugees, and designed an indicator system on a participatory basis for measuring sustainable well-being in Wuppertal[2] (Rose et al. 2017). Within this framework, three RwLs experimented with selected well-being transitions on a district level (box 2, p. 156).

1 We use the terms transitions and transformations interchangeably.
2 *https://w-indikatoren.de*

Key components and process design of real-world laboratories

The team developed its own RwL approach based on a systematic review of the literature on RwLs and related approaches. The resulting eight key components (box 3, p. 157) and process design (figure 1, p. 157) served as an ideal-typical orientation for the Wuppertal RwLs' research practice and for this *Design Report* (Wanner et al. 2018 b).

According to the flowchart (figure 1), actors from science and practice establish a transdisciplinary partnership on an equal footing and progress through the stages of co-design, co-production and co-evaluation. In the *co-design* phase, the partners set the framework for cooperation, clarifying their interests and roles. Deciding on a mutually well-understood real-world sustainability problem as a starting point, they produce systems knowledge in order to refine the RwLs goals and demarcations and to generate ideas for intervention into the system to tackle the sustainability problem. In the *co-production* phase, they jointly decide on intervention ideas which are implemented by practice partners and analysed by scientists. In a cyclical learning process, practitioners and scientists jointly reflect on the implementation and recalibrate the process according to interim findings. The process usually ends with a *co-evaluation,* identifying, interpreting and assessing substantive and procedural RwL outputs and outcomes. These are then fed back (e. g., via recommendations, strategies, practices and articles) into science and practice (Wanner et al. 2018 b).

Methods and data

Drawing on our *WTW* project experience and reflecting challenges and the ways they were coped with, we analyse both the genesis of the project proposal and its implementation. Since the project started, we (the authors) were part of the *WTW* project team. In 2016, we conducted 19 semi-structured expert interviews with duration of one to three hours each as part of a formative evaluation. We interviewed all scientists involved in the initial design of the project proposal, the junior scientists working in the RwLs, the RwL practice partners and the doctoral supervisors. The interview guidelines included questions on the initial co-design phase, roles and interests, science-practice interactions, problems, and preliminary learning outcomes. The interviews were audio-recorded and analysed with *MAXQDA* (Rose et al. 2017). To safeguard some degree of anonymity, we usually will not mention the names nor the exact position of those interviewed when reporting on the results. During the project term, we discussed current issues regarding RwL research and practice in monthly meetings. In February 2018, the *WTW* team organised a workshop with all practice partners to reflect, evaluate and document the joint RwL processes (Wanner et al. 2018 a). Moreover, documents were analysed. We were neither involved in writing the project proposal, nor did we run our own RwL.

DESIGN REPORTS

GAIA regularly publishes the results of transdisciplinary projects. Yet, reporting results leaves little room for discussing the project *design* and the processes shaping it. *GAIA* thus offers a unique opportunity: the ***Design Report***. This format is aimed at researchers working in interdisciplinary teams and/or with stakeholders from outside academia.

Design Reports analyze the decisions that determine the design of the research and communication of a project, offering a critical explanation and discussion of them, paying special attention to the question of how partners from scientific and non-scientific cultures communicate, what kind of communication architectures they have, and how they handle the results.

Design Reports contribute to raising the level of experience in the setting-up and implementation of inter- and transdisciplinary projects with a focus on research and communication. They include recommendations or lessons learnt. ***Design Reports*** are subject to double blind peer review and should present original research.[a]

a For more details see *https://ojs.oekom.de/downloads/GAIA_author_guidelines_design_reports-OTH.pdf*.

Co-design is hard to achieve when drafting a project proposal

Developing the project proposal ideally constitutes the first (co-) design phase as represented in the RwL flowchart. However, the "co" in "co-design" was not very strong – mainly scientists drove the process.

Proposal writing as an efficient top-down process lacking transdisciplinarity

According to interviewees, the basic project idea was first developed by the future project leaders and a research associate. This draft was discussed with additional researchers, and a summary was used to approach practice partners and to facilitate discussions with them and among the members of TransZent. The proposal was written in a truly interdisciplinary way. The multidisciplinarity of the team was not reported to be an obstacle, as the common topic facilitated interdisciplinary integration.

This was not true for the conflict between basic research (as represented by the University) and applied research (as represented by the Wuppertal Institute and the relevant funding program of the German Federal Ministry of Education and Research, BMBF), as was reported in an interview. The interviewee used the measuring of impact as an example for this conflict: "From a social science perspective, we know that social issues are so complex that we cannot really measure their impact. [...] However, the BMBF funding proposals explicitly require an impact measurement" (translated from German). In RwLs where the (external) conditions cannot be controlled and where researchers intervene in the real world this problem becomes even more severe. From the perspective of applied research, however, impact assessment >

BOX 1: Involved scientists and practice partners

Well-Being Transformation Wuppertal (2015 to 2018) was a joint research project of the Centre for Transformation Research and Sustainability (TransZent, University of Wuppertal) and the Wuppertal Institute for Climate, Environment and Energy. TransZent was jointly established by the University of Wuppertal and the Wuppertal Institute as an Interdisciplinary University Research Centre in October 2013. At TransZent, eight junior scientists were employed (part-time) in the project, doing the operative project work. Three of them worked in the district real-world laboratories.

Practice partners were representatives of the civil society initiatives *Essbarer Arrenberg (Edible Arrenberg)*, *Forum:Mirke* and *Utopiastadt*, the semi-public district development agency (Wuppertaler Quartiersentwicklungsgesellschaft), the city administration (in particular the Civic Participation Unit and the Department of Immigration and Integration), the Wuppertal public utility company (Wuppertaler Stadtwerke) and citizens of the city districts Oberbarmen and Wichlinghausen. More citizens were involved in several workshops and a survey on dimensions of well-being in Wuppertal.

BOX 2: The Wuppertal real-world laboratories (RwLs)

Three RwLs were located in city districts. The *Oberbarmen and Wichlinghausen RwL* created solutions to care for (formerly) vacant apartments with the help of tenants who pay below standard but maintain the facility (German: *Haushüten*). The RwL thereby addressed the well-being dimensions "housing environment" and "community", amongst others. The *Arrenberg RwL* focussed on the *Essbarer Arrenberg (Edible Arrenberg)* group, a subgroup of *Aufbruch am Arrenberg (Arrenberg Starts Out)*, a young civil society organisation aiming to achieve a climate-neutral urban district. *Essbarer Arrenberg* promoted sustainable, local nutrition for the Arrenberg district through urban farming, food-sharing, and restaurant days. It thereby contributed to well-being dimensions like "civic engagement", "community", "education", and "health". In the *Mirke RwL*, a forum that integrated all relevant civil and municipal stakeholders of district development for the purpose of participative well-being transformation has been supported *(Forum: Mirke)*, and the inhabitants' self-efficacy has been researched. *Forum: Mirke* improved, inter alia, the well-being dimensions "civic participation" and "community" (Rose and Schleicher 2017).

and evaluation are key. This conflict was not resolved and impact measurement remained part of the project proposal.

As potential practice partners, actors who already played a formative role in the city were asked to take part. Moreover, a certain basis of trust was already to exist. Accordingly, RwLs were established in areas where active practice partners were already available. Equally important for RwL location was geographical distribution across the city and thematic variety regarding dimensions of sustainable well-being.

During project drafting, transdisciplinarity was not fully achieved. Practice partners were only partly involved substantively in the development of the project proposal (mostly through discussions), which therefore lacked true co-design for the most part. This turned out to be problematic during project implementation, as expectations and future roles were not managed adequately in the first place. The top-down approach goes against the very idea of a reflective, process- and learning-oriented RwL where scientists and practitioners meet at eye level also in major decision-making, and goals are not predetermined (Wanner et al. 2018b).

In the majority of interviews, though, this top-down approach has been reported as being an efficient and common approach in this kind of processes, where research perspective comes first and involvement of practice partners second, the schedule is tight and practice partners had not been able to apply for their own funding. However, there was one exception. In the *Mirke RwL*, science and practice partners jointly developed and ranked possible intervention ideas. They employed criteria such as suitability to the project proposal and research interests, utility for the practice partner, and practicability. The *Mirke* practice partner emphasised that the main motivation came from the scientific partner, nonetheless.

Different rationales of scientists, practitioners and research project calls

The scientists had heterogeneous but rather clear interests and motivations for joining the project proposal, such as a high interest in the topic, the need for acquisition or strategic benefits.

In contrast, most of the interviewed practice partners reported that their notion of future cooperation had remained rather vague for the time being. They had an interest in networking and in gaining new resources for pushing forward their projects. The latter motivation partly led to conflicts with the scientific RwL partners in the implementation phase. Most practice partners also valued the new capacities for reflection and evaluation and the expected contribution to sustainable development in Wuppertal and beyond. All practice partners explained that they were bothered in retrospect because they would not have been able to apply for funding of their own work within their respective RwL.

A call-related trade-off arose between the necessary openness and flexibility of RwLs on the one hand and the logic of project proposals on the other. According to the latter, as much as possible has to be specified, and expected benefits and possible results are to be outlined. At least in the *Mirke RwL*, the trade-off was partially mitigated by sketching options in the proposal, leaving the final decision to the transdisciplinary process during project implementation.

When asked what they thought made the project proposal successful, respondents mentioned the good chemistry between project leaders and the convincing idea of integrating RwLs with the development of alternative indicators of well-being in a city of transformation like Wuppertal.

Co-design, co-production and co-evaluation in project implementation

Joint recruitment and different criteria for junior scientists

The implementation of the *WTW* project started with the recruitment of junior scientists in spring 2015. Most of the junior scientists were jointly selected by the senior scientists, the relevant prac-

tice partner and the potential PhD supervisor. According to the arguments referenced in the ranking list, the following recruitment criteria were decisive: experience with transformation processes and research as well as interdisciplinarity and transdisciplinarity, good knowledge of methods, expertise in the research area, communication skills and project management skills. According to the interviews, the stakeholders had different foci, nonetheless. For future PhD supervisors, the academic degrees of the candidates were important as well as the skill to balance theoretical-scientific and practical demands. Practice partners valued experience with bottom-up initiatives, expertise in field and personal engagement with the cause. From the perspective of the senior scientists, the candidates had to show a mix of academic sophistication and pragmatism, team ability, social skills, affinity to sustainable development, and a personality that is compatible with the demands of local transdisciplinary processes. Despite the different criteria, all recruitment board members were able to agree on a joint ranking of candidates.

However, the junior scientists could not meet all of those diverse criteria. Therefore, to train the skills of the team of junior researchers, several workshops were held by external experts. Whereas the original project plan only included workshops on empirical social research, project management responsively shifted emphasis to transdisciplinary methods, allowing for common reflections and site visits with the experts.

Establishing and adjusting communication and organisation structures and leadership

The team organised an internal and an official kick-off event. They were aimed at getting to know each other and to discuss the state of the art and the common goals. The practice partners introduced the idea to establish a regular, informal meeting *(Stammtisch)* at a restaurant that allows for exchange on the project and Wuppertal activities between all science and practice partners on a monthly basis. The events helped all participants to meet at eye level and share project responsibility.

The regular research team meetings were supplemented by quarterly doctoral colloquia and two team retreats. On RwL level, transdisciplinary teams were formed. They usually consisted of a junior researcher and one or two practice partners. The frequency of meetings between the partners varied from monthly to several times a week. In order to share responsibility more broadly and promote participation, RwL steering groups were set up, including scientific and most of all local nonscience stakeholders beyond the core transdisciplinary teams. Moreover, the *Stammtisch* was set up as proposed. During the third project year, *Stammtisch* meetings were opened up to interested stakeholders and citizens beyond the project. In order to maintain the successful format, it was handed over to the newly founded *Wuppertal Alliance Transformationsstadt (Transformation City)*[3] at the end of the project term.

3 *www.transformationsstadt.de*

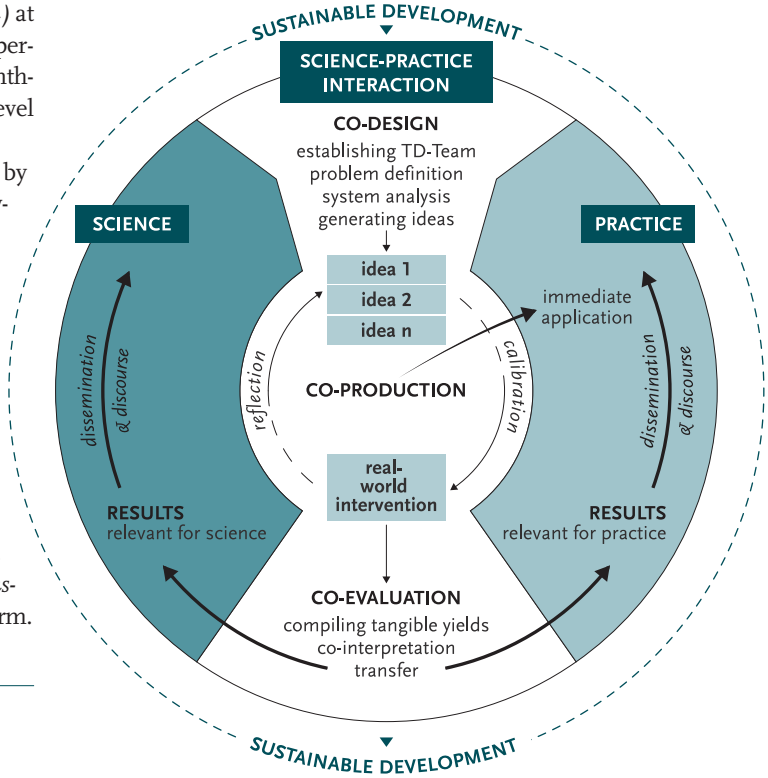
BOX 3: Eight key components of real-world laboratories
suggested by Wanner et al. (2018 b)

1. normative framing: aiming to contribute to sustainable development
2. production of systems-, target- and transformation knowledge (mostly contextualised)
3. real-world problems as a starting point
4. boundaries: "Laboratory" demarcations, defined by content and space
5. transdisciplinary collaboration (co-leadership) with clear roles for practice and science
6. real-world intervention (often called "experimentation")
7. cyclical learning processes through reflection and variation
8. empowerment of change agents and capacity building

The communication and organisation structures were designed, decided and adjusted flexibly according to the perceived needs. Junior scientists and project management pushed team meetings, team retreats, colloquia and transdisciplinary teams; practice partners pushed the *Stammtisch*. Steering groups were supported by all parties and strongly encouraged by an external advisor.

Leadership styles of the (sub)project leaders ranged from *laissez-faire* to detailed instructions at the beginning. For the latter, it was a challenge to move from the top-down proposal-writing process to the eye-level transdisciplinary project practice. In the course of the project, the project management and leadership therefore decided to allow all employees creative leeway in order to do jus- >

FIGURE 1: Flowchart of Wuppertal's real-world laboratories (adapted from Wanner et al. 2018 b).



tice to the transdisciplinary process. In two RwLs, the design of the RwLs was subsequently revised in transdisciplinary co-design workshops, involving both operative junior scientists who were not involved in the drafting of the project proposal as well as practice partners and stakeholders on an equal footing.

Co-design and co-production workshops were already specified in the project proposal as few cross-RwL events, but were redesigned during project implementation to be held as 15 separate within-RwL events, following the recommendations of both scientists and practice partners. The workshops helped all involved actors to reflect, adapt and identify with the RwL objectives and their own roles in achieving them. In Wichlinghausen and Oberbarmen, the public RwL workshops facilitated the formation of the new steering group.

Dealing with science-science conflicts and extensive fieldwork

The trade-off between basic and applied research emerging during the proposal-writing phase also manifested later on. Instead of developing an impact measurement model, the involved scientists developed a method for comparative estimation of RwLs' contributions to well-being transformation and employed it in transdisciplinary workshops with the RwL practice partners (Rose and Schleicher 2017). This compromise avoided dubious strict causality claims of impact measurement, but still helped to assess and compare the real-world contributions of the RwLs. Moreover, the workshops for estimating these contributions also facilitated the transdisciplinary process, firstly by reflecting the stakeholders' roles in and contributions to well-being transformation, and secondly by fostering mutual learning.

Differing academic cultures between the two involved scientific institutions also showed up in the supervision of doctoral theses and subprojects. There were, for example, different views on the necessity of a good theoretical foundation. The issues were resolved through consultations with the scientific project leadership and partly also by shifting supervising tasks to full-time university professors.

Moreover, the junior scientists had not enough time to work on their (inter)disciplinary PhD theses due to their extensive fieldwork. This could have been partly avoided by a clearer separation of roles between science and practice actors from the very beginning and separate resources for RwL management tasks (see next section). While RwL researchers tried to take time off dedicated to work on their theses only, this was almost impossible to keep up for more than a few days in a row due to recurring RwL tasks. Since the RwL work was often rather practical than scientifically rigorous in nature, doing a doctorate in an RwL context also meant conducting additional empirical studies that met scientific standards but were not required from an RwL project perspective. The work on the dissertation was therefore either (temporarily) suspended and/or continued after the project term.

Dealing with resources and role conflicts in co-production

Practice partners were short of time as well, and one of them stated that he was not content with facing the expectation to support scientific activities in his free time. In two RwLs, the initially strong expectation of the respective practice partner to get an additional human resource for hands-on support had different effects on both the newly recruited junior scientists and the practice partners. In one case, the junior scientist felt uncomfortable in the expected role and the practice partner felt somehow disappointed for not getting the kind of support he hoped for, which led to both sides temporarily withdrawing. Project management successfully offered conversations on the issue, and in the course of a thematic narrowing of the RwL's focus, another person from the same civil society initiative eventually became the primary practice partner, while the original practice partner maintained an important role in the background. This significantly improved the situation for all affected parties.

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Artenvielfalt, Ernährung und Geschlechtergerechtigkeit werden selten zusammengedacht – zu Unrecht: Traditionelle Gemüsesorten und deren Zubereitung spielen für eine gesunde Küche in Kenia eine große Rolle. Diese soziokulturelle Analyse rückt die Zusammenhänge zwischen (Kolonial-)Politik, Kommerz und Ernährungssouveränität in den Fokus und entwickelt eine feministische Vision für ein nachhaltiges Versorgungsmodell.

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In the other case, the junior scientist reported that she initially had slipped into the expected role. The resources of the practice partner were so limited that the practical part of the project would not have been able to gain momentum without the active support of the science partner. This left both partners with a certain dissatisfaction regarding their overlapping roles, but without jeopardising cooperation. The ideal for co-production would have been the junior scientist having been tasked with scientific monitoring, process and participation design, whereas the practice partner would have been responsible for the practical implementation. Therefore, the involved scientists and several active citizens co-founded the steering group to spread decision-making and implementation among more people. In the third RwL, tasks and roles were continuously negotiated within the transdisciplinary team, which was perceived as mostly unproblematic and affirmative.

Co-evaluation

Apart from the junior scientists' research diaries, the elements of formative and ex-post evaluation were implemented jointly by science and practice. These included the mentioned workshops assessing the RwLs' contributions to well-being transformation (Rose and Schleicher 2017), constellation analysis (which were also part of enhanced systems analysis) (Wanner and Reinkenhoff 2017) and a joint final evaluation. In the final co-evaluation workshop, story walls and narratives were developed and supporting and inhibiting factors were identified in retrospect (Wanner et al. 2018a). The project outputs have been listed at the project website.[4]

Getting real with the real-world laboratory

The transdisciplinary dimension – lessons learnt

For us, (co-)designing RwLs has been quite challenging indeed. Since RwLs are a young transdicisciplinary and transformative approach (see, e.g., Defila and Di Giulio 2020, Wagner and Grunwald 2019, Wanner et al. 2018b), we could, however, draw on the vast experiences of regular transdisciplinary studies to get started. In *WTW*, we worked through the literature on transdisciplinary quality criteria and methods at our first team retreat and adapted them in a process-oriented way. Also, we invited two experts in transdisciplinary studies for trainings and site visits. Five years later, it is easier than ever to learn from the aggregated knowledge of decades of transdisciplinary research.[5]

It is therefore not surprising that many of our lessons learnt link to insights of other transdisciplinary projects: for example, that a lack of genuine co-design makes co-production more difficult. To enable co-design at eye level right from the start, we also need considerable resources for science and practice when developing RwL proposals (Defila and Di Giulio 2020, Lux et al. 2019, Ober et al. 2019, Rose et al. 2019, Schmidt et al. 2018). Revisiting co-design when necessary and establishing joint steering committees as well as low-threshold communication to facilitate social learning are additional lessons learnt (Rose et al. 2019, Schauppenlehner-Kloyber and Penker 2015, Scholz and Steiner 2015).

To avoid unnecessary difficulties in co-production, personnel discontinuities should be avoided and expectations and roles need to be reflected and managed throughout (Mauser et al. 2013, Ober et al. 2019, Rose et al. 2017). Our experiences thus partly contradict the recommendations of Pregernig et al. (2018, p. 35). They recommend going through co-design with a small core team and hiring personnel such as doctoral students only when the research questions have already been specified. While the *WTW* project largely corresponded to this recommendation, this led to the problems mentioned above. We also recommend involving the practice partners in recruiting the scientific staff. This does not prevent conflicts, but facilitates transdisciplinarity (Rose et al. 2019).

The transformative dimension – lessons learnt

What makes RwLs unique is the cyclical experimental design built into their transdisciplinary process of mutual learning, as well as the fact that they do not only strive for co-producing socially robust applicable knowledge, but also for direct (often local) yet scientifically reflected real-world change (Wagner and Grunwald 2019, Wanner et al. 2018b). RwLs therefore place even higher demands on researchers to fulfil multiple roles than regular transdisciplinary processes, which graduates cannot completely meet (Hilger et al. 2018, Jaeger-Erben et al. 2018). It is crucial to train them accordingly and to account for this in RwL project plans (Ober et al. 2019, Parodi et al. 2018, Rose et al. 2019).

In *WTW*, researchers often took on a change-agent role themselves (Hilger et al. 2018). The trade-off between catalysing both practical outcomes and scientific rigour, well known in transdisciplinary studies (see, e.g., Newig et al. 2019), is even more severe in RwL settings due to extensive practical fieldwork (Schäpke et al. 2018). With little personnel and resources, there may be little time left for conventional research. It can also be efficient for researchers to jump on existing processes and co-shape them instead of setting up new ones (bandwaggoning, Rose et al. 2017). Ideally, practice partners are already in a position of leveraging sustainability transitions.

Yet the true art is to pursue scientific and practical goals not only simultaneously, but in an integrated way. While *WTW* might not have fully achieved this integration, the project members managed to reflect and bring together both perspectives. Multiple joint planning and evaluation workshops over time helped to co-decide on upcoming (research) agendas, share responsibility, collect data, keep track of goals and influencing factors in a systematic way, facilitate mutual understanding of the different rationales and ways of thinking and identify mutual benefits.

For all those reasons, we also endorse the call for longer funding and project periods (Defila and Di Giulio 2020, Parodi et al. 2018, Schneidewind et al. 2018, WBGU 2016). With co-creating >

4 h*ttps://transzent.uni-wuppertal.de/de/forschung/wtw0/output.html*

5 See for example the *GAIA* series on *Toolkits for Transdisciplinarity and Frameworks for Transdisciplinary Research*, edited by Gabriele Bammer; the *td-net toolbox*, provided by the *Network for Transdisciplinary Research;* or the *td Academy*, hosted by the *TransImpact project*.

the platform *Transformation City* and its follow-up projects, parts of *WTW* collaborative infrastructure have been sustained beyond the three-year project term, though.

Despite the mentioned shortcomings when getting real with the RwL, the RwL scientists helped to focus, structure or initiate new and on-going activities in the three city districts that contributed to Wuppertal's well-being transformation. The interventions and steering groups activated and empowered established change agents, scientists as well as individual citizens from the city districts. Because of the scientific support some practice partners received more attention and legitimacy from the local media and politicians, which translated into increased social and political influence. Researchers gained first-hand experience and insights into local transformation processes, which informed their empirical and conceptual work and expanded their soft skills.

This work was supported by the German Federal Ministry of Education and Research (BMBF) under *Grant Research for Sustainable Development (FONA)*, award number 01UT1412A.

References

Defila, R., A. Di Giulio. 2020. Science policy recommendations for funding real-world laboratories and comparable formats. *GAIA* 29/1: 63–65.

Hilger, A., M. Rose, M. Wanner. 2018. Changing faces: Factors influencing the roles of researchers in real-world laboratories. *GAIA* 27/1: 138–145.

Jackson, T. 2009. *Prosperity without growth: Economics for a finite planet.* London: Earthscan.

Jaeger-Erben, M., E. Nagy, M. Schäfer, E. Süßbauer, J. Zscheischler. 2018. Von der Programmatik zur Praxis: Plädoyer für eine *Grounded Theory* transformationsorientierter Forschung. *GAIA* 27/1: 117–121.

Lang, D. J. et al. 2012. Transdisciplinary research in sustainability science: Practice, principles, and challenges. *Sustainability Science* 7/S1: 25–43.

Lux, A. et al. 2019. Societal effects of transdisciplinary sustainability research: How can they be strengthened during the research process? *Environmental Science and Policy* 101: 183–191.

Mauser, W. et al. 2013. Transdisciplinary global change research: The co-creation of knowledge for sustainability. *Current Opinion in Environmental Sustainability* 5/3–4: 420–431.

Newig, J., S. Jahn, D. J. Lang, J. Kahle, M. Bergmann. 2019. Linking modes of research to their scientific and societal outcomes: Evidence from 81 sustainability-oriented research projects. *Environmental Science and Policy* 101: 147–155.

Nordhaus, W., J. Tobin. 1972. Is growth obsolete? In: *Economic Growth*. Edited by W. Nordhaus, J. Tobin. Economic research: Retrospect and prospect 5. New York: Columbia University Press. 1–80.

Ober, S., C. Paulick-Thiel, E. Köppen. 2019. *Einbindung von PraxispartnerInnen in transdisziplinären Forschungsprojekten. Herausforderungen und Empfehlungen. NaWiKo* Synthese Working Paper 4. https://nachhaltigeswirtschaften-soef.de/sites/default/files/NaWiKo%20Synthese%20Working%20Paper%20No%204.pdf (accessed 15.09.2020).

Parodi, O. et al. 2018. Insights into and recommendations from three real-world laboratories: An experience-based comparison. *GAIA* 27/1: 52–59.

Pregernig, M., R. Rhodius, G. Winkel. 2018. Design junctions in real-world laboratories: Analyzing experiences gained from the project *Knowledge Dialogue Northern Black Forest. GAIA* 27/S1: 32–38.

Rose, M., K. Schleicher. 2017. *Was tragen die Wuppertaler Reallabore zur Wohlstandstransformation bei? Ein Leitfaden für einfache Wirkungsabschätzungen in transdisziplinären Projekten.* Wuppertal: Centre for Transformation Research and Sustainability.

Rose, M., K. Schleicher, K. Maibaum. 2017. Transforming well-being in Wuppertal: Conditions and constraints. *Sustainability* 9/12: 2375.

Rose, M., M. Wanner, A. Hilger. 2019. *Das Reallabor als Forschungsprozess und -infrastruktur für nachhaltige Entwicklung: Konzepte, Herausforderungen und Empfehlungen.* Wuppertal Paper 196. Wuppertal: Wuppertal Institute for Climate, Environment and Energy.

Schäpke, N. et al. 2018. Jointly experimenting for transformation? Shaping real-world laboratories by comparing them. *GAIA* 27/S1: 85–96.

Schauppenlehner-Kloyber, E., M. Penker. 2015. Managing group processes in transdisciplinary future studies: How to facilitate social learning and capacity building for self-organised action towards sustainable urban development? *Futures* 65: 57–71.

Schmidt, L., K. Hartberger, S. Kobbe, T. Falk, M. Wesselow, C. Schumann. 2018. Stakeholder involvement in transdisciplinary research: Lessons from three projects on sustainable land management in a north-south setting. *GAIA* 27/3: 312–320.

Schneidewind, U., K. Augenstein, F. Stelzer, M. Wanner. 2018. Structure matters: Real-world laboratories as a new type of large-scale research infrastructure. A framework inspired by Giddens' structuration theory. *GAIA* 27/S1: 12–17.

Schneidewind, U., M. Singer-Brodowski. 2013. *Transformative Wissenschaft. Klimawandel im deutschen Wissenschafts- und Hochschulsystem.* Marburg: Metropolis.

Schneidewind, U., M. Singer-Brodowski, K. Augenstein, F. Stelzer. 2016. *Pledge for a transformative science: A conceptual framework.* Wuppertal Paper 191. Wuppertal: Wuppertal Institute for Climate, Environment, Energy.

Scholz, R. W., G. Steiner. 2015. The real type and ideal type of transdisciplinary processes: Part II – what constraints and obstacles do we meet in practice? *Sustainability Science* 10/4: 653–671.

Stiglitz, J. E., A. Sen, J.-P. Fitoussi. 2009. *Report by the Commission on the Measurement of Economic Performance and Social Progress.* Paris: Commission on the Measurement of Economic Performance and Social Progress.

Wagner, F., A. Grunwald. 2019. Reallabore zwischen Beliebtheit und Beliebigkeit. Eine Bestandsaufnahme des transformativen Formats. *GAIA* 28/3: 260–264.

Wanner, M., A. Hilger, O. Spiker, J. Westerkowski. 2018a. *Was lernen wir aus den vier Wuppertaler Reallaboren? Evaluations- und Transferergebnisse aus dem Projekt Wohlstands-Transformation Wuppertal.* Wuppertal: Centre for Transformation Research and Sustainability.

Wanner, M., A. Hilger, J. Westerkowski, M. Rose, F. Stelzer, N. Schäpke. 2018b. Towards a cyclical concept of real-world laboratories: A transdisciplinary research practice for sustainability transitions. *disP – The Planning Review* 54/2: 94–114.

Wanner, M., F. T. Reinkenhoff. 2017. *Wer hat und wodurch wurde das Mirker Quartier entwickelt? Eine partizipative Konstellationsanalyse am Beispiel eines Wuppertaler Stadtquartiers.* Wuppertal: Centre for Transformation Research and Sustainability.

WBGU (German Advisory Council on Global Change). 2016. *Humanity on the move: Unlocking the transformative power of cities.* Berlin: WBGU.

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