

## Call for Papers: *GAIA* Special Issue 2024

### Impacts of Real-world Labs in Sustainability Transformations

After almost 10 years of research and action in Real-world Labs (RwLs), this special issue of *GAIA* aims to present and analyse the current state of the art of methodology, scope and objectives in RwL research. In particular, we invite empirical evidence and reflection on the impacts of RwLs on sustainability transformations. This special issue was initiated in the context of the RwL conference (<https://indico.scc.kit.edu/event/2597/overview>), held in June 2022 in Karlsruhe, which brought together 300 researchers, practitioners and intermediaries. With 115 contributions presented at the conference, the broad variety of projects and the emergence of a growing and dynamic transdisciplinary community was showcased. Nevertheless, it became clear that the growing interest in this field of transdisciplinary and transformative research, needs a thorough and encompassing perspective on the traceable and substantial impacts of RwLs and adjacent approaches on sustainability transformations.

#### Origin, orientation and methodology of Real-world Labs

The normative anchor point of RwLs lies in the concept of a "Great Transformation" (WBGU, 2011) of our societal structures, lifestyles and economies: a comprehensive, deep and programmatic transformation towards a future-oriented and sustainable society. RwLs as an action-oriented research approach aim to support – and accelerate – these fundamental changes for sustainability transitions (Caniglia *et al.*, 2020; Beecroft & Parodi, 2016; Parodi, 2019; Wagner & Grunwald, 2015, 2019; Schneidewind *et al.*, 2016; Bergmann *et al.*, 2021).

Since their first introduction, there have been diverse and fruitful debates around RwLs as a mode of research, their similarities and differences to other transdisciplinary and transformative approaches, and their methodical and methodological implementations (Schäpke *et al.*, 2018, 2018a; Rogga *et al.*, 2018; Defila & Di Giulio, 2018; Di Giulio & Defila, 2019; Beecroft *et al.*, 2018). RwLs are part of a broader field of social experimentation in dedicated labs, with adjacent approaches like Sustainable Living Labs (Liedtke *et al.*, 2015), Urban Transition Labs (Nevens *et al.*, 2013), T-Labs (Charlie-Joseph *et al.*, 2018; Pereira *et al.*, 2020), Challenge Labs (Larsson and Holmberg 2018) and Urban Living Labs (Puerari *et al.*, 2018; Voytenko *et al.*, 2015) – all of which are welcome to be addressed in this issue.

RwLs share a number of characteristics with these labs: they build on the ideas of real-world experimentation under participative control (Caniglia *et al.*, 2017), of open (social) innovation, and of transfer and upscaling of successful examples (Schäpke *et al.*, 2018). They facilitate participatory processes in a transdisciplinary mode of research that include practitioners throughout the process, from co-design via co-production to co-evaluation (Schäpke *et al.*, 2018, 2018a; McCrory *et al.*, 2020; Wanner *et al.*, 2018). RwLs enable learning about transition and impacts at a local as well as at a larger scale (Singer-Brodowski *et al.*, 2018; Krütli *et al.*, 2018). Apart from these similarities, different approaches and projects choose different ways to engage with sustainability (McCrory *et al.*, 2022) and follow different paths for transferring or upscaling their learnings (von Wirth *et al.*, 2019; Lam *et al.*, 2020).

#### Aims and scope: Impacts of Real-world Labs on Sustainability Transformations

Building on existing conceptual, methodological and typology-oriented scholarship, we want to draw further attention to the different *impacts and impact mechanisms* of RwLs and their adjacent approaches. We understand impacts as demonstrable and practical effects and results of RwLs on sustainability transformations, through real-world experiments and RwL structures. This also includes preliminary steps like generated products, immediate outputs and achieved outcomes (see Luederitz *et al.* 2017; Williams and Robinson, 2020). Our core interest lies in the analysis of RwLs impacts on and for a transformation to sustainability.

Initial concepts for assessing the impact of real-world experiments have been proposed (Luederitz *et al.*, 2017; Wiek *et al.*, 2014; Williams and Robinson, 2020; van Mierlo *et al.*, 2010 ) and the importance of the structural dimension of RwLs has been emphasised (Schneidewind *et al.*, 2018; Torrens and von Wirth 2021; Kivimaa and Rogge, 2022). Empirical and comparative *evaluation* of RwL impacts nevertheless remained scarce. Hence, we welcome comparative inquiries or single case studies, qualitative as well as quantitative assessments, possibly building on these or other substantial evaluation frameworks. In order to enhance rigour, depth, comparability, and cross-case learning, we welcome the **systematic analysis of impacts**. Contributions should describe the impacts of their RwL with reference to addressed **fields** (mobility, energy, consumption, biodiversity, equity, etc.); the **types** of impact aspired (physical change, introduction of new actor groups, changes in governance or regulation, technical innovation, learning, inner transition, socially robust knowledge etc.); the **mechanism, practices or theory of change** (direct/indirect impacts, effect chains, process information on inputs, products and outputs, creating space for learning, systemic interventions, synergies etc.); the **scale** of impacts (within the RwL, beyond the RwL, neighbourhood/regional/(inter-)national level, certain actor groups etc.); the **temporal pattern** of the impacts (short/mid/long-term); the relation between **intended and actual impact** (intended/unintended, expected/unexpected, positive/negative from different actor perspectives etc.); the **geographical** and/or **cultural setting**; and **feedback-effects** from the impacts to the RwL itself. Additionally, we explicitly invite contributions produced in co-authorship with practitioners.

We invite systematic analysis of RwL impacts in the following **topical areas** (further impact-related topics can be proposed):

- *Socio-ecological systems change* including, e.g., nature-based solutions, circular-economy, biodiversity in urban contexts or nature conservation and RwLs
- *Individual, collective, and social learning* in and through RwLs including (higher) education perspectives, relating learning to sustainability transformations
- *Communication, inner transition, relational approaches* and *cultures of sustainability* as well as related practices and their impact
- *Governance, institutions, and policies* supporting democratic participation and transformation
- *Social and technical innovation* as well as *exnovation and unlearning*, including the interplay of both phenomena
- *Regulatory sand-boxes and experiments* and their impacts on sustainability transformations
- *Arts, design and culture* in transdisciplinary research
- *Systems of RwLs*, including networks of collaboration of RwLs as part of a larger RwL-infrastructure
- *Spatial planning and geography of transitions* in relation to RwLs *Scaling and transfer*, including practicable ways to amplify the impacts of RwLs and RwLs as amplification catalysts

- *Perspectives and roles of practitioners* for the generation and evaluation of impact, including the establishment of communities of practice
- *Methodologies of monitoring, evaluation and impact assessment of RwLs*

### **Types of contributions**

Authors are encouraged to use the different article formats offered in GAIA. Besides regular Research Articles, this includes Forum Contributions as well as Design Reports. For details, please see the Guide for Authors: <https://gaia.oekom.de/index.php/gaia/Authors>

## **GAIA Open Access Special Issue**

### **Deadlines, Submission, and Review Process**

Authors are encouraged to submit abstracts to the SI guest editors. Upon acceptance, authors will be invited to submit full manuscripts. Papers will be peer reviewed. Upon acceptance, they will be published Open Access, with no author fees charged. Papers should be written in English with a short summary (if possible) in German and English. However, in exceptional cases, papers in German may also be accepted.

Please submit your abstract (500 up to 1,000 words) indicating the article type (research article, forum contribution or design report) via E-Mail to: [Felix.Wagner@kit.edu](mailto:Felix.Wagner@kit.edu)

The SI guest editor team includes Felix Wagner, Richard Beecroft, Pia Laborgne, Oliver Parodi (all Karlsruhe Institute of Technology), Matthias Wanner (Wuppertal Institute for Climate, Environment and Energy) and Niko Schöpke (University of Freiburg). Christoph Kueffer (University of Applied Sciences of Eastern Switzerland, St. Gallen) is the responsible GAIA co-editor of the SI.

#### **Important Dates**

24.11.2022 or earlier	Submission of abstracts (500 to 1,000 words)
January 2023	Invitation for full paper submission
30.04.2023 or earlier	Submission of full papers, followed by reviews, reworking papers, and final decisions on manuscripts
approx. February 2024	Publication of Special Issue

## References

- Beecroft, Richard, and Oliver Parodi, 2016. 'Reallabore als Orte der Nachhaltigkeitsforschung und Transformation'. *Technikfolgenabschätzung – Theorie und Praxis* 25 (3), 4–8.
- Beecroft, Richard, Helena Trenks, Regina Rhodius, Christina Benighaus, and Oliver Parodi, 2018. 'Reallabore als Rahmen transformativer und transdisziplinärer Forschung: Ziele und Designprinzipien'. In: Antonietta Di Giulio and Rico Defila (eds.), *Transdisziplinär und transformativ forschen*, edited by. Wiesbaden: Springer Fachmedien Wiesbaden. <https://doi.org/10.1007/978-3-658-21530-9>.
- Bergmann, Matthias, Niko Schöpke, Oskar Marg, Franziska Stelzer, Daniel J. Lang, Michael Bossert, Marius Gantert, *et al.*, 2021. 'Transdisciplinary Sustainability Research in Real-World Labs: Success Factors and Methods for Change'. *Sustainability Science*, January. <https://doi.org/10.1007/s11625-020-00886-8>.
- Caniglia, Guido, Christopher Luederitz, Timo von Wirth, Ioan Fazey, Berta Martín-López, Kristina Hondrila, Alexandra König, *et al.*, 2020. 'A Pluralistic and Integrated Approach to Action-Oriented Knowledge for Sustainability'. *Nature Sustainability*, October. <https://doi.org/10.1038/s41893-020-00616-z>.
- Caniglia, Guido, Niko Schöpke, Daniel J. Lang, David J. Abson, Christopher Luederitz, Arnim Wiek, Manfred D. Laubichler, Fabienne Gralla, and Henrik von Wehrden, 2017. 'Experiments and Evidence in Sustainability Science: A Typology'. *Journal of Cleaner Production*, May. <https://doi.org/10.1016/j.jclepro.2017.05.164>.
- Charli-Joseph, Lakshmi, J. Mario Siqueiros-Garcia, Hallie Eakin, David Manuel-Navarrete, and Rebecca Shelton, 2018. 'Promoting Agency for Social-Ecological Transformation: A Transformation-Lab in the Xochimilco Social-Ecological System'. *Ecology and Society*, 23 (2). <https://doi.org/10.5751/ES-10214-230246>.
- Defila, Rico, and Antonietta Di Giulio (eds.), 2019. *Transdisziplinär und transformativ forschen, Band 2: Eine Methodensammlung*. Wiesbaden: Springer Fachmedien Wiesbaden. <https://doi.org/10.1007/978-3-658-27135-0>.
- Di Giulio, Antonietta, and Rico Defila (eds.), 2018. *Transdisziplinär und transformativ forschen*. Wiesbaden: Springer Fachmedien Wiesbaden. <https://doi.org/10.1007/978-3-658-21530-9>.
- Kivimaa, Paula, and Karoline Rogge, 2022. 'Interplay of policy experimentation and institutional change in sustainability transitions: The case of mobility as a service in Finland'. *Research Policy*, 51(1), 104412. <https://doi.org/10.1016/j.respol.2021.104412>

- Krütli, Pius, Christina Pohl, and Michael Stauffacher, 2018. 'Sustainability learning labs in small island developing states: A case study of the Seychelles'. *GAIA-Ecological Perspectives for Science and Society*, 27(1), 46-51. <https://doi.org/10.14512/gaia.27.S1.11>
- Lam, David, Berta Martín-López, Arnim Wiek, Elena Bennett, Niki Frantzeskaki, Andra Horcea-Milcu, and Daniel Lang, 2020. 'Scaling the impact of sustainability initiatives: a typology of amplification processes'. *Urban Transformations*, 2(1), 1-24. <https://doi.org/10.1186/s42854-020-00007-9>
- Larsson, Johan, and John Holmberg, 2018. 'Learning while creating value for sustainability transitions: The case of Challenge Lab at Chalmers University of Technology'. *Journal of Cleaner Production*, 172, 4411-4420. <https://doi.org/10.1016/j.jclepro.2017.03.072>
- Liedtke, Christa, Carolin Baedeker, Marco Hasselkuß, Holger Rohn, and Viktor Grinewitschus, 2015. 'User-Integrated Innovation in Sustainable LivingLabs: An Experimental Infrastructure for Researching and Developing Sustainable Product Service Systems'. *Journal of Cleaner Production* 97 (June), 106–16. <https://doi.org/10.1016/j.jclepro.2014.04.070>.
- Luederitz, Christopher, Niko Schöpke, Arnim Wiek, Daniel J. Lang, Matthias Bergmann, Joannette J. Bos, Sarah Burch *et al.*, 2017. 'Learning through Evaluation – A Tentative Evaluative Scheme for Sustainability Transition Experiments'. *Journal of Cleaner Production*, 169 (December), 61–76. <https://doi.org/10.1016/j.jclepro.2016.09.005>.
- McCrory, Gavin, Johan Holmén, Niko Schöpke, and John Holmberg, 2022. 'Sustainability-Oriented Labs in Transitions: An Empirically Grounded Typology'. *Environmental Innovation and Societal Transitions*, 43 (June), 99–117. <https://doi.org/10.1016/j.eist.2022.03.004>.
- McCrory, Gavin, Niko Schöpke, Johan Holmén, and John Holmberg, 2020. 'Sustainability-Oriented Labs in Real-World Contexts: An Exploratory Review'. *Journal of Cleaner Production*, 277 (December), 123202. <https://doi.org/10.1016/j.jclepro.2020.123202>.
- Nevens, Frank, Niki Frantzeskaki, Leen Gorissen, and Derk Loorbach, 2013. 'Urban Transition Labs: Co-Creating Transformative Action for Sustainable Cities'. *Journal of Cleaner Production*, 50 (July), 111–22. <https://doi.org/10.1016/j.jclepro.2012.12.001>.
- Parodi, Oliver, 2019. 'Wider eine Engführung des Reallabor-Konzepts'. *Ökologisches Wirtschaften – Fachzeitschrift*, 33 (2), 8. <https://doi.org/10.14512/OEW340208>.
- Pereira, Laura, Niki Frantzeskaki, Aniek Hebinck, Lakshmi Charli-Joseph, Scott Drimie, Michelle Dyer, Hallie Eakin *et al.*, 2020. 'Transformative Spaces in the Making: Key Lessons from Nine Cases in the Global South'. *Sustainability Science*, 15 (1), 161–78. <https://doi.org/10.1007/s11625-019-00749-x>.

- Puerari, Emma, Jotte de Koning, Timo von Wirth, Philip Karré, Ingrid Mulder, and Derk Loorbach, 2018. 'Co-Creation Dynamics in Urban Living Labs'. *Sustainability*, 10 (6), 1893. <https://doi.org/10.3390/su10061893>.
- Rogga, Sebastian, Jana Zscheischler, and Nadin Gaasch, 2018. 'How Much of the Real-World Laboratory Is Hidden in Current Transdisciplinary Research?' *GAIA – Ecological Perspectives for Science and Society*, 27 (1), 18–22. <https://doi.org/10.14512/gaia.27.S1.6>.
- Schäpke, Niko, Franziska Stelzer, Guido Caniglia, Matthias Bergmann, Matthias Wanner, Mandy Singer-Brodowski, Derk Loorbach, Per Olsson, Carolin Baedeker, and Daniel J. Lang, 2018. 'Jointly Experimenting for Transformation? Shaping Real-World Laboratories by Comparing Them'. *GAIA – Ecological Perspectives for Science and Society*, 27 (S1), 85–96. <https://doi.org/10.14512/gaia.27.S1.16>.
- Schäpke, Niko, Matthias Bergmann, Franziska Stelzer, and Daniel Lang, 2018a. 'Labs in the real world: Advancing transdisciplinary research and sustainability transformation: Mapping the field and emerging lines of inquiry. *GAIA-Ecological Perspectives for Science and Society*, 27(1), 8-11. <https://doi.org/10.14512/gaia.27.S1.4>
- Schneidewind, Uwe, Mandy Singer-Brodowski, Karoline Augenstein, and Franziska Stelzer, 2016. 'Pledge for a Transformative Science. A Conceptual Framework', 191. *Wuppertal Paper*. Wuppertal: Wuppertal Institute for Climate, Environment and Energy.
- Schneidewind, Uwe, Karoline Augenstein, Franziska Stelzer, and Matthias Wanner, 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 (S1), 12–17. <https://doi.org/10.14512/gaia.27.S1.5>.
- Singer-Brodowski, Mandy, Richard Beecroft, and Oliver Parodi, 2018. 'Learning in Real-World Laboratories: A Systematic Impulse for Discussion'. *GAIA – Ecological Perspectives for Science and Society*, 27 (1), 23–27. <https://doi.org/10.14512/gaia.27.S1.7>.
- Torrens, Jonas, and Timo von Wirth, 2021. 'Experimentation or projectification of urban change? A critical appraisal and three steps forward'. *Urban Transformations*, 3(1), 1-17. <https://doi.org/10.1186/s42854-021-00025-1>
- Van Mierlo, Barbara, Barbara Regeer, Mariëtte van Amstel, Marlèn Arkesteijn, Volkert Beekman, Joske Bunders, Tjard de Cock Buning, Boelie Elzen, Anne-Charlotte Hoes, and Cees Leeuwis, 2010. *Reflexive monitoring in action. A guide for monitoring system innovation projects*. Communication and Innovation Studies, WUR; Athena Institute, VU.

- von Wirth, Timo, Lea Fuenfschilling, Niki Frantzeskaki, and Lars Coenen, 2019. 'Impacts of Urban Living Labs on Sustainability Transitions: Mechanisms and Strategies for Systemic Change through Experimentation'. *European Planning Studies*, 27 (2), 229–57. <https://doi.org/10.1080/09654313.2018.1504895>.
- Voytenko, Yuliya, Kes McCormick, James Evans, and Gabriele Schliwa, 2016. 'Urban Living Labs for Sustainability and Low Carbon Cities in Europe: Towards a Research Agenda'. *Journal of Cleaner Production*, 123, 45–54. <https://doi.org/10.1016/j.jclepro.2015.08.053>.
- Wagner, Felix, and Armin Grunwald, 2015. 'Reallabore als Forschungs- und Transformationsinstrument: Die Quadratur des Hermeneutischen Zirkels'. *GAIA – Ecological Perspectives for Science and Society*, 24 (1), 26–31. <https://doi:10.14512/gaia.24.1.7>
- Wagner, Felix, and Armin Grunwald. 2019. 'Reallabore zwischen Beliebtheit und Beliebigkeit.: Eine Bestandsaufnahme des transformativen Formats'. *GAIA – Ecological Perspectives for Science and Society*, 28 (3), 260–264. <https://doi:10.14512/gaia.28.3.5>
- Wanner, Matthias, Annaliesa Hilger, Janina Westerkowski, Michael Rose, Franziska Stelzer, and Niko Schöpke, 2018. 'Towards a Cyclical Concept of Real-World Laboratories: A Transdisciplinary Research Practice for Sustainability Transitions'. *DisP – The Planning Review*, 54 (2), 94–114. <https://doi.org/10.1080/02513625.2018.1487651>.
- WBGU (German Advisory Council on Global Change), 2011. *World in Transition – A Social Contract for Sustainability*. Berlin: WBGU.
- Wiek, Armin, Sonia Talwar, Meg O'Shea, and J. Robinson, 2014. 'Toward a Methodological Scheme for Capturing Societal Effects of Participatory Sustainability Research'. *Research Evaluation*, 23 (2), 117–32. <https://doi.org/10.1093/reseval/rvt031>.
- Williams, Stephen, and John Robinson, 2020. 'Measuring Sustainability: An Evaluation Framework for Sustainability Transition Experiments'. *Environmental Science & Policy*, 103 (January), 58–66. <https://doi.org/10.1016/j.envsci.2019.10.012>.