Ethics in Living Labs

Reflection Guidelines for *Responsible Research and Innovation* in Living Labs

Version: September 2024

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Involved Persons and Institutions

In 2022, an interdisciplinary project team at the Karlsruhe Institute of Technology (KIT) began working on ethics guidelines for living labs (also known as real-world laboratories, especially in the German speaking area). The project was coordinated by the Academy of Responsible Research, Teaching, and Innovation (ARRTI) and the Karlsruhe Transformation Center for Sustainability and Cultural Change (KAT). In the course of this project, two documents were developed to address ethical challenges in living labs. First, the "Reflection Guidelines" (main author Dr. Elisabeth Does) with a catalog of questions for guided and independent reflection on ethical challenges in the daily work of living lab practitioners. The guidelines are written for a broad living lab audience. Secondly, the "Code of Ethics for Real-World Labs of Sustainability" (main author Dr. Marc Dusseldorp) was created for the "Real-World Labs of Sustainability Network" active in German-speaking countries. The code outlines the shared values of this community and provides guidance for participants in real-world laboratory projects. Members of this network, as well as other individuals with expertise in living labs, were involved in the development process of both documents through workshops and discussions. Both documents can be understood individually as well as complementarily and are available on the ARRTI website as well as on the website of the Real-World Labs of Sustainability Network.

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The Academy for Responsible Research, Teaching, and Innovation at KIT is funded by the Federal Ministry of Education and Research (BMBF) and the Ministry of Science, Research and Arts of Baden-Württemberg as part of the Excellence Strategy of the federal and state governments.

Bundesministerium für Bildung und Forschung

Baden-Württemberg
MINISTERIUM FÜR WISSENSCHAFT, FORSCHUNG UND KUNST

Content Overview

Foreword

Why These Guidelines?

Living Labs (LLs) are transdisciplinary and participatory research formats and a unique form of scientific practice. They are typically set up as temporary scientific projects or as distinct, established organizational units within universities or other research institutions. Thus, general guidelines for good scientific practice or research ethics also serve as a standard for LL practitioners. At the same time, due organizational and methodological peculiarities of LLs that arise from their transdisciplinary, participatory design, such guidelines do not sufficiently cover all aspects relevant to LL work. Consequently, the "Reflection Guidelines" for LLs at hand are to be understood as supplementary guidelines for LL work. They are intended to contribute to the professionalization and long-term establishment of LL work as a responsible science- based practice.

Format of These Guidelines

The guidelines at hand address the fact that there is great diversity of LL formats, particularly concerning their organizational structure, research content, and transformative intentions—i.e., intentions to intervene in existing structures of real-world environments. Hence, these guidelines do not offer an extensive and complete list of fixed values and instructions on how to act upon them. Instead, they are intended to help LL practitioners to independently reflect upon their own LL practice, recognize situational challenges with ethical relevance, and respond appropriately based on their own, carefully pre-meditated judgements.

Central Element: Guiding Questions

Each section concludes with a catalog of guiding questions, which LL practitioners can use as reference points in their reflection process. The questions are written in a practice-oriented manner and break down the ethical challenges described in each section in detail. They are intended to help identify key aspects and individual particularities of one's own LL work and to independently develop suitable responses to associated challenges.

Structure of the Guidelines

The foreword is followed by the guidelines in three parts.

Part 1 identifies three central fields of reflection and action with ethical relevance for LL work:

- Organizational structure

- Common good-orientation and transformation
- Scientific Mission

The description of these three fields of reflection and action is fundamental to all following sections of the guidelines. The tripartite division is intended to help LL practitioners to systematically organize their own reflection processes—whether in groups or individually. Additionally, each field of action and reflection highlights particularly central aspects of LL work that potentially bring about ethical challenges. These ethical challenges are described in their basic outlines. They are not to be understood as a complete list of all possible ethical challenges in all the different forms of existing LL work. Rather, they aim to raise awareness of the most apparent issues and ideally serve as a blueprint for individual reflection processes.

In **Part 2,** general principles of value-based project management in LLs are outlined:

- Diversity in living labs
- Transparency, fairness, and reliability in internal and external relations
- Responsible management of diverse roles and interests
- Solution-oriented error culture and conflict management

These principles rest upon central values for responsible LL work. They are intended to serve as a compass for LL practitioners and can be understood as fundamentally guiding in all fields of reflection and action.

In **Part 3,** role-specific dependencies and responsibilities in LL work are addressed. It shall raise awareness of particular challenges related to specific roles or stakeholder groups. The following stakeholders and their dependencies in hierarchical relationships and responsibility relations are considered:

- Employees in LLs
- Enployees in leading positions in LLs
- Participating citizens
- Affected stakeholders without direct involvement

How Were These Guidelines Developed?

Several workshops and discussions on challenges in LL work, involving practitioners with experience in LL work, form the empirical basis of these guidelines. The results of these workshops and discussions were systematically evaluated by the project team to identify those fields of action in LL work that are

of particular ethical relevance. This was followed by a detailed description of the relevant fields of action with their ethical challenges and the development of reflection guiding questions. The philosophical expertise available within the project team was incorporated into all these steps. In case of questions concerning methodology and development process of the guidelines the project team can be contacted for more detailed information.

Part 1

Ethically Relevant Fields of Action and Reflection in Living Labs

1.1. Organizational Structure

Living Labs (LLs) can vary significantly in their organizational forms. For example, a LL that operates as a time-limited individual project closely affiliated with a research institute is organized differently from a permanently established and organizationally independent LL with numerous individual projects. Even within a single LL, project partners may organize themselves in various ways to meet the specific requirements of a project. Depending on the differences in organizational forms, different hierarchical relationships can emerge between involved individuals or groups, which in turn determine the responsibility relationships among them. Since new organizational forms continuously emerge in the context of LL work, it is uncertain whether guidelines established at one point in time will adequately cover all important aspects for a newly developed LL.

Consequently, a central ethical responsibility of all participants in LL work is to be aware of this distinctiveness and to engage in the continuous identification and reflection of newly emerging fields and questions of responsibility. A shared awareness of the organizational particularities of a LL is essential for recognizing, reflecting upon, and tackling the ethical challenges and responsibilities that exist within the responsibility relationships between involved individuals or groups.

Guiding Questions 1.1: Organizational Structure

Describe and Compare

1.1.1. What is the basic organizational structure of the LL?

1.1.2. In what ways does the LL project resemble or differ from traditional scientific organizational forms?

1.1.3. How does the project resemble or differ from other LLs or existing best or worst practices in LL research?

1.1.4. What experiential reports are available and to what extent can they be applied to the project in order to raise awareness for challenges?

1.1.5. Where is it sensible to follow existing knowledge, and where must new approaches be developed for thinking about and addressing challenges, given that the project is only partially comparable to others?

Special Focus: Clear Attribution of Responsibilities

1.1.6. What groups and individuals are involved in the project, and who is responsible for what?

1.1.7. Is there any risk of misunderstandings regarding important responsibility attributions?

1.1.8. Where do risks exist between groups in this regard?

1.1.9. Where do risks exist within groups in this regard?

1.1.10. What measures can be taken to minimize these risks?

1.2. Common Good-Orientation and Transformation

Common Good-Oriented Risk Assessment

Every scientific practice is committed to the common good in that it must not harm it. Due to their transdisciplinary and participatory orientation, LLs are particularly well-suited for research in the context of societal transformation processes. Often, LL projects not only accompany such transformation processes but also unfold transformative effects themselves, as they actively intervene in real-world environments. Even when the intended effects of such interventions are particularly oriented towards the common good, such as in the context of sustainable development, the actual impact may still involve unintended consequences that are detrimental to the common good.

Hence, responsible LL practice always involves comprehensive risk assessments regarding both intended and unintended consequences. Risk assessments should be carried out with regard to both the transformation goals pursued by the LL and the means or methods used to achieve these goals. Standards for risk analysis (both for assessment before the project begins and for ongoing monitoring) should be developed and applied. Suitable presentation and communication formats are also crucial for ensuring transparent communication about risks to all stakeholder groups. The risks associated with a LL project for the environment in which it operates must not exceed an acceptable level. To determine the acceptability of risks, assessments by ethics committees are of central importance.

Legitimacy of Transformation Goals

Transformative LL work pursues specific transformation goals. Beyond general risk assessments, such goals require solid grounds of legitimation. While researchers are generally protected from external interference in defining research questions and projects due to their fundamental right to academic freedom, limitations need to be considered in the context of transformation goals. Whether society at large or smaller communities within a society are to be transformed toward a specific goal is not up to LL researchers to decide – instead, such matters are to be discussed and decided in political arenas, following democratic procedures. Therefore, the transformation goals of a LL project must align with democratically legitimized goals of societal development.

A transformation goal should be a plausible one. In principle, it should be achievable and this achievability should derived from existing scientific knowledge. Additionally, two constraints originating from the political realm define the frame within which legitimate transformation goals for LL work are set. First, with regard to fundamental principles of political and societal order: The

transformation goal must align with the legally established principles of political and societal order in the democratic society where the goal is to be pursued. Second, with regard to those affected in the vicinity of the LL, for example a city district or rural neighborhood: The transformation goal must receive approval from those directly impacted by the LL experiment and the resulting transformation effects. Such approval should be given or denied in local democratic processes. Affected individuals must have access to all relevant information about the LL project, including information on risk assessments, to make an informed decision regarding their consent.

Guiding Questions 1.2: Common Good-Orientation and Transformation

Risk Assessment

1.2.1. Are there standardized analytical tools available to identify and assess risks for (potentially) affected individuals and environments?

1.2.2. If yes: To what extent do these tools cover all areas and particularities of the LL project? What additional tools or custom-designed approaches can be used to systematically address all relevant aspects of the LL project for risk assessment?

1.2.3. If no: Is there expertise among the individuals involved in the LL project to perform a systematic analysis of the project's risk profile (e.g., through the development of a suitable tool)? Or is it necessary to consult external expertise for this purpose?

1.2.4. Is there exchange on risks with other LLs working in similar areas? How can such exchange be established to enhance competence?

1.2.5. To which official bodies is the LL accountable (e.g., university ethics committees, municipal authorities, etc.), and how is it ensured that the LL fully meets all obligations towards these bodies?

Legitimacy of Transformation Goals

1.2.6. Plausibility: Are there robust scientific findings that classify the transformation goal as in principle achievable?

1.2.7. Alignment with political and societal order: Are all goals pursued by the project in compliance with the constitution? Do they also not contradict other legally established orders (e.g., the economic system) of the democratic society within which the LL operates?

1.2.8. Consent of affected parties: What procedures are available that will reliably reflect the will (consent or denial) of affected parties?

1.2.9. Consent of affected parties: Which of these procedures are appropriate considering the project goal? For instance, is it sufficient for the LLL to be authorized by a municipal council, or is a direct vote among all affected individuals on site required?

1.2.10. Consent of affected parties: How is it ensured that votes among affected parties on site are conducted in accordance with democratic principles? Who is independent and qualified enough to professionally oversee this process?

1.2.11. How is it ensured that all affected parties receive all relevant information for making an informed decision in an appropriate manner (e.g., language suitable for target group)?

1.3. Scientific Mission

Research Methods

LL work generates valuable knowledge that cannot be produced under standard laboratory conditions. Testing new technologies or new forms of social and economic coordination in real-world settings involves methodological peculiarities. On the one hand, real-world experiments rely on established methods from the empirical social and life sciences; on the other hand, the methodological spectrum is expanded with new methods specific to LL work. For instance, new methods may include approaches to facilitate meaningful engagement of participating individuals in the research process. Moreover, the transdisciplinary and participatory nature of LL work necessitates deviations from established standards of classical research formats at certain points. For example, due to its interventionist nature in non-standardizable and non-replicable real environments (e.g., urban districts or nature reserves), repeating such experiments to ensure the intersubjective verifiability of findings and transferability of findings to other contexts may not be possible.

Successful LL work relies on methodological flexibility. However, this flexibility should not be overstretched or become a gateway to arbitrariness in the design of research processes. If LL work becomes arbitrary in its methodological approach, it undermines the goal of providing reliable insights through systematically collected and analyzed data. It is the responsibility of all researchers in LLs to adhere to established standards and to collaboratively develop and establish new standards for those steps in the research process for which no existing standards are available, yet. Including experienced researchers from the LL field as well as of methodological experts from adjacent disciplines, such as social and life sciences and philosophy of science, will ensure the development of robust standards in those areas. The development of new methods arises not only from critiques of traditional research formats and their methodological limitations but also from a self-critical examination of the methodological challenges and limitations inherent in one's own LL work.

Educational Mission

Due to their unique position at the intersection of science and society, LLs not only contribute to knowledge creation in applied research but also serve as hubs for science communication and education. LL work brings people from various social, economic and educational backgrounds into contact with science, providing numerous opportunities to explain factual knowledge and to educate about the procedural aspects of scientific work. It is the responsibility of scientifically trained staff in LLs to fulfill this educational role in order to act as intermediaries between scientific institutions and citizens.

As ambassadors of science in an educational context, it is the special responsibility of LL practitioners to explain the knowledge-building process. This includes emphasizing the importance and advantages of systematic and rigorous application of proven methods as much as explaining the provisional nature of scientific knowledge, uncertainties linked to the research process and approaches to dealing with such uncertainties. It is especially the duty of scientifically trained LL practitioners to recognize, transparently communicate, and explain to all important stakeholders—including those without scientific training—the specific limitations associated with the methodological peculiarities of LL work. This helps prevent the emergence of unrealistic expectations regarding LL work.

Scientific Mission and Personal Motivation

Personal motivation drives dedicated effort and a commitment to meeting high standards of work. At the same time, maintaining high-quality scientific work may at times require a critical assessment of personal motives and an examination of whether the personal objectives pursued within the LL work are fully aligned with the scientific mission. This is especially crucial when a LL project relates to groups or topics of political activism.

Personal commitment in the LL project must remain within the boundaries of the project's legitimate transformation and research goals, methodological standards, and the educational mission defined as part of the scientific mission. LL work must not be used as a means to advance personal values and objectives that transgress these boundaries.

Guiding Questions 1.3: Scientific Work

Understanding

1.3.1. Do all individuals involved in the project sufficiently understand the scientific methods applied in the project?

1.3.2. How are methodological approaches justified, and do project participants understand these justifications?

1.3.3. Do all participants also understand the limitations of the methods used?

Educational Mission

1.3.4. How is it ensured that all stakeholders are provided with a realistic understanding of the methods and results, including their limitations?

1.3.5. What competencies in the field of science communication are required for the project?

1.3.6. Are these competencies available within the team? How can they be acquired?

Scientific Mission and Personal Motivation

1.3.7. What individual and shared values and goals shape the work within the group?

1.3.8. To what extent are these values and goals covered by the scientific mission?

1.3.9. In which situations and for what reasons is there a risk that employees might act beyond the boundaries of the scientific mission due to their personal commitment?

1.3.10. What measures can be taken individually and as a group to detect instances where the LL project is being inappropriately used to further personal ideals at the expense of the scientific mission?

1.3.11. What measures can be taken to prevent such instrumentalization?

Part 2

General Principles of Responsible Living Lab Work

2.1. Diversity in the Living Lab

At the intersection of science, politics, and society, LLs function as facilitators for inclusion. Participation in a LL project should be possible for all individuals, regardless of gender, sexual orientation, physical, mental, or emotional disabilities, skin color, ethnicity, religion, or belonging to any other marginalized groups.

This inclusion mandate applies both to the design of the participation process for citizens and the involvement of other stakeholder groups, as well as to the selection of personnel employed to run the LL. In this context, any LL can be understood as an experimental space in which new models of inclusion and responsible participation can be developed.

Guiding Questions 2.1: Diversity in the Living Lab

Personnel:

2.1.1. What opportunities for improved inclusion of marginalized groups are offered by the scientific institution to which the living lab is affiliated? What opportunities do project partners offer? How can the living lab make optimal use of these opportunities?

2.1.2. What additional measures can the living lab take to ensure even better inclusion?

2.1.3. How can the living lab contribute to the further development of inclusion efforts by the associated research institution?

2.1.4. What factors relevant to improving inclusion are already present in the personnel selection process?

2.1.5. What factors relevant to improving inclusion are important in the design of work processes?

2.1.6. How can work processes be organized such that individual needs of people can be addressed?

Participation Process:

2.1.7. To what extent does the research question or transformation goal of the LL project require the inclusion of marginalized groups?

2.1.8. Is it appropriate to equally consider all marginalized groups, or are certain groups of particularly high relevance to the project and therefore should be prioritized?

2.1.9. How can these groups be approached and included?

2.1.10. Is there an opportunity to receive assistance from the associated scientific institution?

2.1.11. Are there helpful experiences from other LL projects? Can exchange with other LLs on challenges be organized?

2.1.12. How is it ensured that members of marginalized groups can provide feedback on potential challenges or barriers in the participation process? For example, is there a designated inclusion officer in the LL who is specifically responsible for the inclusion process of participating citizens (as opposed to employed staff)?

2.1.13. How can such feedback be translated into actual improvement measures, even during the ongoing project?

2.2. Transparency, Fairness, and Reliability in internal and external relations

The core values of transparency, fairness, and reliability together create fundamental conditions for the development of trust. This applies both to working relationships within a project team and to the public engagement of a LL. Due to their bridging and mediating role between science and society and in order to build trust between the public and scientific institutions, members of LLs have a particular responsibility to act as transparent, fair, and reliable agents.

Transparency

General transparency standards of good scientific practice particularly refer to standards for disclosing funding sources, data sources, research objectives, methods, and results. Transparency about these aspects towards external stakeholders creates a foundation of trust – within the scientific community as well as for a broader public.

Internal transparency towards all participants in a LL project regarding working conditions, organizational processes, decision-making pathways, personal expectations, and interests is particularly important. Transparency in these aspects enables well-informed discussions about coordination issues and reduces the risk of misunderstandings and inefficiencies in the workflow. It also makes abuse of power more difficult and less likely. Transparency about the conditions under which a project is conducted is itself a matter of fairness to all (potential) participants in a project.

Since LLs operate at the intersection of science and society, the boundaries between internal and external relationships are more blurred than in other scientific contexts. As a LL engages more frequently with the broader public, transparency regarding cooperation conditions, organizational processes, mutual expectations, and other aspects becomes significantly more relevant in managing external relations.

Fairness

The general conditions that characterize the work in a LL should not only be communicated transparently but also be designed fairly. Similar conditions for all individuals in hiring processes, task assignments, compensation, and in their rights to be involved and have a say in matters that effect their roles are particularly important. Fair standards and comparability in all these aspects help prevent discrimination and exploitation of employees or collaboration partners.

Creating fair conditions is a particular challenge for LLs because fairness and similarity in terms of individual working or participation conditions should ideally be established across all stakeholder groups, not just within a team.

Reliability

Processes and responsibilities within the project should not only be designed with fairness and transparency in mind but should also function reliably in practice. Trust requires reliability – reliability of organizational structures as well as reliability of people within those structures

Organizational structures should be well-thought-out in the project planning phase and tailored to the specific characteristics of the LL project to minimize or avoid the need for restructuring during the project. Reliably functioning structures enable a reliable workflow within LL teams as well as between LL teams and other stakeholders.

Guiding Questions 2.2: Transparency, Fairness and Reliability

Internal and external transparency

2.2.1. How is it ensured that general transparency standards of good scientific practice regarding funding sources, data sources, research objectives, methods, and results are met?

2.2.2. How is it ensured that the relevant information is accessible and clearly communicated all stakeholders, also those outside the scientific community?

2.2.3. What options are available to clearly present the general conditions of the LL project to all relevant individuals and groups?

2.2.4. How is it ensured that all stakeholders have an adequate information base (e.g., preventing undesirable power imbalances that arise due to unequal access to information)?

Cross-collaboration fairness

2.2.5. How is it ensured that no inappropriately unequal treatment of employees or collaboration partners occurs?

2.2.6. How can necessary differences in treatments be managed in a way that they do not lead to frustration (e.g., different project partners inevitably structuring their working contracts based on different regulations)?

Structural and personal reliability

2.2.7. What organizational conditions must be established to enable individuals to perform their work reliably and to be perceived as dependable contacts both internally to team members and externally to other stakeholder groups?

2.2.8. What measures can be taken to ensure that, in case organizational restructuring becomes necessary during the project, all relevant core processes continue to function as reliably as possible? How can it be ensured in such situations that collaboration partners and participating citizens continue to be reliably supported?

2.3. Responsible Management of Diverse Interests and Roles

Diversity of Interests

Due to their participatory design, LLs bring together stakeholder groups from various professional or voluntary contexts, such as scientific organizations, local politics, businesses, and civil society. This diversity of stakeholder groups comes along with diversity in interests, which can become a source of conflicts. Misunderstandings can easily arise regarding the interests pursued by different stakeholder groups, as not all participants fully understand the working conditions, levels of experience, or professional languages which define other groups. Often, conflicts of interest appear larger than they actually are due to such misunderstandings. Conversely, miscommunication can also cause existing and potentially serious conflicts of interest to go unrecognized for too long. To prevent misunderstandings and the escalation of potential conflicts into actual problems, particularly effective communication between all involved stakeholder groups is essential.

Responsible LL work means providing sufficient time and professional facilitation for discussions about specific interests and working methods of all stakeholders.

Potential Role Conflicts

The diversity of interests and associated potential for conflict can also apply to individuals, for example, when people are active in or affected by LL work in multiple roles simultaneously. A city council member or a scientist might be involved in a LL project in their professional role and as a resident of an affected neighborhood. If a person in a LL project is functioning in multiple roles, this should be made transparent to all participants in the LL.

When assigning (multiple) roles to individuals in the LL, existing compliance rules of the involved institutions (e.g., universities, public administration) should be applied to prevent abuse of power in the case of conflicts of interest. At the same time, it is the responsibility of each participant in a LL to manage their personal diversity of roles consciously, to recognize emerging conflicts of interest early, to make them transparent to others, and, if necessary, to proactively step down from roles.

Guiding Questions 2.3: Diverse Interests and Roles

Diversity of Interests

2.3.1. How is it ensured at the organizational level that there is sufficient space for open, well-moderated communication of interests?

2.3.2. Which existing guidelines (governance policies) for disclosing (potential) conflicts of interest can be used to identify potential weaknesses in the personnel composition early and to take appropriate measures?

2.3.3. What additional transparency requirements might the LL impose to address aspects particularly relevant to the project?

Potential Role Conflicts

2.3.4. Which individuals are (potentially) exposed to personal conflicts of interests due to their role(s)?

2.3.5. What structural/organizational measures are needed to prevent the occurrence of such conflicts or negative impacts on the project?

2.3.6. What measures can these individuals take themselves to prevent the occurrence of such conflicts or negative impacts on the project (e.g., stepping down from roles)?

2.4. Solution-oriented error culture and conflict management

A solution-oriented approach to personal conflicts between groups or individuals in a LL project is as important as a solution-oriented approach to errors that inevitably occur in LL work. A healthy conflict and error culture is characterized by addressing difficulties that arise in a solution-oriented manner, in addition to measures for conflict and error prevention. Solution orientation means, first and foremost, that the causes of problems are clearly identified in order to find the best possible solution for the project, rather than merely finger pointing to guilty parties.

A good conflict and error culture encourages team members to handle mistakes and learning opportunities openly and without fear. In cases where conflicts within a project team seem irresolvable or where there are serious breaches of good work practices, all individuals involved in the LL (both employed and non-employed) should have access to ombudsman and mediation services outside the LL.

Guiding Questions 2.4: Error Culture and Conflict Management

Conflict and error prevention:

2.4.1. Which aspects of LL work described in the preceding and following chapters of these guidelines are particularly relevant to a specific project?

2.4.2. To what extent do adherence to these aspects already contribute to conflict and error prevention in the project?

2.4.3. What additional preventive measures might the project require? Are there helpful insights from other projects available?

Conflict and error management

2.4.4. How is it ensured that participants in the LL who openly address errors and conflicts do not face personal disadvantages?

2.4.5. Are independent moderators/mediators available for conflict mediation?

2.4.6. Do all participants in the LL have equal access to mediation and ombudsman services or other forms of advice? How can such access be ensured?

Part 3

Role-Specific Dependencies and Responsibilities in Living Labs

3.1. Employees in Living Labs

Individual Responsibilities within the Organizational Environment

The tasks of employed staff in living labs are defined by employment contracts and job descriptions. To responsibly fulfill their duties, all employees are guided by general principles of good scientific practice as well as specific guidelines of the living lab and affiliated organizations. These guidelines serve as tools for employees to reflect on their work in the LL and offer support in analyzing and assessing potentially challenging situations and issues.

All LL employees are asked to actively take accountability for their actions within the lab. This includes proactively addressing potential challenges and problems based on independent analysis and assessment, discussing them with others in a well-reasoned manner, and, when necessary, reporting them to third parties. However, power imbalances tied to hierarchical positions can lead to situations where some employees face higher personal risks when addressing challenging situations compared to others. In cases where such risks are particularly high, employees may be relieved from their moral duty to raise issues. Conversely, holding an influential position within the organizational structure may increase an individual's moral obligation to speak up about issues and actively advocate for favorable working conditions.

Responsible Management of Human Resources

It is essential to ensure that employees are dealing with a reasonable workload and are challenged and supported in ways that align with their individual abilities and needs. It should also be considered that special aspects of LL work, which do not typically arise to the same extent in other (scientific or non-scientific) work contexts, can pose challenges for employees. For instance, early-career researchers in LLs often engage in innovative research formats, which, due to their novelty, are associated with high uncertainties, adding to the already existing uncertainties in scientific career planning.

To mitigate these uncertainties, employees should be supported in both their scientific career development and in efforts to remain compatible with other professional fields. Additionally, it is

important for supervisory staff to handle the high intrinsic motivation of employees responsibly. High intrinsic motivation and strong personal identification with the project goals can lead to increased blurring of boundaries between work and private life. LL work should be organized in a way that promotes sustainable management of human resources and provides employees with sufficient space to reflect on their personal relation to their job.

Guiding Questions 3.1: Employees in Living Labs

Individual Responsibilities

3.1.1. Do all employees have access to relevant guidelines and are they familiar with their content?

3.1.2. What additional measures can be taken to support employees in actively taking responsibility for their own actions or to raise awareness of important topics in this context?

3.1.3. What conditions are necessary to motivate employees to proactively address challenges and minimize any associated personal risks?

3.1.4. How can such conditions be created? What opportunities or limitations might exist within the organization to which the LL is affiliated, and how can these be addressed?

Responsible Management of Human Resources

3.1.5. How is it ensured that there are no persistent work overloads for individual employees or the entire team?

3.1.6. Is there access to high-quality training programs that support employees in self-organization and other matters?

3.1.7. What opportunities for individual development / coaching are available at the LL?

3.1.8. What career counseling and planning services are offered, e.g., by associated organizations like universities?

3.1.9. Are these counseling services tailored to the specificities of inter- and transdisciplinary work? If not, how can such specific support be accessed elsewhere?

3.2. Employees in Leading Positions in Living Labs

Complexity of Leadership Tasks

Leading employees in LLs face an exceptionally demanding set of requirements. Beyond the general expectations placed on individuals in leadership positions, specific challenges associated with LL add to their responsibilities. Successfully engaging project partners from diverse sectors such as academia, civil society, business, and politics requires proficiency in understanding and mediating between different systems, cultures, and communication styles. This unique aspect makes relationship management a core responsibility and particularly complex task for leading employees in LLs.

LL work should, therefore, be organized in a way that keeps the responsibilities of leading employees manageable. This approach serves not only to support and protect the leading employees themselves but also to safeguard the individuals they oversee. It is the responsibility of leading employees to advocate for the conditions they need in order to work effectively and to structure the project in a way that allows them to work effectively within the available resources.

Responsibility for Working Conditions and Role Modeling

Leading employees ensure responsible LL work not only by demanding and verifying that their subordinates comply with established rules. They are also accountable for creating conditions that support all employees in independently reflecting on situations and actions, as well as establishing spaces for collective discussions on these matters. As role models, leading employees not only educate their teams about relevant areas for reflection in LL work but also exemplify the principles of responsible LL work in their daily activities. This may include openly discussing their own challenges in implementing these principles and allowing employees to participate in their personal reflection processes.

Guiding Questions 3.2: Employees in Leading Positions

Good Working Conditions for Employees in Leading Positions

3.2.1. What specific requirements does the project place on individuals with leadership responsibilities?

3.2.2. How is it ensured that individuals in leadership positions are aware of their role model function?

3.2.3. How can leadership tasks be effectively distributed among multiple individuals?

Responsibilities of employees in leading positions

3.2.4. How is it ensured that individuals in leadership positions are aware of their role model function?

3.2.5. How is it ensured that individuals in leadership positions are aware of and utilize all available opportunities to create the best possible conditions for their employees?

3.3. Participating Citizens

Scope of Activities

The scope of activities for non-employed participants in LLs is clearly defined: as they are not in an employment relationship with the LL and do not receive financial compensation for their work, they do not take on any organizational tasks. To protect participating citizens from inappropriate exploitation, the LL must be sufficiently funded to cover organizational tasks through paid staff. Additionally, the organizers of the LL must ensure that participating citizens are involved in the LL activities only to an extent that is compatible with their normal daily lives. The LL work should not conflict with these individuals' other professional or personal commitments.

Relevant Legal Information

Particular attention must also be paid to data protection and liability issues. Participating individuals must be fully informed of their rights concerning their personal data according to applicable data protection regulations. Furthermore, all project participants must be clearly informed about the purposes for which the data collected during the project will be used and who holds the rights to process and publish this data. Information on liability regulations in cases of damage to people or property must also be provided at the start of the project.

Conflicts

The inclusion of participating individuals must also comply with the applicable regulations of the ethics committees of the scientific institutions supporting the project. In the event of a conflict, non-employed participants in the LL must not be disadvantaged compared to employed staff. Accordingly, it is especially important to ensure that non-employed participants have unrestricted access to mediation and ombudsman services outside the LL.

Guiding Questions 3.3: Participating Citizens

Scope of Activities

3.3.1. How is it ensured that all participating individuals understand their scope of tasks, including its limits?

3.3.2. How is it ensured that boundaries are not crossed?

3.3.3. Who is responsible for monitoring the distribution of tasks?

Relevant Legal Information

3.3.4. Does the project or its sponsoring organization have sufficient expertise to conduct legal briefings?

3.3.5. How is it ensured that all relevant information is provided to all involved individuals in an appropriate manner and language?

3.3.6. Who is the contact person for questions, and is this person known to all involved individuals?

Cases of Conflict

3.3.7. Are staff trained to handle inquiries and criticism from participating individuals?

3.3.8. How is it ensured that information about mediation and ombudsman services is easily accessible to all participating individuals?

3.4. Affected Stakeholders without Direct Involvement

Even individuals or groups who are not directly involved in the real-world laboratory as employed staff or participating citizens can be impacted by its activities. For example, projects that alter traffic flows or shopping infrastructure in a neighborhood can also affect adjacent areas. The same applies to projects in nature conservation areas and their neighboring regions. Additionally, trials of new human-machine interactions in domestic settings can impact individuals or relationships with individuals who do not directly interact with the machine being tested.

If a decision is made not to include indirectly affected individuals as participants in the real-world laboratory, it must still be ensured that they are considered as persons or groups in the laboratory's impact and risk assessment (see especially Chapter 1.3, e.g., through direct surveys) and are informed about their potential involvement.

Guiding Questions 3.4: Stakeholders without Direct Involvement

Affected Groups and Individuals

3.4.1. Is there an appropriate tool available to reliably identify not only directly but also indirectly affected individuals or groups?

3.4.2. If not, what expertise is required to conduct such an assessment reliably, and how can this expertise be obtained?

3.4.3. Where is the boundary drawn between participants and affected individuals without participation, and what is the rationale for this distinction?

Communication

3.4.4. Is the language used in communication with affected individuals or groups appropriate, and are the project and its potential impacts explained clearly?

3.4.5. How is it ensured that all affected individuals receive information in a timely manner, allowing them to ask questions and express their interests?

3.4.6. How is it ensured that not only information is conveyed but also that opportunities for interest hearings are provided?

Cases of Conflict

3.4.7. Are staff trained to handle inquiries and criticism from individuals and groups who are not involved?

3.4.8. How is it ensured that, in the event of a conflict, concerns from non-involved individuals and groups are included in mediation processes in a solution-oriented manner?

3.4.9. How is it ensured that information about contact persons for conflict cases is easily accessible to non-involved individuals and groups?