4. Metacriteria of sustainability

The aim of this guide is to support scientific sustainability projects and their funding bodies in reflecting on their own respective understanding of sustainability, the project's contribution to sustainability and the negative implications that emerge in view of dilemmas of sustainability. Although contradictions and negative effects are unavoidable, this guide contributes to early recognition of dilemmas, clarification of dilemmas and processing of dilemmas.

The following eight metacriteria with their guiding questions for reflection can be carried out as eight consecutive steps for reflective action in recognising dilemmas of sustainability. They are divided into three blocks that result from the structure of practical dilemmas and concrete dilemmas of sustainability:

Block A: Reflection on the use of the concept of sustainability and the concept of dilemma

With the metacriteria:

1: The possibilities and limitations of the understanding of sustainability used in the project are reflected upon.
8: A use of the concept of dilemma is actively weighed.

Block B: Reflecting on one's own premises for action – project planning phase

With the metacriteria:

2: The description of the problem and the objectives are reflected upon by all participants as a framework for action.
3: The forms of knowledge underlying the project with their possibilities and limitations are reflected upon.
4: Basic decisions and implicit assumptions are reflected upon in the project.

Block C: Reflection on the conditions for action – project implementation phase

With the metacriteria:

5: The processes and possible tensions of inter- and transdisciplinary cooperation are reflected upon.
6: The policies with regard to time in the project are reflected upon.
7: If there are attributions of responsibility, these are actively reflected upon in their justification, with their limitations and their effects.

All metacriteria are operationalised by means of several guiding questions for reflection. The requirements for working on these questions are specified after the questions. There are also additional notes on how to deal with them.

4.1 Metacriterion 1: The understanding of sustainability used in the project is reflected upon with regard to its possibilities and limitations. (Block A)

This metacriterion is used to deal with the two constellations of conflicting goals and the conflicts between different understandings of sustainability as a potential cause of dilemmas. In the sense of early recognition, they refer above all to the area of tension of implicit assumptions in the project.

Reflection question 1: Is the concept of sustainability used in the project defined?

- Yes, like this: "..."
- Yes, however ...
- No, because ...
- ...

Requirements: It should be explained how the term sustainability is used in the project. Related terms that are proximate to a certain understanding of sustainability should also be included (e.g., sustainable development, post-growth, climate, etc.).

Additional notes: This question aims at explaining a possibly implicit but not reflected understanding of sustainability. Every understanding of sustainability is accompanied by certain assumptions about what sustainability aims at, how sustainability is achieved, who is responsible for it and what knowledge is used for it and how. These implicit assumptions become clearer with the reflection on the understanding of sustainability. In addition, it may become apparent if several understandings of sustainability are used in the project. If this is the case, this guiding question for reflection provides an opportunity for clarification and agreement. It may be useful to agree on a common working definition for the project (see 3.1).

Reflection question 2: Does the definition used correspond to one of the classic understandings of sustainability?

- Yes, to the approach ...
- Yes, but there are the following deviations ...
- No, but the term can be understood from the context as follows ...
- No, because ...
- ...

Requirements: It should be reflected upon whether the understanding of sustainability refers to one of the dominant sustainability discourses (cf. section 3.3.5). This does not necessarily have to be the case. It should then become clear how sustainability is specifically understood in the project, whether certain assumptions are specifically formulated in the project or whether several understandings of sustainability are implicitly linked or whether the understanding of sustainability emerges from the context.

Additional notes: This guiding question for reflection aims at revealing implicit references to major social discourses and locating them more closely in the sustainability discourse. Through reflection, it becomes clear which implicit assumptions are given or not given by their place in a discourse and which references and demarcations also exist at the level of the actors. This serves the early recognition of possible areas of tension in cooperation and participation, in the context of structures of funding and science as well as in the context of social conditions.

Reflection question 3: Does the project make clear what contribution it wants to make to sustainability in the project's own understanding of sustainability?

- Yes, ...
- Yes, however ...
- No, because ...
- ...

Requirements: It should become clear which concrete conditions, changes or general results of the project are considered to contribute to sustainability.

Additional notes: This guiding question aims at explaining the goals and interests associated with the understanding of sustainability. At the same time, it becomes clearer what sustainability should look like and which actors, measures, knowledge etc. are required to achieve it.

Reflection question 4: Does the project make clear which trade-offs are accepted, and to what extent does the project's contribution to sustainability hinder other aspects relevant for sustainability?

- Yes, ...
- Yes, however, the following compromises can be found ...
- No, because ...
- ...

Requirements: It should be made clear which concrete conditions, changes and, in general, results are not achieved or hindered by the intended project.

Additional notes: This guiding question for reflection aims at avoiding a possible inability to act due to any dilemmas that may emerge. This is achieved by reflecting on the limits and possible negative implications of one's own project beforehand, so that any conflicts that may emerge in areas of tension have already been reflected upon as a possibility before they occur and can thus be dealt with more easily.

4.2 Metacriterion 2: The description of the problem and the objectives are reflected upon by all participants as a framework for action. (Block B)

This metacriterion serves to reflect on the relationship between the description of the problem and the objectives in the project, on the one hand, and the underlying understanding of sustainability, on the other.

Reflection question 5: Has an understanding on a common description of a problem taken place between all participants?

- Yes, namely ...
- Yes, it took place, but ...
- No, because ...
- ...

Requirements: Different perspectives on the sustainability problem underlying a project are not uncommon in hybrid teams of scientists and practitioners. As long as no common understanding of the problem has been formulated, the description of goals is hardly possible since these will inevitably differ. In the context of this process, different understandings of sustainability and what objectives should be pursued in this area may also come to light, which can trigger conflicts (dilemmas). In this respect, careful clarification is required, otherwise the subsequent research process is jeopardised. In the course of the project, the description of the problem and objectives should be regularly reviewed to see whether they need to be adapted in the light of new findings.

Additional notes: see section *3.3.1 Conflicting goals as a potential cause of dilemmas*

Reflection question 6: Are multiple objectives identified in the project?

- Yes, namely ...
- Yes, however ...
- No, because ...
- ...

Requirements: Of course, there can be several objectives in a project. In this case, it is important to ensure mutual support and the elimination of contradictions between these objectives at iterative checkpoints.

Additional notes: see section *3.3.1 Conflicting goals as a potential cause of dilemmas*

Reflection question 7: In the case of several objectives, is prioritisation carried out and what criteria does it follow?

- Yes, prioritisation exists and follows the following criteria ...
- Yes, there is a prioritisation, but ...
- No, there is no prioritisation because ...
- ...

Requirements: If a team agrees to pursue several objectives in one project, they can under certain conditions be worked on either consecutively or in parallel. Such objectives can contradict each other or lead to dilemmas. One way to deal with this is to prioritise between the different goals. Such prioritisation can be done explicitly or implicitly. Agreeing on the reasons for prioritising or not prioritising helps to actively deal with possible dilemmas.

Additional hints: The greater the variety in research questions, objectives and expertise allowed in a project, the greater the potential for conflicts or dilemmas. It may therefore be advisable not only to prioritise goals but also or alternatively to reduce them. However, this must then be made transparent and actively reflected upon.

Reflection question 8: Do all objectives relate to the understanding of sustainability used?

- Yes, namely ...
- No, the following objectives do not do this because ...
- No, because ...
- ...

Requirements: After agreeing on a working definition of sustainability within the project as well as on a common understanding of the problem and shared goals, it must be examined whether the desired objectives are compatible with the understanding of sustainability. Here, too, the diversity of actors from science and practice plays a decisive role with regard to potential conflicts and dilemmas. It must be ensured that the various goals have been made transparent and accepted by all, and that they neither contradict the understanding of sustainability nor the overall objectives, nor lead to conflicts or dilemmas.

Additional notes: This examination should be carried out taking into account the reflection on the previous guiding questions 1–7. In the case of negotiation processes, an external moderation is highly recommended.

4.3 Metacriterion 3: The forms of knowledge underlying the project with their opportunities and limitations are reflected upon. (Block B)

Since sustainability research projects often bring together different actors as well as different forms and types of knowledge, this metacriterion serves to reflect on the existence of this diversity and how to deal with it (cf. dilemmas as a result of knowledge conflicts). The metacriterion reflects not only on the existence of different forms of knowledge but also on their respective opportunities and limitations and the challenge of integrating knowledge across different forms of knowledge.

Reflection question 9: Is the project based on different scientific knowledge?

- Yes, namely, ...
- Yes, however ...
- No, because ...
- ...

Requirements: The project involves scientists or practitioners who contribute scientific knowledge from the literature or from their own research. Scientific knowledge is knowledge that meets the criteria of scientific work and quality assurance. Scientific knowledge is typically discipline-oriented and can therefore differ in terms of theories, methods, processing and scientific community.

Additional notes: see section 3.3.4 *Conflicts between different forms of knowledge as a potential cause of dilemmas*

Reflection question 10: Is the project based on non-scientific forms of knowledge?

- Yes, namely ...
- Yes, however ...
- No, because ...
- ...

Requirements: In transdisciplinary projects, forms of knowledge that originate from contexts other than science are also used and integrated. In particular, practical knowledge based on experience or traditions plays an important role here, which can also serve to develop effective solutions to sustainability problems.

Additional notes: Actors other than scientists also produce and represent knowledge. They can play a special role in the project, especially with regard to the integration of different forms of knowledge.

Reflection question 11: Are different types of knowledge along the lines of systems-, target-, and transformation knowledge (in the sense of transdisciplinary research) included and adjusted to the understanding of sustainability?

- Yes, by ...
- Yes, however ...
- No, there...
- ...

Requirements: Transdisciplinary research projects include both systems knowledge and knowledge about goals/targets and ways to achieve them (target- and transformation knowledge) and bring them together within the framework of their understanding of sustainability.

Additional notes: Focusing exclusively on one type of knowledge jeopardises the achievement of objectives such as contributing to socio-ecological problem-solving for sustainable development.

Reflection question 12: Are possible tensions or contradictions between different forms and types of knowledge reflected upon?

- Yes, by ...
- No, there...
- ...

Requirements: The particular strengths and weaknesses of the different forms of knowledge are reflected upon. Here, criteria can be: generalisability of knowledge, correspondence to real-world experiences, communicability for non-scientific groups of actors, independent verification. Conflicts between forms of knowledge can be eliminated and knowledge integration across different forms (and types) of knowledge in the project can be achieved.

Additional notes: In the context of the dominance of scientific forms of knowledge, non-scientific forms of knowledge often have to struggle with being seen as less valuable or relevant to decision-making. In this respect, it is also important to be aware of forms of discrimination or disparagement.

The integration of knowledge in transdisciplinary research projects can undergo different pathways and phases. In most cases, it requires a concept or an integrative framework, e.g., through inter- and transdisciplinary concepts such as the ecosystem approach. The existence of such concepts of integration is a suitable indicator of the possibility of successful knowledge integration.

4.4 Metacriterion 4: Basic decisions and implicit assumptions are reflected upon in the project. (Block B)

As mentioned in chapter 3.4, the unreflected adoption of implicit assumptions can lead to tensions in research projects. With the help of these guiding questions, these assumptions can be made visible and accessible through democratic processes of understanding and negotiation in research projects.

Reflection question 13: Are the basic terms of the call for proposals or the project defined and their meaning and significance reflected upon?

- Yes, through ...
- Yes, however ...
- No, there...
- ...

Requirements: The central concepts underlying the project or the call for proposals are examined from different perspectives and discussed in the project network, for example, through the use of transdisciplinary methods of knowledge integration, and thus located in the sustainability discourse.

Additional notes: Terms are embedded in contexts of meaning (theories, scientific approaches, discourses, etc.). Therefore, the same word can have different meanings. Reflecting on the meaning of terms prevents an uncritical adoption of (historically developed) conceptual understandings and coinages, which can otherwise lead to tensions or dilemmas.

Reflection question 14: Are implicit assumptions of individual disciplines about the research subject disclosed and communicated transparently in the project network?

- Yes, by ...
- Yes, however ...
- No, because ...
- ...

Requirements: It is important to deal with the extent to which one's own disciplinary location and the associated interpretive claims have an impact on the handling of the research object and on inter- and transdisciplinary cooperation. This includes conceptual understandings as well as methodological approaches or academic practices.

Additional hints: This can prevent the occurrence of dilemmatic situations by clearly formulating and communicating one's own perspectives and becoming part of collaborative negotiation processes.

Reflection question 15: Are the normative and motivational foundations of one's own actions and the associated interpretive claims reflected upon?

- Yes, because ...
- Yes, however ...
- No, because ...
- ...

Requirements: As a rule, it can be assumed that team members from science and practice also pursue their own agendas with the research. The personal motives for participating in the research project should be actively addressed and the expectations of the research object, project and collaboration should be communicated.

Additional advice: This can minimise the potential for frustration, strengthen cooperation in the project network and avoid dilemmas through open exchange.

4.5 Metacriterion 5: The processes and possible tensions of inter- and transdisciplinary cooperation are reflected upon. (Block C)

This metacriterion refers to the areas of tension outlined in chapter 3.4 and deals with the reflection of processes of participation and cooperation that need to be developed in the context of interdisciplinary and transdisciplinary sustainability research. It also provides suggestions for reflection on how to deal with different heterogeneous values, interests and goals in the context of sustainability research projects.

Reflection question 16: Are the criteria for selecting the actors involved reflected upon?

- Yes, by ...
- Yes, however ...
- No, there...
- ...

Requirements: The actors involved have an influence on the course of the project. In this context, the choice of actors involved is selective in view of the large number of possible stakeholders and interested parties. Diversity of the actors involved is fundamentally relevant for the legitimacy – and thus also the long-term success – of the project. Therefore, attention should also be paid to the inclusion of hitherto less visible actors or groups that are different according to socio-economic or gender-related criteria. In any case, it is necessary to reflect on the criteria for their selection and to disclose the justifications.

Additional information: see 3.4.2 *Tension between cooperation and participation in inter- and transdisciplinary research projects.*

Reflection question 17: Are processes of participation designed in an open and participatory way so that barriers are removed from the outset?

- Yes, by ...
- Yes, however ...
- No, because ...
- ...

Requirements: In order to allow access to the research process for as many stakeholders and interested parties as possible, there should be a low threshold for participation. Any obstacles to processes of participation should be anticipated and removed. If relevant groups are not included, this can lead to conflicts and dilemmatic situations afterwards, which endanger the results and legitimacy of the project.

Additional notes: At the same time, broad participation of a large number of actors is a challenge because it not only complicates processes of communication and cooperation but also increases the potential for conflict and dilemma *within* the project. It is therefore important to strike a sensitive balance between broad participation and workability.

Reflection question 18: Is it clear who in the project network contributes which competencies and (professional) resources to achieve the objectives?

- Yes, ..
- Yes, however ...
- No, ..
- ...

Requirements: In the context of the constellation of the project, it makes sense to know the respective areas of competence of the actors involved and to specifically include them in the research project.

Additional hints: This strengthens the appreciation for the common work, facilitates mutual support and can prevent conflicts, for example, over responsibilities.

Reflection question 19: Are there tensions between the individual objectives of the actors involved in the project?

- Yes, namely ...
- Yes, however ...
- No, because ...
- ...

Requirements: Other actors involved in the project may be directly, indirectly or remotely affected by the project's objectives. Their own objectives and expectations of the research project should be reflected upon accordingly and set in relation to other objectives and expectations in the project network.

Additional information: This is the starting point for an open process of negotiating objectives of the project, at the end of which there are jointly formulated objectives that are supported by all.

Reflection question 20: Are there fixed, regulated communication structures in the project network that enable open, transparent communication between all actors involved?

- Yes, by ...
- Yes, however ...
- No, because ...
- ...

Requirements: There should be fixed communication channels in the project network that ensure a reliable exchange between all participants.

Additional notes: This can prevent conflicts and misunderstandings and enable the research process to run smoothly.

Reflection question 21: Are there structures or action plans that are used when conflicts or disagreements arise in the project?

- Yes, namely ...
- Yes, however ...
- No, because ...
- ...

Requirements: When problems and conflicts arise, it should be possible to use pre-established consensual mediation structures to address problems productively and work out a joint solution.

Additional notes: Problems in the research process and project network can be manifold and inhibit processes in the project. "Contingency plans" create a framework for dealing with conflicts that emerge and also help to sharpen expectations and communication structures.

4.6 Metacriterion 6: The policies with regard to time in the project are reflected upon. (Block C)

This metacriterion focuses on the different policies regarding time that have to be reconciled in projects of sustainability research. These are the time resources that result from the project's funding period, any fixed-term contracts or long-term structures. The policies regarding time also include the partly different temporal processes, which are conditioned by the inherent logics of social and ecological systems. Thus, in the questions for reflection, the handling of different process phases of all participants are addressed and sensitised to the resources of the respective actors.

Reflection question 22: Are the time resources of the actors involved in the project network known and communicated?

- Yes, namely ...
- Yes, however ...
- No, ...
- ...

Requirements: It should be clearly communicated and documented which actor can contribute how much time to the project in order to lay the foundation for transparent joint work.

Additional advice: Clearly communicating expectations, including one's own temporal availability, can prevent misunderstandings and frustrations in the project and at the same time signal appreciation for the time of others, thus avoiding conflicts and tensions.

Reflection question 23: Are the time schedules and processes of the project participants coordinated and communicated?

- Yes, namely ...
- Yes, however ...
- No, because ...
- ...

Requirements: The work processes of the individual actors and their integration into institutional structures should be clearly communicated and coordinated within the research network. Changes or delays should be communicated at an early stage so as not to jeopardise research processes.

Additional hints: In addition to the communication of time resources, this can help to prevent tensions or even dilemmas, as the procedures in the research project are coordinated with those of the actors involved. Furthermore, this can ensure that the research process runs smoothly.

Reflection question 24: Are the inherent logics of the interacting systems of the research object considered in the research process?

- Yes, by ...
- Yes, however ...
- No, because ...
- ...

Requirements: The research process should take into account the inherent dynamics and logics of the social and ecological systems under study and consider them accordingly in the timetable.

Additional notes: As sustainability problems are considered and researched in systemic contexts, the different timelines of individual systems may conflict with the duration of a research project and should be adjusted accordingly.

4.7 Metacriterion 7: If attributions of responsibility exist, they are actively reflected upon in terms of their justification, their limitations and their effects. (Block C)

When responsibility is attributed, this can be both a conflict about responsibility itself and exacerbate other conflicts as the cause of dilemmas. Dilemmas can emerge from a mixture of ambiguous attribution of responsibility, effects on action and potential emotionality. If there are attributions of responsibility, it is therefore important to actively reflect on them. See section 3.3.6 Conflicts over responsibility.

Reflection question 25: Are attributions of responsibility formulated in the project itself or brought to the project from outside?

- Yes, formulated in the project, namely ...
- Yes, brought in from the outside, namely ...
- No, deliberately left out ...
- ...

Requirements: The extent to which responsibility plays a role in the formulation and design of the project should be reflected upon. As attributions of responsibility are part of the conditions for action, it should be considered to what extent this is accompanied by requirements or restrictions.

Additional notes: Attributions of responsibility can be formulated explicitly or implicitly. In addition to the concept of responsibility itself, an indicator for the existence of attributions of responsibility is that goals and concerns are formulated with a particular urgency.

Reflection question 26: What is the relationship between any attribution of responsibility and the project's understanding of sustainability?

- Yes, there is a direct relationship, namely ...
- Yes, however, it contradicts the understanding by ...
- No, because ...
- ...

Requirements: An understanding of sustainability is often accompanied by assumptions about who is responsible for creating unsustainable conditions and who is responsible for creating sustainable conditions. The project's understanding of sustainability and any existing attributions of responsibility should be consistent with each other.

Additional notes: In answering this question, it may be worthwhile to go through the conflicts mentioned in 3.3 as potential causes of dilemmas and also to consider the possibility of strategic assertion and negation.

Reflection question 27: Are the limitations and possible negative effects of any attributions of responsibility reflected upon?

- Yes, limitations are ...
- Yes, however ...
- No, because ...
- ...

Requirements: It should be reflected upon which conditions have to be given so that responsibility can be taken. This may involve other actors or certain structures.

Additional notes: Again, it is worth considering the types of conflict and the possibility of strategic assertion and denial.

4.8 Metacriterion 8: A use of the term "dilemma" is actively considered. (Block A)

Typical conflicts can potentially be the cause of dilemmas and can occur in areas of tension with potential for dilemmas. In addition, dilemmas can be

strategically asserted or denied. It is therefore important to reflect on the potential causes of dilemmas, areas of tension with potential for dilemmas, as well as one's own use of the term "dilemma".

Reflection question 28: Is the term "dilemma" used in the research project?

- Yes, namely ...
- No, the term is not used, but ...
- No, because ...
- ...

Requirements: If the term "dilemma" is used, this should be summarised here. In this context, it should be laid open what the term refers to, for example, possible dilemmas in the project or possible dilemmas in the societal area of tension. In doing so, it should also be taken into account whether the term is used synonymously with other terms such as "conflict".

Additional notes: see chapter 3.2 *Dilemmas – On the basic structure of practical dilemmas.*

Reflection question 29: Can a strategic use of the term "dilemma" be identified in critical reflection?

- Yes, namely ...
- Yes, but...
- No, because ...
- ...

Requirements: The term "dilemma" can be used in different ways, for example, to deny dilemmas, to name dilemmas that have been overcome or to refer to systemic contradictions. With this metacriterion, it is important to reflect on which intention is behind this use of the term in the project itself or in reference to use outside of the project.

Additional notes: A strategic use can, for example, aim to justify the lack of alternatives for a strategy of sustainability, to demonstrate the necessity of a

decision or to expose a given alternative as false. See also section 3.5 above: *Strategic assertion and denial of dilemmas.*

Reflection question 30: Could the term "dilemma" be used meaningfully in the research project to raise awareness of possible tensions or conflicts?

- Yes, namely ...
- Yes, but...
- No, because ...
- ...

Requirements: In the sense of a thought experiment, the term dilemma can be used to describe possible conflicts as potential causes of dilemmas or to sensitise for areas of tension with potential for dilemmas. This can serve to align ongoing decisions in such a way that actual dilemmas are avoided. It can also help to deal with still emerging dilemmas in a knowledgeable way.

Additional notes: Compare chapter 3. *Sustainability and dilemmas – Theory for practice.*