# Guide to workbook 8

## The aim

Workbook 8 introduces you to systems thinking and the generation of knowledge based on different world-views. Life scientists will learn how to engage in collective inquiry processes as part of social valorization of their evidence and how to carry out systems analysis to better understand the social dimensions of a problem.

## Competencies

- You will be able to describe the key features of complex problems.
- You will be able to identify emergent properties, feedback and self-organization as characteristics of systems.
- You will gain reflexive skills, being able to identify, differentiate and evaluate how world-views and their characteristics influence the process of knowledge production.
- You will be able to apply collective inquiry.
- You will be able to apply the approach of critical systems heuristics.
- You will be able to conduct an ethical inquiry.

## How to read this workbook

**THEORY**
**Setting the scene**
We will introduce you to the concept of systems theory and to tools carrying systems thinking. What are the differences between simple and complex problems? How can we understand their behavior? We will describe key features of systems, such as emergent properties, feedback, chaos, and self-organization.

**Self-reflection**
You will become aware of how complex problems are framed differently depending on the societal background of the participating stakeholders. What world-views, norms, values and interests do these boundaries involve?

**Applying systems thinking**
We will introduce you to systems thinking as a three-way communication. Firstly understanding the elements of a system and their interconnections; secondly engaging with the perspectives of participants in a system and exploring their world-views; and thirdly reflecting on the impact of bounding evidence and values on systems.

**Collective inquiry as a framework**
We will introduce you to collective inquiry as a framework to facilitate conversation about different world-views and knowledge, and to offer options for action through critical reasoning.

## COMMENT

Multi-level perspective (MLP) on socio-technological transitions is used as a framework to think about and stimulate systemic change. In this framework systems thinking, collective inquiry and the three loops of learning are used to illustrate how changes can be brought about in a society.

## TOOLS

Collective inquiry can be facilitated by different tools. Systemic complexity games help participants to explore how complex systems operate. Systems thinking can be carried out through critical systems heuristics. Ethical analysis using the five-step model allows you to identify and analyze ethical challenges as part of systems thinking.

## EXAMPLE

We will present you with the example of biodiversity conservation through coffee agroforestry that has been analyzed under the collective inquiry and critical systems heuristic approach by former participants in the *PSC Science & Policy training program* for graduate students.