

CLD validation example

Purpose of the session: Validation of the post-produced CLD

Time: approx. 90 minutes total

Roles and People Needed:

- Facilitator(s): Guide plenary tasks and support group rapporteurs.
- Recorder: Take notes on questions and discussions by stakeholders
- Group Rapporteurs: Nominated participants to lead each subgroup.
- Group Participants: Invited stakeholders to engage in group activities.

Steps:

- Plenary: Facilitator presents the CLD, a systemic map of the problems encountered in the region through a narrative, which is the starting point for discussion. (10 minutes)
- Group Formation: Create 3 subgroups (approx. 4-6 participants each), with each subgroup nominating a rapporteur. Ideally, groups are composed of diverse stakeholders representing each WEF nexus sector (5 minutes)
- Group work (60 minutes):

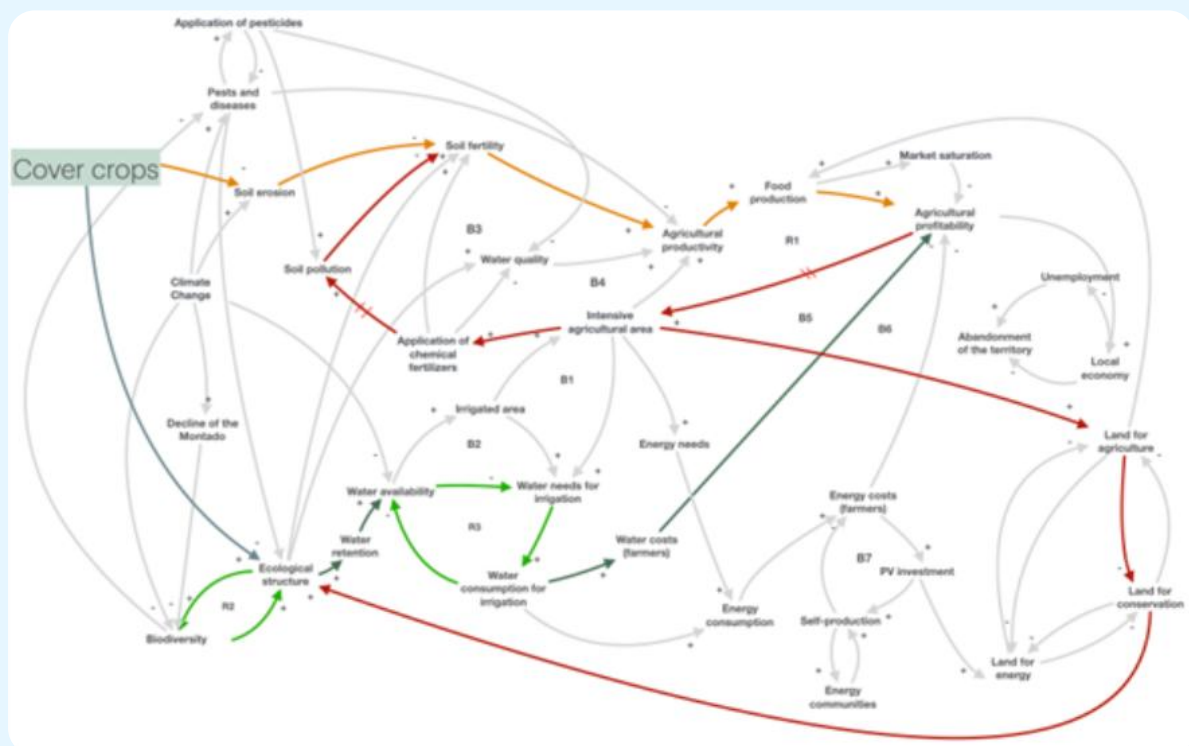
Groups, guided by moderators familiar with the CLD, discuss and include new variables, links, and issues in the CLD. e.g. Do causal relationships hold? Do feedback loops make sense? Are any key variables missing inside or outside a loop? Are causal relationships oversimplified and need more specification? Are causal relationships excessively detailed and need simplification?

The CLD can be used to model and discuss the impacts of the interventions on the system, and possibly identify unanticipated effects generated by the feedback loops underlying the dynamic behaviour of the system. In the same group, the participants shall integrate the different interventions in the CLD. Using the CLD for this task should support the understanding of the impact of the proposed interventions and the different interconnections among the variables. With the introduction of the interventions in the CLD, attention must be paid to the signs (+ and -), i.e. if they have to change with the introduction of these new variables.

At the end of the exercise, the group may discuss the consequences and the improvements caused by the proposed interventions.

See example below

Plenary: At the end of this exercise, the facilitator presents the results of each group, which are discussed with all stakeholders (15 minutes).



In this example, the identified intervention relates to cover crops, a Nature Based Solutions (NbS) in an intensive agricultural area. Cover crops are non-cash crops grown primarily to provide seasonal cover for soil, enhancing its health and stability. They play a crucial role in sustainable agriculture by offering various environmental and agronomic benefits (Yosefi, M. et al., 2024). This intervention was identified as a solution for the problem of intensive agriculture.

The introduction of cover crops creates or strengthens several feedback loops: cover crops enhance the ecological structure, increasing water retention, thereby improving water availability, reducing irrigation requirements, lowering water consumption, which results in higher water availability in a reinforcing loop (loop R3). Improvement of the ecological structure also contributes to increased biodiversity, which further reinforces the positive effects on ecological structure (loop R2).

The CLD also shows that the increase in agricultural profitability may lead to a desire from farmers to increase the area for intensive agriculture, which leads to an increase in the application of fertilizers and growing water needs for irrigation, counteracting the initial benefits from the implementation of nature-based solutions (illustrated by the red arrows in the diagram). The concrete outcome of all these interactions in each case will depend on the relative strength of the different relations and feedback loops operating in the system, which can only be assessed with a quantitative system dynamics model. The main conclusion in this case is that NbS can constitute an important solution to tackle some of the WEF challenges, but they must be part of a wider transformation of agricultural systems.