Nature-based living labs for social transformation to a climate-resilient future

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Introduction

As climate extremes such as severe droughts and pluvial floods are predicted to intensify in the future, it is important to investigate innovative ways to design climate-adaptive water and soil systems through a coherent set of measures. Thus designed measures must not only be technically and economically viable, but they must also address social elements that lead to a wide social innovation and transformation through platform such as Nature-based living labs (NBLL) fig 1.

Fig 1: Nature-based living lab: Definition

The study analyses NBLL in light of the KLIMAP project to understand the role of NBLL in influencing social innovation aspects regarding climate resilient measures (fig 2). It does so by mapping the involved stakeholders and analysing types and levels of learning within the living lab project through literature review, document analysis, participation in workshops & knowledge sessions, and stakeholder interview.

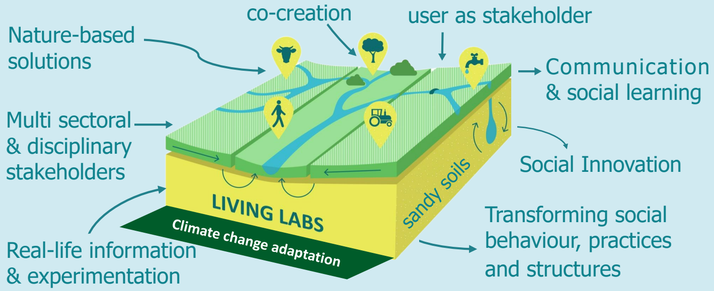

Fig 2: Nature-based living lab and its expected outcomes in KLIMAP

Stakeholder mapping & learning framework

- KLIMAP (2021- 2023) is an ongoing project
- It aims to design innovative climate-adaptive pathways for sustainable land & water management in the Dutch high sandy soil region (fig 3, right).
- It contains a consortium of 24 parties consisting of regional public authorities, companies, and research institutes (fig 3, left).
- Fig 3a, 3b and 3c shows few examples of different measures that are being experimented within KLIMAP.

Fig 3: Stakeholders invovled in KLIMAP consortium (left); KLIMAP experimentation area (right)

3a. Wet crops (Cattail) in wetter areas (natural/artificial) to combat drought by retening water

3b. Perennial grain for drought tolerance, biodiveristy improvement, feed quality, etc.

3c. Effect of different degrees of compacted soil on flooding and desiccation (using polymer tensiometers and TDR sensors)

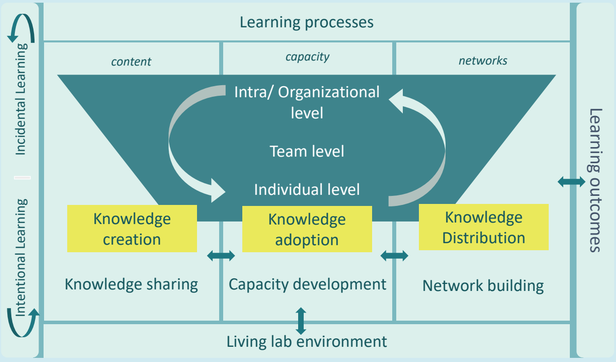

Fig 4: Learning framework with living lab as enabling environment, based on Bhatt (2000) and Cooke and Gorman (2009)

- 'Learning' has the potential to empower individuals and organizations to become agents of change by acquiring, sharing and creating knowledge. These agents will, ultimately, lead to desired social transitions for climate adaptation.
- Thus, this study developed a learning framework in a living lab environment through the lens of social learning (informal and incident learning) and organizational learning (intentional and interdisciplinary learning) (fig 4).

Result (research in-progress)

KLIMAP living lab as enabling environment for engagement and learning	Level of Learning / Type of Learning	Individual/ member level	Group/ Team level	Organizational/ Community level
	Knowledge sharing & creation	• Individual members in the KLIMAP team learn *through learning community* (learning sessions, field-experiments and group discussions) *and observational learning* from other stakeholders with diverse knowledge backgrounds. • Different field experiments share their learning and experiences with each other, thus, making it possible to learn from other team's success and failure in the real-world environment of NBLL. • Knowledge creation, e.g., new combination of knowledge on hydrology (KWR) and agronomics (Louis institute) in the study area.		
	Capacity development	• KLIMAP has developed a knowledge tool based on knowledge gained from field work, modelling and upscaling. Such tools adds to the capacity of decision making of users (individuals or organizations) who will apply it in practice. • Innovative actions; The measures experimented are peer-reviewed to critique, revise and refine skills		
	Network building	• Partnerships to further deepen or broaden the knowledge (living lab experimentation) • New coalition in the network of similar kinds • Knowledge reusability and replicability in another field applicable knowledge directly available to users • Knowledge network		

Fig 4: Application Learning framework on the KLIMAP living lab

- Successful co-creation depends on core competencies (content knowledge) and an interactive environment (NBLL).
- Interactions among stakeholders (including users) at different levels, activates collaboration, co-learning and networking among them, potentially leading to desired social changes.
- While living labs contribute to a certain degree of transformation, a greater attention for interrelations with formal structures & institutions is required for learning from living labs to be translated into policy & create societal transformation.

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