

APPENDIX 1: BACKGROUND AND DEVELOPMENT OF THE RESEARCH FRAMEWORK

Identified factors in the three reviews

Review 1: Muro, M., and P. Jeffrey. 2008. "A Critical Review of the Theory and Application of Social Learning in Participatory Natural Resource Management Processes." *Journal of Environmental Planning and Management* 51 (3): 325–344.

This review identifies various "process features that foster social learning", as well as "conditions that limit opportunities for social learning processes" based on a review of an unspecified number of papers of social learning in participatory natural resource management processes. The identified features and conditions are presented in Appendix Table 1.

Appendix Table 1: Process features and conditions identified in Muro and Jeffrey 2008

"Process features that foster social learning"	"Conditions that limit opportunities for social learning processes"
Facilitation	Nature of problem at hand
Small group work	Very rigid institutional framework
Egalitarian atmosphere	
Repeated meetings	
Opportunities to influence the process	
Open communication	
Diverse participation	
Unrestrained thinking	
Multiple sources of knowledge	

Review 2: Cundill, G., and R. Rodela. 2012. "A Review of Assertions about the Processes and Outcomes of Social Learning in Natural Resource Management." *Journal of Environmental Management* 113: 7–14.

This review identifies "emerging assertions about processes that support social learning" based on a review of definitions of social learning extracted from a sample of 54 articles. These emerging assertions are presented in Appendix Table 2.

Appendix Table 2: Emerging assertions identified in Cundill and Rodela 2012

"Emerging assertions about processes that support social learning"
Deliberate experimentation
On-going monitoring
Joint actions
Reflective practice
Knowledge sharing
Deliberation
Sustained interaction
Exposure of values
Trust building
Long term-self organizing process
Experience of crisis
Iterative reflection

Review 3: Siebenhüner, B., R. Rodela, and F. Ecker. 2016. "Social Learning Research in Ecological Economics: A Survey." *Environmental Science & Policy* 55 (Part 1): 116–26.

This review identifies "causal factors for the emergence of social learning processes" based on a review of 45 articles treating social learning studies. The identified causal factors are presented in Appendix Table 3.

Appendix Table 3: Causal factors identified in Siebenhüner et al. 2016

"Identified causal factors for the emergence of social learning processes"
Social capital and networks (identified in 35 articles)
Institutional make-up (identified in 24 articles)
Environmental crisis (identified in 12 articles)

Monitoring and evaluation (identified in 7 articles)
Incentives (identified in 7 articles)
Internal drivers (identified in 5 articles)
Technology (identified in 1 article)

Recapitulation of identified factors in the three reviews

Based on the identified factors in the reviews we contend that most factors can meaningfully be grouped into the two overarching groups of “procedural” and “institutional” factors. Using terms and examples from the reviews and the reviewed literature, the identified factors in the three reviews are recapitulated as a total of 9 factors that are included in the framework of the paper (Table 1). Appendix Tables 4 and 5 illustrate how different identified procedural and institutional factors from the three reviews have been groped together and recapitulated for inclusion in the framework of the paper.

Appendix Table 4: Recapitulation of procedural factors

Review	Identified procedural factors			
Muro and Jeffrey 2008	- Repeated meetings	- Opportunities to influence the process - Multiple sources of knowledge	- Facilitation - Small group work - Open communication - Unrestrained thinking	- Diverse participation
Cundill and Rodela 2012	- Sustained interaction - Iterative reflection	- Deliberate experimentation - On-going monitoring - Joint actions - Knowledge sharing - Reflective practice - Deliberation	- Exposure of values	
Sibenhüner et al. 2016		- Monitoring and evaluation - Technology		
Recapitulated as	Sustained interaction	Joint knowledge acquisition, sharing and deliberation	Skilled facilitation	Inclusion of relevant stakeholders

Appendix Table 5: Recapitulation of institutional factors

Review	Identified institutional factors				
Muro and Jeffrey 2008	- Egalitarian atmosphere			- Very rigid institutional framework*	- Very rigid institutional framework*
Cundill and Rodela 2012	- Trust building				
Sibenhüner et al. 2016	- Social capital and networks	- Institutional make-up*	- Institutional make-up*	- Institutional make-up*	- Institutional make-up*
Recapitulated as	Social capital and networks	Capability of formalizing new practices, arrangements, norms and values	An organization that fits the relevant ecological unit	Authorities lacking experience, facing special misfits and problems of coordination	Stakeholders possessing strong pre-existing rights over the natural resource

*Section 2 of the paper explains that the reviews provide examples of these factors that fit into the grouping and recapitulation made in the paper.

Reasons behind excluding a limited number of factors identified in the three reviews

There are a limited number of factors identified in the three reviews that do not fit the framework of the paper. These are “Nature of problem at hand”; “Long term self-organizing process”; “Experience of crisis”; “Environmental crisis”; “Incentives” and “Internal drivers”.

The reasons for this are that the identified factor is either too vague to use - “Nature of problem at hand” – or is not relevant to the focus of this article on learning-based interventions: “Long term self-organizing process”. The factors “Incentives”, “internal drivers”, “experience of crisis” and “environmental crisis” were not included in the framework since the factors do not fit well into either of the two overall groups procedural and institutional factors. The value of creating a simple and

parsimonious framework, with only two overall groupings that together cover the most significant identified factors, was deemed higher than the value of adding additional groups of factors to the framework to be able to include these four factors.