APPENDIX 1

Table A1.1: Operationalization of the derived characteristics of TSS for the questionnaire

Characteristic	Questions operationalizing characteristic
(1) Focus on real-world problems	Which problem was tackled?
	How was the problem deduced and how was it further differentiated?
(2) Normativity	What is the normative basis/aim of the project?
	(How did the project contribute to sustainable development and the societal transitions)
	How was 'sustainable' defined in regards to the project's aim?
(3) Diverse theoretical frameworks	Is the concept of "social relations to nature" considered in the research project and if so, how?[1]
	Were other concepts of nature-society/social-ecological relations or other theoretical frameworks considered? If so, how?
(4) Interdisciplinarity	Which disciplines are involved? Please list the scientific education/ background of all team members who were involved in the project and their actual disciplinary/ interdisciplinary assignment within the project.
	How were the different disciplinary research results integrated?
(5) Inclusion of non-scientists	With regard to a transdisciplinary research process, how was collaboration with non-scientists carried out?
	Which methods were used throughout the respective phases (i. problem framing, ii. knowledge production and iii. integration and application; see last line)?
	How intense was the collaboration (information, consultation, collaboration and empowerment) and did it change throughout the respective phases (if so, how)?[2]
(6) Recursive research process	Was the research process adjusted according to the conditions of the research field throughout the research process (if so, please state what exactly was adjusted)?
	Accordingly, were parts of the analysis repeated?
	Were results sent back to the practitioners and actively developed further?
(7) Integration of different forms of knowledge	Which forms of knowledge integration (methods) were applied (see also 4 and 5)?
(8) Contextualization of research[3]	Was a case study approach chosen? If so, which approach?
	Which case study in which context was chosen?
	How was the internationality of your research ensured in regards to a case study approach?
	Is there any additional contextualization of the research that is not addressed by the other questions of this questionnaire (if so, please elaborate)?
(9) Production of different	Which type of knowledge was generated throughout the

types of knowledge	project (system knowledge, target knowledge and transformation knowledge)?[4] Which type of knowledge was mainly generated in which process phase (see last line)?
(10) Generation of societal and scientific impact	Please name at least 2 examples that demonstrate the generation of societal and scientific impact with regard to the project. [If this is not appropriate at this point of time, name at least 2 examples that are likely to generate an impact on practice or science in the future.] What forms of impact did the project have?
Process phases: i. collaborative problem framing, ii. co-creation of solution-oriented and transferable knowledge, and iii. integration and application of produced knowledge	Is there any additional information or comments about the project phases, especially on aspects not asked for so far – in 5 (inclusion of non-scientists) and 9 (type of knowledge)?

[1] This question was asked first because the theoretical framework of "societal relations to nature" was often named in the SÖF-documents (it was the initial inspiration of the SÖF program).

[2] After the answers were summarized, we asked in addition what are the reasons for not empowering the partners of practice?

[3] The questions in regards to the contextualization of research focus mainly on the case study approach because the questions in regards to real-world problems, inclusion of non-scientists and generation of societal and scientific impact also provide information related to this characteristic.

[4] In the SÖF-documents a focus is set on transformation knowledge; we were nevertheless interested in all three forms of knowledge generated in the projects.