

Interactive comment on “Social capacities for drought risk management in Switzerland” by S. Kruse and I. Seidl

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Dear Editor, dear Referees, we are grateful for your comments which helped to improve the manuscript. As you will see below, we have taken up your comments as follows.

Editor's Comment #1 “Social capacities typology: You say, your typology is taken as a synonym for “adaptive capacities” (or the other way round); you argue with “5 dimensions” of adaptive/social capacities according to Adger et al. 2007 (1: information and knowledge, 2: technology and infrastructure, 3: organisation and management, 4: economic resources, 5: institutions and policies). In my mind, there are 3 problems related to that typology (partly in general, partly with regard to the way you applied it): (ad 1) the main reference provided for these five dimensions is Adger et al. (in IPCC

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2007); however, there this typology cannot be found: Adger et al. 2007 rather refer to a great number of indicators, that relate to “institutions, knowledge and technology” (ibid., 727), and implementation issues, that include “policies, investments in infrastructure and technologies” (ibid., 719); later on in the paper when talking about limits and barriers to adaptation, they distinguish: physical and ecological limits, technological limits, financial barriers, informational and cognitive barriers and, finally, social and cultural barriers (ibid., 733-737); however, in the earlier 2001 IPCC report there is a similar but not identical typology (Smit et al. 2001); there they are called “determinants of adaptive capacity” and differentiated in: (1) Economic Resources (2) Technology (3) Information and Skills (4) Infrastructure (5) Institutions (6) Equity. Therefore, please clarify the basis and background of your typology as well as the reasons for revising those found in the literature. (ad 2) moreover, there is no consistent use of your typology: the dimensions distinguished are referred to as both “dimensions” and “capacities” (ad 3) whose capacities do you refer to? is it individuals, organisations, social groups/stakeholders?”

Author's reply #1 Ad 1) In the submitted version we have been rather brief on the origins of the systematisation we use. Indeed, the origin of the approach plus the reasons for choosing it have been not sufficiently clear. Ad 2) We agree that it was not exactly clear how we see the relation between capacities, measures and the dimensions of capacities, see also comment#4 of the anonymous reviewer. (ad 3) Whom we refer to should become clear when referring to the capacities.

Action taken #1 Ad 1) We have added a paragraph on the origins of the concept of adaptive capacities in the IPCC 2001 and the later applications in adaptive capacity studies in section 2. We argue why we chose five dimensions to gain an integrated view on adaptive capacity, explaining what the five dimensions refer to and how this relates to the concept of social capacities. Ad 2) In section 2 we explained the relation between dimensions, capacities and measures which was also requested to be clarified by the autonomous reviewer. We also checked the consistent use of the terms throughout the

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whole text. Ad 3) In section 2 we have explained our understanding of social capacities, the five dimensions we refer to and respectively specified if we refer to individuals, organisations or social groups. Additionally, in the results section we specify if the measures and capacities mentioned refer to individuals, social groups or organisations.

Editor's Comment #2 "Definition of droughts: You define droughts as complex hydro-meteorological phenomena (p. 1); there is a competing social-science based definition (Kallis 2008) who refers to droughts as "socio-environmental phenomena" – refer and relate to it."

Author's reply #2 Thank you for pointing at this very useful review article of Kallis 2008. This has helped to strengthen our argument that droughts include both the hydro-meteorological phenomena and the damaging impacts on societies, economies and environment.

Action taken #2 We have revised and focused our drought definition by explicitly referencing an interdisciplinary understanding of droughts also strengthened by Kallis 2008 including the socio-science perspective: The following sentence was included: "Droughts are complex hydroclimatic, environmental and socio-economic phenomena and mostly related to the decrease in the amount of precipitation over an extended period of time and impacting damage to an activity, group or environment (Mishra and Singh, 2010; Kallis, 2008; Tate and Gustard, 2000; van Lanen and Peters, 2000)."

Editor's Comment #3 Some minor points - You state that after 2003 droughts are increasingly on the agenda in Switzerland (p. 2): please substantiate this statement with some concrete examples - Fig. 1 could contain more information/thoughts (e.g. which capacities/dimensions in which phase and what form/indicator relevant; see e.g. the indicators/issues mentioned on p. 4) - Tables 2: improve presentation (distinguish existing/missing capacities or define weaknesses/strengths); how do capacities/dimensions relate to measures? (called "prerequisite", p. 7 but couldn't/shouldn't they be a result?)

Action taken #3 We have: - Given examples for policy reaction to the 2003 drought

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strengthening drought as an issue for policy and decision makers, i.e. the national adaptation strategy published in 2012, a parliamentary initiative launched in 2010, the climate strategy of the federal office for agriculture as well as a study of the Kanton Fribourg on water scarcity in agriculture. - Specified figure 1 - Specified tables 4 and 6 which highlight the main results on the state of pro-active and re-active drought risk management in Switzerland

Anonymous referee's comment #1 "From my perspective, the most interesting part of the article is related to the identification of points for building social capacities. Although you speak of 'starting points' the paper would profit from strengthening this section! Regarding this aspect, I miss a critical reflection on advantages and disadvantages of the applied approach (to identifying starting points for building social capacities for drought risk management based on stakeholders perspectives of social capacities). Taking into account that stakeholders might have only very few experiences with drought events, an assessment focusing on stakeholders perspectives only might be limited."

Author's reply #1 In our paper we argue that because drought risk management is a rather new issue in Switzerland only an explorative approach based on stakeholder views is possible and a legitimate first step to evaluate drought risk management and identify starting points for building further capacities. We consider the comment as an encouragement to strengthen the discussion and conclusion of our research by a critical reflection of the results and their scope in the discussion section and go more into detail about the strengths and the drawback of our explorative research approach.

Action taken #1 We have added a more detailed discussion about the advantages and disadvantages of the approach and the methods we chose for our study. See last paragraph of section 5.

Anonymous referee's comment #2 "You state that you aim at investigating the social capacities existing from the perspective of the stakeholders and that there are, as a consequence, contradictory appraisals. You also rightly pointed out that the stakehold-

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ers appraisals have to be interpreted against the background of their context. However, reading the result section, I got a rather homogeneous picture of the current state often presented as 'facts'. It is not always clear if a statement was given by an interviewee or if it is a situation description of the authors for embedding the previous interview statement (e.g. p 1365 line 19). I recommend rewriting the result section in a way that the broad stakeholders' perspectives get better visible “

Author's reply #2 We agree that it has not always been clear which of the statements base directly on the answers of interviews and surveys and which information is given by us as context information embedding the interview/survey statement in the special context situation.

Action taken #2 We have reworked the results section and clarified which statements stem from interviews and surveys also relating them to the first and the second study (see also comment#4 by H. March). For the context information we indicated where the information stems from by including references.

Anonymous referee's comment #3 “I agree with the editor that the paper could profit by considering concepts understanding droughts as “socio-environmental phenomena” instead of hydrometeorological ones. This seems especially important for me when investigating social capacities regarding drought management.”

Author's reply #3 See also authors's reply to editor's comment #2

Anonymous referee's comment #4 “From chapter 2 it does not get completely clear how you relate/distinguish the concept of social capacities and the concept of adaptive capacities. You just state that it is similar. This is important as there are quite a lot of studies which applied the concept of adaptive capacity (also in Switzerland: e.g. Hill M. 2013. Climate Change and Water Governance. Adaptive Capacity in Chile and Switzerland. Edited by M Beniston. Vol. 54 of Advances in global change research. Dordrecht Heidelberg New York London: Springer.). Moreover, it does not get clear how you define and delimit terms such as capacities, measures, dimensions and what

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‘social’ means (it seems strange to consider technology and infrastructure as social dimensions).”

Author's reply #4 Please also refer to our reply to the editor's comment#1

Action taken #4 In chapter 2 we have clarified the distinction between adaptive capacity and social capacities (see also editor's comment#1) and also considered the recent application of Hill 2013. Further we have specified the relation between capacities, measures and the dimensions, please refer to reply to editor's comment#1 ad 2). Finally, we have defined the dimension “technology and infrastructure” in section 2 and clarified why we consider it as social dimension, referring to the concept of social construction of reality by Berger and Luckmann 1967.

Anonymous referee's comment #5 “The definition of the 3rd dimension “Organisation and management” is a bit vague and should be improved.”

Author's reply #5 We agree that the five dimensions need to be defined in a more transparent way, including the dimension “organisation and management”.

Action taken #5 We have specified all five dimensions at the end of section2.

Anonymous referee's comment #6 “Table 2: The economic and policy measures are not sufficiently clear (e.g. in how far is a concession a drought risk management measure?)”

Author's reply #6 We agree that the five dimensions need to be defined in a more transparent way, including the dimensions “economic resources” and “policies and institutions”.

Action taken #6 We have specified all five dimensions at the end of section2, referring to the dimension. Further, we have specified the respective measures in Table 3 (former Table 2).

H. March Comment #1 “I wonder if instead of an analysis of the existing (and missing)

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social capacities what the paper does is to analyze the perception (by different stakeholders) of such social capacities. In the abstract you state that the paper “analyses the social capacities for drought risk management and gaps from the perspective of national and regional water users and policy and decision makers in Switzerland”. In the discussion section you also acknowledge to some extent this fact (“In our research we analysed the perception of drought risk management in Switzerland by water users and policy and decision makers”). But maybe you could reflect further on this nuance and acknowledge it in previous sections of the paper, for instance in the last part of section 2.”

Author’s reply #1 We assume, that many drought risk measures can be associated to the five dimensions of social capacities elaborated in section 2. At the same time, these measures indicate if social capacities exist in the respective dimension as we assume the capacities, i.e. the abilities, skills and internal resources to successfully anticipate and respond to external stressors, to be a prerequisite to realise those drought risk measures. Based on these assumptions we investigate the social capacities by inquiring and evaluating the measures realised from the perspective of stakeholders and other involved groups and individuals. In our empirical research we analysed the perception, i.e. the opinions and experiences, of drought risk management in Switzerland by drought-sensitive water users and policy and decision makers. Therefore the evaluation of the capacities is on the one hand our interpretation. We do not conduct an evaluation of the effects of the measures which would deliver a more objective picture. At this early stage of drought risk management in Switzerland we believe that an explorative empirical approach is a first step to evaluate the capacities and identify starting points for capacity building. Future studies can build upon this and conduct a formative evaluation of the drought risk management at different points in time (e.g. during or shortly after the event, one year later, five years later).

Action taken #1 We have clarified our assumptions in section 3 and added a critical reflection of the range and limitations of our results as well as conclusions for further

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research in section 5.

H. March Comment #2 “I do also agree with the editor and referee 1 in extending the notion of droughts to that of “socio-environmental phenomena”. The paper of Kallis (2008) in Annual Review of Environment and Resources is a very relevant contribution which could help you in providing a more critical reflection on the term “drought”.”

Author’s reply #2 See also authors’ reply and action taken to editor’s comment #2

H. March Comment #3 “The methods section could benefit from more detail. A more specific description of the different questionnaires, interviews and expert workshop would be desirable, in order to know with more detail which kind of questions were asked. Maybe you could consider adding a table with some examples of the questionnaires.”

Author’s comment #3 We tried to keep the method section short with the drawback that it gave not many details on the different studies and methods used. Especially it was not possible to trace back which results stem from which study and method used (also see H. March’s comment#4).

Action taken #3 We have added a table (Table 2) listing the different parts and methods used in the two studies which the results presented in this paper are based on. Especially, we listed the main questions that were asked in the interviews, workshop and surveys. We only listed those questions with relevance to the research question of this paper. Also we made transparent who were the participants/interviewees in each part of the two studies. This enables us to refer to the different parts of the two studies in the results section which clarifies which material we took into account for the results (see next comment).

H. March Comment #4 “Finally, some editing/technical details: - It is not clear if in the results you took into account all the interviews and surveys with the representatives. In the methods section you mention 6 economic sectors (p.1362): “we conducted inter-

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views and surveys with representatives of water user groups from different economic sectors potentially sensitive to droughts: agriculture (considering farming, vegetable growing, fruit growing), forestry, water supply, shipping industry, fishery and tourism". While in the first paragraph of section for you just mention "three economic sectors" (p.1363): "The survey and interview studies with different water user groups in three economic sectors showed that water users have a range of existing mitigation and response measures at hand that they realise in case of droughts and low flow conditions". - Check the reference of Vicente-Serrano et al. (2012) in page 1361, line 4, and in table 1. - Check also the titles of the figures/tables in the text and at the end of the document as some do not coincide. For instance in page 1366 you refer to table 4 and I am not sure if you really mean table 5 ("The results on the existing and missing social capacities for re-active drought risk management in Switzerland from the perspective of the water users and policy makers are summarised in Table 4")."

Action taken #4 We have - See reply to comment#3; additionally we reworked the results section and indicated which information stems from which parts of the two studies. - We have checked and corrected the reference to Vicente-Serrano et al. 2012. - We have checked the titles of figures and tables and corrected the references.

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