

Workshop Output WS 3.1.D

Title of workshop: Integrative approaches to adaptation and transformation research in Mountain systems

Prepared by

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Participants*	Graham McDowell, Julia Klein, Yi-ping Fang, Vaibhav Kaul, Enora Bruley, Sandrine Anquetin, Thomas Spiegelberger, Tor Arnesen, Alexandra Jiricka-Pürerer, Loretta Singletary, David Griffith, Iago Otero, Anderson Ribeiro de Figueiredo, Hamidreza Solaymani Osbooei, Jacques Mourey

* Workshop participants that have submitted contributions to the workshop

General questions to please be answered in the workshop reporting

1. What was the focus of the workshop? Methodological issues and advancements or thematic issues (systems knowledge, transformation knowledge, target knowledge). Please check and fill in the matrix in the output section.

Methodological issues and advancements	Thematic issues		
	System knowledge	Transformation knowledge	Target Knowledge
Examples of and best practices for integrative research on climate change adaptation and transformation in mountains, including inter- and transdisciplinary research efforts. Recent achievements and challenges based on existing approaches (i.e. since Perth III). Prospects for improving integrative research strategies.			

2. Which key points were discussed in the workshop as a whole? (This should be more a synthesis and not simply a summary of the key points in each presentation)

Our workshop included 13 presenters and many (~60) audience members. Presentations featured studies and initiatives from the Himalayas, Europe, and North America, and were indicative of increasing engagement with inter- and transdisciplinary research approaches in the context of climate change adaptation and transformation. Presentations were followed by a period of insightful commentary from both presenters and audience members. During this period, participants were asked to reflect on the presentations and their own experience in relation to the workshop's 3 organizing questions. They were instructed to focus their reflections on developments on the subject since Perth III. Below we synthesize key insights from the workshop, organizing key findings around the workshop questions:

Question 1: How has evidence from existing integrative adaptation and transformation research improved understanding of responses to climate change in mountain systems?

- Recent work is leading to apparent consensus about the need for inter- and transdisciplinary approaches to adaptation and transformation research. Participants advocated for work that was even more integrative; there was no mention of a need for highly disciplinary approaches. Integrative work is now perceived as being more credible and useful, making it easier to focus on identifying new and interesting research questions/partner collaborations instead of convincing other researchers, funders, etc. that inter- and transdisciplinary approaches are worthwhile.
- Recent work has demonstrated the benefits (and challenges) of involving mountain people and other stakeholders in the formulation, conduct, and evaluation of integrative adaptation and transformation projects. Several participants focused on this point, all of whom were advocating for deeper and more mindful engagement with those outside of the academy.
- Recent work is calling attention to unequal power dynamics between scientists and other project participants, and is raising important questions about equity, legitimacy, and inclusion in adaptation and transformation research.
- Recent work is highlighting the role of cross-scale dynamics in influencing responses to climate change in mountain regions, and is calling attention to the need for multi-scale and multi-sited projects (most projects to date have been localized case studies).

Question 2: What challenges have impeded integrative adaptation and transformation research, and how might these barriers be overcome?

- Despite increasing involvement with other stakeholders, scientists often continue to lead project design, implementation, and evaluation. Scientists should be cognizant that this top down approach can be viewed as off-putting by mountain communities and therefore should strive for project co-development strategies that ensure community needs and interests are meaningfully integrated into studies of adaptation and transformation.
- Despite increasing attention to unequal power dynamics, power asymmetries often persist between researchers and other project partners. Researchers must strive to identify, understand, and ameliorate (to the extent possible) such unequal dynamics. Researchers must also approach projects and communities with greater humility.
- Despite increasing awareness of cross-scale dynamics, many studies do not involve cross-scale analyses. There are opportunities to allocate more attention to extra-local processes that affect adaptation and transformation in mountain regions.
- Disciplinary scholars who are engaging in integrative projects sometimes lack the research and interpersonal skills needed to effectively conduct inter- and, especially, transdisciplinary projects. Training events focused on the conduct of inter- and transdisciplinary research can help such scholars become sensitized to relevant skills, terminology, etc.
- The lack of consistent methods, theoretical, and conceptual approaches make it difficult to compare study results and to track developments on this subject over time (the need for such consistency was suggested but was not a consensus position).
- Despite growing interest in adaptation and transformation research, institutional models at some universities/departments make it difficult for academics engaged in integrative research to advance in their careers. Inter- and transdisciplinary projects and subsequent

publications may not be valued by their departments, which can affect tenure portfolios, for example.

- Funding for interdisciplinary work has been increasing, but financial support for transdisciplinary research is still limited. There is a need to better demonstrate the scientific and social value of transdisciplinary research to funding organizations.

Question 3: How can insights from integrative adaptation and transformation research be operationalized to foster more sustainable responses to climate change in mountain systems?

- Deeper and more meaningful engagement with mountain residents and other stakeholders in all stages of projects. Such engagement increases the relevance and usefulness of project findings, leading (potentially) to the implementation of tangible activities that improve well-being in mountain areas.
- Endeavor to share results with those outside of the academy, particularly those involved in making decisions that affect responses to climate change.
- Scholars working on this subject can look to other fields for examples of how they have translated research into practical action.

My sense from this workshop is that the number of people interested in, and the depth of thinking about, integrative approaches to adaptation and transformation research has grown considerably since Perth III (which I attended). However, the total number of people/publications focused on the subject remains relatively small. Furthermore, work that is highly integrative and assessment of transformative responses to climate change are still rare. The number of workshop attendees as well as the content of remarks made during the event suggests that the interest and ability needed to advance work on this subject is finally emerging. Notwithstanding, the current state of knowledge about adaptive and transformative (especially) response to climate change in mountains is considerably less developed than many other aspects of mountain research.

3. What is your opinion on the current state of knowledge concerning your topic(s) (focusing on mountain regions)? *Please check and fill in the matrix on the following page.*

Overall assessment of the state of:

What is your personal opinion on the current state of knowledge concerning the topic(s) addressed in your workshop. Please tick the appropriate field. Brief explanations are appreciated.

State of knowledge	Very good	Good	Poor	Very poor	Not appropriate	Comments
Global			X			Where and how adaptation is occurring is somewhat well known for glaciated ranges globally (see McDowell et al 2019, SROCC 2019), but our understanding only reflects adaptation reported in the literature (Much more is likely taking place, but we have no direct knowledge of these actions). Furthermore, there is no global synthesis knowledge for non-glaciated mountain ranges. Likewise, there is no global synthesis knowledge for transformative responses to climate change, although global-scale assessments led by groups like the Mountain Sentinels are beginning to address this gap. To date, relatively few studies have adopted deeply integrative research approaches, although some level of interdisciplinarity is common in mountain-focused adaptation and transformation research. Encouragingly, workshop presentations and knowledge exchange activities suggest that such approaches are becoming more common, and demonstrate increasing interest (and thoughtful reflection) about inter- and transdisciplinary work in the context of responses to climate change in mountains.
Regional			X			Which region? Andes (primarily Peru), Himalayas (primarily Nepal and India). The number of case studies conducted in these regions is leading to regional-level understanding. Nevertheless, most research is concentrated within specific sub-regions in these areas (e.g. the Cordillera Blanca); we therefore only have regional level understanding for a handful of specific locales. However, regional-scale assessments such as GRID-Arendal's Adaptation Outlook Series and ICIMOD's HIMAP report are leading to more robust understanding of responses to climate change at the regional scale. But again, research focusing on transformative change is limited.

Scattered case study-based knowledge		X				Where? Various. Most of what we know about adaptation and transformation is based on case study research. However, 'known unknowns' (i.e. adaptations that are taking place but are not documented in the literature) give me some pause in claiming that we have "good" knowledge. Moreover, relatively few studies adopt deeply integrative research approaches, although some level of interdisciplinarity and community engagement is common in many case studies.
Knowledge about past states/trends					X	
Knowledge about current situation			X			Aspects of the current situation in mountains re: integrative approaches to adaptation and transformation have been well characterized (see citations above). However, the level of knowledge of both what is currently happening with adaptation and transformation in mountains as well as agreement about how to approach research on these topics is quite limited.
Knowledge about future states/trends/thresholds				X		Very little work to date has attempted to apply integrative research approaches to the assessment of future adaptation and transformation.
Knowledge about the system					X	
Knowledge about shaping pathways to more sustainable development (transformation knowledge)				X		There is currently little known about shaping pathways in the context of adaptation and transformation in mountains, although both topics are closely related to this objective. There has been some preliminary work on scenario planning in the context of adaptation, which is somewhat related.
Knowledge about envisaged goals (target knowledge)			X			Goals for what adaptation and transformation in mountains ought to achieve have not been extensively examined or articulated, although there is some nascent work on the subject.

Ideas for questions to potentially be answered by the moderators after the workshop in the reporting (please delete what is not useful):

- 1) Were there any new insights and/or findings presented? If yes, which ones?
- 2) What was the main message/consensus of your workshop?
- 3) Were major uncertainty issues identified and discussed? If yes, which ones?
- 4) Was there any significant controversy (if so, what?) that requires new data (or further exploration of existing data) to resolve the issue? (explain)
- 5) Were new research questions raised? If yes, would working on these questions need to involve other disciplines (which ones)?
- 6) Did the workshop identify research topics (e.g. environmental drivers other than climate) that are, in your opinion, currently greatly underrepresented in mountain research, but should urgently be addressed?

Further Comments