



Editorial: High-Quality Knowledge for Climate Adaptation: Revisiting Criteria of Credibility, Legitimacy, Salience, and Usability

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Editorial on the Research Topic

High-Quality Knowledge for Climate Adaptation: Revisiting Criteria of Credibility, Legitimacy, Salience, and Usability

Climate adaptation in human systems is a process of learning and adjustment (IPCC, 2022). It involves continuously re-building a stock of knowledge, skills and foresight for anticipating, interpreting and acting relative to actual or expected climate. But what distinguishes knowledge of “high quality” for climate adaptation? This raises important ontological, epistemological and methodological questions, and at their core are the quality criteria people apply in appraising knowledge.

Climate-adaptive knowledges have long been inherent to societies relationship to their environment, for example in cultural patterns of seasonal activities (Kwiecien et al., 2021). Over the past 20 years climate adaptation has become a topic of scientific enquiry across diverse disciplines, with efforts to fit that science to societal contexts and norms of quality for decision-making (see e.g., “climate services”; Hewitt et al., 2012). As such, societies have come to make sense of climatic change by juggling a repertoire of traditional, local, practical, scientific and technical knowledges—from proverbs to tailored forecasts—all assessed against different criteria of quality.

Notwithstanding this plurality, certain principles have emerged in the scientific literature as fundamental to appraising knowledges’ fitness for adaptive action. Specifically, the principles of credibility, legitimacy, and salience (Cash et al., 2003), as well as usability and usefulness (Lemos and Morehouse, 2005). These remain influential, but there is nuance to knowledge quality that broad principles miss. We argue for more critical studies of knowledge quality to uncover what principles mean in particular contexts, and what other criteria are appropriate.

This special issue assembles nine articles from 37 authors, which take up the quality of adaptive knowledge as a topic. Three important themes emerge across these articles.

CRITICAL TAKES ON QUALITY: CONTEXT MATTERS

Five articles in this issue argue that knowledge quality is variously interpreted by different actors. Broad principles may not make sense in all contexts of knowledge development and use.

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The articles discuss the contingency of knowledge quality relative to urban adaptation approaches (Boon et al., 2021), traditions within science (Skelton, 2021), co-producing climate services with policymakers (Bremer et al., 2021), institutionalizing of knowledge in the CGIAR programme (Dinesh et al., 2021), and the legitimacy of knowledge for flood risk management (Vanderlinden et al., 2021).

These discussions share a regard for divergent ideas on the role of knowledge. Firstly, these differences are visible among knowledge producers. Traditions of adaptation science disagree on what is important, varying from curiosity to applicability, or the ability to challenge the status quo. There are also multiple knowledge producers, ranging from academics to professional consultants, government scientists, and citizen scientists, with diverging roles and visions. Secondly, the contexts of application are diverse. Knowledge needs for adaptive action vary according to local conditions, stakeholders, space, and time (Cradock-Henry and Frame). There can be differences between users' voiced knowledge "wants" and their "needs" for transformative adaptation. Since the roles of knowledge vary strongly across contexts, and are not self-evident, joint reflection on, and institutionalization of, knowledge quality and knowledge building is needed.

APPLYING CORE PRINCIPLES: OPERATIONALIZATION OF QUALITY

Notwithstanding the contingency of quality to context, five articles in this issue report on efforts to operationalise *a priori* principles of quality in mobilizing knowledge; mostly variations on the principles of Cash et al. (2003) and Lemos and Morehouse (2005). These principles were given effect to in developing climate services for municipal adaptation (André et al., 2021) and managing algal blooms (West et al., 2021); transdisciplinary urban innovation (Basta et al., 2021); institutionalization of knowledges in the CGIAR programme (Dinesh et al., 2021); and developing heuristics of climate scenario development (Cradock-Henry and Frame, 2021).

These contributions highlight the practical limitations of producing knowledge that meets quality principles when faced with contested, uncertain and urgent adaptation challenges. Authors emphasize the technical limitations to quality due to scarce data, gathered over short time series, and often commissioned *ad hoc* according to narrow framings. They also note the challenging work of reflecting diverse ways of knowing in the design, conduct and decision-making around research.

Another key insight is that adaptive action is affected not only by explicit "knowledge products"—e.g., a seasonal forecast—but also by the *processes* of knowledge production, which can give rise to wider impacts on actor networks, learning, practices, values, leadership, or shared understandings. Authors in this issue joined their voice to others (e.g., Hulme and Dessai, 2008) in calling for a shift in focus toward principles of procedural quality,

including equitable participation in extended modes of knowledge production.

BROADENING QUALITY: NEW CRITERIA

Authors question whether the principles discussed above are sufficient for guiding the production of high quality information, and put forward additional criteria. Basta et al. translates "principles" (legitimacy, relevance, credibility and effectiveness) into quality criteria (inclusiveness, equity, flexibility and consistency) relevant to the transdisciplinary co-production of knowledge. Cradock-Henry and Frame similarly suggest that there are important procedural aspects of climate scenario development that need to be taken into consideration to improve the legitimacy of this information.

Effectiveness stands out as an important criterion: can the knowledge production process generate the desired action (Basta et al.; André et al.)? *Equity* is another criterion that was raised to ensure that affected participants contribute to knowledge production (Basta et al.). Equity is an important contextual component that, when taken into consideration in co-production processes, promotes high quality knowledge (Cradock-Henry and Frame).

CO-CREATING QUALITY

Overall, contributions to this issue suggest that quality criteria need to be broadened with specific consideration for underpinning processes and contexts of knowledge production. Attention to the processes of generating information can provide insights that address issues about the context and operationalization of quality criteria.

The critical perspectives provided in this special issue provide a foundation for an urgently needed reflective turn in the practice of co-creating and co-appraising the quality of context-specific adaptive knowledges, aware of the very different roles that knowledge can play in informing local, cross-sector and transformative climate adaptation.

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All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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