

Addressing Risk Perception Through Anthropology: Methodological Pathways Into The Cultural Dimensions Of Risk

Lucilla Jommi^{1*}

¹Department of International Humanities and Social Sciences, University for Foreigners of Perugia, Perugia, Italy. jommi@studenti.unistrapg.it

Abstract: *The increasing frequency of extreme events caused by climate change underscores the need for a more comprehensive approach to risk perception studies, as understanding how societies select and interpret hazards is crucial for developing effective risk reduction plans. While current research, which primarily employs quantitative and psychometric methods, offers valuable insights into awareness and individual responses, it often overlooks or oversimplifies the complex cultural dimensions of risk. This is where anthropology can play a crucial role. Anthropology, with its critical and integrative approach, is particularly well-suited to address the complexities of how people perceive and respond to risk. It recognizes that perceptions are shaped not only by socio-economic conditions and cultural contexts but also by history, power relations, and governance systems. Given this need, the paper explores why and how anthropological methodologies can be applied to the study of risk perception. Through historical analysis, ethnographic fieldwork, and a holistic perspective, anthropology helps reconstruct the "dense fabric of situations" in which risk is experienced. This approach enables a deeper understanding of the meanings people attribute to risk, supporting the development of more context-sensitive strategies for disaster risk reduction and climate change adaptation.*

Keywords: *Anthropology, Climate change, Disaster risk reduction, Local Knowledge, Risk perception*

1. INTRODUCTION

Understanding how people perceive and respond to risk has become critical for effective disaster risk reduction and climate change adaptation. As Schneiderbauer et al. demonstrate, "risk awareness and risk perception have been identified as key factors influencing adaptive behavior and public support for management policies, as well as for taking precautionary disaster reduction decisions" [1, p. 2]. However, a persistent gap has emerged between scientific risk assessments and public responses, revealing fundamental limitations in current approaches to risk perception research. This disconnect becomes particularly concerning when examining the established relationship between perception and action.

The complexity of this relationship becomes evident when analyzing large-scale empirical evidence from comprehensive systematic reviews. As revealed by the study of Wachinger, Renn, Begg, and Kuhlicke, which identifies a "risk perception paradox," asserting that "many studies provide evidence that even though individuals have experience and high risk perception, they seldom take appropriate preparedness actions" [2, p. 6]. In their systematic review, they cite Miceli et al. (2008) in noting that "most empirical evidence suggests that the link between these two variables (risk perception and preparedness actions) is quite weak or even null" [2, p. 6]. This paradox challenges foundational assumptions of much current research and highlights the mediating influence of factors that traditional quantitative approaches often overlook.

The climate change context introduces unprecedented complexity to these already challenging dynamics. Indeed, climate change fundamentally alters the nature of risk perception because "these risks are no longer seen as 'natural'" [2, p. 14]. In fact, "more and more people tend to believe that the extent of damage as well as the frequency of disasters are caused or at least amplified by human actions such as interventions into the climate" [2, p. 14].

This transformation proves critical because it means that "natural hazards could face the same kind of patterns that characterize the perception of technological hazards" [2, p. 14], creating hybrid risk categories that traditional methodologies struggle to address. The authors anticipate that this shift will have "major repercussions for risk governance because social institutions will be blamed not only for inadequate response and emergency measures (as in the past) but also for the severity or frequency of the disasters themselves" [2, p. 14].

Furthermore, climate change introduces temporal and spatial scales that challenge conventional risk perception frameworks. Wachinger, Renn, Begg, and Kuhlicke highlight how climate-related events increasingly intersect with technological systems in complex ways, exemplified by cases like Fukushima, where "an earthquake, a tsunami, and a nuclear accident occurred in a close causal sequence," making "it almost impossible to be prepared for such kind of multirisk exposure" [2, p. 14].

These evolving risk landscapes underscore the critical importance of developing more sophisticated approaches to understand risk perception.'

2. Motivation and Objective

Building on the methodological challenges identified in the first section, this research is motivated by the recognition that existing approaches often overlook crucial aspects of how communities experience and negotiate risk. Current quantitative studies, while generating valuable statistical insights into patterns of awareness and demographic correlations, tend to treat risk perception primarily as an individual psychological phenomenon. As Douglas and Wildavsky demonstrate, this approach fails to capture the collective cultural processes through which societies select and interpret hazards, processes that are crucial for developing effective risk reduction plans [3]. Furthermore, the predominance of psychometric and survey-based research creates what Wilkinson identifies as artificial conditions that "record snapshots of risk judgements outside the specific social contexts in which people live out their day-to-day lives" [4, p. 9]. This methodological approach systematically removes risk perception from the everyday social environments where people encounter and negotiate environmental threats.

These methodological limitations have direct practical consequences for climate adaptation efforts. The systematic review by Schneiderbauer et al. demonstrates that numerous studies fail to adequately consider local knowledge systems and the cultural factors that shape how communities understand and respond to risk [1]. Despite the acknowledged importance of indigenous knowledge for comprehending community responses to environmental change, their analysis revealed that only a minimal number of studies in their comprehensive review explicitly incorporated such perspectives [1]. This cultural insensitivity reflects what Douglas and Wildavsky describe as the problematic dichotomy between supposedly objective risk assessments and subjective perceptions [3]. According to their analysis, this artificial separation has inappropriately assigned scientific legitimacy exclusively to physical sciences while dismissing psychological and cultural interpretations as mere illusions or errors [3].

The urgency of addressing these limitations becomes evident when considering that policies and interventions developed without understanding the cultural dimensions of risk perception often fail to resonate with community concerns and may inadvertently undermine existing adaptive capacities. As Revet and Langumier argue, the dominant "expert culture of risk" seeks to "disseminate this culture of risk as broadly as possible within populations otherwise seen as powerless and vulnerable" through efforts to "acculturate," educate, and "transform mentalities" [5, p. 2]. However, this top-down approach "does little to supply a relevant analytical framework for the complex situations encountered in the field" [5, p. 2].

The limitations of existing research, which overlooks cultural dimensions and relies on top-down approaches, highlight the crucial role that anthropology can play in developing more nuanced analytical frameworks that genuinely engage with local communities' knowledge and lived experiences. Indeed, anthropology recognizes that risk perception is fundamentally a cultural and social process of meaning-making, shaped not only by socio-economic conditions and cultural contexts but also by historical experiences, power relations, and governance systems. Through its critical and integrative approach, which combines historical analysis, ethnographic fieldwork, and holistic perspectives, anthropology helps reconstruct what Revet and Langumier describe as the "dense fabric of situations" in which risk is actually experienced [5, p. 11]. This methodology enables researchers to move beyond standardized risk assessments toward understanding how communities make sense of hazards within their specific social, cultural, and historical contexts.

In light of this, the primary objective of this paper is to examine why and how anthropological methodologies can be applied to the study of climate change risk perception. The analysis focuses specifically on how ethnographic methods can illuminate the meanings people attribute to risk and the social processes through which communities collectively make sense of environmental uncertainty. Rather than advocating for the

replacement of quantitative methods, this research argues for methodological complementarity that combines the statistical insights of survey research with the contextual understanding that ethnographic approaches provide.

To achieve this objective, the paper is divided as follows. First, it provides a systematic critical review of current risk perception research, examining comprehensive systematic reviews to identify specific methodological limitations that contribute to the risk perception paradox identified by Wachinger, Renn, Begg, and Kuhlicke [2]. Second, the paper discusses how anthropological methodologies can address these limitations through an analysis of ethnographic case studies from diverse geographical and cultural contexts. The aim is to show how prolonged engagement, participatory approaches, and multi-scalar investigation can reveal sophisticated local knowledge systems, cultural meanings, and social dynamics that conventional survey methods overlook. Third, the paper discusses how these anthropological insights can be integrated with existing quantitative approaches to develop more comprehensive and culturally sensitive research frameworks. This integration offers the potential to move beyond simply documenting the risk perception paradox toward developing methodological approaches that can both measure and explain the complex relationships between risk perception and adaptive behaviours.

This paper makes distinct contributions to climate risk perception research by demonstrating how anthropological methodologies can address critical gaps in current quantitative approaches. Initially, it provides a critical analysis of existing research methodologies regarding risk perception studies. The paper then proves, through ethnographic case studies from diverse geographical contexts, how anthropological methods reveal sophisticated local knowledge systems and cultural processes that remain invisible to conventional survey-based research.

Ultimately, the paper calls for methodological integration to combine the statistical insights of quantitative research with the contextual understanding offered by ethnographic approaches. Rather than proposing replacement methodologies, the aim is to shed light on how anthropological techniques can enhance existing approaches to achieve a more culturally grounded and contextually appropriate understanding of risk perception.

The research addresses a critical gap between academic risk perception studies and the practical needs of communities facing increasing environmental challenges. By revealing how cultural processes mediate the relationship between awareness and action, this work provides essential foundations for developing more effective adaptation strategies and context-sensitive policies for disaster risk reduction and climate change adaptation.

3. Main Insights

To evaluate the potential contributions of anthropological methodologies, it is essential first to examine the empirical patterns that emerge from existing risk perception research. Major systematic reviews on risk perception conducted over the past decade offer valuable insights into both the achievements and constraints of current approaches, providing a foundation for understanding where methodological innovations might prove most beneficial.

Indeed, recent comprehensive analyses have revealed recurring patterns across hundreds of studies, illuminating both the scope and limitations of contemporary risk perception research. Wachinger, Renn, Begg, and Kuhlicke [2] conducted one of the most extensive systematic reviews, analyzing over 350 European studies from the post-2000 period. Rather than focusing solely on findings, their analysis examined the methodological architecture underlying risk perception research, identifying four dominant factor categories: hazard-specific risk factors, informational variables including media coverage and source credibility, individual demographic and experiential factors, and broader contextual elements such as economic conditions [2, pp. 3-4]. This taxonomy reveals how the risk perception studies have evolved around quantifiable variables amenable to statistical analysis and correlation.

The most compelling insight from this extensive empirical base relates to the persistent disconnect between cognitive awareness and behavioral response patterns. Despite decades of research documenting high levels of risk awareness across diverse populations and hazard types, protective behaviors remain consistently limited, creating a fundamental puzzle in risk communication and management [2]. This consistent pattern

across multiple studies and contexts suggests that conventional theoretical models may be missing critical mediating factors that influence how awareness translates into action [2, p. 6].

Complementary evidence emerges from Schneiderbauer et al. [1], whose specialized review of climate and natural hazard risk perception in mountain regions identified systematic issues with methodological consistency and cultural integration. Their analysis indicates that "results are inconsistent or even conflicting due to a strong influence of context-specific parameters" [1, p. 2], while simultaneously revealing "little information in the literature which addresses the specific situation of risk perception" in diverse environmental contexts [1, p. 3]. Perhaps most significantly for climate adaptation research, they document "a strong gap concerning the integration of indigenous knowledge in risk perception research", despite widespread recognition of its importance for understanding community responses to environmental change [1, p. 3].

A third systematic assessment, conducted by Rufat et al. [6] through an international survey of 150 risk perception researchers, provides direct insights into the theoretical foundations, or lack thereof, underlying current research practices. Their findings reveal that "most studies are exploratory in nature and often overlook theoretical efforts that would enable the comparison of results and an accumulation of evidence" [6, p. 2655]. More concerning still, "over one-third of surveyors did not rely on a particular theoretical model or framework to guide their studies," indicating significant theoretical drift within the field [6, p. 2669].

When examined collectively, these systematic reviews illuminate three persistent methodological constraints that limit current understanding of climate-related risk perception. The first constraint involves what Wilkinson characterizes as pervasive "methodological individualism," wherein research designs treat "respondents as atomized individuals" detached mainly from their social environments [4, p. 9]. This individualistic orientation is evident in the variable selection patterns documented by Rufat et al., who found that conventional demographic characteristics such as age, gender, and education dominate research designs [6]. At the same time, indicators of social vulnerability, including linguistic barriers and minority status, receive minimal attention [6, p. 2662]. Moreover, the preference for psychological frameworks, such as "protection motivation theory," employed in 28% of studies, reinforces this tendency to examine risk perception as primarily an individual cognitive phenomenon [6, p. 2658]. While such approaches yield valuable insights into psychological processes, they systematically exclude the social and cultural contexts within which risk perceptions develop and operate.

This individualistic bias connects directly to a second major limitation: researchers systematically remove risk perception from its natural context. Wilkinson offers a particularly sharp critique of how current methodologies abstract risk judgments from the everyday social environments in which people live and make decisions. The author argues that "psychometric studies record snapshots of risk judgements outside the specific social contexts in which people live out their day-to-day lives" [4, p. 9]. This methodological approach creates artificial conditions that bear little resemblance to how people encounter and negotiate risk in their daily experiences. The problem is compounded by the static nature of most current approaches, which fail to capture the dynamic reality that people's risk perceptions are constantly evolving. As Wilkinson notes, "individuals' perceptions of risk are by no means constant; rather they change in different social settings and in relation to new knowledge and experience of life events" [4, p. 9]. Even more problematic, traditional methodologies impose researcher-defined categories of risk rather than allowing communities to identify and prioritize the hazards they perceive as threatening [4, p. 9].

Building on these first two limitations, current approaches demonstrate minimal cultural sensitivity and limited capacity for integrating local knowledge systems. Despite its recognized importance, Schneiderbauer et al. found that "only nine studies in the in-depth analysis explicitly include references to indigenous knowledge," and noted that research often "overlooks or oversimplifies the understanding of risk perception of indigenous communities" [1, p. 12]. This cultural inattentiveness reflects what Douglas and Wildavsky identify as a more fundamental conceptual problem: the false separation between "objective" risk and "subjective" perception [3]. They argue that this artificial division has wrongly "allocated real knowledge to the physical sciences and illusions and mistakes to the field of psychology" [3, p. 186]. This separation ignores the fact that risk perception is fundamentally a cultural and social process of meaning-making, rather than simply an individual psychological response to external stimuli.

The convergence of these three limitations (methodological individualism, decontextualization, and cultural insensitivity) creates what Revet and Langumier describe as an "expert culture of risk" that seeks to "disseminate this culture of risk as broadly as possible within populations otherwise seen as powerless and vulnerable" through efforts to "acculturate," educate, and "transform mentalities" [5, p. 2]. However, this top-down approach "does little to supply a relevant analytical framework for the complex situations encountered in the field" [5, p. 2]. These methodological limitations have direct practical consequences, as policies and interventions developed without understanding the cultural dimensions of risk perception often fail to resonate with community concerns and may inadvertently undermine existing adaptive capacities.

4. DISCUSSION

The methodological limitations identified in current risk perception research point toward the need for approaches that can capture what Revet and Langumier describe as the "dense fabric of situations" in which risk is experienced [5, p. 11]. Anthropological methodologies offer a direct response to these limitations by acknowledging that risk is a culturally constructed phenomenon. As Douglas and Wildavsky demonstrate, people's awareness of dangers aligns with their cultural commitments and ways of life, effectively dismantling the artificial distinction between "objective" and "subjective" risk [3]. This cultural perspective, combined with anthropology's emphasis on prolonged engagement and collective meaning-making processes, directly addresses the individualistic bias, decontextualization, and cultural inattentiveness that characterize much current research. It highlights that the gap between awareness and action stems from deeper cultural dynamics that cannot be fully illuminated through quantitative approaches alone.

This cultural understanding receives strong theoretical support from Wilkinson's comprehensive analysis of risk perception, which reveals that risk perception is inherently dynamic and polysemic. Wilkinson states that within everyday social contexts, risk functions as a concept with multiple, shifting meanings, which explains why traditional survey methods consistently fail to capture how communities perceive and experience uncertainty [4, p. 11]. Since risk perception is context-dependent and shifts based on social circumstances, cultural values, and power relations, anthropology offers valuable insight to address it, as existing ethnographic studies of climate-related risk perception demonstrate.

Durand's four-year ethnographic study in Lattes, France, exemplifies how prolonged immersion enables researchers to understand the cultural mechanisms behind apparently paradoxical community responses [7]. Rather than measuring awareness levels, Durand examined "how the issue of flooding occurs in everyday life", revealing that risk forgetting was not due to "ignorance or denial" but because residents "simply find no practical support... to refine an intelligence about flooding collectively" [7, pp. 4-5]. This insight emerged from extended observation of how technical protection discourse, social homogenization, and contradictory urban design practices interacted to prevent the development of an effective risk culture, despite high flood awareness. The study demonstrates how anthropological thick description reveals the multiple layers of meaning within which communities experience risk. Durand identified three interconnected mechanisms that prevent the development of a risk culture, which are invisible to survey research: technical protection discourse promoting overconfidence, limited social diversity avoiding the circulation of varied risk narratives, and security measures against intrusion that "constitute an obstacle for evacuation in case of flooding" [7, p. 3]. These findings demonstrate that effective climate adaptation necessitates an understanding of the entire cultural context of community life, not just individual risk perceptions.

Langumier's ethnographic analysis of France's "Plan Rhône" reveals how anthropological methods can expose the gap between official risk communication and community understanding. Through participant observation of consultation processes, Langumier found that supposedly participatory approaches maintained institutional control by addressing "an 'ideal inhabitant' who would share the objectives of public policy and support expert discourse" [8, p. 136]. However, local farmers possessed sophisticated environmental knowledge, sharing "a perfect empirical grasp of the field with experts in hydraulics, by virtue of having observed each flood, the flow of water during significant rainfalls, the maintenance of dams and irrigation systems" [8 p. 140]. This study illustrates how the anthropological validation of local knowledge systems reveals crucial insights that are systematically excluded from formal risk management. On Barthelasse Island, Langumier found that "the memory of floods is inseparable from the agricultural world. For the island's

inhabitants, it refers to an ordeal that confirms their rootedness in the territory and membership of local society" [8, p. 146]. This cultural understanding of risk as connected to community identity and place-based knowledge represents precisely the kind of insight that climate adaptation strategies need, but quantitative surveys cannot access.

Moreover, Benadusi's multi-sited ethnography of post-tsunami reconstruction in Sri Lanka demonstrates how anthropological methods illuminate the collective construction of risk meanings. The study reveals how disaster experience becomes a "contested laboratory of social learning" where different actors develop divergent understandings of post-disaster risk and appropriate responses [9, p. 88]. Benadusi found that "the actors who encounter each other in the wake of the catastrophe do not constitute a community" but rather "social networks characterized by a high degree of internal heterogeneity" [9, p. 111].

Rather than viewing these divergent perspectives as implementation failures, anthropological approaches recognize contested meanings as revealing the fundamental dynamics by which societies build up risk perception. In the Sri Lankan case, fishing communities prioritized maintaining their relationship with the ocean that provided their livelihood, while international experts focused on technical solutions to prevent future casualties [9]. These different interpretations emerged not from misunderstanding but because different social actors operated from diverse value systems, had access to various resources, and faced different consequences from reconstruction decisions. These contested meanings expose the inherently political nature of risk perception, as they reveal questions of power, resource distribution, and whose knowledge is considered legitimate.

Similarly, Reichel and Frömming's six-month participant observation in Swiss Alpine communities demonstrates how anthropological methods can systematically document the sophisticated local knowledge that formal risk assessment overlooks [10]. The researchers found that communities possess "highly differentiated knowledge about avalanches or mudflows" that remains "rarely considered in the creation of risk and hazard plans" [10, p. 48]. Moreover, the employment of participatory mapping techniques in this research enabled communities to articulate their environmental knowledge rather than simply respond to externally imposed risk categories. This methodological innovation directly addresses the fundamental limitation identified by Wilkinson, who argues that traditional risk perception studies present respondents with "risks selected by the researcher" rather than allowing communities to determine what they consider risky [4, p. 9]. The Swiss case reveals that local climate change perceptions emerge from complex cultural negotiations, where "whether or not particular interpretations and actions related to climate change prevail depends on several factors," including embedded value systems and social pressures [10, p. 50]. This finding highlights the importance of anthropological approaches in effective climate adaptation, which can access culturally embedded risk understandings rather than imposing predetermined frameworks that may fundamentally misrepresent community priorities and knowledge systems.

These ethnographic studies reveal three methodological elements that directly complement existing quantitative approaches: prolonged temporal engagement, participatory knowledge co-production, and integration of multiple scales of analysis. Each element addresses specific limitations in current risk perception research while enhancing rather than replacing quantitative insights.

The first methodological contribution lies in extended fieldwork, which enables observation of risk perception dynamics across time and social contexts. Wilkinson notes that "Individuals' perceptions of risk are by no means constant; rather they change in different social settings and relation to new knowledge and experience of life events" [4, p. 9]. This temporal variability cannot be captured through single-point surveys but requires sustained engagement to witness how risk meanings evolve within communities. Durand's four-year study documented how preventive behaviors gradually diminish over time [7]. In contrast, Reichel and Frömming's extended presence allowed for an understanding of how local environmental knowledge is "created, evolves, and is used" within specific social contexts [10, p. 43]. This longitudinal dimension reveals patterns invisible to snapshot methodologies and provides crucial insights into how risk perceptions shift in response to changing circumstances, policy interventions, and collective learning processes.

Building on this temporal dimension, participatory approaches represent a second crucial element that enables communities to define their risk perception and contribute to research design. This technique can address the fundamental disconnect between formal research responses and actual community behavior that

characterizes much current research. Reichel and Frömming's process was "guided by reciprocity" with "several feedback sessions held to define and discuss necessary corrections," ensuring research findings accurately reflected community perspectives [10, p. 46]. This ongoing validation process directly bridges the gap Wilkinson identifies between perceptions "formally recorded by questionnaires and the attitudes and behaviour with which people respond to risks within the social contexts of everyday life" [4, pp. 9-10]. Through such participatory validation, anthropological methods ensure that research captures authentic community priorities rather than imposing external frameworks that may misrepresent local concerns.

The third methodological element involves integration across multiple scales, which allows anthropological methods to connect household-level practices with broader institutional processes and historical contexts. This scalar integration directly addresses the decontextualization problem that limits current approaches. Benadusi's multi-sited approach traced connections from "Sri Lankan national meeting rooms where humanitarian agencies collaborated with government institutions...to the affected coasts of Sri Lanka where reconstruction projects were translated into practice," revealing how macro-level policies interact with micro-level community responses [9, pp. 90-91]. This methodological innovation demonstrates how risk perception operates simultaneously across different scales of social organization, from individual households to national institutions, and how these scales interact to produce the complex patterns of awareness and action that quantitative studies struggle to explain.

These three methodological elements work synergistically to address the core limitations of current risk perception research. Rather than replacing quantitative methods, these anthropological approaches enhance understanding by providing the cultural context necessary to interpret statistical patterns and explain apparent paradoxes. The illustrated case studies demonstrate how ethnographic insights can illuminate the social and cultural mechanisms through which awareness translates, or fails to, into protective action.

This complementarity suggests that the most effective climate risk perception research will systematically combine quantitative mapping of awareness patterns with anthropological understanding of the cultural processes that shape collective responses to risks. Such integration offers the potential to move beyond simply documenting risk perception toward developing methodological approaches that can both measure and explain the complex relationships between knowledge, culture, and action in the face of increasing risks.

5. CONCLUSIONS

The mounting challenges of climate change demand a fundamental rethinking of how risk perception is studied and understood. While current quantitative approaches provide valuable statistical insights into patterns of awareness and demographic correlations, they remain insufficient for understanding the complex cultural processes through which communities collectively make sense of climate risks. The persistent disconnect between cognitive awareness and protective action reveals the limitations of methodologies that treat risk perception as an individual psychological phenomenon detached from social and cultural contexts. This paper has demonstrated how anthropological methodologies offer essential complements to existing approaches by illuminating the cultural dimensions that risk perception researchers often overlook. Through a critical analysis of methodological limitations and examination of ethnographic case studies from diverse geographical contexts, the paper reveals how prolonged engagement, participatory methods, and multi-scalar investigation can expose sophisticated local knowledge systems, cultural meanings, and power relations that shape community risk perception.

The ethnographic studies examined in the discussion session consistently demonstrate that effective climate adaptation requires an understanding not merely of what communities know about risks, but also of how they construct meaning around environmental threats within their specific cultural contexts. These studies reveal that apparent failures to act on risk information often reflect sophisticated cultural negotiations rather than ignorance or denial, challenging fundamental assumptions underlying current research and policy approaches.

The framework for methodological integration presented in this paper provides pathways for combining the statistical insights of survey research with the contextual understanding that ethnographic approaches offer. This integration addresses three critical limitations identified in current research: methodological individualism, which ignores social contexts; decontextualization, which abstracts risk perception from

everyday life; and cultural insensitivity, which overlooks local knowledge systems. Rather than replacing quantitative methods, anthropological approaches enhance their interpretive capacity by revealing the cultural mechanisms through which statistical patterns emerge.

The practical implications of this methodological integration extend beyond academic research to policy development and implementation. Indeed, climate adaptation strategies developed without understanding the cultural dimensions of risk perception often fail to resonate with community priorities and may inadvertently undermine existing adaptive capacities. By revealing how cultural processes mediate the relationship between awareness and action, anthropological insights provide essential foundations for developing more effective, context-sensitive approaches to disaster risk reduction and climate adaptation.

Future research should prioritize developing systematic frameworks for integrating quantitative and ethnographic approaches, moving beyond the artificial division between "objective" risk assessment and "subjective" perception toward a more holistic understanding of how communities experience and respond to the new and multiple risks presented by climate change.

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