Defining a humanitarian shelter and settlements research agenda

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A B S T R A C T

Despite the knowledge gained on post-disaster sheltering and housing over the last several decades, there remains a disconnect in the evidence needed by humanitarian practitioners and the learning that the research community is capturing. To determine the research needed by practitioners, we assembled a Delphi panel of experts in humanitarian shelter and settlements. They first identified and then ranked the relative importance of research topics. Ninety-six research needs were identified and ranked by importance in six key areas that included: (1) comparing and evaluating approaches to sheltering, (2) shelter and settlement programming, (3) design and construction of shelter, (4) understanding impacts and outcomes of shelter, (5) disaster risk reduction and the humanitarian-development nexus, and (6) challenging contexts and topics. Top research priorities identified include a need to better understand how to support shelter self-recovery, longitudinal and long-term impacts of shelter, and the transition from response to recovery. The resulting needs provide a research agenda for humanitarian organizations, academic institutions, and donors, aligning with the Global Shelter Cluster's strategy to invest in evidence-based response.

1. Introduction

The provision of adequate shelter has been described as one of the most difficult areas of international humanitarian response [1]. In the face of rising challenges, such as protracted crises, climate change, and growing number of displaced populations, the humanitarian system faces unprecedented change. This change requires better incorporating lessons from the past and generating new knowledge that can support aid to better assist communities affected by conflict and disaster. Sheltering and housing practice and study has saved lives, fostered stronger livelihoods, and strengthened disaster risk reduction. Despite this growing community of practice, the application of evidence in humanitarian decision-making remains sparse, and the evidence base itself is deficient [2,3].

For sheltering and housing after a disaster, the evidence dilemma is two-fold. First, consolidating the body of knowledge, which has been primarily formed around rich case studies of humanitarian crises [4–8], is challenging. There is a general absence of comparative studies that enable findings to be generalized within national contexts and globally [9]. As will be discussed, there is a divide between 'shelter' and 'housing' that has been artificially created in the name of organization by humanitarian and development actors with similarly divided learning.

Second, there is little systematic direction for a future humanitarian research agenda relating to sheltering, resulting in evidence that is collected and formed without a guiding strategy. The Global Shelter Cluster [10] inaugural *State of Humanitarian Shelter and Settlements* identified lessons learned and pointed to lingering questions that require future evidence. This research builds on this volume of perspectives, focusing on where evidence is needed. More broadly, the few examples that reflect on the body of knowledge for humanitarian shelter and settlements [11–13] do not systematically map existing gaps nor set an agenda that prioritizes the most important areas where future evidence is needed.

Humanitarian agencies provide perhaps the strongest need for a research agenda. Specifically, the Global Shelter Cluster's current strategy calls to *"further analyze existing evidence and gaps and set out a broader operational field research agenda"* [14]. This priority is one of four key pillars aimed to strengthen humanitarian shelter and settlement actors' ability to respond effectively to crises worldwide. In response, this study aims to determine the current research priorities needed for the humanitarian shelter and settlements sector. We argue that while there is no shortage of problems facing humanitarian response requiring researchers' attention, there is a need to more deliberately focus limited resources toward the most critical evidence needed by practice. There is

a dearth of studies that seeks to systematically consult practitioners on the evidence they require. To address this concern, we ask the research question: *What are the most important future areas of research needed for humanitarian shelter and settlements?*

We first define what we mean by humanitarian shelter and settlements and to whom we are proposing a research agenda. We then outline our methods, which involved surveying experts in multiple rounds of a Delphi panel, before discussing a prioritized list of research needs that could guide future evidence creation.

2. Background

There has been significant effort given to the study of sheltering and housing after a disaster, driven by its critical role in facilitating broader recovery [15]. Housing often forms the foundation for social and economic development [16], especially in resource-limited communities [17]; however, the literature on sheltering and housing after disaster has often been characterised by a fragmented knowledge base. Daar et al. [18] found that in a recent survey of humanitarian experts, further research on shelter was among the top priorities for humanitarian response. We first provide a snapshot of how the humanitarian sector has examined evidence on shelter and the organization of the current body of knowledge on this topic, followed by bounding the humanitarian shelter and settlements field, then outlining why a research agenda is needed.

2.1. Bounding humanitarian shelter and settlements

Quarantelli [19,20] noted the emergence of four common phenomena in dwelling practices after disaster: (1) emergency sheltering; (2) temporary sheltering; (3) temporary housing; and (4) permanent housing. Emergency sheltering refers to the actions taken by affected people seeking refuge for short periods preceding and immediately following a disaster. Temporary sheltering denotes short term displacement in other living quarters. Temporary housing signifies the reestablishment of household routines in alternative accommodation. Permanent housing implies more established dwelling. While this conceptual lens of sheltering and housing is one of the most widely applied [21], these terms often take on different meaning depending on their context, varying in duration and substance. Despite raising concerns over the often-inconsistent use of these terms, current literature and practice have yet to reconcile these terminologies. As Smith and Wenger [22] note, recovery phases are often assumed to occur in a linear, delimited fashion, when experiences of disaster-affected populations deviate from these bounded constructions. Yet, these terms have significance for making sense of the complexity of crises and making knowledge more accessible to those that need it. For humanitarian actors, sheltering processes provide immediate life-saving assistance; however, these solutions frequently become the only assistance communities receive. As Leon et al. [23] and others have asserted, there is often nothing to transition to after humanitarian assistance. Thus, there is a perceived and real barrier between sheltering and housing processes [24]. In the context of this work, we seek to build upon knowledge that has underscored both ends of this spectrum [25,26].

In this research, we consider the humanitarian shelter and settlements sector to be the network of actors working together to assist in post-disaster recovery on sheltering and housing issues. The sector has its roots in early humanitarian movements and the burgeoning Bretton-Woods development institutions. However, its origins might be more appropriately linked with work commissioned in 1975 by the United Nations Disaster Relief Coordinator (UNDRO), the predecessor to the United Nations Office for Coordination of Humanitarian Affairs (UNO-CHA), which eventually commissioned the *Shelter after Disaster* publication [27]. In its second edition [28], this authoritative text laid out many of the fundamental principles and guides that underpin practice today.

With the formation of the humanitarian clusters in 2006 [29], the creation of the Emergency Shelter Cluster, now simplified in name to the Shelter Cluster, consolidated expertise and facilitated greater coordination of disaster response activities. While the Shelter Cluster played a significant role in the organizing principles around humanitarian shelter and settlements, the *Sphere Handbook of Minimum Standards in Disaster Response* concurrently institutionalised the sector's operating procedures [30]. Since the first edition in 2000, shelter has been central to the belief that those affected by disaster or conflict have a right to life with dignity.

While the needs of people affected by disasters drive the humanitarian shelter and settlements sector's organization, so do funding streams and donor agencies. The United States Agency for International Development's Office of U.S. Foreign Disaster Assistance (USAID/OFDA) defines common goals of the sector as *"the expeditious and appropriate provision of covered living space to adequately shelter displaced populations, while also promoting safer, healthier settlements that link emergency S&S assistance to longer-term recovery efforts"* [31]. Similarly, the European Civil Protection and Humanitarian Aid Operations (ECHO) states the goal of the sector *"is to preserve life and alleviate suffering, for disaster-affected populations in need of basic shelter in secure and appropriate settlements, where conditions have significantly deteriorated and fallen below commonly-accepted minimum humanitarian standards, or are anticipated imminently to do so"* [32]. Yet, as Saunders [13] points out, donor influence on boundaries are sometimes artificial and disconnected from household experiences. For example, OFDA can fund rapid, emergency "shelter" solutions as well those that bridge to longer term recovery, but the department is prohibited from funding "housing" work that falls under other USAID development programmes. These donor perspectives have historically driven short-term solutions; however, recent calls through the World Humanitarian Summit and Grand Bargain have sought to increasingly link humanitarian assistance to longer-term development to address underlying vulnerabilities better.

The addition of 'settlements' has more recently found its way into the naming of the sector and the emphasis on how humanitarian shelter programming is delivered. Settlement activities recognise the intrinsic linkages between shelter and the broader context of villages, towns, or cities [33]. This linkage has renewed focus on the interaction between social systems and the built environment. Capturing this refocused, holistic approach to the sector, the Sphere Standards [30] define settlements as "*the wider locations where people and community live.*" Underlying these efforts are growing calls to address the root causes of vulnerability and destabilization, connecting humanitarian assistance to development efforts. This positions the shelter and settlements sector at the humanitarian-development nexus, linking relief, rehabilitation, and development by recognizing that short-term humanitarian needs in emergencies, poverty, and state fragility occur concurrently and cannot be separated. These movements have further blurred the sector's boundaries but provided critical insights into engaging with the complex social systems to make aid more effective.

2.2. Rationale and need for a research agenda

To better understand and support this continuously growing and evolving sector, practitioners and researchers must collaborate to develop a prioritized list of the most important areas for further research. As Graham Saunders, the former head of IFRC's Shelter and Settlements, stated, *"... the sector has failed to develop because institutions have not advanced their own understanding of the subject despite progress at field level"* [28], which has left significant gaps in the complex process of housing reconstruction. Moreover, very few non-governmental organizations claim to specialize in housing, leading to a less developed repository of knowledge on appropriate assessment strategies [16]. Further, many humanitarian organizations have had relatively little impact when considering the scale of humanitarian crisis [34]. This limited coverage is driven in part by focusing on costly interventions

that have not looked at innovations at scale. Conflicts arise within the sector as organizations and governments are pulled to achieve their goals of reducing disaster risk and aiding with long-term recovery [35]. Post-disaster housing is often highly politicised, decentralised, and in resource-limited contexts [36]. These are frequently accompanied by the absence of formal land tenure, complicating the transition of aid to development. There is also mounting pressure from the growing demand on the humanitarian system, confounded by climate change and increasing urbanisation. The majority of those displaced by disaster and conflict now reside in cities [37]. Understanding these complexities requires evidence to guide policy in increasingly challenging contexts.

UNOCHA [38] estimates that 168 million people currently need humanitarian aid. In the face of these growing pressures on humanitarian institutions, there is a need to take stock of what evidence is in place to inform humanitarian shelter and settlements programming and what evidence is yet to be captured. Thus far, there are several robust syntheses on focused topics for the humanitarian shelter and settlements sector. These recent efforts have included comprehensive reviews of shelter self-recovery [39], indicators to evaluate shelter assistance projects after disasters [40], and area-based approaches [41]. Missing, however, is an overall framework to guide the collection and prioritization of evidence. There is a critical need to create a humanitarian shelter and settlements research agenda to better align researchers and practitioners around common goals. To create this research agenda, we must first understand the research areas that practitioners view as the most important for the sector.

3. Methods

To synthesize existing evidence gaps and their relative importance within humanitarian shelter and settlements, we first solicited needed research areas from professionals working in the sector. Then, we assembled a Delphi panel of expert practitioners to rate the importance of research areas to obtain consensus.

3.1. Pre-study survey

First, to create an initial list of priority research areas that the expert panel could rate, we developed and administered an open online survey in late 2017. The questionnaire's goal was to identify key areas for future research and develop an initial list of topics that could be carried forward in a rating process. The questionnaire included three open-ended questions to generate an initial list of research topics deemed important to practitioners. We first asked respondents to list the three most significant challenges facing their organization. We next asked respondents to list five areas they felt merited future research and would help make humanitarian shelter assistance more effective. Finally, the questionnaire asked respondents to list the three most important skills or knowledge areas needed by individuals working in humanitarian shelter and settlements. The cross-section of challenges, knowledge, and skills was intended to sample possible research areas broadly. We intentionally limited the survey to three questions to encourage responses and reduce drop-out rates.

The survey was shared through InterAction's Humanitarian Shelter Working Group and was posted on the Global Shelter Cluster website. Invitations were sent to shelter leads for all organizations sitting on the Shelter Cluster Strategic Advisory Group (SAG), who were invited to distribute and share the survey. We provided no incentive to participate in the survey. In total, 15 respondents replied with research areas that were consolidated into distinct topics through qualitative coding by the second author. All three authors reviewed the consolidated list to ensure that each topic was distinct, also checking to ensure that additional topics were not missed. These were also supplemented with informal correspondence with both donors and implementing agencies.

3.2. Delphi panel

We employed the Delphi method as a systematic tool for consensus-building amongst experts. The Delphi technique is particularly helpful for goal setting and addressing strategic objectives [42]. Furthermore, Delphi techniques were suitable because the experts we sought were geographically dispersed and difficult to assemble in person or at the same time [61]. We conducted a Delphi survey online in three rounds, with the first round focused on identifying and validating the list of possible research areas. The second and third rounds asked participants to rate the importance of each research need.

To be considered for the expert panel, we required experts to have a minimum of ten years of experience working in the humanitarian shelter and settlements sector. Based upon this criterion, we invited 35 experts to participate in the Delphi, with the additional goal of having a representative balance of stakeholders, including individuals who worked for non-governmental organizations, donor agencies, and inter-governmental organizations. 22 of the 35 qualified experts participated in the first round with primary affiliations of participation as follows: three from inter-governmental organizations, four from International Federation of Red Cross and Red Crescent Societies (IFRC), three from donors, ten from non-governmental organizations, and two independent consultants. Six respondents were female, and 16 were male. As can be expected from Delphi studies, we experienced attrition between rounds, with 16 completing the second round, and 14 completing all three rounds. Frequencies for affiliations for the second and third rounds were, respectively, one from inter-governmental organizations, three and two from International Federation of Red Cross and Red Crescent Societies (IFRC), two and one from donors, eight and seven from non-governmental organizations, and two independent consultants. The gender of respondents included four females and 12 males in the second round and three females and 11 males in the third round. The stakeholder and gender composition for the final round was approximately proportional to the first round. The results presented reflect the relative importance based on the final round rankings.

The first-round affinity grouped research priority areas from the pre-study survey responses and reviewed literature into six themes: (1) comparing and evaluating approaches to sheltering, (2) shelter and settlement programming, (3) design and construction of shelter, (4) understanding impacts and outcomes of shelter, (5) disaster risk reduction and the humanitarian-development nexus, and (6) challenging contexts and topics. Participants were asked to add specificity and clarity to the list of research needs and note any additional priority areas that had not been identified previously. There was also an opportunity to suggest removing items from the list if any were deemed not to be applicable.

The second round presented individual research needs within these six themes, asking participants to rate the relative importance of the identified research needs to enhance humanitarian shelter and settlements. These were rated using a Likert scale that included ratings of not important, slightly important, moderately important, important, and very important. At the end of each of the six themes, participants were asked to provide rationale for their ratings in an open-ended text box. This rationale was particularly important to capture given the focus on consensus measures.

In the third round, for items that did not reach consensus, respondents were provided with the panel's median ratings of importance for each research area, their response from the previous round, and a histogram of all panel members' responses. We selected the median response because this measure of centrality is less susceptible to bias [43]. We also provided a compiled list of statements of the panellists' rationale for their ratings. Panel members were then asked to re-evaluate their ratings, based upon the panel's rationale, and provide further comments to justify their rating.

We measured consensus by the median absolute deviation (MAD). This value accounted for variance around the median and not the mean

response. When the absolute deviation fell below one-half point (0.5) on the five-point scale, or 10% of the possible scale, we achieved consensus. In practice, this was approximately equivalent to the majority of the panel selecting the median importance rating with no more than one individual deviating beyond two adjacent importance ratings (e.g., choosing a 5 when the panel median was 3). The average and median ratings summarize the panel's opinion of the importance of each research area. The average deviation and range of responses show the degree to which the panel agreed on the median value.

We implemented several measures to reduce bias in response. While participants knew that all panelists were experienced professionals, the panellists' names were kept anonymous. Further, we randomized the order of topics within each of the six theme sections in each panellist's survey to ensure validity. Finally, we provided commentary and rationale on the quantitative responses to ensure that panelists did not misinterpret ratings. This research followed ethics protocol 17–0561 approved by the Institution Review Board at the University of Colorado Boulder.

4. Findings

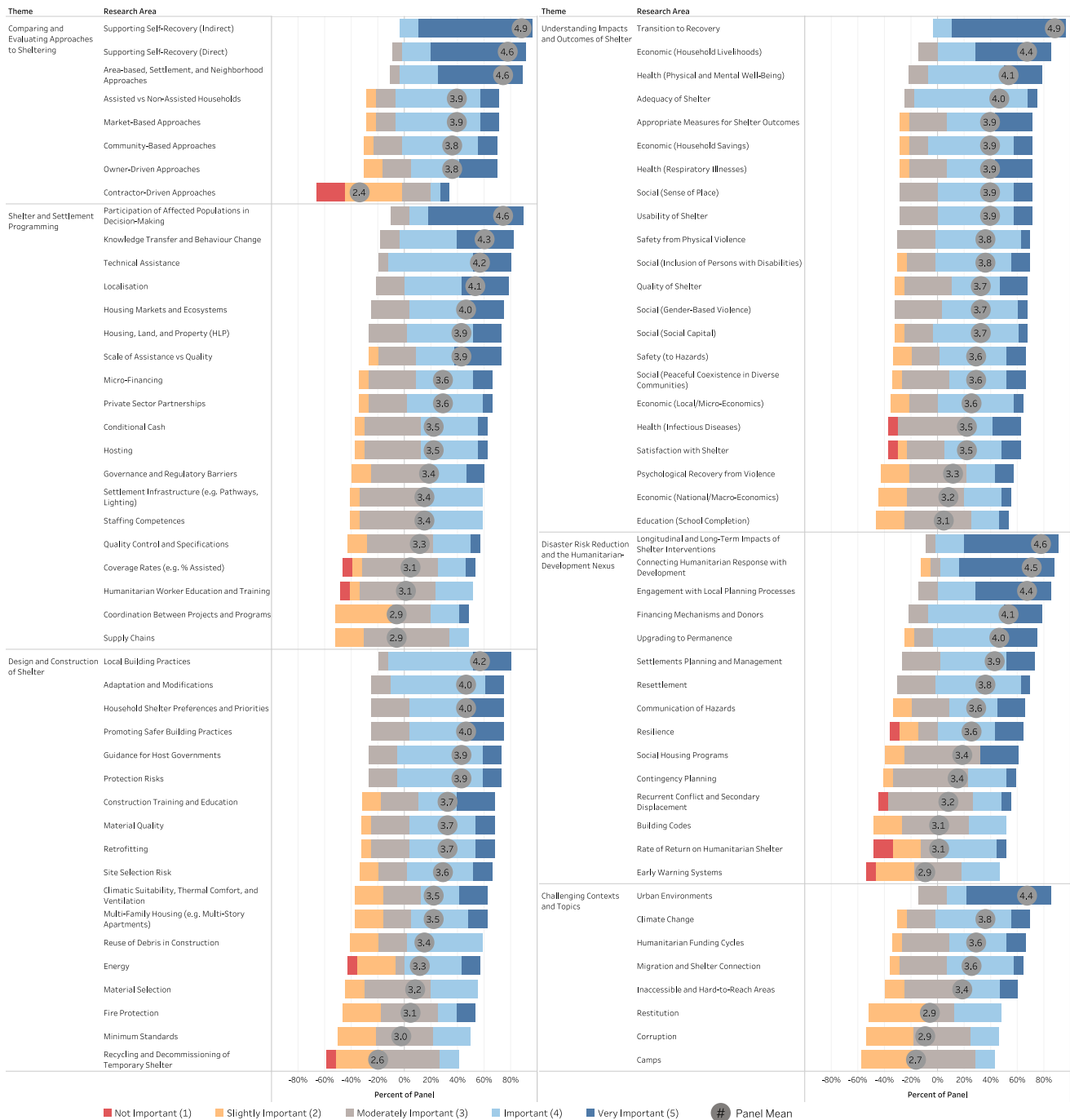The panel members identified 96 research needs that were affinity

Fig. 1. List of humanitarian shelter and settlements research areas.

grouped into the six categories mentioned in the research methods section above. All of the identified research needs are shown in Fig. 1. The mean importance, from 1, which represents *not important,* to 5, which represents *very important,* is shown for each item, as is the distribution of responses.

The top research priorities were supporting indirect self-recovery and transitioning to recovery. Self-recovery, or the process of reaching outside formal humanitarian assistance with technical, material, or financial support [39], was divided into direct and indirect based on the panelist responses from the first round of the Delphi. Direct support, in this case, refers to the intended beneficiaries of such support. In contrast, indirect support refers to unintended recipients of support; for example, people living outside target communities or even outside directly affected disaster or conflict regions who benefit. After supporting indirect and direct self-recovery, the next most important research areas were longitudinal and long-term impacts of shelter interventions; area-based, settlement, and neighbourhood approaches; and the participation of affected populations in decision-making. Subsequent items in the top ten needs included connecting humanitarian response with development, the impact of shelter on household livelihoods, engagement with local planning processes, and urban environments.

There were a few key differences when we compared evaluations of importance across different stakeholder groups. As a telling sign of agreement, seven of the top ten research priorities were the same for donor agencies and implementing organizations. However, donors had universal alignment on three priorities not considered by implementing organizations, including construction training and education, social housing programs, and upgrading to permanence. While these areas were related to those identified as important by implementing agencies, they notably focus on investment in sustainable recovery outcomes. While this may fall outside the direct mandate of humanitarian organizations, these present a possible entry point to bridge engagement with development actors.

Just over one-third (39 of 96) of the research areas achieved consensus on the degree of importance. However, many needs fell just above our defined cut-off for consensus, with nearly all of the areas (93 of the 96) falling below 15% absolute deviation from the median. This suggests an overall high degree of agreement on the relative importance of topics defined. In the sections below, we highlight the key findings within each thematic area.

4.1. Comparing and evaluating approaches to sheltering

The first category, comparing and evaluating approaches to sheltering, included eight research areas related to how organizations and governments approach shelter and settlements programming. During the first round of the Delphi, this category name was changed from "delivery mechanisms" to "approaches" in response to a panelist comment stating, "*we can and often should support recovery without "delivering" anything. The obligation of a good shelter practitioner should only be 'ensuring dignity, safety, and transition to a full recovery with increased safety; there should be no obligation to deliver anything.*" Overall, this category of research areas allowed panelists to discuss the need to compare and evaluate shelter and settlements program approaches. Here we define approaches as the strategies and guiding principles applied in shelter programming. As stated by one panelist, evidence is needed to understand "*the comparative efficiencies and effectiveness of these approaches [to sheltering] … and how they contribute to or hinder long-term development.*" All but one of the items identified within this category of needs had mean importance scores above 3 (moderately important).

Experts rated and commented on supporting shelter self-recovery, both directly (mean = 4.86, MAD = 0.51) and indirectly (mean = 4.64, MAD = 0.24), as the top two priority research areas. These areas were among the top four most important research topics out of the 96 needs identified. Direct support narrowly did not achieve consensus, while there was strong agreement for indirect support. In the first round,

one panelist indicated that *"most recovery is self-recovery (and that humanitarians don't reach the majority of affected populations)"* to explain why *"this is the area that I think is of highest need to continue to understand and support."* Another panelist noted, "*as well as studying more effective ways to support the self-recovery of those we do assist, there is a real need for more research on how we can best assist the "other 90%", that we never actually directly assist in any way.*"

The third most important area was settlement, area-based, and neighbourhood approaches (mean = 4.57, MAD = 0.55). Despite its high importance, the area narrowly did not reach census, highlighting divided views on these integrated approaches' future potential. Reflecting on the research need, a panelist noted, *"I think it is a trending topic, and certainly it is one of the 'lenses' that has been overlooked that I see as important, but overall I don't see this as the revolution that many see it as."* Others noted that this should be the central focus for future research, particularly around the impact of these integrated approaches and on processes to deliver them.

Contractor-driven approaches were rated the least important in this section and had the lowest overall importance of any of the research needs identified (mean = 2.36, MAD = 0.67). However, this area also had one of the lowest consensus levels, and the potential value from future research was contentious. The panelist comments on this topic revealed conflicting viewpoints; one noted, "*In reality, most construction is done by contractors. The only sustainable intervention is by working with contractors and government, and we should get better at both.*" Another stated, "*with a push towards cash, I see a reduced engagement in contractor given shelter responses. This is different if we are talking about infrastructure - but ultimately, I don't see we need research on this; we just need to apply proper contract management approaches!*" This later viewpoint suggests a move toward applying known best practices, while the former is linked to the need to re-examine knowledge of contractor-driven models in the context of a changing humanitarian landscape.

4.2. Shelter and settlement programming

The next category of research areas included twenty-one factors involved with shelter and settlements programming. Within this section, panelists identified research needs that related to operational concerns. Specifically, further study of the participation of affected populations in decision-making (mean = 4.57, MAD = 0.61), knowledge transfer and behaviour change (mean = 4.29, MAD = 0.49), and technical assistance (mean = 4.21, MAD = 0.46) were rated as the most important. While the latter two areas achieved consensus, participation did not. This lack of consensus was due, in part, to a small number of individuals on the panel who held out evaluating this as only moderately important, as noted by one expert, "*This is a very important idea, but there is a lot of literature on this already."* Others pointed to the need to look for unconventional ways of enhancing participation, such as the potential that cash-based approaches might hold.

Both knowledge transfer and technical assistance had strong agreement on importance, but there was debate over what aspects were most in need of future research. These sentiments were summarised by one respondent, *"[knowledge transfer] is the most fundamental thing we should focus on after life-saving shelter, and we are simply not good at it and need better evidence to work from."* Most respondents commented on a need to better understand the process, or 'how,' of technical assistance. However, a smaller contingent also challenged assumptions on the state of technical knowledge itself, *"Perhaps this reflects some people's view that we 'know' how to do the hardware, how to get the technical bit right. An error, in my opinion. As a sector, we lack technical competence."* These perspectives align with broader views in the humanitarian and disaster risk reduction community that understanding knowledge processes remains a critical area of need for future study [44,45].

On the lower end of programming research priorities, panelists noted coordination between projects and programs (mean = 2.93, MAD = 0.45) and supply chains (mean = 2.93, MAD = 0.46) as less important

areas for future work, but both achieved consensus. These areas were noted to have significant work already taking place and well-established resources to meet current demands.

4.3. Design and construction of shelter

The design and construction of shelter theme included nineteen areas focused on technical dimensions of dwellings, centred on construction and building practice. The most important research needs identified in this theme centred on understanding local building practices (mean = 4.21, MAD = 0.46), adaptation and modifications (mean = 4.00, MAD = 0.41), household shelter preferences and priorities (mean = 4.00, MAD = 0.49), and promoting safer building practices (mean = 4.00, MAD = 0.49). Particularly, panelists emphasized the need to develop tools to better understand local construction practice, with consensus across all related research needs. Several panellists commented on the importance of "*identifying and recognizing existing skills*" and studying various dimensions of localisation by creating "*relevant links with local practices.*" An example of needed future work cited included developing country-specific building typology profiles in advance of responses. There was consensus that new technical evidence required to move away from blanket solutions to context-specific, nuanced understanding of construction markets.

Panelists ranked research into recycling and decommissioning of temporary shelter as the least important topic within this theme, but similar to other research areas rated with lower importance research, this topic lacked consensus (mean = 2.64, MAD = 0.55). Comments to justify this lower rating centred on greater importance of situating the stage of shelter into recovery plans, rather than specific technical dimensions. Across this theme, panelists emphasized a need to focus on localized construction, shifting away from universal standards.

4.4. Understanding impacts and outcomes of shelter

There were twenty-three items related to shelter outcomes and impact. The panel identified four categories relating to the impact of shelter, including economic, social, environmental, and health benefits, with more specific areas noted within each of these topics. The items identified within this category all had mean importance scores above 3 (moderately important), the only category where this occurred.

The most important research area identified was understanding the transition to recovery (mean = 4.86, MAD = 0.25). All but one panelist assessed this as 'very important,' having the highest degree of consensus of any of the ranked needs in this survey. Beyond just linking humanitarian programs, there was also mention of the need to understand recovery *for whom* and what is meant by recovery. This area has been historically unstudied in the existing literature and merits future work. Tobin's [46] work, commissioned by Elsevier, noted that less than 14% of disaster research publications have focused on this critical phase. This research need is connected to complementary methodologies, such as longitudinal studies and long-term impact evaluations. Despite continued efforts to raise the need to examine recovery [22], this area remains more vital than ever if the humanitarian-development gap is to be closed. This was followed by understanding the impact of shelter on household livelihoods (mean = 4.43, MAD = 0.65) and the impact of shelter on physical and mental well-being (mean = 4.14, MAD = 0.49). While these were the most important areas of shelter impact identified, there was a consensus that shelter benefits are accepted, but not explicitly known, reflected in recent efforts to map the extended impact of shelter and settlements [3].

Lower ranked needs tended to have a narrower focus within this theme, such as the impact of shelter on school completion rates (mean = 3.14, MAD = 0.57) or psychological recovery from violence (mean = 3.29, MAD = 0.61). This points to a need to disaggregate the impacts of shelter, as there are differing priorities for practice even within specific outcomes, such as economic and health outcomes.

4.5. Disaster risk reduction and the humanitarian-development nexus

The disaster risk reduction and humanitarian-development nexus theme covered research areas related to the sector's broader issues, many of which focused on longer-term capacity building and addressing communities' underlying vulnerabilities. Longitudinal and long-term impacts of shelter interventions (mean = 4.64, MAD = 0.51), connecting humanitarian response with development (mean = 4.50, MAD = 0.71), and engagement with local planning processes (mean = 4.43, MAD = 0.65) were among the highest-rated topics within this theme and also placed within the top ten most important topics. One panelist noted the importance of connecting response with longer-term development by reinforcing that everything is tied to later stages: "*But all shelter (beyond blankets and kitchen sets) is, or should be, developmental.*" Many sentiments expressed in the previous theme on understanding impacts emerged in this section more explicitly.

Several topics within this theme scored relatively low in terms of both importance and consensus. For example, expert panelists had a wide range of opinions on early warning systems, which had the lowest average importance (mean = 2.86, MAD = 0.51). There was a consensus that while these systems were beneficial and needed, they fell outside the scope of what the humanitarian sector should prioritize. Instead, one panelist noted that research should be "*more about impacts and outcomes and influence on other issues and sectors*" rather than extending the sector's direct research focus on broader topics. These reflect continued challenges in bounding the sector's reach and role – an area that merits future work.

4.6. Challenging contexts and topics

In addition to the above themes, a group of research needs emerged that did not fit within the boundaries of the above categories. This final conglomeration of topics focused on particularly challenging contexts, situations, or dimensions of shelter practice. Besides their challenging nature, there was no particular unifying theme in these research areas; however, we wanted to give merit to these topics. Some of these are on the fringe, while others are more transformational to shelter and settlements practice, challenging traditional assumptions.

The highest-rated topic was urban environments (mean = 4.43, MAD = 0.74), consistent with the increasingly urban nature of humanitarian response. However, this area was also met with some skepticism, as one panelist stated, "*I worry we overestimate our influence in urban environments unless we can better embrace and utilize market-based approaches to achieving quality at scale.*" Another explained their lower rating of the urban context, "*because there is so much work already being done,*" signaling urbanization already had sufficient momentum. Climate change (mean = 3.79, MAD = 0.57) was the second-highest rating, with one panelist stating, "*Why aren't humanitarians doing more to factor climate change into our ways of working?*" In addition to these, humanitarian funding cycles (mean = 3.64, MAD = 0.55) and the politics of aid (mean = 3.64, MAD = 0.41) were tied as the third most important. These reflect a need to better understand the institutional context in which humanitarian actors operate and how to address current concerns over funding shortfalls.

Camps had the lowest mean rating within this theme (mean = 2.71, MAD = 0.49). Panelists consistently indicated the need look beyond organized settlements, citing that a wealth of resources are already available for these contexts. We will discuss this more below, but this is linked with opinions that align with the need to focus on informal and uncontrolled settings.

5. Discussion

The Delphi panel results alluded to the most important areas of research for humanitarian shelter and settlements practice. From the list of research needs identified, it is essential to note that all of the

identified areas are important, reflected by the average degree of importance and the relatively few individual responses of 'not important.' This was partly by design as we prompted panelists to only identify important areas; thus, other topics that they felt were not important were unlikely to make this list. As a result, we are not suggesting that any of the needs identified, even the ones at the bottom of the list, do not merit further research, only that researchers should strongly consider focusing their efforts on items at the top of this list.

While the topics identified paint a clearer picture of where humanitarian shelter and settlements evidence is needed, researchers must also attend to the linkages between these research gaps. As one panelist noted, *"There are a lot of overlapping themes. Some can be disentangled, and some cannot, and shouldn't be … Many other topics – for example, the impact of cash on shelter projects – are so complex and context specific that they cannot be separated from the context, the approach. … But generally, I think there may need to be a cross-fertilisation of the sections and topics."* By ranking items, we have attempted to organize current knowledge gaps; however, the nexus of topics is also critical in cases. Future synthesis is needed to unpack which links between research needs are most critical.

The resulting list of research needs demonstrates that an overwhelming body of knowledge is still needed, evidenced by the diversity in topics. However, a few broader recommendations have emerged from this synthesis. The first is the need for a balance between research on immediate shelter needs with longer-term transformation. There was also a noted tension in better understanding trade-offs in quality and scale of shelter inventions. Finally, future research on shelter and settlements programming needs to step beyond the camp setting into less structured environments.

5.1. Addressing short- and long-term needs

Within the humanitarian shelter and settlements sector, there is a tension between reaching both immediate emergency relief and longer-term recovery and resilience needs. It is necessary to balance both timeframes, but many panelists noted that the sector too readily neglects longer-term recovery and resilience-related goals in favour of short-term achievements. This tension is especially evident when navigating humanitarian funding cycles. As one panelist noted, *"the funding cycle enables or restricts what can be done and what can be planned. It might not be the same as the recovery cycle of the affected households, so this needs to be reviewed."* As a result, there is a need to generate further evidence on how to link humanitarian institutional constraints to community recovery timelines.

Through the Delphi panel process, panelists also repeatedly noted the need for further longitudinal and long-term research studies because, as one expert panelist stated, *"we don't know what happens decades later."* Previous work mentions the need for long-term studies [12]; however, we have yet to see this materialize in research. Some studies are emerging that explore longer-term shelter outcomes [47,48]; however, preference continues to be given to immediate responses. Related but distinct, longitudinal studies are even fewer. There is a need to methodologically follow projects and communities over time to more fully understand the impact of shelter support mechanisms [49]. This gap is undoubtedly due to limitations on identifying suitable funding mechanisms and the difficulty in gaining access to required old documentation. Much of the need to study longer-term outcomes was reflected in understanding the impact of shelter, which provides more explicit gaps in evidence where evaluation work is needed.

Research on these topics is not without challenges, and there remains a disconnect between researcher and practitioner timelines. After a disaster, humanitarian practitioners rush into areas to complete needs assessments and provide life-saving assistance. Researchers, in contrast, often enter much later in the reconstruction and recovery process. The timeline gap between practitioners and researchers leaves much to still be learned during the transition from response to longer-term recovery and was highlighted as one of the most important future research areas.

Bridging this divide also holds the potential to bring clarity to disconnects between donor objectives and long-term priorities of communities [50,51].

Much of these challenges and opportunities have surfaced in calls to unify the humanitarian-development nexus [52]. This study's results point to increased interest from practitioners to engage in conversations about structural change to address disaster risk reduction. However, mandates of impartiality and neutrality challenge humanitarians – ideals should not be thrown aside but need to be considered in light of aspirations to transition to recovery and development efforts. Fundamentally, addressing long-term needs requires engaging in political processes that fall outside norms for the humanitarian system. Frequently, ideas such as 'permanence' are intentionally left out of conversations and deferred, creating dilemmas on common ground for governments and humanitarian actors. Future research needs to be mindful of these histories [53] when seeking to inform evidence for the humanitarian shelter and settlements sector. There is, however, a critical need for transformation to recognise the realities of time scales that affected communities face and engage in research that can aid sustainable pathways out of humanitarian assistance.

5.2. Scale vs. quality of assistance

There continues to be tension on the quality of programming vs the scale at which it can be delivered [54]. A recent example of this is the growth of self-recovery and area-based movements arising in parallel; the former arguably addressing current limitations in scale [55] while the latter aims to enhance quality [56]. Existing studies have sought to examine scale and quality in both approaches; however, this intersectionality needs to have more significant consideration in future research.

Some panelists noted that both these movements, area-based approaches, in particular, were little more than current buzzwords for the underlying concepts of scale and quality. One panelist stated, *"For me this is not an area of particular interest [area-based approaches] and more the sector 'buzz word' of the moment. Happy to follow the trajectory but given no donor has actually set out how they would fund such approaches at scale, and other sectors have their own version whereby livelihoods, for instance, is the key driver, I don't see this as the answer in the bigger landscape of how humanitarian response currently operates."* In contrast to these opinions, some comments raised the question of whether the limited uptake of these approaches is linked to entrenched institutions or lacking evidence to back their justification, pointing to the possible need for research to clarify the efficacy of their application in programming.

In light of recent work highlighting the limited reach of humanitarian shelter assistance [34], future research must continue to document how to achieve higher coverage. This issue extends well beyond merely increasing funding to include examining new modalities that reach a larger number of households in need of shelter support. Complimenting this work, there is a need to challenge the effectiveness of interventions and benchmark scales of quality.

5.3. Moving beyond camps

Another key topic that emerged was a need to generate evidence beyond centralised and organized settlements, notably camps. Several panelists noted the volumes of research and tools in place for these contexts, but research outside these settings is sparse. As one expert put it bluntly, *"As aid workers, we are prone to focus on assisting those easiest to assist. We have deadlines and deliverables that we must meet. Yet generally, we assist such a small percentage of the overall directly and indirectly affected population. How do we reach the mass of those affected and make smaller but more strategic inputs?"* Another panelist further noted that it is necessary to look beyond camps to *"recurrent conflict and secondary displacement, remote programming, households in places where humanitarian stakeholders cannot access, hard-to-reach areas, households in places where access is*

disproportionately difficult or expensive; and very prolonged/protracted displacement." Thus, there exists an opportunity for the research community to produce evidence on what strategies and approaches reach the most vulnerable. Examples of this include growing focus on support for hosting [57] and other decentralised and often invisible forms of sheltering that arise [58].

Aligned with these trends, there was a concern raised over the overwhelming focus of research on natural hazards, despite over 80% of humanitarian support occurring in conflict settings [59]. This is particularly relevant in light of the growing number of complex and protracted humanitarian crises. There are obvious barriers as to why research has been limited in these contexts, namely that researchers' access and security are significantly more challenging. Opportunities exist, however, to better analyze existing data, such as through Shelter Cluster reporting mechanisms. This alone will not be sufficient to address existing gaps, as several respondents noted the inoperability of lessons from natural hazard responses to conflicts, stemming from the absence of a known recovery period in the later, but can be a start. There is also a need for greater partnership, particularly with local researchers [60], to address how to access evidence in conflict areas. Without a more intentional focus of resources by researchers in these settings, the imbalance in studies is unlikely to shift.

5.4. Limitations

While this study attempts to bring clarity to prioritizing research through generalisable needs, we recognize that the reductionist approach taken has limits. Foremost, the list generated is discrete and does not connect research across these themes. Ranking all combinations of these research needs would be an overwhelming task, particularly when considering national contexts that merit greater attention. As mentioned before, we only sought to determine the relative importance of research needs, which differs from the scale of evidence gaps. We expect that this list may guide future reviews to better synthesize the evidence within areas deemed important by practitioners.

We did not provide an opt-out response option for individual questions; instead, we forced participants to respond to the best of their ability. While this ensured consistency in responses and was done for validation purposes, several panelists noted that evaluating the importance of all topics was difficult as some were outside of their direct experience. One panelist noted, *"I don't believe anybody has anything close to a clear view on all of these topics."* Further, all staff were senior international staff from their respective organizations. Thus, we acknowledge that we are missing national staff perspectives that are essential, particularly under the localization agenda. However, we intentionally sought to include staff who had experience in multiple contexts to draw out global themes. There are equally as important research needs that exist within-country contexts that merit further synthesis. In addition, this work did not include shelter experts in academia, who can be the focus of further studies that extend this work. Based on the demographics of the experts selected, the results are directed toward humanitarian response in the Global South.

6. Conclusion

This study identified important research priorities for the humanitarian shelter and settlements and ranked these through a Delphi process based on practitioner views – the first such attempt to systematically map these knowledge gaps. The subsequent list of 96 research areas provides a research agenda for humanitarian organizations, donor agency, and academic institutions. This work offers insights to form collective action around research goals, directly contributing to the Global Shelter Cluster's strategy to bolster evidence-based response. Overall, the research needs identified point to pressing gaps beyond initial short-term timeframes, understanding pathways to scale quality assistance, and understanding how to work in increasingly decentralised

and complex contexts.

For academics, this work lays out a vision for the focus of future research. While gaps from peer-reviewed literature sources provide insights from experts across numerous contexts, these perspectives rarely come from practitioners directly. This agenda raises the voices of these individuals in guiding where research resources need to be directed. While there is significant work directed towards many of the areas identified, there are a number of areas identified as most important to practice that have yet to receive adequate attention. For instance, there is a need to better understand recovery processes for communities that do not receive formal humanitarian assistance. These insights offer the opportunity to inform new strategies for humanitarian organizations to scale assistance and better meet the needs of affected populations. There is also a pressing need to make the body of knowledge that already exists more accessible through dissemination and engagement with the humanitarian shelter and settlements community. In the words of one practitioner, *"The purpose of research in this area is to have easily accessible, verifiable information that is easy to understand and communicate."* To date, this is the exception rather than the norm. An entry point to this is through the Shelter Cluster's working groups, which align with many of the themes highlighted on the list generated through this work.

The research topics identified also may be valuable to donors regarding where funding is needed to support evidence. This may guide evaluation work for future programs or efforts to consolidate guidance notes and practice resources. We further believe that this work can help develop a research funding strategy that guides decisions on where evaluation resources can best be allocated. While needs are certain to evolve as new challenges confront humanitarian actors, many of these challenges are pervasive and lingering questions that need financial backing to address.

Finally, the prioritization process also affords implementing organizations an opportunity to reflect where they can direct their internal monitoring and evaluation efforts. Much of the learning that exists in humanitarian practices remains trapped within organizations. Unlocking this knowledge can be time-intensive and costly, requiring investments in dissemination. By aligning around common needs, this research points to where organizations could focus their efforts. The evidence gaps raised can prove useful in building a community of practice that addresses these issues. Through the Global Shelter Cluster, working groups also provide an opportunity to engage with these research needs to organize around common goals. Lastly, organizations can also use this list as a benchmark for expertise in the shelter and settlements community, identifying their skillsets and capacities.

Data availability

Datasets related to this article can be found at http://dx.doi.org/10.17632/3kvxtjxjy5.1, an open-source online data repository hosted at Mendeley Data.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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