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Data, guidelines and ethics for managing flood risk when people are already forcibly displaced

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Data, guidelines and ethics for managing flood risk when people are already forcibly displaced

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1. Understanding the challenge: the complexity of flood risks for already forcibly displaced populations

The impact of flood disasters on already forcibly displaced people is substantial. From 2019–2024, 40 reports of major flood impacts on already displaced people were identified across 27 countries (figure 1). This is likely an underestimate, as poor reporting of flood events complicates the breakdown of events, posing challenges for early action and humanitarian efforts. In order to implement appropriate action, this article synthesises literature with outcomes from a workshop at the 2023 Global Flood Partnership [1] meeting (involving 23 researchers and practitioners) and five semi-structured interviews of staff working in flood management in refugee camps in Eastern Africa [2], to provide greater insights into the complex and fragmented nature of flood risk for forcibly displaced peoples. We highlight considerations for professionals, humanitarian works, policy makers and scientists working on mitigating and managing flood risk in displacement settings before we outline some key recommendations.

Forcibly displaced people are among society's most vulnerable. Forced by conflict, persecution, or natural hazards to move to unfamiliar areas with typically few personal assets, they often find themselves in economically and environmentally marginalized regions. They may not speak the local language or understand the culture and environmental

conditions, leading to weak coping mechanisms. In 2023, there were an estimated 117.3 million displaced people, including 37.6 million refugees and 68.3 million internally displaced persons (IDPs), with 75% hosted in low and middle-income countries [3]. Living conditions are often precarious, with about a quarter of refugees living in camps and an unknown number of IDPs in IDP settlements. The number of displaced people has risen annually over the last decade, a trend that is widely predicted to be further exacerbated as more extreme climate impacts make regions less hospitable [4] and increasing the risk of conflict [5].

Forcibly displaced people face limited choices for relocation, often to areas with 'unknown risks' from natural hazards [6]. Those displaced cannot predict how long they will be displaced; a temporarily inhabited site may be safe for a season but face greater risk over a longer period. Vulnerability to flooding and other hazards are not equal amongst forcibly displaced people. The threat of a disaster to those forcibly displaced came to international prominence in 2021 when flooding and landslides affected ~84 000 Rohingya refugees in Cox's Bazaar, Bangladesh [7]. As media attention grew, numerous organisations inundated humanitarian practitioners with data, sometimes unsolicited. While the perception from the data providers may have been 'any or all data is better than nothing', the influence and potential unintended consequences of both those data and of a foreign (and likely uninformed) authoritative voices (and likely

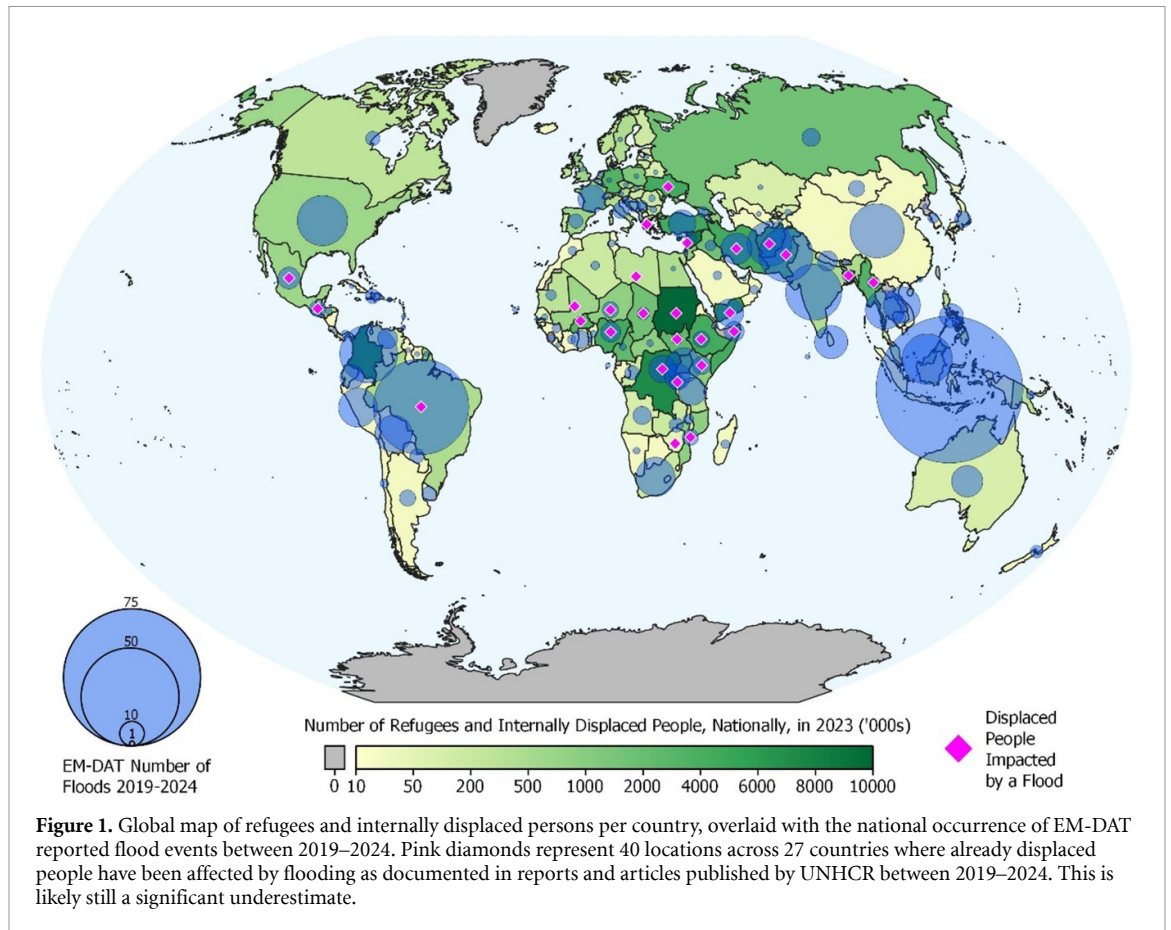


Figure 1. Global map of refugees and internally displaced persons per country, overlaid with the national occurrence of EM-DAT reported flood events between 2019–2024. Pink diamonds represent 40 locations across 27 countries where already displaced people have been affected by flooding as documented in reports and articles published by UNHCR between 2019–2024. This is likely still a significant underestimate.

uninformed) was rarely considered. The provision of appropriate action to reduce the risk of flood impacts to already displaced people requires careful consideration

2. Challenges in managing flood risks for forcibly displaced people

Here we consider flood management to involve actions designed to reduce the risk and impact of floodings to displaced people. In this section, and summarised in table 1, we outline some of the key challenges, which are broadly split into two themes—(1) the provision of information to support the initial siting of camps/settlements and (2) supporting flood risk management and mitigation once camps/settlements are established. Challenges are numbered as ‘C challenge number’.

C1 Urgency: Humanitarian crises often force quick decisions with sub-optimal information, which do not necessarily prioritise the issue of flood management. Semi-structured interviews of staff working in flood management in refugee camps in East African refugee camps identified ‘the nature of humanitarian crisis’ as a key challenge in flood management decisions [2]. One interviewee from these semi-structured interviews noted that while forecasting and flood simulation tools are helpful, the

spontaneous nature of crises means refugees settle before surveys are completed. Timing is critical in setting up settlements and decision makers have multiple competing issues to deal with and limited time for planning. So although flood information can be given, such as flood hazard maps or forecasts, it is often too late for action. In response situations, an abundance of flood information can lead to additional time and resource burdens related to evaluating appropriateness, quality and fitness of use aspects of those data, potentially leading to situations where an anticipation or preparedness decision can be less effectively made given what is now a shorter lead time [8].

C2 Host communities: Host states are obliged by law to ensure that the rights to basic needs such as water and sanitation are maintained during a crisis. The UNHCR Master Plan states displaced people must be protected and there is peaceful coexistence of communities and sustainable local development. In many situations host communities are vulnerable to floods themselves and governments need additional external support to provide these services. An inclusive, region area-wide consultation process is recommended to ensure both host communities and migrants benefit from new facilities (e.g. healthcare). Local engagement aids peaceful co-existence and flood risk management, as host communities may possess critical

Table 1. Challenges and recommendations of flood management for already displaced people. ‘Siting’ refers to the theme of the provision of information to support the initial siting of camps/settlements, and ‘management’ refers to the theme of supporting flood risk management and mitigation once camps/settlements are established.

Theme	Challenge	Recommendations								
		Project design	Inclusivity	Indigenous knowledge	Data & models	Capacity building & decision making	Documentation	Reporting	Ethics	
Siting	C1: Urgency	X								
	C3: Marginalized locations	X								
	C10: Data use	X			X					
Management	C7: Health	X								
	C2: Host communities									
Both siting & management	C4: Temporary nature	X	X	X		X				
	C5: Governance							X		X
	C6: Guidelines							X		X
	C8: Decision-making									X
	C9: Data governance		X							
	C11: Sense of place		X							
	C12: Funding	X								

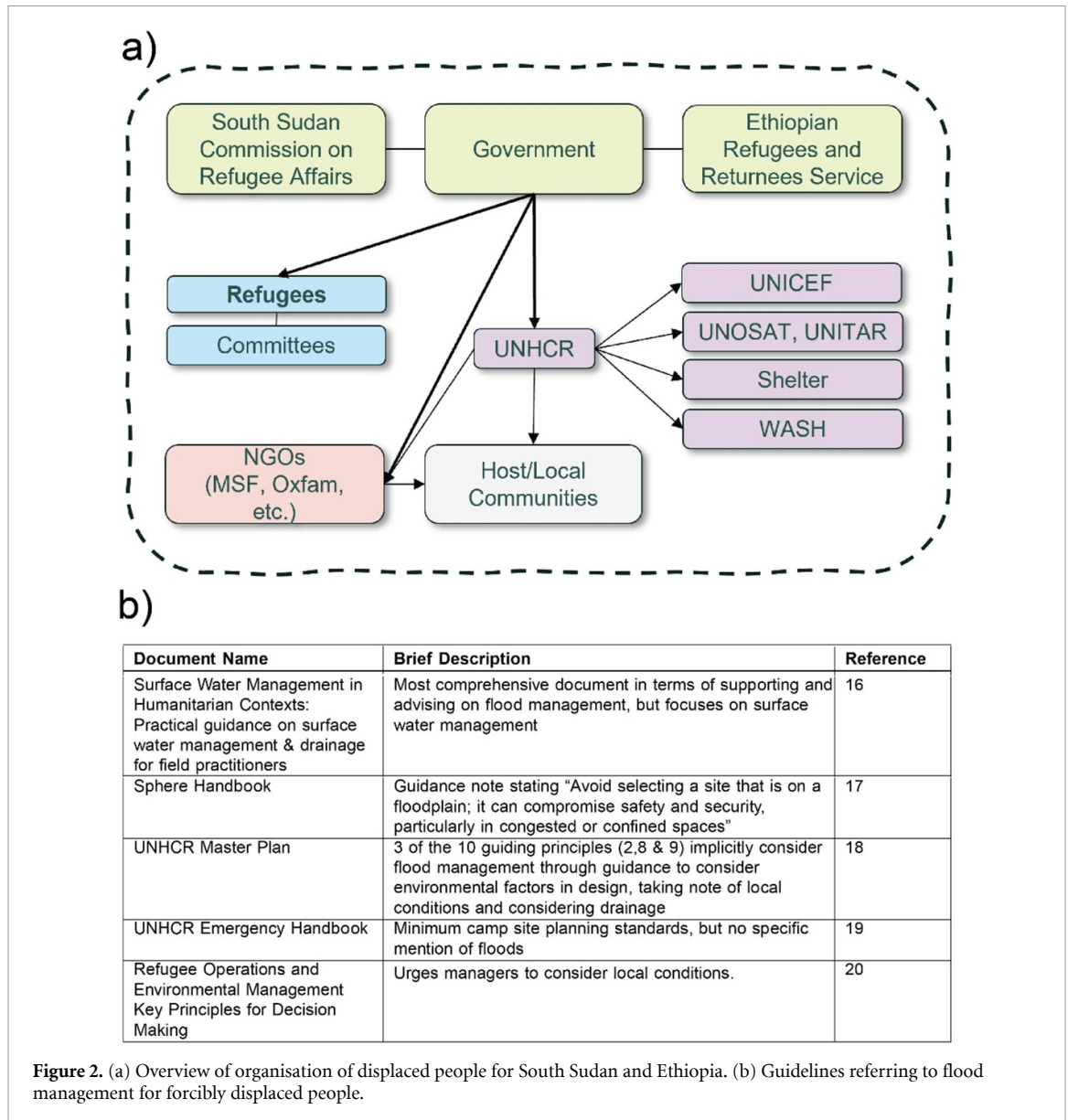


Figure 2. (a) Overview of organisation of displaced people for South Sudan and Ethiopia. (b) Guidelines referring to flood management for forcibly displaced people.

local knowledge and experience. Co-produced flood protection plans can safeguard all parties and ensure flood management in camps does not worsen flood risks for host communities.

C3 Marginalized locations: Camp locations are often in marginalized areas far from urban centres [9, 10]. For instance, about 150 000 Rohingya refugees reside on Bhasan Char, an island in the Bay of Bengal previously deemed uninhabitable in part due to its high flood risk [11]. Such remoteness can mean camp occupants are excluded from socioeconomic opportunities and livelihoods [12]. In situations when a settlement needs to be sited quickly, criteria such as available land, access to resources and services such as water, education, security and transport are favoured. Where flood risk is not considered at the planning stage, the only option remaining is to manage and mitigate against flooding rather than site the camp in an area with reduced flood risk.

C4 Re-framing of temporary nature: The idea of displacement as being a temporary state needs reconsideration. Camps are intended to provide humanitarian aid until a durable solution is found [13], but they often persist much longer, averaging 10.3 years [14] with other estimates pointing to two decades [15]. For IDPs, displacement lasts more than 10 years [15]. This perceived temporality results in inadequate investment in infrastructure and flood mitigation, complicating planning unless this narrative shifts.

C5 Complex governance & responsibility: Many actors manage services for displaced people, as shown in figure 2(a) for South Sudan and Ethiopia. These actors vary by country and include governments, national and international organisations, host communities, and the displaced people themselves. The host government is primarily responsible, with organisations like UNHCR supporting coordination and service delivery. While experts can advise on site

location, the final decision rests with the government. When governments lack capacity or political will, other organisations may take leadership roles, either collaboratively or independently. No single actor solely protects displaced people, making it crucial to involve all relevant actors throughout the project.

C6 Lack of guidelines: While several handbooks offer some guidance (figure 2(b)), none explicitly instruct users to conduct flood risk assessments or use specific datasets. Consequently, the influence of flood risk on decisions depends on individual discretion of site planners. Guidance should include the questions needed for a flood risk assessment, whom to involve, and the process for selecting and gathering appropriate data.

C7 Prioritizing flood risks in health and disease prevention strategies: Humanitarian actors juggle multiple risks in East Africa, 60% of participants reported responsibilities for controlling vector-borne diseases and addressing threats like cholera outbreaks after floods [2]. Poor drainage in camp locations is widely understood to cause public health issues, with practitioners noting this was a key challenge when considering flood mitigation strategies [2]. Opportunities are being missed for the integration of flood risk assessments into wider decision making/guidelines and potential mitigation of later human health concerns.

C8 Unclear decision-making process: Another challenge, closely related to the lack of guidelines, is the unclear decision-making process. Semi-structured interviews by Paterson [2] revealed uncertainty and inconsistencies about which guidelines to follow and confusion over who was responsible for flood management. The abundance of information is often hard to interpret. Actors responsible for displaced people typically accept all data to avoid potential repercussions, even if it is not understood or used effectively. Therefore, collaborating with key actors to provide useful data is crucial. Moreover, decisions are made at the coordinating platform level, with no single person responsible.

C9 Data governance: While maps and datasets can help decision making, their value is only realized when the proper standard operating procedures, governance and decision-making systems are in place to support the inclusion and prioritisation of useful data for flood risk management, and importantly the de-prioritisation of less relevant data others. If not, there can be a cacophony rather than what is commonly perceived to be a wealth of data. Prioritisation of the most vulnerable populations in how data is produced and used is paramount.

C10 Appropriate data use: Focusing on the pursuit of more and more data for understanding and mitigating flood risk for forcibly displaced people has not

led to the results needed to support the most vulnerable forcibly displaced populations, and in fact can be creating unique new challenges. Models and datasets used to estimate flood risk in this context may not be fit for purpose. For example, built up and disaggregated population datasets may ‘miss’ displaced people [6, 21], remote sensing may not be able to delineate flooding in arid or densely populated areas [22], or flood models may have limitations due to resolution or processes [23]. Importantly, limitations should be communicated clearly with a succinct message conveyed to decision makers who are often not familiar with the intricacies of the models and datasets used—this should be done at the very early stages of stakeholder engagement. However, globally available datasets still hold utility, especially in urgent decision-making contexts [24].

C11 Sense of place & security: A sense of place and security is vital amongst people who have already been forcibly displaced. Forcibly displaced people may resist relocation despite flood warnings, fearing loss of their place and belongings. At the GFP workshop, participants discussed occasions where displaced people refused to move despite a flood warning, as they feared they would lose their dwelling and be robbed. Hence, it is critical to ensure safety of dwelling tenancy and belongings during evacuations, to avoid this concern becoming a reason that people may choose to stay in an area with impending floods. Moreover, participants at the GFP workshop discussed that another reason why those who have settled refuse to relocate is fear of losing kinship ties. Fear of losing kinship ties also contributes to voluntary immobility, a behaviour increasingly studied [25] and can result in a reluctance to evacuate for an impending flood. Therefore, it is important to secure guarantees that kinship ties will be preserved in flood scenarios.

C12 Funding: Financial constraints, time pressures, and a shortage of trained humanitarian workers limit flood management implementation, such as improving drainage, building defences, and safely locating infrastructure. Workshop participants highlighted insufficient funding hindering the implementation of site assessment recommendations. One respondent noted that ‘the future of flood management appears to be constrained by issues relating to funding and appears that a move towards climate smart and more environmentally sustainable interventions is likely to be supported by institutional donors.’ Therefore, acknowledging financial constraints and human resources is essential when working on this topic.

Towards resilient futures: recommendations and way forward

The threat of floods and natural hazards to forcibly displaced people is gaining attention among

decision-makers and researchers. While flood risk may be a lower priority compared to the protection and eventual return to their places of origin, managing floods is crucial to prevent fatalities and damage or destruction to dwellings and infrastructure, and enhance welfare. Best practices in this area are still evolving, and many may underestimate its complexity. Our recommendations, with the challenges they address referred to as ‘C Challenge Number’, are as follows (also see table 1).

Project design: Given the urgency of siting decisions (C1), utilize existing data and models effectively rather than testing new approaches (C12). Consider holistic risk approaches integrating multiple hazards and align with water and health guidelines (C7). Project design should also focus on longer term, sustainable solutions, shifting away from the temporary narrative (C4). Take note of the marginalized locations (C3) and funding constraints (C11).

Inclusivity: Ensure decisions empower IDPs and refugees and include overlooked groups like children and host communities (C2,C9). Consider sense of place and security (C10).

Indigenous knowledge: Collaborate with host communities and those directly working with forcibly displaced populations to incorporate indigenous knowledge into flood management and mitigation (C2,C9).

Data & models: Focus on understanding and integrating existing datasets and methods into flood management and mitigation decision-making processes. Improve guidance and best practice documentation to promote more effective use of current knowledge rather than solely relying on improving flood data (C12).

Capacity building & decision making: Enhance local capacity and leadership in flood management. Improve guidance documents and accessible records to facilitate informed decision making (C6).

Documentation: Assign responsibility for flood management in forcibly displaced people settings (C5,6,8).

Reporting: Improve reporting of flood events, including (at a minimum): type of flood (e.g. fluvial, pluvial, coastal), number of fatalities, number of people forcibly displaced and duration of inundation. Better reporting can highlight events and help practitioners learn (C5).

Ethics: It is a privilege to be a scientist and data provider in situations where lives and livelihoods of the most vulnerable are at stake. It may feel good to make a map and think about all the potential benefits that an appropriate use of that map can yield, but it is also important to understand the influence

and power dynamics at play. This must be part of a renewed code of ethics for scientists supporting humanitarian operations, and in doing so improve the clarity around benefit and risk for the humanitarian decision makers, the scientists/data providers and the most vulnerable populations (C9).

Data availability statement

UNHCR articles were searched for from www.unhcr.org/uk/search. EM-DAT data is available from [https://EM-DAT—The international disaster database \(emdat.be\)](https://EM-DAT—The international disaster database (emdat.be)). Both datasets are freely available.

All data that support the findings of this study are included within the article (and any supplementary files).

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