External stakeholders' attitudes towards and engagement with local knowledge in disaster risk reduction: are we only paying lip service?

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Abstract: In the research and policy environment, local knowledge (LK) is increasingly seen as an important component of building the resilience of communities and delivering sustainable disaster risk reduction (DRR) approaches tailored to local contexts. Many studies focus on documenting LK in different contexts; however, far less emphasis has been given to understanding how external stakeholders (i.e. government, NGOs, consultants) engage with and perceive the value of LK for DRR. Through an intepretivist epistemology and a case study research design, this paper sets out to fill in this gap by engaging with external stakeholders involved with community-based flood risk management in Malawi. It bases its findings on a thematic analysis of qualitative data collected through focus group discussions (n=7) and key informant interviews (n=69) conducted in 2016 and 2017.The findings show that although there is an appreciation of the importance of LK in rhetoric, its inclusion in DRR practice remains limited. The strong dichotomy between local and scientific knowledge persists and it has led to the further marginalisation of LK. The international policy and research push for LK in DRR is therefore not translated to realities on the ground. To the best of our knowledge, this presents one of the first studies of external stakeholders' attitudes of LK and how these influence its overall position in DRR. The paper calls for further development of knowledge co-production processes that will be based on giving equal weight, recognition and importance to LK.

Key words: local knowledge, indigenous knowledge, flooding, communities, co-production, community-based disaster risk reduction

1. Introduction

It is widely acknowledged that people living in areas experiencing frequent natural hazards are not helpless victims, but innovative agents possessing valuable local knowledge (LK) [1,2]. In the broadest sense, LK is what local communities know about natural hazards and related risks, how they perceive these risks, and what actions they take to address them [3]. A number of terms for LK are commonly found in the literature, including indigenous and traditional knowledge for disaster risk reduction (DRR). However, different terms refer to a fact that local people know a great deal about hazards affecting their everyday lives, their own vulnerabilities [4], and they use LK to prepare for, mitigate, respond to, and recover from disaster impacts [5]. Therefore, LK is often portrayed as a component of community resilience in the context of natural hazards [6–8], with its main characteristics relevant for DRR explained below.

LK is context-based and engrained in a socio-ecological setting [9], it is based on experience and developed over time through experimentation, innovation, trial and error [10]. Furthermore, LK is fluid and constantly evolves as the needs of communities change and in interaction with external, scientific, and 'Western' knowledge systems [2,11,12]. LK it is not homogenous and it is not a community trait as different people have different knowledge, with factors such as age, gender, level of education and power status influencing its use [3,13,14]. Finally, LK is shaped by and integrates aspects of social, economic, and political realities at local levels [15], and for this reason, it cannot be detached from its social, political and cultural contexts [14]. `

The literature contains examples of the benefits of including LK in DRR and wider development practice. Overall, the underlying rationale is that basing interventions on LK means that the actual needs of the vulnerable populations are presented [16–19] as it gives agency and voice to local people [20]. LK is a means for participation, empowerment, and increased project sustainability [3,21,22]. The inclusion of LK is cost-effective, since it is based on local capacities and it can reduce the need for external assistance and aid; this is especially relevant in the developing world context where local governments and non-governmental organisations (NGOs) are operating on limited budgets [23–25]. Interestingly, recognition of LK is seen to improve the application of externally introduced interventions and technologies [16,26,27]. When LK is taken into account, partnerships between local communities and external stakeholders can be fostered [4,28].

Previously receiving scarce attention in academic DRR literature [29], LK is now gaining rising prominence [30]. Currently, research emphasis in DRR is on documentation of LK in different contexts (e.g. [31–34]) and on understanding the pathways for integrating local and scientific knowledge (e.g. [12,35–38]). There has been far less emphasis on understanding the process perspectives related to LK. Process perspectives include how is this knowledge created, learned, refined, discussed, and perceived at local levels [14,39–41]. Understanding process perspectives on LK also requires consideration of how LK interacts with external knowledge and institutions, and approaches to development in general, which is at the moment rather limited [42–45]. This is in line with an argument by Cook [46], who suggests that there is a lack of understanding of how LK is valued and perceived by external DRR stakeholders, such as government and NGO workers. Taking into account that these stakeholders are instrumental in facilitating the inclusion of LK in DRR approaches, this lack of knowledge is problematic.

Similar to the increasing interest in research, the importance of LK is echoed in global policies [47]. For instance, Sendai Framework for Disaster Risk Reduction 2015-2030 recognises the need to include local, traditional and indigenous knowledge in disaster risk assessments and design of locally-appropriate plans and policies [48], while the Paris Agreement [49] sees LK as an option for adapting to climate change impacts. The International Panel on Climate Change (IPCC) Report on the 1.5° C warmer world also stressed the importance of LK as an adaptation option to reduce climatic risks [50]. There are also existing tools on how to include community input and their LK in practical DRR solutions. For instance, Nonnecke et al. [51,52] developed a participatory platform for identifying and prioritising local DRR strategies in the Philippines, Taylor et al. [53] showed how qualitative GIS can be used to incorporate LK into formal knowledge infrastructures in Kenya and South Africa, and Pasquier et al. [54] presented a method for

incorporating LK into future flood risk adaptation and planning in the coastal UK. Yet, despite the growing interest and realisation that LK can greatly contribute to DRR and existing tools the use of LK in DRR practice remains largely limited [25,55]. For instance, Persson [56] discussed how the official flood early warning information in Sweden is still a long way from integrating LK gathered through unofficial sources, and Dube and Munsaka [25] showed how in Zimbabwe LK is still a long-way from being recognised in the official DRR system. LK is still seen as inferior to technical approaches based on engineering and physical sciences and is thus undervalued; therefore, the potential for LK in DRR has not been fully realised [19,57–61].

The focus of this paper is on Malawi, a flood-prone country in Sub-Saharan Africa. A recent analysis by the Global Facility for Disaster Reduction and Recovery (GFDRR) reported that around 100.000 people are affected by flooding on an annual basis in Malawi [62]. In such a setting, people have developed rich LK on flooding, which has been acknowledged in several studies [63,64]. For instance, Šakić Trogrlić et al. [1] detailed the LK for flood risk management (FRM) in southern Malawi. Their study showed that LK for FRM has multiple dimensions and features before (e.g. complex web of local early warning indicators and strategies for early action), during (e.g. local methods of evacuation and reliance on social networks), and after the floods (e.g. reconstruction approach). Similarly, Chawawa [65] argued that people have developed a culture of living with floods and are hence confident to face them. These and other previous research efforts on LK in Malawi have been primarily focused on documenting its different dimensions, with little exploration of the role this knowledge plays in the implementation of associated projects and programmes.

This paper aims to explore the attitudes of external stakeholders towards LK used by local communities in Malawi in their dealing with frequent flooding. External stakeholders, in line with Van Nierkerk et al. [66], comprise representatives from the local and national government, and NGOs (international, national and local) working on flood risk management. These groups are heavily involved with local communities in the process of community-based flood risk management (CBFRM), which presents a commonly employed approach to reducing flood risks at local levels in Malawi [67,68]. CBFRM is a hazard-specific type of community-based disaster risk reduction (CBDRR) [69], a family of approaches to DRR which are in theory based on people's' participation and their LK [66].

Through critically exploring the attitudes of external stakeholders, the paper seeks to provide useful insights as to why, despite praise in academic literature and policy environment, LK still remains underutilised in DRR. An in-depth, critical, and qualitative analysis of external stakeholders narratives will contribute to the identified research gap on the lack of knowledge of how external stakeholders engage with LK.

The remainder of this paper is organised as follows: a description of the qualitative methodological approach adopted; a presentation of different aspects of external stakeholders' attitudes, including their general awareness of LK, perceived benefits and limitations of LK, as well as their current use of LK and a proposed way forward; finally, a discussion of the results and main conclusions.

2. Methodology

2.1 Qualitative research approach

The analysis presented in this paper is based on a qualitative research approach. Central to this type of research is that it provides a complex and detailed understanding of real-life problems [70], as it describes social realities through research participants experiences and perceptions [71]. Given that this research focused on understanding external stakeholders' attitudes and engagement with LK, a methodology which allowed for gathering their rich and personal insights was deemed appropriate. Furthermore, this research was based on an intrepretivist epistemology, as interpretivists seek to gain understanding of a social world through the eyes of the people studied, and describe social realities through research participants' experiences and perceptions [71,72]. In the present research, the underlying assumption was that research participants (i.e. external stakeholders involved with DRR in Malawi) represent experts on the topic of enquiry; hence, gaining an understanding of the problem at hand has to be based on their experiences and perceptions.

2.2 Case study area

The study adopted a case study research design, used for studying topics within a real-life context [73] and suited to the exploration of the interaction between different groups [74]. Case study research design was therefore appropriate as the focus of the study is on the interaction between external stakeholders and communities at risk of flooding manifesting through a lens of the role of LK.

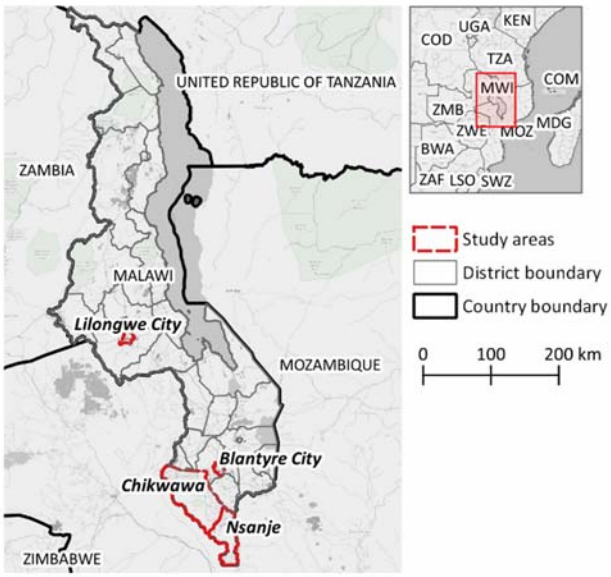

Figure 1: Map indicating the areas where data collection took place (Map data copyrighted OpenStreetMap contributors and available from https://www.openstreetmap.org)

The geographical focus of this study was in the Lower Shire Valley (composed of Chikwawa and Nsanje districts and presented in Figure 1), the most flood-prone area of Malawi. In the Lower Shire Valley, severe flooding occurred in 1942, 1956, 1997, 2001, 2002, 2003, 2005, 2006, 2012,

2015 [75–77] and more recently, in March 2019 during Cyclone Idai. In addition to major events, annual flooding episodes are estimated to affect up to 100 and 500 households in Chikwawa and Nsanje respectively [77,78]. Mwale [79], based on Atkins [80], reports that 40% of the population in Chikwawa and 90% in Nsanje is affected by floods. Based on the hydrodynamic modelling, Adeloye et al. [81] estimated that flood hazardousness in the valley falls into medium to high categories.

Floods bring severe, cascading consequences in the Lower Shire Valley. They destroy houses and crops, cause loss of life, wash-away livestock, and present a threat to public health through cholera and malaria outbreaks [76]. Furthermore, they destroy the physical infrastructure (e.g. roads, irrigation schemes, water boreholes) [82] and social infrastructure by interrupting the work of hospitals and schools (*ibid.*). Additionally, floods cause internal displacement of the affected population.

2.3 Participants and data collection

The qualitative data set was collected during two periods of fieldwork in 2016 and 2017 in Malawi, with a primary geographical focus in the Lower Shire Valley (composed of Chikwawa and Nsanje districts and presented in Figure 1), selected for the following reasons. First, the fact that the Lower Shire Valley is the most flood prone area of the country [79], with previous research identifying that communities have rich LK regarding floods in their localities [1]. Second, the Lower Shire Valley is a setting with an abundance of community-based activities aimed at building community flood resilience and implemented by development agencies in collaboration with the government [67], giving access to research participants from NGOs and the government that are directly involved with the members of local communities (i.e. holders of LK). The combination of these two factors meant that the research was done in a geographical area with an existing involvement of external stakeholders with communities experiencing flooding and known to have LK related to floods. In addition to the Lower Shire Valley, data was collected in the capital of Lilongwe and in Blantyre (Figure 1), as national level headquarters of NGOs and government departments are based in these cities. Engagement with stakeholders at the national level was deemed important as these individuals, and their respective departments and organizations, also have direct involvement and experience with community-based projects.

The study primarily focused on participants from NGOs and the government, identified by previous research [67,68] as important stakeholders of CBFRM in the country. During fieldwork, the first author also encountered a group of consultants working on CBFRM projects in the Lower Shire Valley; consequently, these participants were interviewed. Primary data collection instruments were semi-structured key informant interviews (KIIs) and Focus Group Discussions (FGDs). Details of the KIIs and FGDs are presented in Table 1. Overall, 28 interviews with governmental stakeholders (18 at district and 10 at the national level), 36 interviews with NGOs (21 at district and 15 at the national level), and four interviews with FRM consultants were conducted; totaling 69 interviews. In addition, seven FGDs were conducted with the members of NGOs (n=4) and local government (n=3) in Nsanje and Chikwawa.

In this study, data saturation was used as a criterion for determining the sample size. As explained by Guest et al. [83], data saturation means that further interviews or FGDs yield very little or no new insights. Towards the end of data collection, it was noted that no new was being shared, which was interpreted as data saturation. For interviews, studies suggest that saturation occurs within twelve interviews [83], while for FGDs 90% of themes identified through data analysis occur within three to six FGDs [84]. As presented previously (Table 1), the number of interviews and FGDs conducted for the purposes of this research was within these ranges.

Table 1: Breakdown of key informant interviews and focus group discussions

		District level			**National level**
		Nsanje	*Chikwawa*	Total	
Interviews	Government	13	5	18	10
	NGOs	11	10	21	15
	FRM consultants				4
Focus group discussions		*Nsanje*		*Chikwawa*	
	Government	1		2	
	NGOs	3		1	

Research participants were sampled using both purposeful and snowballing sampling methods [85]. Purposive sampling involves selection of participants directly relevant to research aims based on a set of criteria in order to obtain in-depth information related to the phenomenon of interest [72]. Following this, participants were selected based on the criteria of having worked with flood-affected communities on projects and initiatives related to building their resilience; this criteria applied for governmental, non-governmental, and stakeholders working as consultants. The questions posed were open-ended and designed to capture multiple dimensions of participants' attitudes towards LK, covering the aspects of: (i) general understanding of LK, (ii) the extent of the use of LK in the work of respective stakeholder, (iii) perceived benefits and limitations of LK, and (iv) barriers and opportunities to wider use of LK in CBFRM. Similar questions were asked during both KIIs and FGDs, thus avoiding the possible bias of basing findings on a sole data collection method. At the end of each interview, participants were asked to recommend to the researcher further organisations/individuals that could provide useful insights on the topic (i.e. snowball sampling). Subsequently, these organisations/individuals were contacted and interviews organised and conducted.

2.4 Data analysis

All of the FGDs and KIIs were conducted in English and recorded, with the exception of two KII (following the participants' preferences, detailed notes were taken). The recordings were transcribed verbatim and data were coded and analysed using thematic analysis [72], defined as

'*a method for identifying, analysing and reporting patterns (themes) within data'* [86, p.79]. Thematic analysis is a common method of data analysis used with interpretivism [87] and it relies on coding, generally referred to as a central activity in qualitative data analysis [88]. Coding involves attaching meaning to a piece of text (e.g. word, phrase, sentence, or paragraph) [89], where a researcher '*defines what is happening in the data and begins to grapple with what it means'* [90, p.113]. It is an iterative process, constantly revised and revisited through analysis [72]. Multiple codes are merged into themes which present major findings in qualitative studies [91]. The major themes identified through this research are presented as sub-sections (i.e. 3.1, 3.2, 3.3, and 3.4) in the results section (Section 3). The analysis was conducted using software for qualitative data analysis (i.e. NVivo 11).The decision to use the software was made due to the large amount of data collected. Nvivo 11 was predominantly used as a software for data management since it allowed for easy grouping of data scattered across transcripts and ease of access during the analysis.

3. Results

3.1 General perceptions of local knowledge

Across all interviews and FGDs, participants stated that LK is commonly used by local people in areas of Malawi frequently impacted by flooding, indicating that external stakeholders exhibit awareness of LK in communities. Generally, this knowledge was perceived as the knowledge held by rural communities and it includes knowledge of predicting floods, responding to floods and self-organising in the absence of external help. LK was often referred to as ancestral and having a strong cultural component as it is a part of local tradition. Participants perceived LK as part of lives and livelihoods, confirming that LK is often tacit and cannot be taken out of the context of everyday practice [92]. For instance, an interviewee from a national NGO (NLNGO2) stated that LK is '*things they* [communities] *do but they do not necessarily know it is local knowledge*'.

When asked about specific examples of LK, the majority of participants focused on different local early warning indicators. For instance, it was often shared how local communities observe different types of trees (e.g. increased flowering of trees) and behaviour of animals (e.g. increased number of ants and hippos leaving the river) and based on these, predict that floods will happen in their localities. A senior representative from the national government (NLG1) explained that '*if you talk about local knowledge, the first thing people will think about is early warning*.'. According to this participant, this is problematic, as it means that other, important dimensions of LK, such as peoples' in-depth knowledge of flood hazard and locally-deployed ways to decrease the risks are left out of consideration. Previous documentation of LK for flooding in the Lower Shire Valley [1] indeed showed that LK is much more encompassing than mere early warning indicators.

Interestingly, there was an evident dismissal of the fact that LK is not just ancestral and traditional, but it is constantly evolving, partly through external influences brought by development and DRR projects. As stated by an NGO representative (LNGO1) working at a district level, LK is '*not learning from other conventional methods and programmes that are around*'. LK was portrayed as an unchanging and static concept, suggesting that local communities are at times perceived as inactive learners incapable of refining their LK. However, there was a strong perception that

the utility of LK is heavily influenced by environmental change, namely environmental degradation and climate change, both in terms of its reliability (e.g. increased frequency and magnitude of flooding brought about by climate change) and accessibility (e.g. environmental degradation resulting in a loss of trees used as indicators of floods). Furthermore, participants pointed out that new approaches and technologies (e.g. official early warning information and mobile phones) undermine communities' confidence in their LK, since external stakeholders favour approaches proven by mainstream science. In the words of a participant from an NGO (NLNGO1) '*technology is good in a way, but it comes at the expense of LK*'.

Although generally participants talked about LK as useful for the communities, external stakeholders thought that LK is still often perceived as backward; as explained by an NGO participant (NLNGO1) that LK is often seen as an '*uncivilised way of doing things*'. One of the participants (NLNGO7) explained that at times, there is an aversion towards LK: '*The knowers like myself and yourself generally despise local knowledg*e'. Finally, it emerged that many organisations working with communities behave as if LK is useless (NLNGO10). Interestingly, when talking about LK with a connotation of being backward, participants were hardly ever expressing it as their own views, but rather as what they perceived to be a general attitude of the development community towards LK. When asked why this is the case, participants shared a number of reasons, including that external stakeholders often go to communities with an attitude that local people ought to be taught. Further explanations were that the effectiveness of LK is questionable (i.e. communities are still heavily impacted by flooding on an annual basis); perceived dominance of scientific over local knowledge; different education levels between those working with communities and communities themselves; and lack of understanding from the side of external stakeholders of the principles LK is based on, thus making it challenging to fit into their own frames of understanding.

Regardless of their general views of LK, study participants pointed out increased interest for LK in FRM work at community levels. They noted that, overall, international and national policies on DRR are increasingly placing emphasis on community participation and their LK. Furthermore, the emergence of a decentralised governance system for DRR in the country (explained in detail in [68]) has presented an opportunity for increased engagement with LK as it required collaboration with communities at risk (i.e. holders of LK). Finally, participants felt that since the frequency of flooding is on the increase, aggravating flood loss and damage at the community level, it is important to explore how LK can complement existing approaches for building resilience.

3.2 Perceived benefits and limitations of local knowledge

During FGDs and interviews, participants placed considerable emphasis on outlining what they perceive to be benefits and limitations of LK. Table 2 and Table 3 provide a classification of the main categories of benefits and limitations, respectively, and based on the thematic analysis of KIIs and FGDs. Engaging with these narratives is important as it reveals how the agency of LK is perceived by those that are directly involved with local communities.

A major perceived benefit is that taking LK into consideration improves the acceptance of external interventions in the communities. According to participants, people put value to their LK, and if they see it taken on board, they will be more likely to accept external interventions. For instance, an NGO worker in Nsanje explained that communities are more likely to be receptive to scientific forecasts if they are in line with their local flood indicators. Also, communities are keener to participate in activities if they feel their LK is taken into account: '*If you consider that whatever they are trusting is true, it will be easy to work with them, because they will say someone* [external stakeholder] *is part of us*' (LNGO7).

Table 2: Perceived benefits of local knowledge (based on themes emerging from the Focus Group Discussions and Key Informant Interviews)

Benefits of local knowledge	Description
Acceptance of external interventions and participation	LK as a tool to foster acceptance of external interventions in the communities and as a means of ensuring participation of community members
Local insights	LK offers valuable insights into local contexts
Fostering sustainability and trust	LK as a vehicle for implementation of sustainable solutions and trust between external stakeholders and communities
Cost savings	LK provides costs savings for external stakeholders

Table 3: Perceived limitations of local knowledge (based on themes emerging from the Focus Group Discussions and Key Informant Interviews)

Perceived limitations of local knowledge	Description
Lack of evidence for LK	There is no available evidence for LK. Evidence includes scientific validation of LK, as well as evidence in terms of LK being validated in real time (i.e. observing effectiveness over a given period of time)
Spatial confinement of LK	Place-specific nature of LK presents a limitation because it makes it challenging to package it and upscale.
Lack of documentation of LK	LK is not documented and as such it is difficult for external stakeholders to access it.
Heterogeneity in knowledge possession and use	LK is not equally distributed within a community, not everyone is using it the same. There is a gap in generational use and possession.
Accuracy and applicability of LK	LK has questionable accuracy and reliability, it is not applicable for all levels and magnitudes of flooding, and it does not work well in unknown conditions and with increasing changes (e.g. climate change, environmental degradation).

LK provides useful insights to external stakeholders, making it easier to understand the local context. FRM consultants pointed out how in a country like Malawi, resource constraints mean

there are no high-quality data for flood models; therefore, by consulting local people, useful insights into flood dynamics can be given which can then be used to help calibrate the models (e.g. by collecting previous flood depths through peoples' recollections). Interviewees also argued that including LK contributes to the ownership and sustainability of projects, both identified by previous research as significant challenges for CBFRM in Malawi [67]. Finally, it was mentioned that significant cost savings for external stakeholders can be realised if LK is taken into account.

Although participants identified benefits of LK, far more emphasis was placed on the limitations of LK. Interestingly, many of the perceived limitations directly stemmed from the inherent characteristics of LK. For instance, the fact that LK is not documented presented a frustration, as external stakeholders found it difficult to access. Furthermore, the context-specific nature of LK was seen as problematic; participants pointed out that LK varies between and even within communities, making it difficult to have confidence in its validity, unlike in scientific knowledge, which was generally seen as universal (i.e. applicable in different spatial and temporal settings). Moreover, as LK is heterogeneous within a certain community, external stakeholders felt it is challenging to identify the ''right'' individuals to source LK.

The biggest perceived limitation however was the lack of evidence that LK works. By lack of evidence, people were primarily referring to scientific evidence (i.e. utility of LK being validated by mainstream scientific methods), and to a lesser degree the lack of time-tested records of LK performance. According to participants, in the absence of scientific evidence, LK will not be seen as a valid type of knowledge. Lack of evidence as a limitation is evident from these words of an NGO worker (NLNGO9):

'*Us, people who are planning development activities, we would like to know that there is something that makes sense, scientifically. But for local knowledge, there are things that cannot be explained. If I go there and see that it is not true, but people still believe in it, and I feel like it is not true, then I may not even listen to it. So in that case, I am just ignoring it, because I do not believe in it personally. Unless someone studies these things, documents them and convinces us: this thing has an explanation and this is how it works. Then we would look at it with another eye and we would start believing it*.'

Another major limitation was the accuracy and applicability of LK. Under accuracy, people challenged that LK cannot work beyond past experiences of a community, particularly given climate change induced changes to early warning indicators. In terms of applicability, it was noted that LK is not applicable for all types and magnitudes of flooding. For example, flash floods occur so rapidly that communities have hardly the possibility to rely on LK early warning indicators, and high return period river floods with extreme impacts can be beyond what communities have experienced before and based upon which they have developed their LK.

Participants explained that the limitations of LK make it very challenging for them to use it in their work. For instance, it was stated that a lack of evidence for LK impedes inclusion of LK in project proposals and means that it is challenging to build a case for LK with donors. Furthermore, spatial confinement of LK, a general lack of documentation and its inherent heterogeneity also present

obstacles, as participants shared that their projects are always limited with the time and finances available.

3.3 (Lack of) Use of local knowledge

When asked to elaborate on the current status of the use of LK in their work with communities, the answers participants have can be classified as either explicit or implicit. Explicit refers to examples in which the use of LK is more concrete in the process of project design and implementation. For instance, through the application of Participatory Vulnerability and Capacity Assessments, LK is elicited to inform local level planning, such as the production of village contingency and action plans; however, this valuable input is underutilised in facilitating risk-informed development at district levels, as the data collected is not systematically documented and shared. Further examples of explicit use often mentioned was the use of LK in flood forecasting awareness raising campaigns (e.g. when seasonal forecasts are communicated to communities, LK is used to fine-tune the forecasts), use of local materials and workforce, consultation with local traditional leaders, and building onto existing local communication practices (e.g. providing megaphones to improve existing informal warning message dissemination).

Implicit refers to less structured approaches of using LK. Interestingly, in many cases participants were using the word '*encouragement*' to describe the way in which LK is considered in their work. According to participants, they often encourage local people to continue using their LK while they themselves do not necessarily explicitly include it in their approaches, which indicates the use of LK in an *ad hoc* manner.

'We are only promoting by encouraging them to use the local knowledge, the knowledge they have in forecasting of extreme disasters or extreme weather. We are not necessarily training them, or maybe sharing with them some of the local knowledge that they can use, because we are not experienced or we do not have much expertise in that area. It is them who have the knowledge, so we are also encouraging the use of that knowledge. That they should not abandon it as the different ways of forecasting are coming in projects.' (NLNGO14)

The participants hope that when communities are encouraged to use their LK, they will be more resilient in the absence of external assistance and that communities will be more receptive to accept approaches based on scientific knowledge (e.g. official flood warning information whose uptake in Malawi remains low).

Despite the examples of explicit and implicit use of LK, participants generally felt that LK is underutilised at the moment. A representative of an NGO at the national level (NLNGO6) described:

'It is like local knowledge is being done separately, they are doing their own thing. The scientific knowledge, they are also working on their own. There is no room for these two to come together or converge and discuss and see how best they can be intermingled, or they can be blended so that we move forward together. I think that is the opportunity that we are missing.'

This sentiment was echoed by most participants. For instance, a national-level participant from an NGO (NLNGO7) bluntly stated: '*Frankly, local knowledge is not used much in our projects*', while the national government employee (NLG2) pointed out the interventions implemented at community level do '*not take much into account what the locals know*'. LK is often overlooked in favour of scientific knowledge, indicating the unequal power relation between local and scientific knowledge. This also points at dynamics much wider than LK: the current development discourse and approaches suggest that people constantly need to be trained and their capacities need to be developed, which indicates a prevailing assumption that local communities cannot manage their development (including DRR) on their own.

'*Because at the moment it is like, there is that conflict, it is not being seen, but there is that conflict, because there is overreliance on scientific knowledge* […] *They* [external stakeholders] *don't really recognise the local knowledge which is in the communities.*' (FGD participant NGO Nsanje)

3.4 External stakeholders' recommendations for enhancing the role of local knowledge

Given the general perception that LK is not currently sufficiently utilised, participants proposed a number of ideas for enhancing its use and contribution to FRM practice in the country, with emerging themes presented in Figure 2. The recommendations presented in Figure 2 do not represent a framework for integrating local and scientific knowledge similar to frameworks developed by e.g. [35,36,45,93] , and were not validated through a case study, as this was beyond the research aim. Instead, these recommendations provide insights from the thematic analysis which form a part of external stakeholders' attitudes of LK and directly influence the status of LK in DRR, as it will be discussed in detail in Section 4.2.

Not surprisingly, and taking into account the identified need to generate evidence for LK , the most important step according to participants is to document and validate LK.

'*We need to document and validate. That is the key. Because you can't just* [say] *this is how it works, but we need to validate it. I think that is one area that we can focus on*.' (LNGO16)

As strongly argued by participants, building a case for LK at professional and policy decision-making levels require that the utility of this knowledge is proven. As put by one of the interviewees from local government (LG5) in Chikwawa:

'*Our approach is top-down in terms of policy formulation. For the centre to adopt local knowledge, unless it is backed by well-researched knowledge: this is real, and it can work*.'

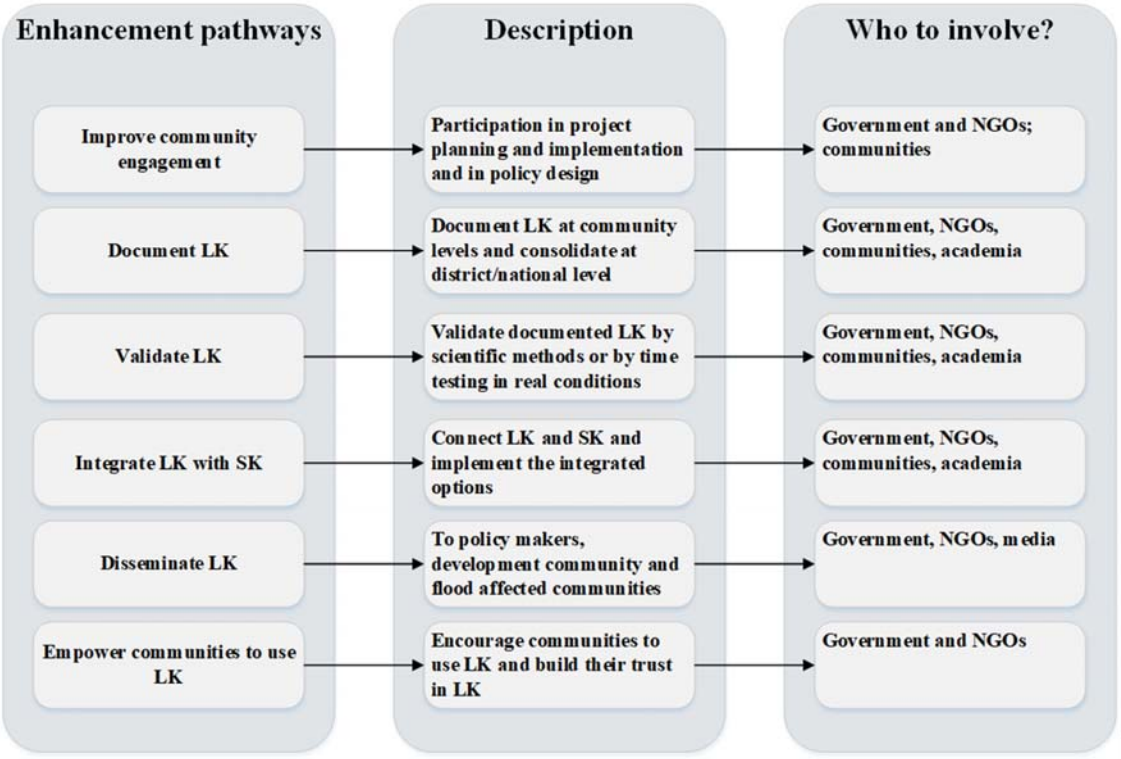

Figure 1: Recommendations for how external stakeholders can enhance the role of LK in flood risk management (based on themes emerging from the KII and FGD). Abbreviations in full.

There was an overwhelming consensus for a need to integrate LK and SK. According to the interviewees, taking into account the severity of flooding problems, it is important to utilise all means available. As voiced by an FGD participant from NGOs in Nsanje: '*We are talking about disasters and we cannot take chances*'. Two main reasons for integration were emphasised. Firstly, people felt that communities still place more importance on their LK compared to scientific knowledge. For some of the external stakeholders, people place more importance on LK due to the fact that the levels of illiteracy are high in communities, hence it is challenging for them to understand concepts developed on scientific principles and they prefer to stick to the ways that worked for them in the past. Interestingly, others suggested that this is because people do not trust what the external stakeholders bring due to previous failures of interventions in communities or (specific to warning messages) inaccuracy of official warnings. Secondly, a need for integration emerges due to perceived limitations of LK in the light of external pressures such as climate change and environmental degradation.

In terms of knowledge validation and integration of LK and SK, the focus was primarily on local early warning indicators, suggesting again that other dimensions of LK (see [1]) are overlooked. Participants repeatedly called for more research, through which these signs could be documented and after that validated, either through finding scientific explanations or through testing in real-time conditions (i.e. seeing that signs indicating certain types of behaviour happen). At times, it was challenging to distinguish the difference between 'validation' and 'integration between SK

and LK' because integration was often presented as a process in which the utility of LK is confirmed through finding its scientific explanation.

4. Discussion

In the disaster literature, LK is predominantly approached through studying it through a community lens (e.g. [2,31,32]). However, the perspectives on LK of those working directly with communities (i.e. external stakeholders) remain overlooked or are seldom explored in detail ([46], and to some extent [25]), despite their crucial role in facilitating the inclusion of LK in DRR. The results presented reveal interesting dynamics between LK and external stakeholders, which can be discussed across two main lines of reasoning. First, the awareness and recognition of LK do not translate into its meaningful inclusion in DRR approaches on the ground, and second, external stakeholders' narratives point to a strong dichotomy between local and scientific knowledge which results in the supremacy of scientific knowledge.

4.1 Mismatch between rhetoric and practice

External stakeholders show awareness of LK, recognise that it presents an important component of how people deal with flooding at local levels, and point out that there is an increased interest in the use of LK in their approaches. However, it was evident that they do not acknowledge the hybrid nature of LK (i.e. the fact that LK constantly evolves and incorporates new dimensions [94]), as their responses indicate that LK is often viewed as traditional and to an extent 'frozen in time'. This is in contrast with realities on the ground, as previous research with local communities in Malawi showed that local people as knowledge holders are involved in an unstructured process where their knowledge is continuously refined and integrating knowledge coming to the communities from the outside (e.g. through official warning information) [1].

External stakeholders clearly identified various benefits LK could bring to their interventions on the ground. However, given that the inclusion of LK in these interventions is limited, this paper argues that the rhetoric of LK importance and its acknowledgment does little to facilitate its actual inclusion in practice. The mismatch between rhetoric and practice is especially revealed in discussions about the perceived limitations of LK, which appear to be hindering the use of LK. LK is perceived to be difficult to access, use, and understand, as it is not documented, it is spatially confined, and it is heterogeneous in terms of knowledge possession and use. In such a format, LK simply does not fit in the current setup of CBFRM in the country. As participants indicated, their projects are limited with time and finances and are often based on donor-driven agendas, resulting in limited and inadequate participation of local communities (previously, community participation in DRR was also criticised by [65,67,68]). This suggests that CBFRM, as a dominant approach for building flood resilience at local levels in Malawi, is not adequately inclusive of LK, which is in direct contradiction with the very theoretical setup of community-based approach as a process based on extensive participation, local needs and LK [57,95–97]. Dekens [3] drew attention to the fact that it is popular to use LK in the discourse, since it is connected with the internationally acceptable rhetoric of participation, whereas the experiences from the ground might tell differently. Results from Malawi suggest the same: a rhetoric

appreciation of LK does not lead to LK being an equal component in tackling flood risks at the local level.

The rhetoric in Malawi goes beyond stakeholders' narratives as LK is explicitly referenced in a number of national policies. For instance, Malawi Growth and Development Strategy III [98] calls for consideration of LK in disaster risk assessments and early warning. Similarly, the National Guidelines for Community-Based Flood Risk Management [99] see a value of LK as a basis for flood zoning and identifying flood depths, frequencies, and magnitudes. Despite these policy aspirations, results suggest that implementation realities look quite different. Romero et al. [100] argue that general and vague recommendations for the use of LK in policies do not result in practical knowledge inclusion during policy implementation, something that the results of this research also confirm. Previous research on DRR in Malawi found that the government lacks capacity to implement their policies, especially at lower (i.e. village) administrative levels [68,101].

4.2. The dichotomy between scientific and local knowledge

An important argument of this paper is that external stakeholders' attitudes reveal a strong dichotomy between scientific and local knowledge as a central pillar of the mismatch between rhetoric and practice.

As a common theme, participants asked for LK to be documented and validated before they can make further use of it. This indicates that despite the general acknowledgment of LK, external stakeholders see the agency of LK only when it fits into their frames of understanding and worldviews, which presents a significant finding of this study. The constant calls for generating evidence for LK through scientific validation reveal an important aspect of external stakeholders' attitudes: the dichotomy between LK and SK is still very much present on the ground, despite academic research demonstrating this to be unhelpful [11,58,102], as it leaves limited space for understanding how different types of knowledge could work together. The dichotomy was present in participants' narratives on the integration of local and scientific knowledge, as it was predominantly conceptualised as a process in which the agency of LK is confirmed through finding scientific explanations. These findings are important because they clearly show that the differential power relations between the knowledge of local people and external stakeholders are maintained, and indicate that CBFRM, an approach that is supposedly built on LK and participation, has done little to challenge this attitude, but has rather 'masked' this dichotomy behind the rhetoric of participation and community-based interventions, which is line with a recent critique of participation in DRR [103]. This statement is not to dismiss aspects in which LK is involved (e.g. PVCAs, awareness raising campaigns). However, the results show that this is limited at the moment, and external stakeholders themselves acknowledge there is a long way to go in creating a system in which different types of knowledge will be used side by side and with equal weight.

If the way for LK to prove its value for FRM is for it to be validated by scientific methods, then it is clear that the existing system is built on the premise of the dominance of SK, where LK can only possibly complement it, but only after its validity has been proven. Additionally, as the results suggest, one of the biggest benefits of LK is that it can foster the application of their (i.e.

external) interventions. While exploring the approaches to community participation in global DRR policies, Tozier de la Poterie and Baudoin [104] found that global policies increasingly see LK as a way to tailor different external interventions to the audience, rather than seeing the value of LK in DRR *per se*. The results suggest that the reality from the ground mirrors this global outlook.

Mere recognition of LK by external stakeholders does not translate into its meaningful inclusion, which is in line with Cook's [46] findings from Bangladesh. However, the present study contributes to the existing knowledge base by providing additional evidence revealing how the dichotomy between local and scientific knowledge is maintained at local levels and how this directly influences the use of LK in CBFRM. The findings on this dichotomy present a valuable addition to studies on the integration between local and scientific knowledge (e.g. [35,36,40,45]) , by interpreting the attitudes of external stakeholders in the process and the extent to which their attitudes influence the overall uptakeof LK. This paper argues that meaningful integration (i.e. not done at the expense of one knowledge system) can be achieved only if both local and scientific knowledge are seen with an equal potential to contribute.

5. Conclusions

Given a limited understanding of in the literature, this paper set out to explore the external stakeholders' attitudes towards and engagement with LK for DRR, based on data collected through FGDs and KII's in Malawi. To the best of our knowledge, this is one of the first studies explicitly focusing on external stakeholders and their perspectives of LK for DRR. As demonstrated by this research, if LK is to be increasingly used in DRR, their perspectives need to be carefully considered, as these stakeholders explicitly influence the level of the uptake of LK.

The results show that, although external stakeholders see LK as an important aspect of communities' approach to deal with flooding in their localities, the current system makes limited use of it, indicating a mismatch between the rhetoric of LK importance and inclusion and the reality of practice on the ground. There is a strong dichotomy between local and scientific knowledge resulting in further marginalisation of LK, as it is seen as valid and useful only when fitting into external stakeholders' frames of understanding (i.e. their epistemology and ontology). The latter was evident from an overarching attitude that LK needs to be documented and validated, from a predominant conceptualization of integration of local and scientific knowledge as a process where LK has to be explained scientifically, and from identifying as a main benefit of LK the fact it can foster the acceptance of external interventions in communities rather than recognising the value LK has per se. Furthermore, the results showed that external stakeholders have a somewhat limited understanding of LK evident through their perception of LK as static, thus disregarding the fact that LK constantly evolves and is highly dynamic.

Through engaging with the narratives of external stakeholders, this paper showed that despite global policy and research push for LK in DRR, realities from the ground indicate that LK is still marginalised and inferior to SK. There is an evident need for developing and creating pathways for making LK an equal partner in delivering DRR at local scales, thus realising its potential to

sustainable and impactful resilience building. In this sense, further research into knowledge co-production (e.g. [105,106])is recommended, with a special emphasis on designing co-production approaches that will be based on equality of local and scientific knowledge. The findings of this research indicate that the role of external stakeholders and their attitudes needs to be carefully considered if co-production processes are truly to be inclusive of LK.

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Declaration of interests

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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