Received: 24 December 2021 | Revised: 21 July 2022 | Accepted: 27 July 2022

DOI: 10.1002/rhc3.12259

ORIGINAL ARTICLE

RHCPP WILEY

Fire risk communication in the urban informal sector: Evidence from traditional marketplaces in Accra, Ghana

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Abstract

Urban marketplace fires in Ghana are chronic, devasting in economic losses and disproportionately impacting informal sector workers. Yet, the scholarly works on urban disasters have focused on hydrometeorological and other man-made disasters to the neglect of marketplace fires, particularly the challenges in risk communication between emergency management agencies and urban marketplace workers. In seeking to extend the emerging but scant work on urban marketplace fires in Ghana, this paper analysed fire risk communication to understand how socio-cultural factors influence the perceptions and protective behavioral strategies of traders in two traditional urban

marketplaces of Accra. In-depth interviews with both public agencies and traders showed that traders' social networks and interactions are important sources and channels for fire risk communication, albeit unharnessed by formal emergency management agencies. It also revealed how cultural elements such as religious beliefs about fire risks affect proactiveness in fire risk preparedness and response. To ensure effective risk communication about marketplace fires, this paper calls attention to and mainstreaming of socio-cultural aspects of everyday life in marketplaces into disaster risk planning and management.

KEYWORDS

Accra, fire risks, risk communication, socio-cultural factors, urban market

INTRODUCTION

> *A scene of dark clouds of smoke rising, burning properties as wailing marketplace women and crowds gather in shock, traders count their loss as the sound of sirens mute the cacophony of market confusion, security personnel arrive, and the fire service race against time. The affected look above in prayerful gaze, agitations soar against emergency management agencies who seem to promise but never deliver while others cry to politicians and the government for help—a typical scene of urban marketplace fire in Accra that shows destruction of not mere properties but livelihoods*.

Marketplace fires in Ghana are detrimental to the vitality of urban life since marketplaces are economic spaces with strong identities that intersect social and cultural aspects of everyday life (Asante & Helbrecht, 2019). Indeed, the Ghanaian urban marketplace, known for its lively congestion and bustling economic life, natural clustering of traders and customers (e.g., in stalls, along streets, and in commuter buses) represent, arguably, the strongest spatial manifestation of the urban informal economy (Acheampong, 2019; Boamah et al., 2020). Moreover, 80% of Ghana's workforce operates in the informal sector, where less-regulated marketplaces constitute a significant component (Ghana Statistical Service, 2013)—with far-reaching implications on the urban economy, governance, and resilience (Acheampong, 2019; Boamah et al., 2020; Obeng-Odoom, 2011).

Disruptive as they have been, urban marketplace fires have not received significant attention in the urban disaster literature in Ghana relative to hydrometeorological disasters (Amoako et al., 2021; National Disaster Management Organization, 2010; Oteng-Ababio et al., 2015). Yet, Oteng-Ababio and Sarpong (2015) show that between 2000 and 2009, an average of 2662 fires occurred nationally, with about 599 in Accra, the capital. Since 2010, urban marketplace fires have also increased economic and

socio-cultural impacts (Addai et al., 2016). The paucity of scholarly evidence on fire disasters persists despite the fact that marketplace traders are mostly without insurance and constantly fighting against precarity and inequalities—a reality complicated by the ongoing impacts of COVID-19 (Akuoko et al., 2021; Avenyo et al., 2020).

Unfortunately, this relatively inadequate attention is not confined to the academic discourse. In the policy arena, studies show that local governments have failed to plan for and integrate fire disaster risk reduction strategies into urban management (Amoako et al., 2021; Owusu-Sekyere et al., 2017). Also, rapid urbanisation, weaknesses in local planning and policy, lack of effective fire regulation and management, corruption, illegal electrical connections, and negligence explain the perennial marketplace fires in Ghana (Addai et al., 2016). Additionally, the institutional tendency to perceive urban commercial fire as a "minor risk" and thus sacrifice the opportunity for effective fire disaster responses for other competing development needs appears to engender marginalisation and neglect of those in the informal sector (Okyere et al., 2022). Subsequently, some scholars assert that formal disaster planning and management implicitly operate with the assumption that memory of disasters erodes quickly among vulnerable populations (Oteng-Ababio & Sarpong, 2015).

Fortunately, a few but an empirically rooted stream of emerging research sheds some light on the problem of urban marketplace fire disasters in Ghana (Aboagye et al., 2018; Aning-Agyei, 2018; Oteng-Ababio et al., 2015). For instance, Oteng-Ababio and Sarpong (2015) used a Community-Based Risk Assessment tool to analyse coping strategies in the Makola market and found social capital to be a crucial local resource for mitigating risks. Yet, public authorities downplay the potential of such local resources. Aning-Agyei (2018) also analysed postdisaster recovery in three of Ghana's major urban marketplaces (Kantamanto, Makola, and Kumasi Central) and concluded that the location of market stalls exacerbates fire risks with economic and psychological recovery taking more than 3 years. Stakeholder and geospatial analysis have also shown that the outbreak of marketplace fires is entwined in the ethos of disaster planning and management, where poor risk communication and weak collaboration exist within the formal sector (Aboagye et al., 2018; Oteng-Ababio, 2016).

Generally, these insightful studies on marketplace fires in Ghana tie into the broader literature on the significance of the socio-cultural dimensions of disaster risk communication (Abunyewah et al., 2019, 2020; Erdiaw-Kwasie et al., 2019; Meyer, 2018; Monteil et al., 2020). Yet, this apparent sociological turn (Tierney, 2019) in understanding marketplace fire disasters in Ghana has not adequately explored how socio-cultural factors influence risk communication and perceptions of fire disasters in traditional urban marketplaces and how they can inform better disaster planning and management (Giddens & Sutton, 2021; Norman et al., 2015). Clearly, this stands at odds with the evidence that the socio-cultural aspects of risk communication are critical to devising appropriate strategies for preventing and managing disaster risks (Abunyewah et al., 2020; Fatemi et al., 2020; McMakin & Lundgren, 2018; Petrun, 2009).

Therefore, this paper extends the current work on urban marketplace fires in Ghana by emphasising the socio-cultural factors that underpin risk communication. The remainder of this paper presents the conceptual framework, then fire risk management in Ghana, the research approach, study results, discussion, and finally, the conclusion.

SOCIAL AND CULTURAL UNDERPINNINGS OF RISK COMMUNICATION AND PERCEPTION

Risk communication is an important aspect of the disaster management process, occurring at every phase: mitigation and prevention, preparedness, response, and recovery (Abunyewah et al., 2018; Fathollahzadeh et al., 2022). Historically, risk communication has been a one-way transfer of information from authorities to the public. However, in recent times, the concept has shifted to an interactive process involving the exchange of information among individuals, groups, and organisations (Höppner et al., 2012; Khan & Mishra, 2022). The one-way communication approach inhibited agency-community trust building, leading to the failure of risk communication goals. Such an approach also fails to provide accurate and up-to-date risk information to the public, create awareness about disaster risks, and provide context-specific actions to motivate preparedness initiatives (Abunyewah et al., 2019; Attems et al., 2020; Kopacz et al., 2022).

Providing accurate and timely information about disaster risk generally should improve disaster preparedness and response. However, for the past few decades, increases in disaster information dissemination campaigns and awareness have yet to result in enhanced preparedness and response to disasters at the global, regional, and community levels (Abunyewah et al., 2020; United Nations Office for Disaster Risk Reduction [UNDRR], 2019). According to UNDRR (2019), many risk communication programs and activities have failed to achieve their intended purpose due to misconceptions about the risk and the inability of communicators to tune the message recipients' perception to positively respond to warnings and undertake preparedness actions. Studies have found that people with low-risk perceptions are more likely to ignore risk communicated messages compared to those with high-risk perception (Karasneh et al., 2021). Disaster experience relationship with risk perception has revealed a striking heterogeneity. Studies have shown that direct disaster experience reinforces precautionary actions (Siegrist & Gutscher, 2008), while indirect disaster experience may not trigger precautionary actions (Wachinger et al., 2013).

Elsewhere, trust in authorities has been found to be a positive predictor of risk perception (Liu & Yang, 2021; Siegrist, 2021). However, increased trust in authorities sometimes leads to underestimation of risk and transfer of protection responsibility to leaders (Botzen et al., 2009). For example, Sly (2000) found that agency-community relationships have a substantial impact on risk perception. Siegrist (2021) elaborated on this finding to conclude that a good relationship between public agencies and communities builds trust, which positively impacts risk perception.

Risk, however, is socially constructed and culturally specific (Bankoff, 2003) and hence, underscores the role that cultural factors play in the interpretation or perception of risk. It has been argued that giving less recognition and priority to culture may lead to low-risk perception, ineffective risk communication, and consequently, inhibit social resilience (Warner & Engel, 2014). Here, some scholars uphold the prioritization of culture within human-environment interactions (Bankoff, 2003; Kapucu, 2008; Krüger et al., 2015; Mercer et al., 2012; Warner & Engel, 2014). From this view, culture refers to local knowledge of disaster, values, norms, language, beliefs, techniques, networks, and artefacts that help individuals and communities to mitigate, prepare and recover from disasters (Engel et al., 2014; Giddens & Sutton, 2021). Practically, the culture of communities reveals the strategies and practices enacted by both formal and informal actors in preventing, responding, managing, and mitigating risk. Yet, cultures are hardly universal, given the different

geographies of hazards and the diversity of disasters that threaten different social groups. This localised reading of culture in disaster risk studies is grounded in the concept of disaster subcultures, which entail adaptive responses of social groups or communities to existing or potential disasters (Engel et al., 2014; Weller & Wenger, 1973, Wenger, 1978).

In the ancient Mesopotamian context of flood disasters, for example, Weintritt (2009, p. 178) refers to the "culture of catastrophe," which denotes how experience with disasters enables cultures to learn important lessons and also develop interaction and engagement with perennial challenges. In this context, the role of religion and religious beliefs in risk perception and communication is noteworthy. According to Weintritt (2009, p.177), while extreme events were apparently treated as "matter-of-fact" by officials in Ancient Baghdad, immediately after disaster events occurred, they were religiously interpreted as a "sign of divine power." Intriguingly, the god-factor was strongly upheld when disasters were effectively managed and controlled. Thus, the perception of risk as a divine gift implied the need for cultural capacities to manage risks rather than focus on negative outcomes. In the Philippines, Bankoff (2009, pp. 265–66) reveals that frequent experiences with disaster have led to a normalisation of risk and emergent subcultures where disaster is considered a "frequent life experience" that is curated in memory and collectively managed among locals. Here, a combination of religious prayers and collective response to disasters constitute everyday risk cultures. Nonetheless, more recent literature indicates that it is not uncommon to have contradictory subcultures that generate a "clash of beliefs" within and between formal and informal systems (Tasantab et al., 2020, p. 631).

Building on the earlier work of disaster subculture proponents (e.g., Weller & Wenger, 1973), Engel et al. (2014) identify beliefs, knowledge, technology, socialisation, and inter–intra organisation as the main elements of culture. They capture risk information flows and the interpretative aspects that typify communities and local groups' perceptions and protective behaviors in predominantly informal settings. Drawing on the foregoing, this paper underscores that while sources, medium, and agency trust are important in risk communication and perception, integrating cultural elements such as beliefs, networks, and experience (Figure 1) provide important avenues for working within social settings to enhance the role of risk communication for protective behaviors.

SETTING THE CONTEXT

Fire risk management in Ghana: The risk communication gap

Fire as a hazard continues to strike regularly and brings a devastating toll on property and human lives, particularly across the urban landscape of Ghana. In the last decade, a day has never passed without reading or hearing from news outlets about a fire outbreak in some parts of Ghana (Addai et al., 2016). Most of these fire occurrences have been in commercial (markets), domestic, industrial, and institutional areas (Oteng-Ababio et al., 2015). The review of academic research and institutional reports demonstrate that faulty wiring and misuse of electrical gadgets, power fluctuations, accidents through the use of naked frames and lighting devices, smoking, and ignorance (Addai et al., 2016; Boateng, 2013) are the major causes of fire outbreaks in Ghana. These underscore the need to strengthen and resource institutions such as the National Disaster Management Organisation (NADMO) for better risk communication.

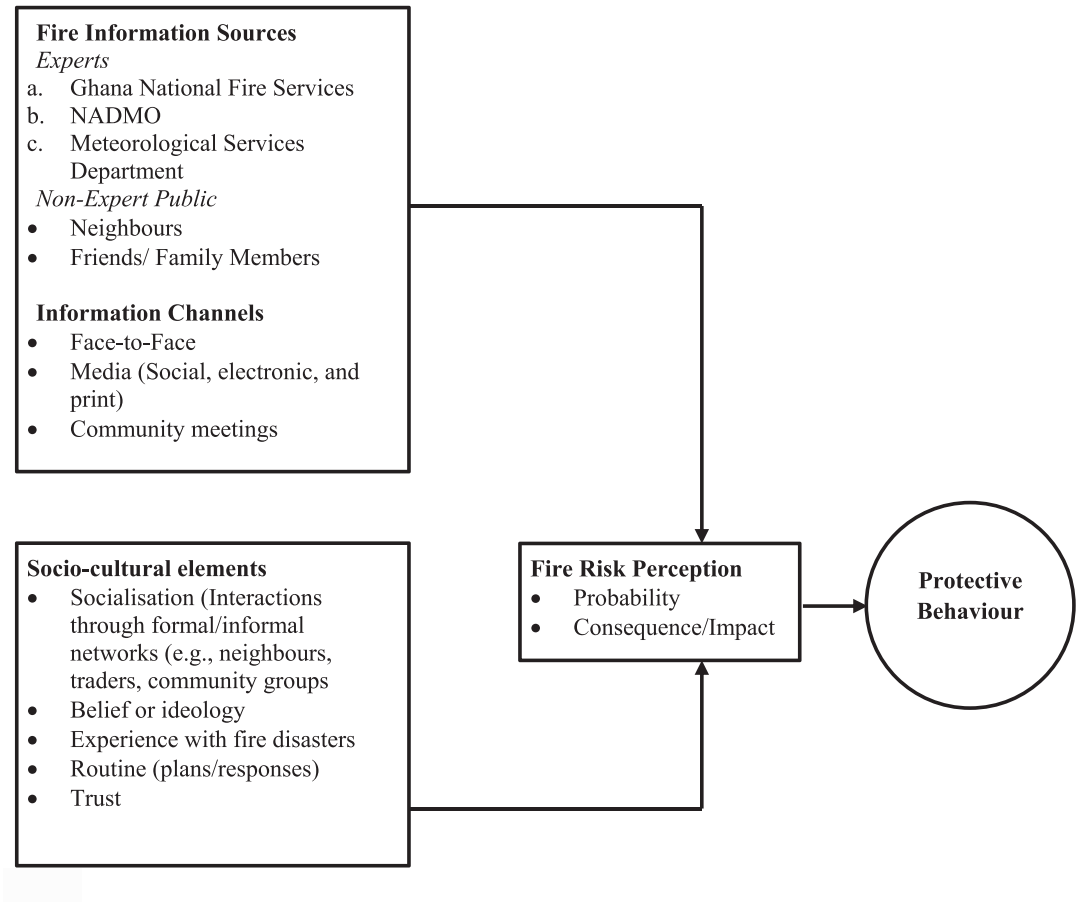

FIGURE 1 Analytical framework of market fire risk communication. *Source*: Authors' elaboration

The NADMO was established and mandated by Act 517 of 1996 to manage disasters and similar emergencies in Ghana. It draws on strategic partners from government agencies and grassroots communities during emergencies. With its decentralized representation at the national, regional, and district levels (National Disaster Management Organisation, 2005), the NADMO coordinates all activities and serves as a frontline agent with the Ghana National Fire Service (GNFS) to reduce fire risk. The GNFS was also established in 1963 and reestablished by Act 537 of 1997 to support undesired fire prevention and management (Ghana National Fire and Rescue Service, 2011). Other stakeholders, such as the security agencies, Environmental Protection Agency, Ghana Health Service, and the Ambulance Service, also play vital roles in fire prevention and management. An intrinsic component of fire risk reduction is the National Platform for Disaster Risk Reduction and Climate Change Adaptation, commonly referred to as the "national platform" instituted at the national, regional, and district levels. The national platform is a multi-sectoral and multi-stakeholder platform that undertakes vulnerability assessment to profile fire-prone areas and develops appropriate strategies for fire risk reduction. Thus, the national platform also ensures that relevant information and decisions on fire risk obtained are shared among the stakeholders for effective fire risk management.

However, like many countries in Sub-Saharan Africa, weak governance systems have led to ineffective fire risk management. Poor governance has not been just a barrier to effective risk reduction and fire management but also a predominant cause of increasing fire risk levels (Global Facility for Disaster Reduction and Recovery and World Bank, 2010; United Nations Development Programme, 2004). In Ghana, the ineffective implementation of fire risk management policies often stems from unclear institutional arrangements and inadequate implementation capacity (Amoako et al., 2021). While communication is key to disaster risk management (United Nations Office for Disaster Risk Reduction, 2007), it remains one of the main barriers in Ghana as fire risk communication is often lagging (Norman et al., 2015) and fire risk management institutions appear isolated from civil societies, NGOs, communities, and research institutions (The Centre for Health Systems and Policy Research, 2016). Furthermore, risk information acquired by fire risk management agencies is not properly communicated to those at risk—depriving them of valuable information necessary to build resilience (United Nations Office for Disaster Risk Reduction, 2014). Oftentimes, risk communicators always come to the party at the event stage when most stakeholders are focused on possible ways to suppress the fire (Norman et al., 2015), thereby neglecting the crucial aspects of pre- and post-event risk communication. When fire risk communication processes have focussed mainly on the event stage, the result has been ineffective as risk communication processes initiated during the fire incident stage have frequently failed to get the desired response from people (Norman et al., 2015).

Profiling Accra and its marketplace fire risks

The study is geographically situated in Accra—Ghana's capital city. Since its establishment as the capital of the British Gold Coast in 1877, it has become a major administrative and economic centre. The city has experienced rapid growth, and it is considered one of the fastest-growing cities in West Africa. The city's rapid growth and intense urbanisation manifest strongly in the urban informal economy, where about 60% of urban residents earn a living (Grant & Nijman, 2004). Within Accra's urban informal economy, the traditional marketplace constitutes the strongest geographic constellation of services (e.g., urban food traders and processors, repairers, etc.) and micro-manufacturing (e.g., textile and garments), dominated by women (Osei-Boateng & Ampratwum, 2011). Even in the recent boom in upscale shopping malls in the city, the traditional marketplace maintains its dominance as the main economic hub for local households and retailers from neighboring countries such as Togo, Ivory Coast, and Burkina Faso (Grant & Yankson, 2003). In spite of its long history and immense contribution to urban livelihoods and the city economy (Robertson, 1983), the conditions of traditional marketplaces in urban Ghana are widely known to be precarious and vulnerable to a spectrum of risks, including fires (Oteng-Ababio & Sarpong, 2015).

Indeed, marketplace fires remain one of the most widespread commercial fires that are experienced in the country, especially in the urban metropolises owing to the congestion and poor urban planning. To illustrate this point, we present official data spanning 7 years to show the general trend of commercial fire outbreaks in Accra. Data from the GNFS between 2010 and 2016 shows a 114% increase in commercial fire cases between n 2010 and 2016. Also, a total of 48 lives were lost between 2010 and 2016 due to commercial fires, while 42 persons were injured. Overall, Accra provides an empirically suitable setting to study urban marketplace fires for two reasons: (i) the

ubiquitous distribution and socioeconomic relevance of traditional marketplaces and (ii) the perennial outbreak of fires in these geographic spaces. After all, marketplace fires in the city are chronic and have implications for risk governance.

Case studies: Makola and Nima markets

This paper is based on two traditional marketplaces in the Greater Accra Metropolitan area. In selecting these two markets, this paper follows the notion in disaster subcultures that there are differences in the way communities experience, respond and perceive disaster risks, and as such, no disaster subcultures are identical (Engel et al., 2014). This allows for comparison as the two markets are different in terms of the scale of market activity, the sphere of influence in terms of clientele base, the different risks and experiences with market fires, and the social context in which they were developed.

The Makola market is important in the Accra metropolis because of its large size, regional sphere of influence, and role in Ghana's political-economic history. It was established in 1924 (Oteng-Ababio & Sarpong, 2015) and has since been the centre of Accra's wholesale and retail trade activities. Nicknamed the "queen of Accra markets" (Robertson, 1983, p. 469), the Makola market epitomised the strength of the Ghanaian informal and traditional marketplace. Over time, the market has grown, inhabiting more than 35,000 traders and hawkers (Oteng-Ababio & Sarpong, 2015), albeit in an unregulated manner. The uncontrolled growth and poor regulation of the Makola market by city authorities pose significant risks of fire hazards.

On the other hand, the Nima market is smaller in size, with a lower sphere of influence. Geographically, the Nima market is located at the heart of Nima. The development and growth of the market are inextricably linked to the growth of Nima. The settlement dates back as far as 1836 when it developed as a dormitory community for Hausa merchants who came to Accra from Nigeria for trading activities. The growth of Nima as a slum emerged partly to the delay of the settlement's incorporation into the Municipal boundary of Accra in the colonial period (Agyei-Mensah & Owusu, 2010). Even though efforts were made to replan the settlement as part of a redevelopment scheme in 1976, this never materialised. Thus, the unplanned nature of the settlement affected other activities, including the nature of its markets. The market is characterised by a constellation of rented stores and open space trading activities, with the latter being the most visible. The market's growth has been mostly haphazard and out of control, creating vulnerable conditions that expose the market to fire hazards.

RESEARCH APPROACH

The case study design was adopted for this study since it is considered suitable for understanding and interpreting the social and personal context of a phenomenon (Yin, 2009). Adopting a case study design also enabled the team to deploy qualitative research methods in view of the research's explorative character and objective to analyse socio-cultural factors that influence risk communication and protective behavior among urban market traders in Accra. Tierney (2019) noted that qualitative methods have been important in disaster risk studies to better understand the socio-cultural context within which a specific risk occurs and impact the interpretation and perception of risk. Hence, in the context of disaster risks such as urban market fires,

TABLE 1 Summary of study respondents

Interview				
Informants	Number of participants	Gender of respondents		Average years of experience managing fire risk
		Male	Female	
Regional Coordinating Council	3	2	1	4
Ghana National Fire Services	4	3	1	11
NADMO	4	2	2	6
Executives of traders' union	4	1	3	-
Market traders	20	6	14	-
Focus Group Discussion				
Makola Market	8	3	5	-
Nima Market	8	2	6	-

the case study design allowed us to focus on fire hazards within specific contexts to unearth information about the socio-cultural aspects of fire risk amplification.

The study commenced with a literature review on fire risk communication and the social and cultural elements that shape risk perception in disaster-prone settings. Apart from published articles, reports, Acts of Parliament, and institutional profiles produced by international, national, and local agencies provided an overview of fire risk management, especially fire risk communication challenges, in Ghana.

Field data collection was conducted following a clear understanding of the research gap. This ensured a continuous interaction between the theoretical underpinnings and the data collected (Yin, 2009). Semi-structured interviews were conducted with 35 key informants from public fire risk management institutions, urban market managers, trade union executives, and traders (Table 1). The final sample size of 35 was informed by the principle of saturation in qualitative studies—the point at which further interviews do not yield any additional insights in relation to research questions (Saunders et al., 2018). Institutions contacted for this study are shown in Table 1. These were purposely selected based on the document review of fire risk management in Ghana. The traders selected for this study have either experienced or witnessed fire outbreaks in the two markets in the last decade and hence possessed first-hand experiences of fire risks. Traders were contacted through the market managers and traders' union executives.

The institutional interviews included information about risk communication strategy, resources, the channel of communication and engagement with urban market stakeholders (before, during, and after market fires), and socio-cultural factors that influence communication and use of fire information. On the part of the traders and traders' union executives, interview topics included sources of information on fire risk and communication among traders, response to fire risk information, norms, beliefs, and market fire risk-related practices and interactions with state institutions. All interviewees were briefed on the purpose of the study, the data collection method, and the use of the data. Only those who gave full consent were interviewed. The interviews were conducted in either English or one of the local languages depending

on the interviewee's preference. Field interviews lasted between 30 and 35 min and were audio recorded.

The interviews were transcribed and analysed using thematic content analysis—which unearths socio-cultural conditions (Bryman, 2016). The study followed the six-step process that has become the benchmark for trustworthiness in qualitative studies (Braun & Clarke, 2006). Step 1 was data familiarisation: all authors reviewed the transcripts by reflecting and thinking through data from the perspective of the analytical framework. Here, the main components of the theoretical framework (Figure 1), such as sources and channels of risk information, socio-cultural elements, and fire risk perception, were used as the "signposts" for identifying related words and phrases (codes) in the transcribed data. These initial codes were categorised under each of the main components in Figure 1. For example, words such as "radio" and "market leaders" were coded as sources and categorised under sources and channels of fire risk communication. Similarly, phrases such as "God is protecting us" and "spiritual matter" were coded as religious beliefs and thus connected to socio-cultural elements of fire risk perception. Next, all authors shared their descriptive codes and understandings of the transcripts: debriefing and initial coding (e.g., market fire, radio, fire agency, prayer, etc.). In Step 3, the team collectively triangulated the codes by comparing (similarities and differences) and searching for emergent themes or connections, subthemes, and hierarchies. Step 4 continued with debriefing among team members, vetting, and ascertaining accuracy by referring to original transcripts and codes. Step 5 defined and finalized the themes (e.g., source of risk information, belief, social interaction, etc.). Finally, step 6 entailed producing the report. For the purposes of analysis, the thematically defined codes were presented through the hermeneutic principle of sensemaking in the form of interpretative narratives with long or short quotes. Informed by the theoretical framework, this interpretative analysis was structured into sources and channels, social interactions, trader characteristics, and fire risk perceptions. Such a "focused" form of thematic analysis allowed us to better explicate aspects of fire disaster cultures, especially the socio-cultural dimensions of fire risk perception and consequent protective behavioral practices in the two marketplaces.

RESULTS

Sources and channels of fire risk information

Findings from the study showed that fire risk information basically emanates from both formal and informal sources. In Ghana, formal sources of information refer to constitutionally mandated institutions such as the GNFS and NADMO to prevent and manage undesired fires. In both Makola and Nima markets, respondents indicated fire risk awareness programs held by the GNFS and NADMO on the radio sometimes ignite conversations about fire risk among traders. However, further discussions with traders revealed that the reception of such information was hampered by "broken promises of disaster managers who talk a lot on the radio but don't come to the markets" (FGD Participant 6, Nima). In Makola, where fire outbreaks are rampant, interviewees portrayed limited engagement between state agencies, especially the metropolitan assembly and traders, during prefire and postfire events. Citing the GNFS, for example, Makola market traders' association leaders mentioned that fire managers are only present at fire outbreaks, mostly after severe damages have already occurred. In fact, one participant during the FGD with traders narrated:

> ...seeking information from or reporting on fire outbreaks to appropriate state agencies is an arduous task. The GNFS and NADMO are reactive rather than proactive with contact phone numbers not active in many cases [FGD Participant 8, Nima Market].

For those in Nima, all formal sources of fire risk information came from disaster managers via radio channels because "almost everyone has a radio in their stall" (Traders' union executive, Nima). Compared with Makola, traders had no engagement with fire officers in the market, perhaps "because we do not have frequent fire outbreaks like other big markets in Accra" (Interviewee 5, Nima).

The results also showed that informal sources of information were common in the two markets. Such information was obtained from nonofficial sources such as family, friends, and neighbors to serve as confirmatory channels to learn about fire risk. FGDs in both markets disclosed that traders' reliance on informal sources of information had emerged from several years of limited engagement and poor response by disaster managers. In Makola, both traders and union executives alluded to the tendency for disaster managers to make "empty promises of financial support to help affected traders restore their market activities that never materialised" (Traders union executive, Makola). This strained relationship with disaster management institutions probably explained the suspicion with formal sources of information as one market respondent remarked that: "I check with my fellow traders and group members at this market to confirm any fire risk information I hear on the radio or elsewhere" (Participant M6 Makola).

Similarly, one respondent in Nima expressed "no faith in the fire officers as they don't come here and just sit at the radio station telling us what do to" (FGD Participant 3). Here too, interviewees mentioned that they "confer with the market leaders and also other traders and friends to check what they have heard about fire risks" (Participant, 7, Nima). For the traders and their union executives in Makola and Nima, negative past experiences with state agencies imply that it is not prudent to solely rely on formal information sources and channels. While it appeared from the FGDs that similarity in traders' narratives about fire risk was used as a social fact-check, it was not clear what happened when conflicting narratives were shared about a particular risk event. As one trader in Makola remarked:

> If everyone [traders] shares similar information about a fire risk event, we tend to go along with it. But it is very confusing when people are saying different things. But how can you trust the GNFS and NADMO? They don't do what they say.

However, interviews with disaster management representatives framed traders' resort to informal sources as "unreliable" (Representative 1, NADMO) because "all risk information, including fires, must be officially sanctioned by constitutionally mandated agencies" (representative 2, GNFS). Despite this apparent gulf between formal and informal channels, respondents in Makola were more open to holding regular meetings with formal agencies on ways to reduce fire risks at their marketplace since they are frequently impacted by fire outbreaks.

Traders' social interactions in the marketplace

Engagement with stakeholders revealed that the marketplace is seen as a community with strong interconnected social ties and networks. As a result, social interactions

pervade marketplace activities. Despite this, market fires did not appear to be a major topic in everyday social interactions in both markets. In Makola, some FGD participants shared the view that "fire risk is not a major discussion topic in everyday social interactions at the marketplace" (Participant M1, Makola Market) even though fire outbreaks were perennial. Yet, it became clear through further probes that this was a conscious psychological action to help previously affected traders cope with their loss and look forward. Here, it is important to emphasize this does not represent a "collective loss" of past events. The conversation with union leaders sheds some insights:

> We don't sit here and talk about fires all the time. We have good relations and share a lot in the market. There are people [traders] here who lost all their products from previous fires. Why should we keep reminding them of such tragedy when they are gradually recovering and looking forward? (Union representative, Makola)

> Please listen; even though we don't always talk about it doesn't mean we have forgotten. We remember that is why we continue our social activities to have resources and support victims to get back to business. We are not like the officers [agencies] who only appear after fire outbreaks (Union leader, Makola)

On the other hand, in Nima, discussions about fire risk only gained momentum during an outbreak of fire or "neighbouring market centres in other districts." Particularly, results from the Nima market suggest that conversations about fire risks occur after fire outbreaks, albeit for a brief period after which things get back to normal. Given that market fires are rare in Nima, most risk conversations are centred on events happening elsewhere.

Observably, social interactions and a sense of belonging typical of traditional marketplaces in Ghana have seemingly generated livelihood capitals that enhance collective support in terms of recovery for traders impacted by market fire disasters. In both Makola and Nima, the interviewees indicated that social networks of family, friends, and neighbors serve as channels of information about fire risks. In addition, social networks as a source of financial aid as well as emotional and psychological support were present in Makola but absent in Nima. A former victim and another trader recounted:

> The 2014 fire outbreak in Makola Market burnt my store, which was fully stocked with items running into thousands of Ghana Cedis…few months after the fire outbreak, family and friends, including the traders' union, supported me in many ways, including providing capital to start all over again [Interviewee 6, Makola Market]

> We usually share information by phone calls or through conversations. I heard about the last Makola market fires through a fellow trader who called to ask if I had heard the story in the news. She shared the details with me. We just talked about it for a while and just move on as it was not in our [Nima] market. Our market has no concrete support program. I don't know what will happen to me if I was a victim of a market fire (Participant N2, Nima).

Moreover, district NADMO officers reported that they offer relief items to fire victims—in spite of delays—but "cannot do more because they are not mandated to offer business support" (NADMO representative). As earlier mentioned, respondents' claim of delays and unfilled promises from disaster management agencies implied that they tended to rely mostly on social networks in the market to seek, share, and utilise fire risk preparedness and response information from their union executives.

Traders' characteristics: The role of language and religious beliefs

As earlier mentioned, the Makola market is cosmopolitan and converges almost all ethnic groups in Ghana, including those from neighboring West African countries such as Burkina Faso, Mali, Nigeria, and Ivory Coast. Nima, on the other hand, is quite ethnically homogenous in terms of religion and language—mostly Hausa and other northern languages. Language, the primary vehicle for communicating information to traders and other market stakeholders, was a significant challenge to effective fire risk communication. In Makola, the interviewees reported that trade union executives often shared vital fire risk information through dominant southern Ghanaian languages such as Twi and Ga, without consideration for the language of minority groups, especially those from northern Ghana.

In both markets, however, the language medium for risk information from disaster management agencies was English—Ghana's official language. During the FGDs, discussants pointed out that the lack of diversity in language from union leaders and disaster management officials affected the timely and accurate receipt of information and sometimes interpretation of information among individuals with limited proficiency. A female migrant at Makola market shared her plight:

> I migrated from northern Ghana to Accra in 2016 to engage in trading activities at this market [Makola]. Sometimes I hear there will be information about market fire risk preparedness from the union and associations, but they do it mainly in Akan languages or Ga. Unfortunately, I am not proficient in any of these languages …I usually ask my friends or fellow traders to translate it for me if they are able to attend. This prevents me from active engagement and discussions of issues (Participant M12, Makola Market)

> Sometimes we hear from our association leaders that there will be risk information campaigns by public officers on the radio. The officers say they are going to speak the Akan language, but when you listen to them, they are using more big English words we cannot understand. This is not for us. (Participant N9, Nima Market).

Participants' religious beliefs also shaped their perceptions and attitudes toward marketplace fires. In both markets, some traders believe that widespread and frequent fire outbreaks were "beyond the physical realm" (Participant 4, FGD Makola). Rather, they were perceived as manifestations of God's wrath against the exploitative acts and immoral activities in the market and wider society. Participants in the two FGDs insisted that fire outbreaks were a "spiritual matter" that concerned the battle between good and evil, necessitating fervent prayers to appease God. While participants in Makola called for the combination of both physical and spiritual responses, some traders in Nima do not participate in fire risk discussions because

they believe that no amount of mitigation and preparedness activities can prevent fire disasters.

> ...fire outbreaks in the market are a result of spiritual forces that are beyond the realm of human abilities to manage, other than via prayer. Because of this, we continually have to seek the face of God... and I believe that has contributed to the decreased frequency of outbreaks in other markets. (Participant M18, Makola Market)

> ...the exploitation and corruption in economic activities need to be corrected to prevent these judgments from God. I hear some people say we need both physical and spiritual actions. For me, it's a waste of time to join fire discussions if they are not calling for prayers. See, we have not had fires here because we pray a lot...even the officers [disaster managers] know this (Participant N6, Nima)

Traders' fire risk perceptions and protective behaviors

All respondents have directly heard about, witnessed, or experienced a market fire disaster. These variations in experiences with market fires seem to explain the differences in perceived risk and protective behaviors between participants from Makola and Nima. For the most part, respondents at the Makola market recounted past experiences with fire outbreaks, especially the February 2019 incident, which destroyed shops and items running into millions of Ghana Cedis. For these participants, market fires were perceived as a perennial threat to "our survival and ability to provide food for our families" (Participant M1, Makola). As narrated above, trader union leaders believed in both human and divine responses and have consequently reached out to the GNFS and NADMO to seek information on fire preparedness and response mechanisms. Yet, several proposals submitted to state institutions to run awareness programs and equip traders with fire preparedness and response skills "has not happened" (Traders Union executive, Makola Market). Here, earlier expressions of distrust in disaster managers have not deterred market community leaders from seeking to work with public officers because they "don't have the technical ability to solve this dangerous problem" (Trade union executive, Makola).

On the contrary, respondents from the Nima market indicated they have not directly experienced a fire outbreak for over a decade. For those in Nima, experiences with market fires were indirect—through media and social interactions at the marketplace. Participants also expressed the belief that their frequent prayers and faith have helped with the infrequent fire outbreaks in their market compared to other areas. For them, "there is no urgency to waste time interacting with fire officers, who will only appear when there is fire occurrence" (Participant N2, Nima). At Nima, trader union leaders were adamant that "we do not expect any fires here; we don't have any support programs around fire or the engage the fire service."

Comparing the knowledge of fire preparedness and response of the two trader unions, it is evident that the Makola market traders' union seems more responsive and active in seeking measures to deal with fire hazards. Repeated experiences of marketplace fires have prompted the Makola traders' union to be proactive by taking reports of people who undertake risky activities that can cause fire outbreaks in the marketplace seriously (Table 2).

TABLE 2 Comparative summary of socio-cultural elements

Elements	Makola	Nima
Source of risk information	Formal: GNFS, NADMO	Formal: GNFS, NADMO
	Informal: family, fellow traders, friends, traders' union executives	Informal: family, fellow traders, friends, market leaders
Channel of risk information	Radio and occasional physical exchanges (often postfire event)	Only radio channels
Language	Informal social interactions: Akan and GA (Dominant local languages); no minority languages	Informal social interactions: Hausa (common to the community)
	Formal: English (limited use of local or minority languages)	Formal: English
Religious belief	Market fires are beyond the physical realm	Market fires are a spiritual matter
	Combination of physical and spiritual responses	Prayers and religious rituals explain infrequent fire risks
Protective behaviors	Social activities by traders' associations to support victims of market fires through financial resources	Prayers are more important than own actions or those from unreliable disaster managers.
	Combination of physical responses and spiritual interventions (e.g., prayers)	
Interaction with DM organisations	Seeking and open to engagement with disaster managers	Not interested in engagement with "unreliable" disaster managers

> For us, we have seen fire destroying stock of items in over 500 shops here in Makola… we take reports about fire risk activities seriously and take proactive actions to stop them…we wish the GNFS and NADMO will run annual fire awareness training in the market. This, we think, will significantly reduce the frequency of fire outbreaks (Traders union executive, Makola Market)

> Our market is safe. We have not had any fires in a decade. God is protecting us. The officers [disaster managers] don't come here, and we also don't seek or rely on them (Traders union executive, Nima)

DISCUSSION

Risk communication is an integral component of fire disaster prevention, mitigation, response, and recovery processes aimed at creating awareness, building trust, and stimulating preparedness actions. The effectiveness of fire risk communication is anchored on several factors of which socio-cultural elements are essential. This study is built on the premise that fire risk is socio-culturally construed, and socio-cultural values should be mainstreamed in its risk communication and management processes.

In this study, it was found that there is limited communication between public agencies on the one hand and traders and market unions on the other hand in both markets. This reflects poor expert-public relationships that have the tendency to sometimes delay the timely release of risk information and undermine trust-building (Ahmad et al., 2009; Cope et al., 2014; Renn et al., 1992). Indeed, the failure of public agencies to adhere to promises made to victims of marketplace fire affected relationships and trust building. Furthermore, the low support from public agencies to help victims of fire disasters to bounce back seems to reflect the endemic absence of state action and trust for state agencies during disasters in global south cities, as apparent in Accra (Amoako, 2016) and Kampala (Faria et al., 2021). Perhaps, this explains traders' reliance on group initiatives. In response to the endemic absence of state action before, during, and after marketplace fires, victims of marketplace often relied on support from social networks (e.g., family, friends, and union executives) to bounce back to business. In terms of fire risk information received, market traders relied on social networks to triangulate messages received from formal sources as a result of relational mistrust. Given this reality, disaster managers should engage traders and their marketplace as sites for (i) framing fire disaster risks, (ii) identifying sources and channels of communication to enhance trust and risk awareness, and (iii) creating a bidirectional arrangement for fire risk information flow and disaster preparedness.

In addition to the difficulty in getting public emergency agencies to conduct awareness programs on fire disasters, the media was also a primary source of fire risk information. This is troubling and illustrates how educational programs on market fire risk prevention, preparedness, and response are not targeted toward marketplaces but at the public. While educational awareness programs that benefit the public are important, marketplaces in Ghana are riskscapes of fire disasters that necessitate deliberate actions to empower traders to implement actions and behavioral actions to minimize, avoid, and recover from disasters. This finding aligns with Sellnow et al. (2017), who conclude that media reports of disaster risk events often do not engender appropriate protective measures and behaviors to avoid disaster risks. Similarly, studies such as Frisby et al. (2017) and Wickline and Sellnow (2013) observe that news reports of disaster events often do not include information on necessary actions to help people navigate their risks. Thus, targeting marketplaces for specific fire educational programs will prompt intense discussions on fire prevention and response among traders and union executives and engender proactive localized responses within marketplaces—as in the case of the Makola market. Such targeted educational programs can utilize traders' social networks within the marketplaces to help disseminate market fire information quickly beyond information received on the radio or seen on social media, which may sometimes be irrelevant for marketplaces. Since traders' social interactions in both markets were important in sharing information about risks, this makes it imperative for policymakers to work within such social networks by involving them in all the stages of fire risk management to ensure that emergency planning, preparedness, and response to marketplace fires are effective (Attems et al., 2020).

Traders' experiences and social networks were found to influence fire risk perceptions. In the Makola market, where many stakeholders have witnessed and experienced fire disasters, the perceptions of traders and union executives are high about fire risk and promoted precautionary measures—affirming how a direct disaster experience can positively influence the public's perception of preparedness (Becker et al., 2017; Elshaer et al., 2022; Terpstra et al., 2009). It is thus apparent that traders who have regularly witnessed fire disasters with significant damages perceive

marketplace fires as risky and dangerous. Such traders tend to be more willing to adhere to messages from public authorities, peers, and traders' union executives. In this case, the frequency and severity of fire disasters were indicators of traders' perception of marketplace fire risk. On the contrary, markets such as Nima, with the infrequent occurrence and indirect experience with disasters, underestimate fire risk and under prepare for potential disasters (Botzen et al., 2009; Kasdan, 2018). It is thus imperative for traders at marketplaces where market fires are infrequent to have access to targeted fire education programs to avoid traders having a false perception of safety.

Traders and unions acknowledged the importance of risk information and awareness on fire disaster prevention and response. However, the coordination of fire education and awareness programs was mainly done by union executives without support from expert agencies. Education awareness was primarily based on information received from secondary sources and was communicated using dominant languages. This side-lined minority groups in the discussion of issues related to fire preparedness and prevention. This study finding is in conformity with Tan and Said (2015), who found that linguistic minorities are confronted with exclusion and disadvantages in the context of disaster management. Furthermore, the use of the dominant languages acted as a barrier for minorities with limited language competency and fire risk knowledge to actively engage in discussion, prepare and respond effectively in the wake of a fire outbreak. In addition, public agencies' communication of disaster risk in English resulted in linguistic minorities relying on those with language skills to understand and acquire critical fire risk information for preparedness. This could potentially lead to delay, misinterpretation, and distortion of messages disseminated, thereby increasing minorities' vulnerability and negatively impacting traders' perceptions and preparedness toward fire disasters (Arlikatti et al., 2014; O'Brien et al., 2018).

Religious beliefs also elevate the importance of cultural elements in risk communication. Traders, especially in the Nima market, perceived the infrequent fire outbreaks as due to divine response to fervent prayers and thus reducing the importance of fire risk reduction strategies in the marketplace. Studies indeed point out that culture (language and religious beliefs) pose significant challenges in effective risk communication and preparedness (Shepherd, 2010). For this reason, policy-makers need to work within local cultures to develop a shared understanding of fire risk and its responses through participatory processes to address message recipients' cultural and information needs.

Indeed, besides information channels and sources, this study also affirms findings from previous studies (Oteng-Ababio et al., 2015; Rohrmann, 1995; Shao, 2017; Tancogne-Dejean & Laclémence, 2016), indicating that socio-cultural factors are fundamental in forming fire risk perceptions. Additionally, the study findings establish that heterogeneous communication channels and information sources facilitate the verification of fire risk information. Hence, it is crucial to understand the intersections between information capabilities and socio-cultural environments before protective behavior can be promoted among specific population cohorts (Littlefield, 2015). This study thus affirms that inducing changes in the protective behavior of those at risk of disasters—such as traders in marketplaces—requires a close examination of the socio-cultural factors that influence their perception of and response to risk (Krüger et al., 2015; Littlefield, 2015; Sellnow et al., 2017; Rohrmann, 1995; Sellnow & Seeger, 2021; Warner & Engel, 2014). In essence, a robust risk communication strategy is essential to fostering protective behaviors among specific people who are at risk of marketplace fires.

Overall, the findings from this study demonstrate that, akin to the extant disaster literature (Bankoff, 2003; Krüger et al., 2015; Mercer et al., 2012; Warner & Engel, 2014), fire risks are socially constructed and culturally specific and underscore the role that culture plays in the interpretation or perception of risk as well as risk communication. In contributing to the sociological turn on fire disasters, this study demonstrates how low-risk perceptions and infrequent encounters with fire disaster events can cause people at risk to ignore fire risk communication messages (Karasneh et al., 2021; Morgan et al., 2002) while those with high-risk perceptions and encounter fire risks frequently take precautionary actions (Siegrist & Gutscher, 2008; Walpole & Wilson, 2021). For this reason, accounting for culture in fire risk communication engenders effective risk communication that contributes to enhancing resilience to fire disasters (McMakin & Lundgren, 2018; Petrun, 2009; Warner & Engel, 2014). However, because of the differences in how different people and places perceive, experience, and respond to disaster risks (Engel et al., 2014), such as fires, understanding the culture and sociology of fire risks, as evidenced by this study's findings, allows for disaster risk communicators and managers to mainstream the socio-cultural aspects of specific people and places—such as their social networks, language, and belief systems—into disaster preparedness and management (Sellnow & Seeger, 2021). In this way, barriers to disaster preparedness—such as beliefs that fire is God-induced, under-preparedness due to infrequent fire disasters, and mistrust of public emergency management agencies—in risk management can be navigated, and any misconceptions dealt with via effective risk communication (Bankoff, 2009; Tasantab et al., 2020; Weintritt, 2009). Furthermore, bidirectional information or knowledge flow in fire risk communication is imperative and can be achieved by the exchange of information among and engagement with a broad set of fire risk stakeholders (Höppner et al., 2012; Khan & Mishra, 2022; Shao, 2017), particularly those at risk, and the provision of accurate and up-to-date risk information to the public to inform context-specific actions. This motivates preparedness initiatives (Abunyewah et al., 2019; Attems et al., 2020; Kopacz et al., 2022) and enables risk communication that informs behavioral changes beyond the awareness of disaster risks (Rohrmann, 1995; Sellnow & Seeger, 2021).

CONCLUSION: TOWARDS SOCIO-CULTURALLY SENSITIVE FIRE RISK COMMUNICATIONS

This study has sought to elevate the importance of socio-cultural aspects of risk communication in formulating effective fire risk prevention and management strategies in both traditional urban marketplaces. This study sheds insights on how channels of risk information, social interactions, language, and religion interact to shape fire risk perceptions and protective behaviors among traders. This study thus advances the market fire risks and disasters literature in Ghana and the broader disaster literature by emphasizing the saliency of socio-cultural factors in risk communication. It affirms how public agency-community engagement, perceived trust, fire disaster experience, and culture (language and religious beliefs) influence precautionary actions among those at risk of disasters and is essential for effective risk communication (Bankoff, 2003; Rohrmann, 1995, Sellnow & Seeger, 2021; Steelman & McCaffrey, 2013).

It is suggested that implementing a community-based risk reduction framework that is rooted in socio-cultural realities is warranted. Here, disaster managers must seek to build partnerships with at-risk communities by carefully selecting a mix of

people representing different groups (e.g., union leaders, migrant traders, etc.). Practitioners should not only take into consideration influential individuals but also include representatives that have a better understanding of the fire disaster management needs and circumstances of riskscapes. Also, communicating in multiple languages that cater for diverse constituents is necessary to build a shared understanding of risk and its appropriate responses. The use of risk pictographs and working within existing social connections should be considered critical media in communicating risk. There are significant religious undertones in the way risk is perceived, and this should not be discarded. Rather, it is important to understand the wider context of these religious framings by collaborating with varied stakeholders to comprehend the history and contextual profile of fire risks. This could open possibilities for mutual exchanges, build trust and allow risk knowledge transfers.

The ability of at-risk persons and communities to support risk communication and develop sustainable fire risk management strategies relies on capacity and experimentation. It is recommended that disaster managers must be proactive and equip vulnerable communities with risk reduction and adaptive tools to better understand and mitigate fire impacts as well as align with social norms and culture. In addition, the paradigm of education awareness through risk communication should shift from the traditional notion of imparting expert knowledge to disaster managers and practitioners working together with at-risk communities to understand risk and manage it better. For high riskscapes (such as marketplaces in Ghana), regularizing participatory risk education programs could improve fire risk communication and can shape perceptions of risk and eventually protective practices.

Future studies should explore opportunities to develop models that seek to test the effectiveness of cultural integration in risk participatory risk communication in marketplaces. Future studies may also explore deliberative mechanisms for addressing differences and tensions in risk cultures within informal contexts to foster effective collaboration between experts and nonexperts during risk communication.

ACKNOWLEDGMENTS

Open access publishing facilitated by Charles Darwin University, as part of the Wiley - Charles Darwin University agreement via the Council of Australian University Librarians.

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How to cite this article: Abunyewah, Matthew, Seth A. Okyere, Louis K. Frimpong, Stephen K. Diko, Michael O. Erdiaw-Kwasie, and Victor Boateng. 2022. "Fire Risk Communication in the Urban Informal Sector: Evidence from Traditional Marketplaces in Accra, Ghana." *Risks Hazards Crisis Public Policy* 1–24. https://doi.org/10.1002/rhc3.12259