



# Critical gaps and implications of risk communication in the global agreements—SFDRR, SDGs, and UNFCCC: 3 select case studies from urban areas of tropics in South Asia

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## Abstract

There has been a consistent rise in urban disasters, particularly in developing countries located in tropical areas. Among various challenges of disaster risk management and climate change impacts, it is noted that most residents are poorly informed about their risk exposure or apposite response. The paper is based on the premise that one important cause for this gap is inadequate emphasis on risk communication at different levels of planning and agreements. Accordingly, it highlights some important gaps in the risk communication across international agreements including Sendai Framework for Disaster Risk Reduction (SFDRR), Sustainable Development Goals (SDGs), and United Nations Framework Convention on Climate Change (UNFCCC), and evaluates their impacts at the local level. It brings three selected urban case studies located in the tropical areas of the South Asia region that illustrate gaps in risk communication that result in enhanced vulnerability and deviations in response. The findings are based on secondary data and literature focusing on global agreements, risk communication, and disaster response. The paper argues that even though global strategies address urban risks, the fragmented nature of risk communication results in poor response and contributes to losses that occur in disasters. Three critical gaps noted in risk communication include (i) it not prioritized at different levels, (ii) inadequate structures to measure its impacts and stakeholders inclusiveness, and (iii) indifference to cultural diversity and integration. Further, it is suggested that there is a need to redefine risk communication at the global scale that extends beyond warning generation and considers multiple factors influencing response including interlinked vulnerabilities and variations in perceptions emerging from varied geographical, socio-cultural, economic, and political processes.

**Keywords** Risk communication · Disaster response · Sustainability · Climate change · Urban tropics · South Asia · SFDRR, SDGs, UNFCCC

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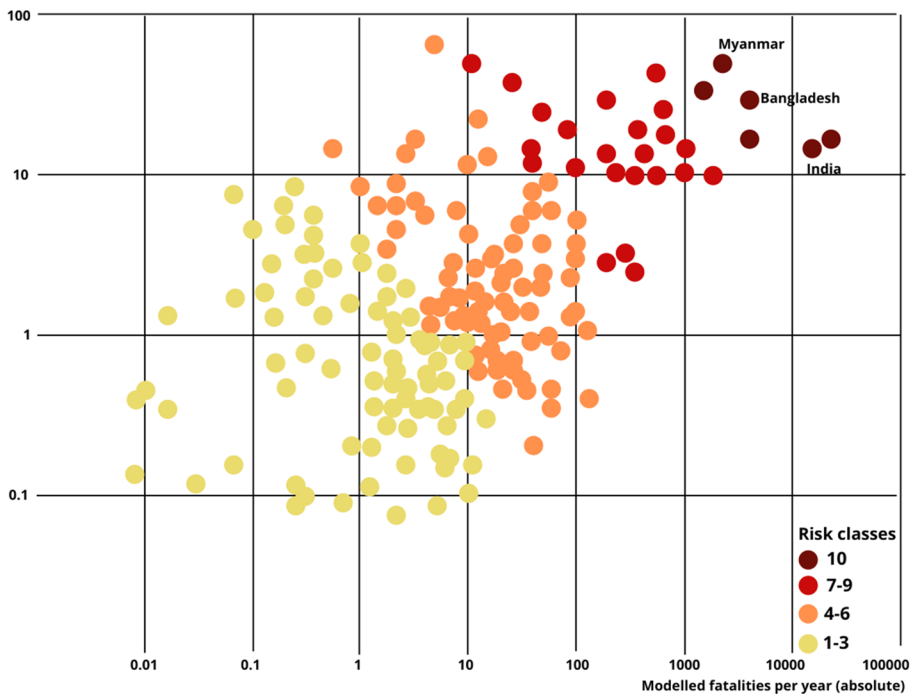
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## 1 Introduction

The world is largely urban with over 55 percent of its total population living in cities, which is expected to grow 68 percent in 2050 (United Nations 2018). Cities located in the tropical areas are some of the most populated cities in the world, which share a wide range of development statuses and come from a variety of cultural backgrounds. Bangkok, Darwin, Dubai, Jakarta, Kolkata, Mexico, and Nairobi are just a few names that depict this diversity. The data from the top ten most populated cities in the tropics suggest that more than 138 million people are exposed to varied natural hazards by virtue of their location and excessive concentration of population (Swiss Re 2013; Norris 2014; Muhammad and Chan 2020). The coastal areas in South Asia, particularly cities located in Bangladesh, India, and the Maldives face tremendous risks of climatic hazards including sea-level rise, tropical cyclones, erosion, and flooding (UNDRR 2009). It is found that cities in South Asia are not only exposed to higher risks but also experience a high mortality rate in disasters (see Fig. 1). Out of nearly 410,000 deaths from climatic hazards in the last ten years, a majority of people died in low and lower-middle-income countries (IFRC 2020). The continued growth of cities in developing countries thus implies swelling cumulative risks from climate change (Norris 2014). In a scenario, where most cities are exposed to one or more hazards, risk communication is not just an important need but also critical for saving millions of lives exposed to diverse hazards (Swiss Re 2013; United Nations 2018).



**Fig. 1** Country-wise multi-hazard risk and modeled fatalities per million per year. Based on UNDRR (2009 p. 50)

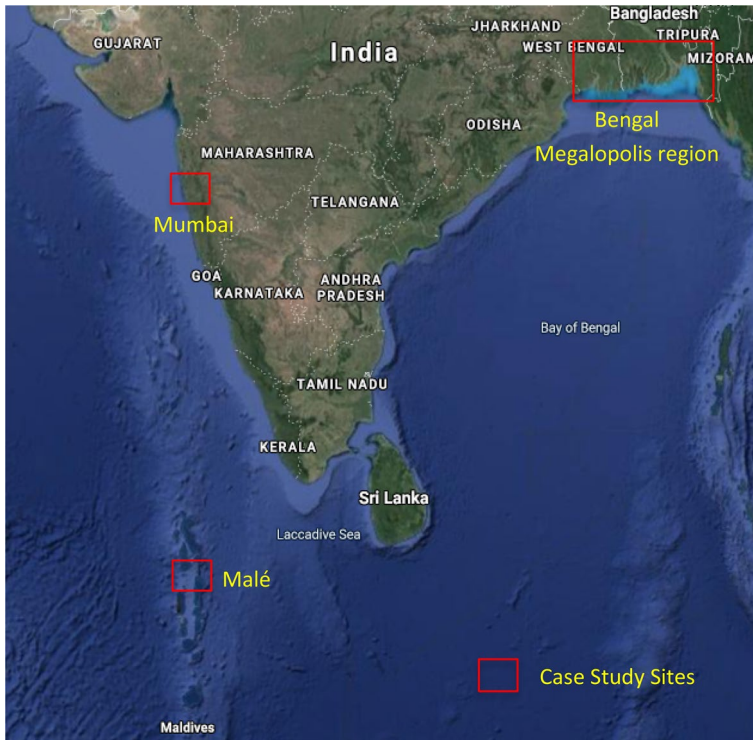
The disaster management and planning in most cities are not only governed by the local administration and legislation but they also have obligations to follow guidelines suggested by the global agreements, such as SFDRR, SDGs, and UNFCCC. Among various challenges of disaster risk management and climate change, lay inadequate risk communication across different response phases, stakeholders, and levels (Palttala et al 2012). The risk communication here not only refers to informing communities about their risk exposure or crisis communication through various means of warning generation, but it has a wider connotation, which considers the local socio-cultural contexts, scale, uncertainty, causes of the disaster, past experiences, learning, trust, and ongoing engagements that influence risk perception and response, and through that the entire process of risk management (Khan and Kelman 2010; Infanti et al. 2013; Khan et al. 2017). A gap is noted in the literature on the influences of risk communication in global agreements at the local level. This paper fulfills this gap by addressing specific gaps in risk communication across the three global agreements for their implications at the local level by using three case studies from South Asia.

## 2 Methodology

The paper is based on secondary data and literature, reporting recurrent damage and losses in disasters with a focus on cities located in the tropics of South Asia. For the assessment of risk communication in the global agreements, the framework documents of SFDRR (UNISDR 2015), SDGs (United Nations (2015a), and UNFCCC (United Nations (1992, 2015b), and related websites were consulted. A literature review focusing on risk communication and disaster response is also conducted to discuss its significance and associated gaps in the global agreements. The paper is an outcome of ongoing research on risk communication, wherein it is particularly focusing on how the gaps in the risk communication at the global agreements influence local response and outcomes. A detailed assessment of risk communication across SFDRR, SDGs, and UNFCCC is submitted for publication separately as it is beyond the scope of one paper (Khan and Mishra n.d.). This paper evaluates three case studies, purposively selected from the urban tropics i.e. cities in between the Tropic of Cancer and the Tropic of Capricorn in South Asia to highlight the varied nature of hazard exposure, socio-economic background, risk communication concerns, and challenges faced at the local level. The three selected case studies include the coastal megacity of Mumbai, an island city of Malé, and cross border cultural megalopolis region of the Bay of Bengal. These cities are exposed to a variety of natural and social risks from climate change including sea-level rise, storm surge, tropical cyclones, flooding, water scarcity, building collapse, migration, and so on. These cities not just highlight distinct risks, and vulnerability but also demonstrate varied challenges of risk communication, gaps, and subsequent implications. Although the case studies are chosen from South Asia (Fig. 2), the impacts of these gaps are also discussed for their wider implications after every individual case study.

## 3 Risk communication and global agreements for risks and response

The year 2015 is seen as ‘the year of big three’ when leaders from different countries agreed to address global risks from disasters (SFDRR), development (SDGs), and climate change (Paris Agreement) perspectives (Pearson 2015). It was indeed a major step required



**Fig. 2** Location of Case Study Sites in Tropical South Asia. Based on Google Image [<https://www.google.com/maps/@12.7518033,78.3312392,3153739m/data=!3m1!1e3>]

to deal with existing and emerging risks in an increasingly globalizing world. The three agreements—SFDRR, SDGs, and UNFCCC go in-depth to assess various challenges and issues that the world faces relating to disasters, sustainability, and climate change respectively. However, assorted focus, and varied resources and capacities of different implementing agencies, make it difficult to integrate practices to reduce risks at the local level (Hori and Shaw 2014). Despite having an emphasis on the cooperation and implementation of the major international policies including each other; the three agreements share different languages and understanding of risk communication (UNISD 2015; United Nations 2015a; 2015b). Although the differential treatment of risk communication across the three global agreements is acknowledged, how do they influence the risk response at the local level needs further exploration (Khan and Mishra, n.d.).

Risk communication is increasingly recognized as a critical component of disaster risk response (Fakhruddin et al. 2020; Winograd et al. 2021). It refers to the exchange of real-time information, advice, and opinions between experts and people facing threats to their health, economic, or social well-being (WHO 2021a, b). The significance of risk communication lay in the fact that it not only enables people to make informed decisions but it also influences people perception, preparedness, and response to varied disaster risks (Shaw et al. 2013; WHO 2021a, b). However, most studies note that implementation of disaster risk communication focuses primarily on one-way information flow for disseminating hazard forecasts, disaster warnings, alarms, risk messages, or even crisis communication,

challenges to which are recurrently identified in the literature (Barnes et al 2007; Mackie 2013; Netten and van Someren 2011; Sharma and Patt 2011; Palttala et al. 2012). Risk communication here refers to all communication relating to disaster risks mitigation, preparedness, response, and recovery (Infanti et al 2013). It is used as an overarching concept that facilitates a holistic understanding of risk at different levels and includes different kinds of risk communications such as risk assessments, risk information generation, and dissemination, risk awareness programs, forecasts, early warning, and crisis communication. It is essential in the sense that in the rapidly changing risk scenario, the purpose of risk communication is not just limited to simply conveying the information or persuasion of the passive public but also to induce public engagement, hear local voices and values, and trigger actions that bring changes in social norms and behaviors (Moser 2010; Moser and Dilling 2011). A gap is thus noted between the theory and implementation of risk communication wherein risk communication practices are frequently limited to its traditional use as a tool to make people aware, warn and inform for risk responses in contrast to the expanding discourse of risk communication that invokes trust, heuristics, emotions, experiences and socio-cultural contexts that need to be evaluated and incorporated for addressing varied disaster risks (Sheppard et al. 2012; Khan et al. 2017). Part of the gap also exists due to a lack of acknowledgment of gaps in risk communication at the global level for their implications at the local level.

## 4 Critical gaps and implications of risk communication in the three global agreements

### 4.1 Gap: risk communication doesn't emerge as a priority

Although the three agreements of SFDRR, SDGs, and UNFCCC cover various risks, however, risk communication doesn't emerge as a priority due to their respective focus on disasters, development, and climate change (UNISDR 2015, United Nations 1992, 2015a, b). The SFDRR outlines four priorities that include the understanding of risks, strengthening of risk governance, investments, and enhancing disaster preparedness and response in both pre-and post-disaster situations (UNISDR 2015). The document recurrently mentions communication that mainly refers to the communication systems or mechanism i.e. telecommunication, information technology, associated services, and policies. Similarly, SDG talks about communication in terms of technology and tools apart from an early warning for hazards, while the Paris Agreement (UNFCCC) talks about adaptation communication along with national alignment and accuracy of information shared. Limited connotation of risk communication in these agreements results in a lack of urgency in overall risk communication until a disaster occurs.

#### 4.1.1 Case study: coastal megacity - Mumbai, India

Mumbai, located at the latitude of 19° 0' N & 72° 48' E is one of the most densely populated cities of India with 20.7 million population in 2014 (Norris 2014). Situated on the west coast of India, the city faces risks from rising sea level, storm surge, excessive rainfall, recurrent flooding, earthquake, and associated hazards. Old buildings and poor urban planning keep the local vulnerability high during monsoon season for blocked drainage, waterlogging, overflow, and building collapse. The collapse of old and dilapidated buildings due

to heavy rainfall has rather become a recurrent feature of the city (Jha 2019). Nearly 1472 incidents of building collapse in Mumbai city and suburbs have been recorded between 2015 and 2019 wherein 106 people lost their lives and another 344 suffered injuries (PTI 2020). Limited housing options and inadequate rent control policies with little or no incentive for building improvement allow the increasingly old and dilapidated buildings to co-exist in the city that enhances local vulnerability (Stecko and Barber 2007).

Despite an average of 250–350 building collapses per year, the communication of building collapse in the District Disaster Management Plan of Mumbai City and Greater Mumbai mainly focuses on the role of various organizations involved before, during, and after a disaster with the acknowledgment of gaps such as rent control act, legal hurdles and paucity of funds, but gives a little plan to overcome the issues (Narvekar 2018, 2019; PTI 2020). While these plans make a passing reference to sustainable development and talk about risks from climate change, there is a lack of urgency and clarity around how and when these issues are going to be addressed. Even though vulnerability is identified, inadequate communication for public engagement and involvement for vulnerability reduction and participation become important contributors to risks. It is noted that major infrastructure developments in the region rarely pay attention to disaster vulnerability (Moneycontrol News 2019). The communication of building bylaws and construction of illegal and risky infrastructure including old buildings remains in the legal purview with limited public interactions, awareness, and support. However, the cost of delayed and limited communication is frequently borne by the people who are either unaware of risks, except when they receive legal orders, or lack the capacity to make suggested changes.

In many cases, the scope of rebuilding remains beyond the scope of inhabitants in the developing world wherein they are provided with little assistance to support their relocation or rebuilding that may help to reduce the risk. The legal communication of risks occurs more as a threat than an opportunity to save the lives of people who fear where to go and how to deal with sudden evacuation. It is noted that nearly 16000 old buildings in Mumbai are in dilapidated conditions and not fully vacated by the residents in the fear of losing their housing despite notice (Malamulkar 2017). Besides, the speed of redevelopment and repair is very slow within a complex urban governance system, which keeps both vulnerability and risk high for impending disaster(s). Ignorance towards the increasing vulnerability of cities in the local governance and gaps in policies can be seen in the recent statement from the Bombay High Court—“The situation has gone out of control... we have to value human life. Come with policies so that human lives can be saved” (Sequeira 2021).

#### 4.1.2 Implications

Although SFDRR, SDGs, and UNFCCC talk about various risks and responses, and stress collaboration and cooperation; there is little emphasis on risk communication in the plans and policies (UNISDR 2015; United Nations 2015a, b). The impact of this can also be observed in disaster management planning at the country level. The National Disaster Management Plan of India although talks about the coherence and implementation of all three global agreements, but does not mention risk communication (NDMA 2019). Emphasis on early warnings in the global agreements and country plans, limits the focus of risk communication concentrated on certain hazards or situations, which allows vulnerability to grow which is a key factor in rising urban risks. Since most developing countries lack resources to deal with significant risks, enhanced vulnerability increases the possibility of disasters (UNDRR 2009; Cardona et al. 2012). Besides, early warnings come with a little

time for the exposed population to respond and hence trigger fear and reactions instead of planned response (Fakhruddin et al 2020). Much of the risk communication from media about disasters comes as crisis communication that gives limited options for action that can revert the situation. In the above case study, a significant population living in old high-rise buildings keeps the vulnerability high resulting in frequent deaths in recurrent heavy rains. Most of these events are not counted as a disaster due to less mortality rate per event. However, it can cause a disaster, if a major event like the Latur earthquake - 1993 occurs (India Today Web Desk 2015). Limited connotation of risk communication to an early warning or crisis communication not only confines the risk communication but also delays mitigation activities by both people and governing bodies. While cities in tropical areas are consistently growing, inadequate risk communication may fail other efforts done towards addressing disaster risks, sustainable development, or climate change adaptation (Bhagat 2011; Denis et al 2012). It is also observed that while there are numerous articles on the significance and effectiveness of risk communication, limited attention is paid to prioritizing the risk communication (Tinker et al. 2000; Frewer 2004; EPA 2019; Abrams and Greenhawt 2020). The prioritization of risk communication is essential not just for disaster risk reduction, but also for inducing urban sustainability and climate change adaptation.

#### **4.2 Gap: inadequate structures for stakeholders inclusiveness and to measure the impacts of risk communication**

The three agreements (SFDRR, SDGs, and UNFCCC) view risk communication primarily as the responsibility of the national governments that lead to a top-down approach of dissemination of risk information or warning (see UNISDR 2015; United Nations 1992, 2015a, b). Subsequently, there is little discussion on structures for stakeholders' engagement and inclusiveness to assess varied impacts of risk communication at the local level. In the absence of sufficient structures to measure and assess the change or results on the ground, it is difficult to address various local challenges that are often not clearly articulated at the global scale (Mysiak et al. 2016 p. 2190). It is particularly important for the global risks, such as COVID-19 or climate change for which risks are communicated globally, which can have significant negative local impacts as noted in the following case study of Malé.

##### **4.2.1 Case study: island city—Malé, Maldives**

Located on a low-lying archipelago at the latitude of 4°17'N & 73°50'E, the capital of Maldives – Malé is one of the highly vulnerable cities in the world to the impact of climate change due to its proximity to the equator (Harvey, June 9, 2016). It is susceptible to sea-level rise, water scarcity, tropical storms, storm surge, flooding, and tsunami, many of which pose a direct threat to its survival. It is also one of the most densely populated island cities in the world with 129,281 people living in an area of two square kilometers (May and Riyaza 13 July 2017). Following the World Health Organisation (WHO) declaration of COVID-19 as a pandemic and a call for countries to take “urgent and aggressive action” on 11 March 2020, Maldives declared the “State of Public Health Emergency” on the next day (WHO 2020, MMPRC 2020). The declaration included travel restrictions between resorts, safaris, and inhabited islands, banning all excursion activities within the country, suspension of tourist check in to guest houses and city hotels in the Greater Malé Region, followed by restrictions across the entire country and on all non-essential travels between



islands (MMPRC 2020). Both Malé and the country rely heavily on tourism which contributes to 23 percent of its total GDP (UNDRR 2019). COVID-19 risk communication had a significant negative impact on its economy with pre-existing low fiscal strength and high dependence on tourism (Schafer 2019). The pressure was gripping for Malé due to travel restrictions imposed in most countries and advisory issued to drop all non-essential travel in Europe and America along with the fear that insurance companies would not pay recovery expense of COVID-19 to tourists.

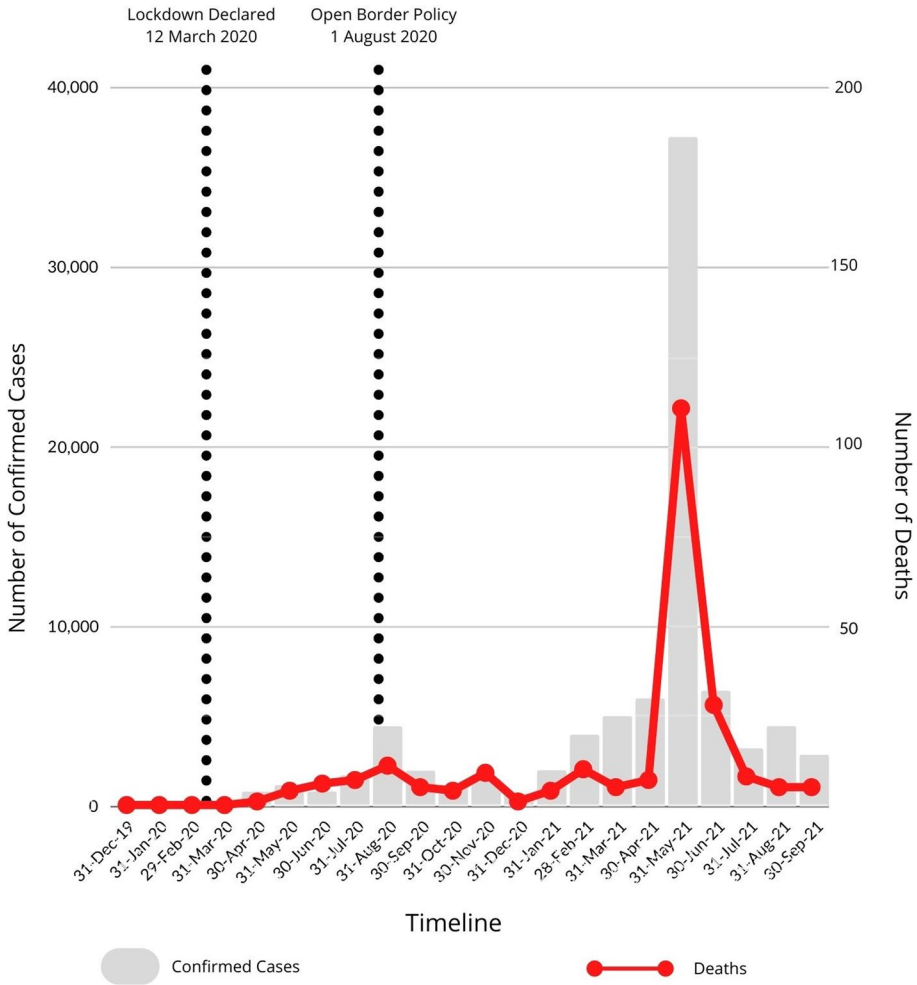
A significant drop in the overall number of tourists led the country to take an unparalleled decision. The severe impact on the economy, made the city and the nation pull out all the rules and implement one of the most open border policies in the world from 1 Aug 2020 (Rasheed 2020). Contrary to other places, visitors in the city of Malé did not need to have negative COVID-19 tests but had to follow quarantine rules. The data of the impact of COVID-19 in the country shows that when the lockdown was imposed in the country, there was a negligible impact of the pandemic in terms of confirmed cases or number of deaths (figure 2). Although, it can be possibly due to inadequate testing, however, even after opening the border limited increase was noted in the number of confirmed cases, and the real impact of COVID-19 didn't occur until May 2021, when the second wave gripped the country (WHO 2021b). The erratic change in the rule of the country occurred mainly due to the unsustainability of lockdown attributed to its small spatial and economic size that relies heavily on tourism, which was not the case in other major countries of the region. While lockdown for a few months controlled the transmission, it made people more vulnerable in this case with little or no income, which led the country to make new rules to overcome the extreme impact of previous risk communication. In any case, the country couldn't have sustained lockdown for a year or more, which discouraged the country to follow global risk communication.

#### 4.2.2 Implications

It is worth noting that during the initial conversation COVID-19 risk and response, the World Health Organization (WHO) managed most conversations relating to risks and its guidelines attributed to the nature of hazard, and there was a limited reference of SFDRR, SGDs, or UNFCCC for managing the response. Lack of guidelines on risk communication can also be seen as a missed opportunity, which was at an all-time peak due to excessive risk communication across stakeholders at all levels including governments, international bodies, and the local public. It not only led to chaos but created a hazardous situation due to risk miscommunications when the Director-General of the WHO, expressed his concerns by saying, “We're not just fighting an epidemic; we're fighting an infodemic” (United Nations 2020). Emphasis on communication tools, early warning systems, and information technology in the three agreements kept the focus on availability and access to these resources rather than their use and implications. It can be also linked to their misuse contributing to the failures associated with risk communication. Although the Paris agreement talks about adaptation communication, its specific orientation to climate change impacts is less useful at the ground level when people find it difficult to link hazards with climate change (Fig 3).

A diverse response by different countries created a situation of heightened uncertainty for the local people. On the one hand, where Hungary opted for complete control and rule by decree, Malé opted for open borders policy, and other countries chose partial or full lockdowns for variable times (Baume and Bayer 2020; Dunford et al. 2020; Rasheed 2020).





**Fig 3** Risk Communication and Impact of COVID-19 on Maldives Based on data retrieved from WHO (2021b) and Rasheed 7 October 2020

In India, a sudden lockdown made millions of people migrate back to villages resulting in 29,415 fatalities in 81,385 accidents on roads and highways during the March-June lockdown period (Gupta 2020). These implications signify the importance of unplanned risk communication and the lack of structure to measure the impacts of risk communication at different levels. Although the inclusiveness of the vulnerable groups has been emphasized in planning in most global agreements in general, they often remain on the receiving end in terms of risk communication. Studies note a gap in risk communication that addresses the needs of different vulnerable groups (Meredith 2008). Inadequate structures to assess and measure the outcome of the risk communication at the local level keep the local plans disconnected without much accountability at the local or global scale. It is essential to not just inform but also account for losses attributed to poor risk communication so that they can be planned to avoid the worst-case scenario. Jerneck (2013) notes that in the face of varied risks, particularly in the case of climate change, it is crucial that the narratives have

a direction (toward sustainability), distribution (global inclusiveness), and diversity (multiple approaches, methods, and solutions). Global inclusivity is not only essential to involve effective participation in dealing with threats like COVID-19 or climate change but also to avoid secondary hazards such as poverty or extreme response. At the same time, acknowledging diversity is also critical to address local needs and also to benefit from the local cultural practices that may help to reduce loss.

### 4.3 Gap: indifference to cultural diversity and integration in risk communication

The three global agreements talk about communication of risks predominantly from a technical point of view, where the information given to the society is informed by science and data available on a particular hazard or its likely impacts (see UNISDR 2015; United Nations 2015a, b). A little emphasis is placed on its local socio-cultural relevance and association that significantly affect the disaster response and produce variations over space and time (Canon 2015; Khan 2012a, b). The review of the 2030 agenda for SDGs emphasizes the inclusion of culture as an integral component of the future (Yildirin et al. 2019). However, it has yet to be linked with risk communication. Within a society, people may understand various terms differently, which not only implies different meanings assigned to the technical terms such as risks or vulnerability but also how risks are perceived, framed, and responded which is often deep-seated in the socio-cultural context (Cardona et al 2012; Eiser et al 2012; Sandell et al 2013). The missing cultural links and their impact on public response were clear in COVID-19 risk communication and the following case study of the Bay of Bengal Region highlights the recurrent impacts of such gap.

#### 4.3.1 Case study: cross-border cultural megalopolis region of Bengal

The Bay of Bengal region, spread across India and Bangladesh, is known for its rich cultural identity, close socio-economic ties and festivals, and exposure to common natural hazards across the borders (Banerjee and Samaddar n.d; Paul 2020). While the region has several cities, the four major cities located in its tropical deltaic area include Kolkata (22°57'N and 88°36'E) in India, and Khulna (22°85'N & 83°54'E), Barisal (22°70'N & 90°35'E), and Chittagong (22°35'N & 91°78'E) in Bangladesh. It is now an established fact that millions of people living in these cities are at high risk of tropical cyclones, sea-level rise, flooding, storm surge, erosion, and salinization (Ali 1996; Danda 2020). In the recent cyclone *Amphan*, nearly 84 people lost their lives, another 3 million had to evacuate in Kolkata while nearly 500,000 people lost their homes, 10 million affected and 2.5 million people had to be evacuated in Bangladesh (Ellis-Petersen and Rahman 2020). These hazards are likely to be intensified by climate change, and in the presence of multiple challenges of urban development, resource scarcity, and cross-border migration, they bear the potential to cause disasters if not managed well (Population Reference Bureau, 2001; Debova 2014). In contrast to Malé, the Bengal megalopolis region shares a rich traditional and cultural heritage with the neighboring cities within and across the borders and hence it would be limiting to see a city in isolation. The impact of ignoring the cultural ties was noted in the separation of Bangladesh from India in 1947 and then from Pakistan in 1971 (Debova 2014). The cross-border migration between India and Bangladesh has remained an ongoing activity ever since the creation of the country attributed to shared history, ethnicity, religious, linguistic, and cultural ties (Joseph and Narendran 2013). Policies underpinning these socio-cultural factors not only disrupt the development process but also lead

to unrest as noted in the case of the CAA Act in 2019 that created conflicts in Kolkata and other parts of India (Debova 2014; Canton 2020). This gap was also noted in COVID-19 risk communication.

There was little emphasis on the integration of cultural diversity in the COVID-19 risk communication, except the use of local language and mediums for information outreach (UNICEF 2020). Some variations noted in the way information was communicated in the two countries can be attributed to differences in the governance, whereby India adopted a tougher approach of 1-day curfew leading to nationwide lockdown for 21 days, Bangladesh used a relatively soft approach with ten days of public holidays leading to lockdown with relatively a greater emphasis on community engagement and awareness (Chauhan 2020; Mamun 2020). The local variations in socio-cultural contexts, practices, and relevance of rules did not find much space in the top-down risk communication of COVID-19 (Hebbar 2020; Mamun 2020). It not only led to an unexpected response in the form of migration, blame, and denial but also established a disconnect due to the inapplicability of response suggested by the government in varied local situations. For example, the concept of social distancing couldn't be applied to thousands of densely populated slums with millions of residents in cities of the region (Mahmud 2020; Ray 2020). The situation became further critical with the arrival of the migrant population in the densely populated risk areas, who not only became the carriers of the disease but also enhanced the local vulnerability with reduced income and heightened exposure to cyclone *Amphan* that affected the region (PTI 2020; DhakaTribune 2020). Complete ban without any guidelines led people to violate associated rules to follow their traditional practices with which they share deep emotional attachment. Sporadic clashes resulted in arrests of thousands of people as noted in Ram Temple celebrations amidst lockdown in Kolkata, while millions of people left cities to celebrate Eid in Bangladesh (PTI 2020; Kamruzzaman 2021). These incidents could have been avoided with adequate guidelines that accommodate cultural diversity and integrate that into risk communication. In contrast, many people chose to celebrate Durga puja online, which is another common festival in the region (Banerjee and Samaddar n.d; Paul 2020). A greater cultural sensitivity could thus be used to plan risk communication to generate more support and effective response to a disaster.

### 4.3.2 Implications

The generic guidelines of WHO are followed by different nations based on their institutional framework, capacities, and resources with a little contextualization of the local socio-cultural variations and other hazards exposures. Subsequently, several aberrations were noted in the global response to COVID19 due to varied socio-cultural contexts at different levels. It is noted that countries with loose or rule braking culture (e.g. Mexico 150,000 deaths) were affected significantly more by COVID 19 than those which followed rules (e.g. Japan's 5000 deaths) even with a nearly identical population (Gelfand 2021). Many of the disaster responses are interconnected with cultural practices, and risk communication without accounting for local cultural beliefs and practices not only makes people feel alienated but also pushes them to not follow the rules. It is noted in various religious gatherings that occurred across different nations and became the source of COVID-19 transmission e.g. Church gathering in South Korea and Kuching, Sarawak, and Tabligh gathering in Malaysia, Brunei, India, and Indonesia (BBC News 2020; Supramaniam and Ghazali 2020; Aubrey 2020). These incidents not only created fear but also eroded trust

that resulted in stress and discrimination within societies having diverse cultural orientations as noted in India and some other countries (Sayeed 2020; Paul 2020).

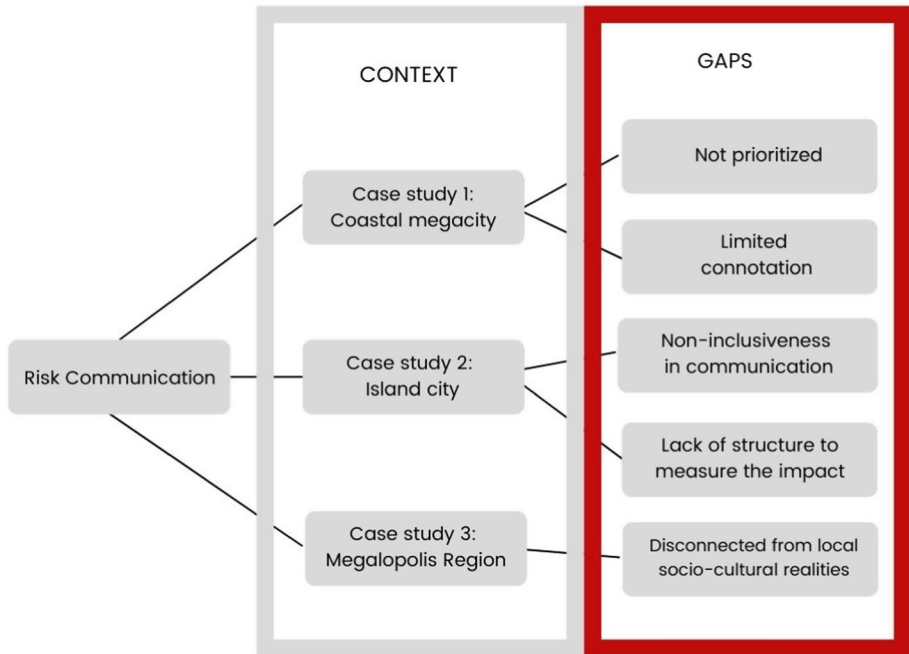
The pandemic is also labeled as a “cultural catastrophe” due to the severe and long-lasting impact of lockdown affecting a range of civil, cultural, political, and social rights (Inter arts 2021). It not only affected cultural practices but the closure of nearly 95% of art and culture museums also impacted the livelihoods of workers in both organized and unorganized sectors (UNESCO 2020; Inter arts 2021). COVID-19 also put the 370–500 million indigenous population at risk who are the guardians of 20 percent of the world’s territory (UNESCO 2020). Inadequate consideration of cultural diversity also limited the use of traditional local knowledge systems to overcome a widespread disaster like pandemics. Cultural integration may not only help to generate favorable responses but could also build local resilience. Studies note that tailoring of risk communication for the target population is likely to produce better results in comparison to situations where they are not customized (Winograd et al. 2021). A deeper understanding and integration of cultural practices in risk communication is essential for the collective and aligned response.

## 5 Discussion and conclusion

The frequent occurrence of disasters in the urban tropics is on a consistent rise when many of these cities from developing countries lack adequate resources and funding to manage increasing risks (OECD 2015). In such cases, a better preparedness of the local population becomes an important way to avoid disasters. This requires the population to be well informed about various risks, their vulnerability, and effective responses. The three case studies discussed in the paper brought forth varied gaps noted in the domain of risk communication in recurrent hazards at different levels (Figure 4). As the gap in risk communications had a direct impact on livelihoods during COVID-19, two out of three case studies discuss the varied nature of gaps related to COVID-19 and their impacts at the local level.

Although risk communication has gained significance and evolved in studies focusing on the disaster and climate change risks, its applications in the global agreements primarily centered on hazards with emphasis on warning generation and coordination for the response. It keeps the risk communications away from addressing the root of disaster that lay in social, economic, and political vulnerability (Wisner et al. 2012; Southard 2017). As delineated in Case Study 1, with the limited connotation of risk communication, vulnerability continues to prevail and cause recurrent disasters. Literature notes that disasters may not necessarily follow the sequence of hazards characteristics but they do recurrently and disproportionately affect the most vulnerable population (Hallegatte et al. 2020). It is also found that in many cases where risk communications address specific vulnerabilities e.g. COVID-19, they fail to pay attention to interlinked vulnerabilities arising from systemic processes where short term solutions of lockdown, social distancing, and excessive fear of disease proved to be counterproductive in long-term (Alcántara-Ayala 2020). There is, therefore, a need of having a broader perspective of risk communication that acknowledges not just various types and factors of vulnerability but also interlinked vulnerabilities and apposite responses to overcome them.

A limited focus is also the reason for not having risk communication as a priority in most development and planning processes. The culture of risk communication as a priority has the potential to reduce the disaster cost with shared accountability leading to effective risk governance (Ahren and Rudolph 2006; Amaratunga et al. 2019). The



**Fig 4** Gaps in risk communication emerging from varied urban contexts of selected case studies. Source: The authors

need for more proactive risk communication is consistently increasing with changing risk scenarios in the face of climate change. It is noted that many emerging issues are not addressed or identified as key areas in three global agreements wherein urban areas are particularly identified to be vulnerable. A proactive risk communication may not only make people risk-informed but would also create a context of shared responsibility for bringing change when they are aware and be involved.

IFRC (2020) notes that multiple crises overwhelmed both local as well as global capacities to deal and provide assistance in time that resulted in constrained international solidarity with dwindling economic situations. It is essential that the guidelines for global risk communication consider the local implications particularly in the areas of extreme impacts as noted in the second case study of Malé. As many countries may require support to deal with such a complex situation, it is vital that the global agreements take account of risk communications and implications at various levels by creating structures for engagement and measurement of outcomes. Further, the integration is not just essential at the global but also at the local scale.

The social and cultural construction of risk has been repeatedly highlighted in literature but hardly addressed through risk communication for its overall resolution as noted in the third case study of the Bengal megalopolis region (Johnson and Covello 1987; Beck 1992; Austen 2009). Extant literature recurrently notes that the effectiveness of disaster preparedness and response to warning systems depends not just on the ethnic and socio-economic population composition but also on the shared culture of response and adaptation to warnings (Perry 1987; Aguirre 1988; Vaughan 1995; Khan 2012a,

SAMHSA 2017). Many of these differences also have spatial expressions, however, little attention is paid to changing spatial patterns of disaster risk for risk communication (Khan et al 2012). Besides, the population growth in cities has been seen largely as a demographic phenomenon and similar measures are suggested across countries despite diverse socio-cultural differences (Khan 2012b). The role of culture is rather protruding in disaster response as it influences risk interpretation and choices that people make during a disaster (Schipper 2014). However, often it is ignored at the global and local level of planning of DRR and risk communication leading to a significant gap in response. The cultural differences need attention from the perspective of both risk communication and response.

The acknowledgment of varied impacts of disasters and risk communication has become an essential need in the age of information. In the current era of social media and fake news, a misinterpretation often travels faster than accurate information or data (Lewandowsky et al. 2019). In such a case addressing risk communication in a coherent manner is essential for all the global agreements as the cost of incoherence is unavoidable and significant (Murray et al. 2017; Sandholz 2019). It is particularly important when the national governments not only follow the global guidelines of risk communication by WHO as noted for COVID-19 but also base their disaster management planning on the latest global agreements as noted in the case study of India.

It can thus be concluded that there is an increasing need to priorities risk communication across the three global agreements and integrate various lessons learned over time in theory and practices. The purpose of risk communication is not just to make people aware, warn, and inform about their risk exposure and response but also to enhance stakeholders' engagement and inclusiveness of varied socio-economic, political, and cultural diversity to reduce disaster risks and for effective recovery. It may also require redefining the risk communication at the global level which extends beyond warning generation and considers multiple factors influencing response including interlinked vulnerabilities emerging from varied socio-cultural, economic, political processes. As global agreements tend to influence disaster response at the local level, it is essential that they not only include comprehensive risk communication planning but also provide guidelines for the same to be adopted at the national or local level. As risk is the common unifying factor across the three leading global agendas of SFDRR, SDGs, and UNFCCC, appropriate risk communication has the potential to lead the way forward for the conjoint outcome of a sustainable world. However, further research would be required to re-orient global risk communication to address varied risk exposures, structures for the effective participation and inclusiveness of stakeholders along with measurement of its impact in short and long term.

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