Integrating psychosocial and WASH school interventions to build disaster resilience

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ARTICLE INFO

ABSTRACT

This paper reviews the key disaster risk management (DRM) frameworks used for protecting children's wellbeing in disaster settings and identifies a lack of consideration for (1) psychosocial and (2) water, sanitation and hygiene (WASH) needs. It also demonstrates that these two domains are meaningfully linked, as access to adequate WASH provision may protect psychosocial wellbeing and promote community resilience. As support in both domains is vitally important to children's wellbeing, these gaps warrant immediate attention. Schools are uniquely situated to support these needs as part of disaster risk management and resilience building. Therefore, we consider the ASEAN Common Framework for Comprehensive School Safety (ACFCSS), which is an adaptation of the Comprehensive School Safety Framework (CSS) implemented in schools across the ASEAN region. While the CSS explicitly considers WASH, it only briefly considers psychosocial support; the ACFCCS lacks consideration of both domains. We argue revisions of the ACFCSS should prioritise the inclusion of psychosocial and WASH support and consider the role of schools beyond their capacity as educational institutions. We present an adaptation of ACFCSS with an additional framework pillar to guide this revision. Overall, we advocate for an integrated approach to DRM in schools based on an evidence-based, interdisciplinary perspective. We provide a series of evidence-based recommendations for DRM frameworks to consider, especially for those that intend to safeguard the wellbeing of children.

1. Introduction

In the wake of disasters, children are among the most vulnerable for developing psychological trauma [1–4]. Multiple frameworks have been proposed to support the disaster preparedness, response and recovery of children and communities following natural hazard events. However, these frameworks lack emphasis and guidance concerning psychosocial needs and needs pertaining to water, sanitation and hygiene (WASH). This paper examines the importance of integrating psychosocial support and access to WASH services in disaster risk reduction (DRR). DRR is a systematic approach to assessing and reducing risk, with the purpose of minimising vulnerabilities, mitigating the adverse impacts of natural hazards and facilitating sustainable development [5].

The paper gives novel consideration to how WASH and psychosocial support intersect in relation to disasters. We propose that access to psychosocial support and WASH services be included explicitly in existing disaster risk management (DRM) frameworks. DRR and resilience in low-/middle-income nations prone to natural hazard events, such as the Association of Southeast Asian Nations (ASEAN) region, would benefit immensely from improved frameworks. It is this region's DRM that this paper addresses in particular, especially concerning the

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List of frequent acronyms and abbreviations

AADMER   ASEAN Agreement on Disaster Management and Emergency Response (Guide)
ACFCSS   ASEAN Common Framework for Comprehensive School Safety (Framework)
ASEAN   Association of Southeast Asian Nations
BBB   Build Back Better (Framework/Guide)
CSS   Comprehensive School Safety (Framework)
DRM   Disaster Risk Management
DRR   Disaster Risk Reduction
GADRRRES   Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector
GFDRR   Global Facility for Disaster Reduction and Recovery
GPSS   Global Program for Safer Schools (Framework)

INEE   International Network for Education in Emergencies
INEE MS   INEE Minimum Standards in Education (Framework)
PTSD   Post-traumatic stress disorder
SDG(s)   Sustainable Development Goal(s)
WASH   Water, Sanitation and Hygiene
WISS   Worldwide Initiative for Safer Schools (Framework)

Other Acronyms and Abbreviations
CBT   Cognitive-behavioural therapy
CBTS   Community-Based Total Sanitation
EDMR   Eye movement desensitization and reprocessing
JMP   Joint Monitoring Program
JSPADM III   ASEAN-UN Joint Strategic Plan of Action on Disaster Management (Guide)
KIDNET   Narrative exposure therapy for children

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wellbeing of children in seismic hazard zones.

The literature identifies schools as vital centres of support for children and their communities following a hazard event [6–8]. Resilience building and disaster recovery are facilitated through a system of processes that exist to buffer the impact of disasters, or improve circumstances during or afterwards, including short-term responses and long-term planning [9,10]. While there is no cross-disciplinary consensus on what resilience means [11], the Intergovernmental Panel on Climate Change [12] defines resilience as the ability of a social system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation and the capacity to adapt to stress and change. Drawing on the SPHERE Handbook for humanitarian response (2018), the International Network for Education in Emergencies (INEE) Strategic Framework 2018–2023 (2018) [114] and the INEE Minimum Standards in Education [13], we propose an integrated approach to DRR and resilience-building through schools. The goal of this paper is to build on existing frameworks in the ASEAN region, particularly the *ASEAN Common Framework for Comprehensive School Safety* [14,112] to explicitly include the psychosocial and WASH gaps in the ACFCSS impact children's experiences before, during and after disasters. This broadening of scope may result in better school preparedness practices and improved child and hence community resilience.

This paper begins by providing a literature review exploring the psychosocial impact of disasters on the wellbeing of children and communities, the role of WASH in DRM and its links to psychosocial resilience. A review of core DRM frameworks is then presented; this section specifically considers which components should inform the revision of the ACFCSS, which is presently composed of three pillars that do not explicitly include psychosocial interventions or WASH access. Based on this review, the paper then discusses the implications of such revisions for the ACFCSS. A practical solution for moving towards a more integrated approach is presented by proposing an adapted version of the ACFCSS with an additional pillar. The paper concludes by exploring the implications of this additional pillar and offering recommendations for future research and applications of the adapted framework.

2. Literature review

2.1. Psychosocial impact of disasters on children and psychosocial interventions

There is a significant body of knowledge demonstrating the effects of disasters on children. Common mental health problems associated with disasters are anxiety, depression and post-traumatic stress disorder (PTSD; [15,16], though there is currently no exact programme or tool for improving psychosocial or mental health preparedness regarding disasters [17]. Studies on disaster preparedness and post-disaster recovery often lack adequate consideration of psychological wellbeing and its impact as these domains are often oversimplified (or entirely omitted) in DRM frameworks [16]. Thus, there is a need to design and establish a plan to help communities prepare and cope with emotional issues when facing disaster events [18]; see also [19]. Though some research has explored mental distress in children and youth in relation to disaster recovery (e.g. Refs. [20–22], little is known about the long-term mental health impacts of disasters [15]. This section considers the psychosocial and mental health impact of disasters on children, where 'psychosocial wellbeing' refers to the connection between individual psychological aspects (thoughts, emotions and behaviours) and collective social aspects (relationships, traditions and culture) that are central to positive human functioning but which are often disrupted by traumatic events [23].

Recent empirical studies emphasise the need for psychosocial support in disaster recovery and preparedness strategies. Murphy et al. [24] found a large proportion of survivors from eight humanitarian interventions identified mental health as an essential component of individual and collective resilience, and reported psychosocial support as the most valued component of disaster response in a quarter of the sites. Post-disaster studies report that unmitigated psychological disturbances can cause severe consequences in the daily lives of children, especially as children facing disasters often experience extreme changes in their mood, behaviour, development, memory and decision-making [2,16]. Disasters also have the potential to exacerbate existing or underlying mental health issues across the family unit, which can accentuate the vulnerability of children and introduce potential for neglect [25]. The literature documents specific examples of the problems this can cause in hazard-affected communities, such as increases in domestic violence post-disaster [26].

The use of psychosocial interventions for children experiencing trauma in this context has been examined in several studies. Two recent meta-analyses by Brown et al. [27] and Newman et al. [28] found that mental health interventions were significantly more effective than natural recovery in minimising PTSD symptoms, and identified a series of variables that may moderate the effectiveness of the interventions: individual vs group, intervention setting, providers' level of training, parental involvement, age and length of therapy. These reviews emphasise the need for the intervention to occur as soon as possible after the disaster to protect children's psychosocial wellbeing. They also emphasise that informal, group-based interventions are as effective as formalised approaches (e.g., Cognitive Behaviour Therapy, Eye Movement Desensitization and Reprocessing), which is important to note as resources are often scarce post-disaster, and group interventions can be facilitated with several children at once by a single, trained individual (see Ref. [29].

Group-based approaches may also be ideal for attending to children's complex psychological needs in disaster recovery contexts. Children often exhibit complex presentations of trauma-related stress disorders [30], which may be overlooked when administering individualised treatment but would be addressed in wide-spread group interventions. For example, Math et al. [31] found community-based group interventions were the most beneficial interventions for primary, secondary and tertiary children survivors[1] of the tsunami in the Andaman and Nicobar Islands (India) in mitigating adjustment disorder, depression and panic disorder. Group-based therapies have been shown to effectively address a series of related issues (e.g., anxiety, panic disorders, depression) in children and other groups (adolescents, adults, elderly), and provide essential components of psychosocial rehabilitation (e.g., Refs. [32,33]. Group interventions are especially effective in supporting children's psychosocial needs in disaster contexts when they offer wide-spread support to various individuals in children's complex social worlds who may also need psychosocial support (e.g., friends, peers, community members [25,34,35]; foster a sense of belonging and an improved sense of self-worth, respect and competence in children, (e. g.) through group-play [36], and in adults (e.g., Ref. [37]. They also foster lower attrition rates as children are less likely to drop out of group treatments than individual sessions [38].

However, there are many well-documented barriers to supporting the psychosocial wellbeing of children who experience potentially traumatic events, including disasters. A review of the psychological impact of disasters on children highlights that the most significant challenge to supporting their psychosocial needs is that children often do not report their psychological reactions to a trauma or a disaster unless specifically asked [2]. Even when asked, children may struggle to convey their complex feelings and emotions, which they may lack both the vocabulary and life experience to describe [39]. Kar [2] argues that children are not often given the opportunity to discuss their feelings because of assumed 'cognitive immaturity' (i.e., too young to grasp the significance of traumatic events). Though children may struggle to understand and verbalise their experiences and needs, it is critical to provide them with a safe space to discuss their psychological health; children are often willing to discuss their experiences when given the opportunity. This has been corroborated by studies in other areas of trauma, such as bereavement [40] and personal traumatic memories [41].

2.2. Considering the unique position of schools in supporting the needs of children and communities

Schools are uniquely situated to support children's psychosocial needs, given their resources (e.g., teachers, staff, space, facilities) and context as institutions that serve as the centres of their communities and as the primary institutions which support children's education (see Refs. [42–46]. Education in emergencies provides immediate physical and psychosocial protection and life-saving knowledge and skills (e.g., concerning disease prevention, self-protection and awareness of rights; see also, [47,48]. For example, schools in disaster-prone regions often provide vital DRR education directly to children through teachers. Disaster preparedness curricula, which include a psychosocial component, have been shown 'to better prepare children to deal with emotional reactions during and after disasters' [49]; p.124). Schoolchildren learn quickly and often become active agents of change [50]. Kar and Chambers [51] argue that schools and student activists have major potential to change the future in their communities.

Schools are also involved in local DRM and are ideal sites to facilitate psychosocial response, namely through group-based interventions. For example, a study of school-aged children in Hawaii who were exposed to hurricane Iniki showed that individual and group treatment by trained school counsellors was effective in reducing self-reported trauma-related symptoms [29]. Schools can also support the psychosocial wellbeing of children through group-based approaches using informal routes of engagement, such as play and sport [52]. Such activities stimulate intrinsic protective mechanisms that contribute to the child's resilience to distress (e.g., through informal social support, practice in managing emotions and self-control; [53,54]. However, appropriate training of coaches and facilitators impacts the effectiveness of such interventions, as sports, for example, are inherently neutral and require an informed coach to mould the activity to be therapeutic [52]. Schools are identified as ideal institutions to lead efforts in supporting children's psychosocial wellbeing, as children often experience various levels and waves of distress following a hazard-event [1,2] and schools can often facilitate these group-based therapeutic activities (see also, [7,8,55]. Psychosocial support systems can also support the majority of the school population (e.g., IASC, 2006).

Schools are known to be valuable resources in promoting resilience in disaster-affected communities as they provide trusted psychosocial and physical support to children, which often benefits the overall community [56–58]. Save the Children (i.e. [59], argues that there is a need to train people in dealing with the portions of the population who suffer from loss and trauma associated with disasters and emergencies, as the number of post-disaster trauma victims requiring attention often exceeds the capacity that public mental health personnel can support. Schools are, therefore, ideal support sites because activities that serve to help teachers develop an understanding of how to interact with trauma-exposed children may foster a sensitivity that is vital to improving children's psychosocial circumstances over generations.

2.3. WASH, disaster risk management and resilience building

There is a consensus that good quality, accessible WASH facilities are critical in disaster contexts, to reduce the risk of transmission of communicable diseases and protect against mental health impacts [60–62]. The role of WASH and psychosocial recovery as part of post-disaster recovery and resilience-building remains largely under-researched. WASH is considered a human right [63]; WASH supports daily activities and basic needs such as personal hygiene, access to sanitation and water for both sanitary and hygiene purposes, and cooking [64]. A series of major international organisations highlight the importance of WASH in DRR and recovery. WHO [65]; UNDRR [66]; UNICEF [13], and UNDP et al. [67] each assert that WASH saves lives in emergencies and routine situations, and is a priority in response to emergencies. These organisations argue that providing WASH services helps people return to their normal daily activities after a disaster and that the main objective of WASH programmes in disasters is to reduce faecal-oral transmission of disease.

While SDG 6 [68] aims to ensure availability of water and sanitation for all by 2030, progress has been slow with 2.2 billion people lacking access to safe drinking water and 4.2 billion without access to safely managed sanitation [69]. Already vulnerable groups (children, elderly, poor) are at greater risk, with up to 15,000 children under the age of five dying of preventable causes, such as diarrhoea and pneumonia, everyday [70]. Data from schools also suggest that many students suffer from inadequate access to WASH [65].). Humanitarian crises, emergencies and disasters can place an additional burden on WASH infrastructure where it already exists but also presents an opportunity in places where it is missing. Krishnan [71] argues that disaster recovery offers an opportunity for communities to actively initiate and influence change in WASH implementation and behaviour in order to improve recovery action. Krishnan [71] also stresses that recovery programmes should take a holistic approach in order to meet community priorities

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[1] "A primary survivor is one who was exposed directly to both the earthquake and the tsunami. A secondary survivor is one with close family and personal ties to primary survivors. Tertiary survivors include individuals from communities beyond the impact area, the majority of which were exposed to the earthquake only." [31]: 33).

and, through participation, should tackle issues around water supply, menstrual hygiene needs, privacy and security of WASH facilities, without neglecting the need for rebuilding physical structures, strengthening livelihood opportunities and aligning them with disaster preparedness and mitigation measures.

Lack of access to WASH can exacerbate the post-disaster consequences of affected populations and is vital for poverty reduction, especially for marginalised populations [72]. A study by Wanda et al. [73] reveals how the inadequacy of WASH provision experienced at the local level in communities affected by natural hazards and disasters is an issue that often stems from the mismanagement of WASH governance at the regional and national levels, especially the lack of WASH legal frameworks. The quality of services provided is also a concern. For example, the ASEAN Public Toilet Standards [74,75] state that public toilets need to be clean, dry, hygienic; located conveniently, well maintained, equipped with proper waste management systems; safe, private, accessible to the public and those with various needs (e.g., cultural, gendered, disabilities). Yet, in reality, many of the WASH facilities in selected signatory countries do not meet these criteria, including in schools [76]; see also [51]. Thus, concern for WASH implementation and maintenance is emphasised for post-disaster contexts, and further still regarding developing countries where local governance structures may be weak and adversely affected in times of crisis [77].

WASH should be considered a critical need and priority during emergencies and in post-disaster recovery efforts. These services are vital for building resilience to various types of unpredictable crises, such as natural hazards, armed conflict or global pandemics. This notion is reflected in the current context of a pandemic where lack of access to WASH services has been associated with a higher risk of COVID-19 spread [78] and has been a significant barrier to disaster recovery efforts (e.g., Refs. [79,80]. Prioritising WASH in early and longer-term stages of response is essential to building resilient communities, which are well-equipped for future hazards given their recurring nature [77]. There is also reason to believe WASH and psychosocial wellbeing are inherently linked (e.g., Refs. [81–83].

2.4. Holistically considering DRM: realising the links between psychosocial support and WASH

WASH may have the potential to mitigate or exacerbate the consequences of the psychosocial dimensions of wellness - especially in the context of natural hazard events. For example, Parikh et al. [84] systematically analysed evidence (>500 publications) of synergies and trade-offs between improved sanitation and SDGs. They found that 'sanitation action is required to achieve all 17 SDGs' (p.13), including those concerned with psychosocial wellbeing and mental health. That is, Parikh et al. [84] demonstrate that WASH is directly linked to a series of experiential outcomes, including psychosocial wellbeing.

Studies across disciplines reflect that integrated psychosocial and WASH support is highly valued amongst disaster survivors. For example, Kawasaki et al. [57] surveyed 1557 parents and 145 teachers in Hiroshima, Japan, which is at high-risk of landslide disaster. They found 'a remarkably high' proportion of respondents were primarily concerned about both WASH provisions (i.e., bathroom conditions, hygiene management) and the mental health care of children. Likewise, an anthropological investigation by Stevenson and colleagues (2012) found water to be a source of psychological stress for those in communities with limited or difficult access to water due to practical challenges of water insecurity (e.g., having to reuse water, not being able to cook fresh meals, exposure to water-related illness from use of accumulated water sources, thirst and dehydration), and a series of psychosocial concerns such as shame at 'appearing unclean to others', 'wearing soiled clothes' or at 'being unable to fulfil normative expectations of hospitality' (p.397). Stevenson et al. Stevenson et al. [82] later expanded their investigation to find that water insecurity significantly predicted

psychological distress, even when controlling for food insecurity, socio-economic status and the quality of the previous year's harvest. Other social science studies have explicitly linked WASH to emotional distress marked by feelings of shame, anxiety, fear, worry, frustration, anger and enhanced vulnerability (e.g., Refs. [85–87]. Each of these studies also emphasises a gender difference, where women and girls are likely to be affected to a greater extent by water-insecurity due to the responsibilities of their culturally based gender roles (e.g., cooking, cleaning, washing; carer) and their own unique needs (e.g., regarding increased privacy and menstruation; [88].

Further, the evidence base shows that emotional distress may be exacerbated by natural hazards that introduce additional WASH issues or worsen already difficult conditions of access or purity (e.g., Refs. [82, 89]. Worsened WASH conditions may contribute additional 'life stress', which has been empirically linked to a greater predisposition to develop PTSD, both before and after exposure to a traumatic event [90,91]. WASH scarcity has also been documented to engender interpersonal conflict in families and communities, including domestic violence and mistrust amongst neighbours (see Refs. [82,85,89]. Lack of social support is a major risk factor for developing post-traumatic stress disorder. Social support is especially important for protecting children [92,93], who are already especially vulnerable to developing post-traumatic stress symptoms following a disaster related to natural hazard events [94]. Schools may have the potential to moderate these effects by providing basic WASH provisions for children and families during times of need, such as safe drinking water, sanitary toilets and handwashing stations [95]. In addition to meeting the physical and social needs of their pupils and communities, schools with adequate WASH facilities should also have a sustained hygiene promotion programme to ensure holistic, long-term care which endures through all stages of disaster resilience, response and recovery phases [96].

While WASH is incorporated into some community-based DRR and preparedness frameworks (e.g., Build Back Better [BBB] [113], Comprehensive School Safety Framework [CSS] [116], these provisions are still overlooked in the disaster management discourse (e.g., Sendai framework). A review by Lee et al. [16] identifies a series of gaps associated with the health- and disaster-focused SDGs. As the UNDESA SDGs [68] serve as the foundation for a series of major DRM frameworks, such gaps are increasingly significant and need to be remedied. The notion of WASH being explicitly linked to psychosocial resilience in disaster preparedness contexts is a gap, which this paper argues has not been explicitly acknowledged in the DRR frameworks, but which is central to DRM and resilience to natural hazards. As schools are valuable resources in the promotion of community-wide resilience and are primary institutions mitigating the effects of disasters on their communities and pupils, we argue that the DRM frameworks should address links between WASH and psychosocial resilience for children.

3. Psychosocial interventions and WASH in existing DRM, resilience and safety frameworks

3.1. Disaster risk reduction and management frameworks overview

While WASH services and psychosocial wellbeing play an important role in disaster preparedness, resilience building and post-disaster recovery, both in general and within schools, they are not included in existing frameworks in the ASEAN region, particularly the ACFCSS. The omission of these domains jeopardises school-aged children's wellbeing regarding their physical safety and mental wellness. However, several international DRM and related frameworks offer insights into addressing this gap.

Table 1 outlines the major international DRR and DRM frameworks and highlights which include WASH access and psychosocial support. While some, such as BBB, do include them, they are either mentioned only briefly or are not considered in the disaster context explicitly. Even in the case of the United Nations' *2030 Agenda for Sustainable*

Table 1
Main disaster risk reduction and management frameworks.

Creators & Audience	Aims & Focus	Format	Psychosocial Support?	WASH Support?
Sendai Framework for Disaster Risk Reduction 2015–2030 (2015)				
Developed by: United Nations Office for DRR. Audience: Governments; Policymakers; International, regional and national DRM organisations; UN member states.	Successor of the *Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters* (2005). Aims to achieve a substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries. Adoption of measures which address the three dimensions of disaster risk (exposure to hazards, vulnerability and capacity, and hazard's characteristics).	Priorities for Action: 1 Understanding disaster risk. 2 Strengthening disaster risk governance to manage disaster risk. 3 Investing in disaster risk reduction for resilience. 4 Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.	☑ Yes, but only brief acknowledgement of psychosocial need. See, Priority 4: (33°) Enhance recovery schemes to provide psychosocial support and mental health services for all people in need. ☒ The terms 'mental health', and 'psychosocial' each appear only once; 'psychological' does not appear.	☑ Water (briefly). ☒ The term 'water' appears only once; the terms' sanitation' and 'hygiene' do not appear.
SPHERE Handbook for Humanitarian Response (2018 – Regularly Updated)				
Developed through an international collaboration of various humanitarian organisations. Audience: Governments; Policymakers; Military; International, regional and national DRM organisations; Practitioners involved in planning or implementing a humanitarian response; donors; private sector; survivors.	A universal guide for post-disaster and conflict contexts, disaster preparedness and resilience. Informs core humanitarian standards globally. Based on *The Humanitarian Charter*, 4 protection principles (e.g., Enhance safety, dignity, ensure access assistance, assist physical and psychological recovery, help people claim their rights) and the *Core Humanitarian Standard* (impartiality, humanity, independence, neutrality).	Sectors: 1 Water supply, Sanitation and Hygiene. 2 Food Security and Nutrition. 3 Shelter and Settlement. 4 Health.	☑ 1 Domain: Mental Health. See: Essential Concepts in Health, Mental Health. ☑ The terms 'mental health', 'psychosocial' and 'psychological' appear consistently throughout.	☑ 6 Domains: Hygiene Promotion, Water Supply, Excreta Management, Vector Control, Solid Waste Management, WASH in Disease Outbreak and Healthcare Settings. See: *Essential Concepts in Water Supply, Sanitation and Hygiene promotion* and *Essential Concepts in Heath.* ☑ The terms 'water', 'sanitation' and 'hygiene' appear consistently throughout.
Build Back Better (2018)				
Developed by: Global Facility for Disaster Reduction and Recovery (GFDRR). Audience: Governments; Policymakers; International DRM organisations; Practitioners involved in planning or implementing a humanitarian response; donors; private sector.	An *approach,* not framework. Follow-up to *Unbreakable* report [99] A steering principle, particularly for resilience-building and post-disaster recovery.	Dimensions: Build Back Stronger. Build Back Faster. Build Back More Inclusively.	☒ No, though it is included in the *Unbreakable* report. ☒ The terms 'mental health', 'psychological', 'psychosocial' do not appear.	☑ Yes (briefly). See: Resilient Recovery and Building Back Better. ☒ The terms 'water' and 'sanitation' each appear only thrice; 'Hygiene' does not appear.
Build Back Better in Recovery, Rehabilitation and Reconstruction (2017) [115]				
Developed by: United Nations International Strategy for Disaster Reduction (UNISDR) Audience: Governments; Policymakers; International DRM organisations; Practitioners involved in planning or implementing a humanitarian response; donors; private sector.	Supports Priority Four of the *Sendai Framework*: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.	Tasks from *Sendai Framework*: 4b.1 Develop an all-stakeholder, national-level disaster recovery framework. 4b.2 Enable pre-disaster recovery planning among all stakeholders. 4b.3 Formalise Processes and systems to enable effective assessment of post-disaster damages and needs … to formulate broad recovery strategies. 4b.4 Institute or strengthen policies, laws, and programs that promote, guide, support BBB … for [all stakeholders].	☑ Yes, but only brief acknowledgement of psychosocial need. See: Responsibilities and Resources. ☒ The terms 'mental health' and 'psychological' do not appear; 'psychosocial' appears only twice.	☑ Yes (briefly). See, Responsibilities and Resources. ☒ The term 'sanitation' appears only once; 'water' only thrice; 'Hygiene' does not appear.
Guide to Developing Disaster Recovery Frameworks (2015)				
Developed by: World Bank and GFDRR. Audience: Governments; Policymakers.	To enable a government to create a national disaster recovery framework. A practice-based guide offering options that can be adapted to an individual country's conditions.	6 Modules: 1 Conducting Post-Disaster Damage and Needs Assessment. 2 Policy and Strategy Setting for Recovery. 3 Institutional Framework for Recovery. 4 Financing for Recovery.	☒ No. ☒ The terms 'mental health', 'psychological', and 'psychosocial' do not appear.	☑ Yes. ☑ The terms 'water', 'sanitation', and 'hygiene' appear throughout.

Table 1 (*continued*)

Creators & Audience	Aims & Focus	Format	Psychosocial Support?	WASH Support?
		5 Implementation Arrangements and Recovery Management. 6 Strengthening Recovery Systems in National and Local Governments.		
2030 Agenda for Sustainable Development – Sustainable Development Goals (2015)				
Developed by: United Nations Department of Economic and Social Affairs (UNDESA) and UN member states. Audience: All stakeholders working towards global, sustainable development.	Supported by the Division for Sustainable Development Goals. Provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. Non-disaster specific.	17 Sustainable Development Goals (with 168 Targets): 1 No Poverty. 2 Zero Hunger. 3 Good Health and Wellbeing. 4 Quality Education. 5 Gender Equality. 6 Clean Water and Sanitation. 7 Affordable and Clean Energy. 8 Decent Work and Economic Growth. 9 Industry, Innovation and Infrastructure. 10 Reduced Inequalities. 11 Sustainable Cities and Communities. 12 Responsible Consumption and Production. 13 Climate Action. 14 Life Below Water 15 Life on Land. 16 Peace, Justice and Strong Institutions. 17 Partnerships for the Goals	☑ Yes, but non-disaster specific. See (e.g.) SDG 3. ☒ The term 'mental health' appears only twice; 'psychological', and 'psychosocial' do not appear.	☑ Yes, but non-disaster specific. See (e.g.) SDG 6. ☑ The terms 'water' and 'sanitation' appear throughout. ☒ The term 'hygiene' appears only twice.

Development (2015), which serves as the universal 'plan of action for people, planet and prosperity' (p. 5) and consistently re-affirms its aim of promoting disaster risk reduction, the connection between WASH practices and psychosocial wellbeing is not acknowledged, and psychosocial dimensions are not considered in depth.

Considering the ASEAN region specifically, a series of frameworks have been developed over time (see Fig. 1). The AADMER's objective was to support the existing and planned hazard-response initiatives by ASEAN Member States (i.e., Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam; [14]. AADMER (2009) [111] and ASEAN Vision 2025 [97] played critical roles in the region's approach to DRM, but there is no mention of WASH or psychosocial support or interventions in the three strategic pillars that drive the response efforts through the frameworks. These gaps remain prevalent in the AADMER-WP (2016), which informed the ASEAN-UN JSPADM III [98]. Thus, the guidance for DRR and DRM in the ASEAN region does not explicitly include WASH or psychosocial considerations. Instead, the focus is on making the ASEAN a leader in the Worldwide Initiative for Safe Schools (WISS; 2015)[116,117] by following the guidelines outlined in the ACFCSS framework.
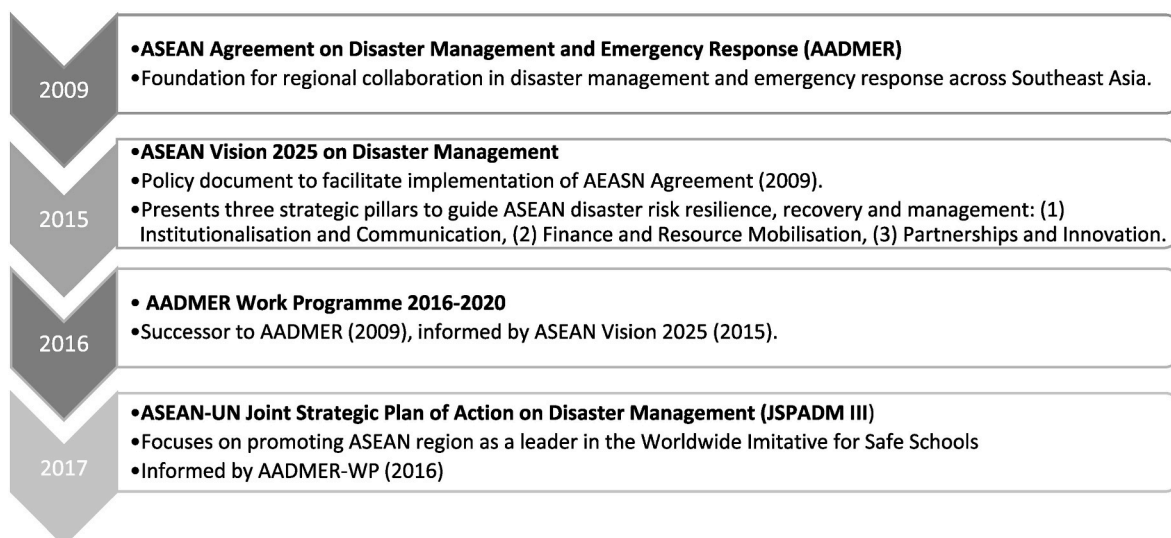

Fig. 1. Successive ASEAN disaster management frameworks for Southeast Asia.

3.2. Disaster risk reduction and management frameworks for education and school safety

Lack of identification of hazards and mitigation of risks in these institutions can lead to prolonged challenges in bringing children back to school post-disaster and recovering their full operation within the community; such outcomes can have detrimental, long-term effects on children's development [99]. Several additional frameworks and initiatives help facilitate DRM in schools. The most widely used frameworks for the education sector in emergencies, disasters and recovery, are the INEE MS [13]; CSS (2017) developed in support of the Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector (GADRRRES), and the WISS (2015) developed by GADRRRES and UNISDR. Table 2 presents a summary of the frameworks.

The CSS explicitly outlines schools' responsibilities concerning water and sanitation and provides some guidance for supporting the

Table 2
Main Disaster Risk Reduction and Management Frameworks Pertaining to Schools.

Creators & Audience	Aims & Focus	Format	Psychosocial Support?	WASH Support?
INEE Minimum Standards for Education: Preparedness Response and Recovery (2012)				
Developed by: Developed by: Inter-Agency Network for Education in Emergencies (INEE), Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector (GADRRRES), and UNISDR Audience: Governments; Policymakers; Education Institutions; Practitioners; NGOs.	Foundational tool used by the Global Education Cluster, which is co-led by UNICEF and Save the Children. Ensures quality education response. Ensures populations affected by disaster or conflict have the right to life with dignity and to safe, quality and relevant education. Recognises the capacity of schools to support their pupils and communities beyond their function as educational institutions (e.g., spaces for social engagement, participating in society, shelter). Advocates for the promotion of schools as community centres, arguing that schools symbolise hope.	5 Domains: 1. Foundational Standards 2. Access and Learning Environment 3. Teaching and Learning 4. Teachers and Other Educational Personnel 5. Education Policy Domains consist of various standards; Total of 19 standards, each with accompanying key actions and guidance notes.	☑ Yes. See (e.g.), Access and Learning Environment domain. ☑ The terms 'mental health', and 'psychological' appear only twice but 'psychosocial' appears throughout.	☑ Yes. See (e.g.) Access and Learning Environment domain. ☑ The terms 'water', 'sanitation', and 'hygiene' appear throughout.
Worldwide Initiative for Safer Schools (2015)				
Developed By: GADRRES and UNISDR Global government-led partnership.	To secure political commitment and facilitation or fostering of Safe Schools implementation around the globe. Provides technical assistance for governments interested in implementing the *Comprehensive School Safety* (CSS) framework (2017). Support Governments in developing national strategies for school safety as part of existing national disaster risk reduction or education plans.	Supports the CSS (2017) which consists of three components: 1. Safe Learning Facilities (disaster-resilient infrastructure). 2. School Disaster Management. 3. Disaster Risk Reduction and Resilience Education. Promotes 'Safe School Leaders' expected to make safe schools a priority as part of their national planning and education agenda.	☒ Not explicitly; by proxy through the CSS. ☒ WISS is communicated over a series of webpages and documents. Concerning the development document: the terms 'mental health', 'psychological' and 'psychosocial' do not appear.	☒ Not explicitly; by proxy through the CSS. ☒ Concerning the development document: the terms 'water', 'sanitation', and 'hygiene' do not appear.
Global Program for Safer Schools (2014)				
Developed by GFDRR. Audience: Governments; Policymakers; Ministries of Education.	To boost and facilitate informed, large-scale investments for the safety and resilience of new and existing school infrastructure at risk from natural hazards, contributing to high-quality learning environments. Complimentary to the CSS.	Roadmap for Safer and Resilient Schools (RSRS) supports the design of intervention strategies and investment plans to make schools safer and resilient at scale.	☑ Yes. RSRS explicitly notes hazards alter children's social and emotional wellbeing. ☒ However, the terms 'mental health', 'psychological' and 'psychosocial' do not appear.	☑ Yes. RSRS explicitly states that water and sanitation are safety concerns. ☒ However, the terms 'water' and 'sanitation' appear only twice; 'Hygiene' does not appear.
Comprehensive School Safety Framework (2017)				
Developed by GADRRRES and UNISDR. Audience: Governments; Policymakers; Ministries of Education; DRM and DRR Agencies.	To develop a strategic framework and guiding tools to support governments, education and DRR practitioners in integrating DRR as part of school curricula. To develop educational safety initiatives at the national and local levels.	3 Pillars: P1. Safe Learning Facilities. P2. School Disaster Management. P3. Risk Reduction and Resilience Education.	☑ Yes, but not explicitly; e.g., CSS provides some guidance for developing 'social cohesion' and building a 'culture of peace'. ☒ However, the terms 'mental health', 'psychological' and 'psychosocial' do not appear.	☑ Yes. Pillar 1 explicitly adopts SDG 6 (Clean Water and Sanitation). ☑ The terms 'water', 'sanitation' and 'hygiene' appear throughout.
ASEAN Common Framework for Comprehensive Schools Safety (2016)				
Developed by: GADRRRES specifically for the Southeast Asian context. Audience: Governments; Policymakers; Ministries of Education; National DRM and DRR Agencies.	To enhance school safety against the adverse impacts of natural and man-made hazards for the ASEAN nations. Intended to adapt the CSS (2013) for implementation in the ASEAN region.	Same pillars as CSS.	☒ No. ☒ The terms 'mental health' and 'psychosocial' appear once; 'Psychological' does not appear.	☒ No. ☒ The terms 'sanitation', and 'hygiene' appear only thrice; 'Water' does not appear.

psychosocial wellbeing of children by 'developing social cohesion, and a culture of safety and resilience' (p.5). While the CSS explicitly considers WASH, it only briefly considers psychosocial support. The ACFCSS is intended to be a comprehensive adaptation of the CSS fit for implementation in ASEAN schools. Yet, it does not itself sufficiently consider psychosocial or WASH support, or explicitly link back to the CSS for these matters (e.g., as the WISS does concerning both psychosocial and WASH domains). Given that psychosocial and WASH support is missing in the region-specific version of the CSS, the ACFCSS framework cannot be considered comprehensive. Given our focus on ASEAN region schools this paper will focus on adapting the ACFCSS framework to make it more comprehensive.

The ACFCSS commits to periodic review every three to five years; this paper argues revisions should prioritise the (re)inclusion and discussion of psychosocial and WASH support. In addition, none of the CSS-related frameworks (i.e., CSS, ACFCSS, WISS, GPSS) consider the role of schools beyond their capacity as educational institutions, though the INEE MS does. This paper argues revision of the ACFCSS should improve the current CSS framework by addressing this limitation and considering the role of schools beyond their capacity as educational institutions (e. g., as community centres). In consideration of the previously reviewed frameworks, this paper subsequently presents a fourth pillar that can be implemented into the ACFCSS. This fourth pillar combines psychosocial wellbeing and WASH in education to benefit school settings; both of these elements are integral to ensuring safe and resilient schools, and a positive learning environment for children, which promotes wellbeing.

4. Building wash and psychosocial support into the ACFCSS with a fourth pillar

To adapt the ACFCSS into a comprehensive framework, we first highlight the need to reintegrate all original CSS components. This includes advocacy for sustainable WASH provisions. This can be implemented through green school practices and community engagement in construction (see also, [100,101]). As the CSS only briefly considers psychosocial wellbeing, we argue the ACFCSS further develop its considerations for this domain explicitly. GPSS [102] explicitly considers psychosocial risk and need in DRM contexts, despite also being developed from the CSS. This supports the notion that incorporating psychosocial elements is essential; doing so in a new edition of the ACFCSS would help fill in the current gap.

The CSS aims to achieve 'Learning Without Fear' and 'Schools as Zones of Peace'; the ACFCSS should retain these aims as they are well documented to support psychosocial wellbeing. For example, fear-free and peaceful environments are indispensable in protecting children and youth (e.g., see [35,103–105]), and are also beneficial to teachers who are also exposed to the potentially traumatic hazards themselves (see Ref. [34]. 'Schools as zones of peace' may provide an invaluable 'buffering effect' [106] of trauma-related stress symptoms, as these institutions facilitate social support by providing their community members a space to engage and interact informally. Beyond their capacity as educational institutions, schools can be enriching and restorative public spaces that present opportunities for informal learning, employability
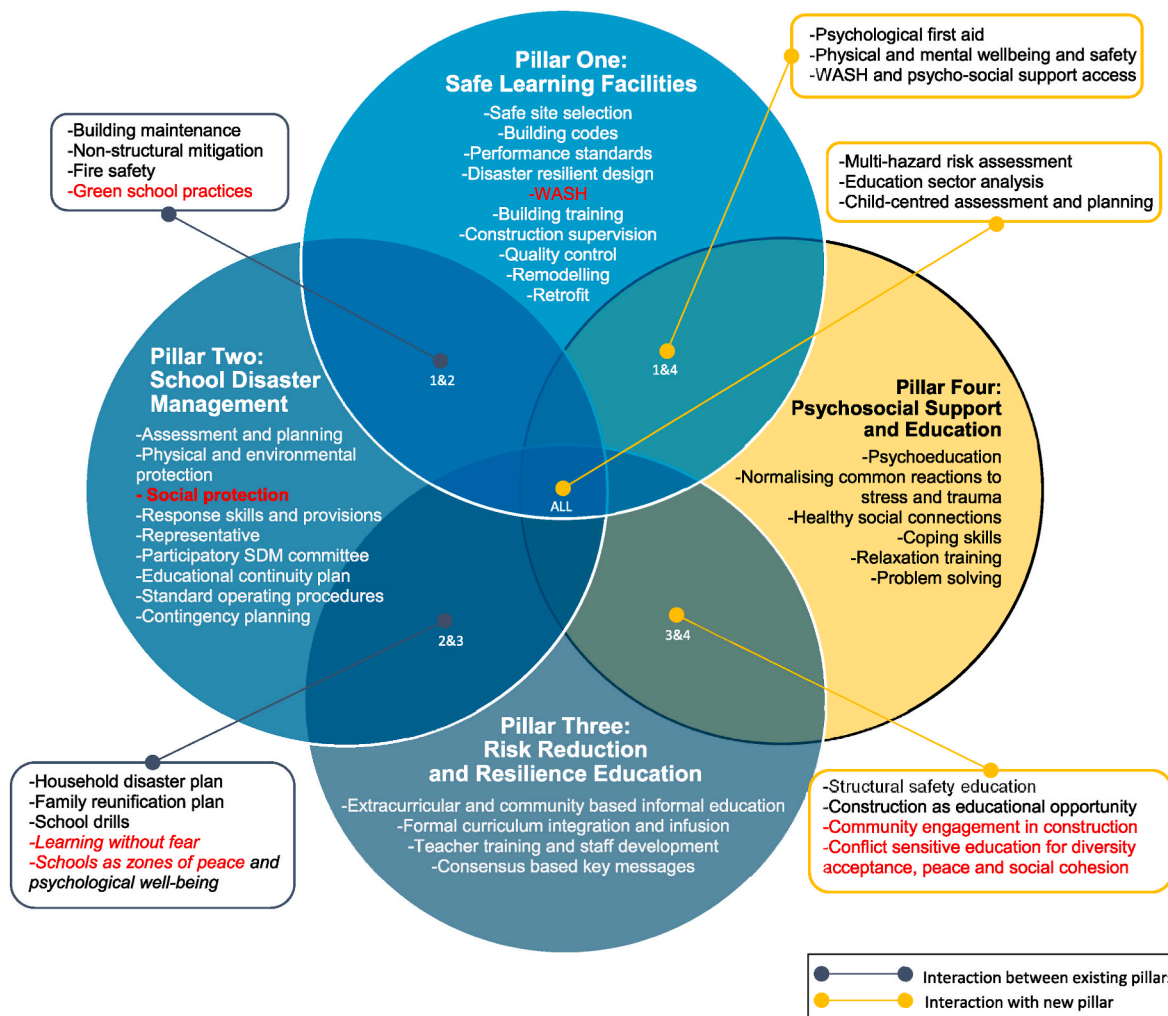

Fig. 2. Adapted ACFCSS with the proposed pillar 4 to integrate WASH and psychosocial support.

and contribute to shaping the collective identities of their communities [107,108]. Building on the existing evidence, we propose that a fourth pillar be added to the ACFCSS to explicitly integrate psychosocial wellbeing. Fig. 2 illustrates a revised ACFCSS framework which integrates these recommendations; red text indicates guidance that appears in the CSS but not in the ACFCSS, which we propose should be reincluded in the ACFCSS.

We further recommend that the ACFCSS consider the implementation of all of its Pillars throughout the DRM cycle (see Fig. 3). Employing and upholding DRM practices at all stages would contribute to the capacity of this framework in serving ASEAN school communities from an interdisciplinary and evidence-based foundation. For example, the pre-disaster Phase 1 is an ideal period when school-based interventions can work to improve WASH awareness, services and use, such as through education-based behaviour change campaigns about best WASH practices. This period should also include a focus on improving the psychological resilience of children and communities by promoting access to psychological support services and education-based programs, which better prepare school communities for overcoming the psychological impact of natural hazards (see also recommendations from Refs. [109,110]. We emphasise that efforts at every stage should also be shaped by what is learned following new hazard events, making the process iterative. Since the ACFCSS informs school practice, we highlight that revisions are urgent given that children are made vulnerable by the omission of WASH and psychosocial support considerations in this framework.

5. Towards an integrated approach to DRM and resilience-building through schools

This paper has reviewed how major frameworks for DRM and resilience-building consider psychosocial support and WASH, including in the *Sendai Framework*, the *Hyogo Framework*, the *Sphere Handbook*, AADMER and JSPADM III. We emphasise that children are especially vulnerable where their psychosocial and WASH needs are concerned and we have therefore also reviewed the major education and school-specific frameworks, such as INEE MS, CSS, WISS, ACFCSS. This review has revealed that these frameworks do not provide adequate consideration of psychosocial and WASH provisions, though some acknowledge these provisions are central to DRM and resilience-building. As the focus of these frameworks primarily concerns 'safety' and the role of schools in providing safe spaces for their pupils and surrounding communities, we argue that the notion of 'safety' should encompass both psychosocial and physical aspects. Since WASH is directly linked to psychological wellbeing because of the unique role of these provisions in the everyday lives of individuals, both WASH and psychosocial wellbeing must feature prominently in DRM. Considering that schools inherently provide a gateway to support children and their communities, the vast omission of psychosocial support in school-based disaster risk management frameworks is a severe limitation. Comprehensive frameworks should include strategic plans for providing adequate and timely psychosocial support, especially for children.

6. Conclusion

This paper has sought to build on and address gaps in the ACFCSS, which guides disaster risk management efforts in ASEAN schools and serves as an example of how the CSS may be adapted for use in schools globally. We have pointed to the potential advantages of these changes to ACFCSS for fostering resilience in children and their communities. Our intent is not to disregard the vital efforts of the ACFCSS, but support future dialogue and suggest amendments to make DRM frameworks interdisciplinary. DRM and resilience building for children involves complex challenges; addressing these challenges requires a holistic approach which integrates both the physical infrastructure and psychosocial interventions. In the case of the ACFCSS, the key suggested
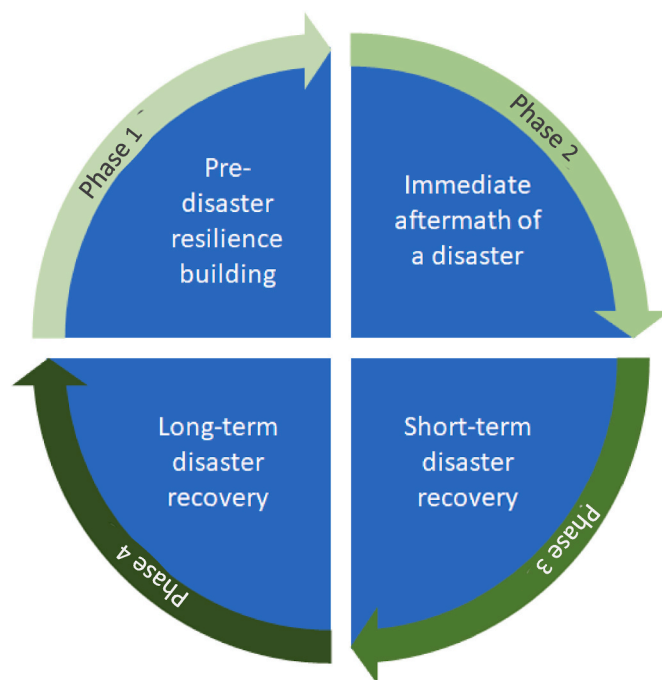

Fig. 3. Four phases of disaster risk management: A guide for ACFCSS implementation.

revisions are to add a fourth pillar that addresses the psychosocial needs of pupils, children and communities, and to integrate WASH into Pillar 1, as it appears in the CSS framework but not in the ACFCSS. We have demonstrated that DRM frameworks lack emphasis on psychosocial wellbeing and WASH and argued that these two domains are linked: access to adequate WASH provision may protect psychosocial wellbeing and promote community resilience. Schools are uniquely situated to support both the psychosocial and WASH needs of children; beyond their capacity as educational institutions, schools can act as community centres, which provide residents with a physical and social space to connect and interact, thereby providing informal social support and building a sense of togetherness. Our guidance would allow the ACFCSS to be brought into better alignment with the major international disaster risk recovery and management frameworks. A holistic framework would allow schools to become potential hubs for resilience building in preparedness and recovery phases. This would support resilient recovery and delivery of the UN Sustainable Development Goals by improving physical and psychosocial wellbeing of children. Though we have focused on the ASEAN region and the ACFCSS, this paper can inform efforts to improve DRR and DRM frameworks globally. For example, as the global consultation process for the newest iteration of the global CSS Framework (2021–2030) is currently underway, researchers and practitioners involved in implementation are encouraged to apply the insights highlighted in this paper in evaluating and maximising the comprehensiveness of these DRM frameworks - especially in region-specific adaptations and adaptations that exist to safeguard vulnerable populations. Other regional and global frameworks should draw on the provided insights to address underlying deficiencies, lest they become the foundation for any future adaptations.

Declaration of competing interest

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

Acknowledgements

References

[1] M.L. Belfer, Caring for children and adolescents in the aftermath of natural disasters, Int. Rev. Psychiatr. 18 (6) (2006) 523–528, https://doi.org/10.1080/09540260601048877.

[2] N. Kar, Psychological impact of disasters on children: review of assessment and interventions, World J. Perdiatr. 5 (1) (2009) 5–11, https://doi.org/10.1007/s12519-009-0001-x.

[3] S.J. Thadathil, B. Joseph, Psychological impact of massive natural disaster on school students–A significant but unseen aspect of school management in post disaster scenario–A study from rural Nepa, J. Manag. 6 (2) (2019) 121–129.

[4] F.H. Norris, M.J. Friedman, P.J. Watson, 60,000 disaster victims speak: Part II. Summary and implications of the disaster mental health research, Psychiatr. Interpers. Biol. Process. 65 (3) (2002) 240–260, https://doi.org/10.1521/psyc.65.3.240.20169.

[5] United Nations Children's Fund [UNICEF], UNICEF and disaster risk reduction, n. d. https://www.unicef.org/files/DDR_final.pdf.

[6] A. Fothergill, L. Peek, Surviving Catastrophe: A Study of Children in Hurricane Katrina, Learning from catastrophe: Quick response research in the wake of Hurricane Katrina, 2006, pp. 97–129.

[7] M. Mooney, R. Tarrant, D. Paton, D. Johnston, S. Johal, The school community contributes to how children cope effectively with a disaster, Pastor. Care Educ. (2020) 1–24, https://doi.org/10.1080/02643944.2020.1774632.

[8] C. Mutch, The role of schools in helping communities cope with earthquake disasters: the case of the 2010–2011 New Zealand earthquakes, Environ. Hazards 17 (4) (2018) 331–351, https://doi.org/10.1080/17477891.2018.1485547.

[9] J.M. Nigg, Disaster Recovery as a Social Process. Wellington after the Quake: the Challenge of Rebuilding Cities, 1995, p. 81 (Report).

[10] D. Rathfon, Measuring Long-Term Post-disaster Community Recovery, University of Delaware, 2010. Doctoral dissertation.

[11] K.F. Gotham, B. Powers, Building resilience: social capital in post-disaster recovery, Contemp. Sociol. 44 (1) (2015) 30–31, https://doi.org/10.1177/0094306114562201a.

[12] Intergovernmental Panel on Climate Change [IPCC], Annex II, in: R.K. Pachauri, A. Reisinger (Eds.), Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II, and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, IPCC, Geneva, Switzerland, 2008, p. 86. https://www.ipcc.ch/site/assets/uploads/2018/02/ar4_syr_full_report.pdf.

[13] Inter-agency Network for Education in Emergencies [INEE], Minimum Standards for education: preparedness, response, recovery. https://inee.org/system/files/resources/INEE_Minimum_Standards_Handbook_2010%28HSP%29_EN.pdf, 2012.

[14] Association of Southeast Asian Nations [ASEAN], ASEAN member states, n.d. https://asean.org/asean/asean-member-states/.

[15] H. Khankeh, J. Roudini, Natural disasters - mental health impacts, in: J. Nriagu (Ed.), Encyclopedia of Environmental Health, second ed., Elsevier, 2019, pp. 574–576, https://doi.org/10.1016/B978-0-12-409548-9.11533-7.

[16] J. Lee, D. Perera, T. Glickman, L. Taing, Water-related disasters and their health impacts: a global review, Progress Disaster Sci. (2020) 100123, https://doi.org/10.1016/j.pdisas.2020.100123.

[17] J. Roudini, H.R. Khankeh, E. Witruk, Disaster mental health preparedness in the community: a systematic review study, Health Psychol. Open 4 (1) (2017), https://doi.org/10.1177/2055102917711307.

[18] World Health Organization [WHO], Risk Reduction and Emergency Preparedness: WHO Six-Year Strategy for the Health Sector and Community Capacity Development, World Health Organization, Geneva, 2007. https://apps.who.int/iris/bitstream/handle/10665/43736/9789241595896_eng.pdf.

[19] C. Solberg, T. Rossetto, H. Joffe, The social psychology of seismic hazard adjustment: re-evaluating the international literature, Nat. Hazards Earth Syst. Sci. 10 (8) (2010) 1663–1677. https://discovery.ucl.ac.uk/142673/1/nhess-10-1663-2010.pdf.

[20] A.M. La Greca, W.K. Silverman, Treatment and prevention of posttraumatic stress reactions in children and adolescents exposed to disasters and terrorism: what is the evidence? Child Develop. Perspect. 3 (1) (2009) 4–10, https://doi.org/10.1111/j.1750-8606.2008.00069.x.

[21] A.S. Masten, A.J. Narayan, Child development in the context of disaster, war, and terrorism: pathways of risk and resilience, Annu. Rev. Psychol. 63 (2012) 227–257, https://doi.org/10.1146/annurev-psych-120710-100356.

[22] C.F. Weems, L.K. Taylor, M.F. Cannon, R.C. Marino, D.M. Romano, B.G. Scott, V. Triplett, Post traumatic stress, context, and the lingering effects of the Hurricane Katrina disaster among ethnic minority youth, J. Abnorm. Child Psychol. 38 (1) (2010) 49–56, https://doi.org/10.1007/s10802-009-9352-y.

[23] T. Sim, J. Garai, Natural disaster: from individual-focused to community-based psychosocial work, Mental Health and Social Work (2020) 375–393.

[24] R. Murphy, M. Pelling, H. Adams, S. Di Vicenz, E. Visman, Survivor-Led Response: local recommendations to operationalise building back better, Int. J. Disaster Risk Reduction 31 (2018) 135–142, https://doi.org/10.1016/j.ijdrr.2018.04.009.

[25] A. Danese, P. Smith, P. Chitsabesan, B. Dubicka, Child and adolescent mental health amidst emergencies and disasters, Br. J. Psychiatr. 216 (3) (2020) 159–162, https://doi.org/10.1192/bjp.2019.244.

[26] D. Parkinson, C. Zara, The hidden disaster: domestic violence in the aftermath of natural disaster, Aust. J. Emerg. Manag. 28 (2) (2013) 28–35.

[27] R.C. Brown, A. Witt, J.M. Fegert, F. Keller, M. Rassenhofer, P.L. Plener, Psychosocial interventions for children and adolescents after man-made and natural disasters: a meta-analysis and systematic review, Psychol. Med. 47 (11) (2017) 1893–1905, https://doi.org/10.1017/S0033291717000496.

[28] E. Newman, B. Pfefferbaum, N. Kirlic, R. Tett, S. Nelson, B. Liles, Meta-analytic review of psychological interventions for children survivors of natural and man-made disasters, Curr. Psychiatr. Rep. 16 (9) (2014) 462, https://doi.org/10.1007/s11920-014-0462-z.

[29] C.M. Chemtob, J.P. Nakashima, R.S. Hamada, Psychosocial intervention for postdisaster trauma symptoms in elementary school children: a controlled community field study, Arch. Pediatr. Adolesc. Med. 156 (3) (2002) 211–216.

[30] M. Fazel, H.J. Stratford, E. Rowsell, C. Chan, H. Griffiths, K. Robjant, Five applications of narrative exposure therapy for children and adolescents presenting with post-traumatic stress disorders, Front. Psychiatr. 11 (2020) 19, https://doi.org/10.3389/fpsyt.2020.00019.

[31] S.B. Math, S. Tandon, S.C. Girimaji, V. Benegal, U. Kumar, A. Hamza, K. Jangam, D. Nagaraja, Psychological impact of the tsunami on children and adolescents from the Andaman and Nicobar, Prim. Care Companion J. Clin. Psychiatry 10 (1) (2008) 31–37, https://doi.org/10.4088/pcc.v10n0106.

[32] J. Sundquist, K. Palmér, A.A. Memon, X. Wang, L.M. Johansson, K. Sundquist, Long-term improvements after mindfulness-based group therapy of depression, anxiety and stress and adjustment disorders: a randomised controlled trial, Early intervention in psychiatry 13 (4) (2019) 943–952, https://doi.org/10.1111/eip.12715.

[33] A.S. Bratt, M. Rusner, I. Svensson, An exploration of group-based compassion-focused therapy for adolescents and their parents, Scandinavian J. Child Adolescent Psychiatry Psychol. 8 (2020) 38–47.

[34] K. Baird, A.C. Kracen, Vicarious traumatisation and secondary traumatic stress: a research synthesis, Counsell. Psychol. Q. 19 (2) (2006) 181–188, https://doi.org/10.1080/09515070600811899.

[35] S.R. Jenkins, S. Baird, Secondary traumatic stress and vicarious trauma: a validational study, J. Trauma Stress: Off. Pub. Int. Soc. Traumatic Stress Studies 15 (5) (2002) 423–432, https://doi.org/10.1023/A:1020193526843.

[36] D.C. Ray, S.C. Bratton, What the Research Shows about Play Therapy: Twenty-First Century Update. Child-Centered Play Therapy Research: the Evidence Base for Effective Practice, 2010, pp. 3–33.

[37] K. Lund, E. Argentzell, C. Leufstadius, C. Tjörnstrand, M. Eklund, Joining, belonging, and re-valuing: a process of meaning-making through group participation in a mental health lifestyle intervention, Scand. J. Occup. Ther. 26 (1) (2019) 55–68, https://doi.org/10.1080/11038128.2017.1409266.

[38] D. Gillies, L. Maiocchi, A.P. Bhandari, F. Taylor, C. Gray, L. O'Brien, Psychological therapies for children and adolescents exposed to trauma, Cochrane Database Syst. Rev. (10) (2016), https://doi.org/10.1002/14651858.CD012371.

[39] M.S. Scheeringa, C.H. Zeanah, M.J. Drell, J.A. Larrieu, Two approaches to the diagnosis of post-traumatic stress disorder in infancy and early childhood, J. Am. Acad. Child Adolesc. Psychiatr. 34 (2) (1995) 191–200, https://doi.org/10.1097/00004583-199502000-00014.

[40] P. Barnard, J. Nagy, I. Morland, Children, Bereavement and Trauma: Nurturing Resilience, Jessica Kingsley Publishers, 1999.

[41] G.S. Goodman, J.A. Quas, Trauma and memory: individual differences in children's recounting of a stressful experience, Memory for everyday and emotional events (1997) 267–294, https://doi.org/10.1016/S1041-6080(97)90014-5.

[42] H.G. Casto, Just one more thing I have to do": school-community partnerships, Sch. Community J. 26 (1) (2016) 139–162.

[43] J.L. Epstein, M.G. Sanders, Connecting home, school, and community, in: Handbook of the Sociology of Education, Springer, Boston, MA, 2000, pp. 285–306.

[44] R.S. Oktari, K. Shiwaku, K. Munadi, R. Shaw, Enhancing community resilience towards disaster: the contributing factors of school-community collaborative network in the tsunami affected area in Aceh, Int. J. Disaster Risk Reduction 29 (2018) 3–12, https://doi.org/10.1016/j.ijdrr.2017.07.009.

[45] R.S. Oktari, K. Shiwaku, K. Munadi, R. Shaw, A conceptual model of a school–community collaborative network in enhancing coastal community resilience in Banda Aceh, Indonesia, Int. J. Disaster Risk Reduction 12 (2015) 300–310, https://doi.org/10.1016/j.ijdrr.2015.02.006.

[46] C. Wiest-Stevenson, C. Lee, Trauma-informed schools, J. Evidence Inform. Social Work 13 (5) (2016) 498–503, https://doi.org/10.1080/23761407.2016.1166855.

[47] R. Gentile, C. Galasso, Y. Idris, I. Rusydy, E. Meilianda, From rapid visual survey to multi-hazard risk prioritisation and numerical fragility of school buildings, Nat. Hazards Earth Syst. Sci. 19 (7) (2019) 1365–1386, https://doi.org/10.5194/nhess-19-1365-2019.

[48] D. D'Ayala, C. Galasso, A. Nassirpour, R.K. Adhikari, L. Yamin, R. Fernandez, A. Oreta, Resilient communities through safer schools, Int. J. Disaster Risk Reduction 45 (2020) 101446, https://doi.org/10.1016/j.ijdrr.2019.101446.

[49] A.R. Elangovan, S. Kasi, Psychosocial disaster preparedness for school children by teachers, Int. J. Disaster Risk Reduction 12 (2015) 119–124, https://doi.org/10.1016/j.ijdrr.2014.12.007.

[50] S. Bresee, B.A. Caruso, J. Sales, J. Lupele, M.C. Freeman, A child is also a teacher': exploring the potential for children as change agents in the context of a school-based WASH intervention in rural Eastern Zambia, Health Educ. Res. 31 (4) (2016) 521–534, https://doi.org/10.1093/her/cyw022.

[51] K. Kar, R. Chambers, Handbook on community-led total sanitation. https://www.communityledtotalsanitation.org/sites/communityledtotalsanitation.org/files/cltshandbook.pdf, 2008.

[52] R. Henley, Helping children overcome disaster trauma through post-emergency psychosocial sports programs, in: Swiss Academy for Development Working Paper. International Platform on Sport and Development, 2005. https://resourcecentre.savethechildren.net/sites/default/files/documents/1681.pdf.

[53] L. Bergholz, E. Stafford, W. D'Andrea, Creating trauma-informed sports programming for traumatised youth: core principles for an adjunctive therapeutic approach, J. Infant Child Adolesc. Psychother. 15 (3) (2016) 244–253, https://doi.org/10.1080/15289168.2016.1211836.

[54] P. Goodyear-Brown, Trauma and Play Therapy: Helping Children Heal, Routledge, 2019.

[55] R.S. Cox, L. Scannell, C. Heykoop, J. Tobin-Gurley, L. Peek, Understanding youth disaster recovery: the vital role of people, places, and activities, Int. J. Disaster Risk Reduction 22 (2017) 249–256, https://doi.org/10.1016/j.ijdrr.2017.03.011.

[56] V.A. Johnson, K.R. Ronan, D.M. Johnston, R. Peace, Evaluations of disaster education programs for children: a methodological review, Int. J. Disaster Risk Reduction 9 (2014) 107–123, https://doi.org/10.1016/j.ijdrr.2014.04.001.

[57] H. Kawasaki, S. Yamasaki, M.M. Rahman, Y. Murata, M. Iwasa, C. Teramoto, Teachers-parents cooperation in disaster preparation when schools become as evacuation centers, Int. J. Disaster Risk Reduction 44 (2020) 101445, https://doi.org/10.1016/j.ijdrr.2019.101445.

[58] A. Sakurai, M.B.F. Bisri, T. Oda, R.S. Oktari, Y. Murayama, M. Affan, Exploring minimum essentials for sustainable school disaster preparedness: a case of elementary schools in Banda Aceh City, Indonesia, Int. J. Disaster Risk Reduction 29 (2018) 73–83, https://doi.org/10.1016/j.ijdrr.2018.08.005.

[59] F. Yasmin, Psychosocial interventional training manual. Save the children UK. https://resourcecentre.savethechildren.net/sites/default/files/documents/2367.pdf, 2010.

[60] L. Acharya, K.D. Upadhya, F. Kortmann, Mental health and psychosocial support aspects in disaster preparedness: Nepal, Int. Rev. Psychiatr. 18 (6) (2006) 587–592, https://doi.org/10.1080/09540260601038407.

[61] S.A.A. Hirani, Vulnerability of internally displaced children in disaster relief camps of Pakistan: issues, challenges, and way forward, Early Child. Dev. Care 184 (9–10) (2014) 1499–1506, https://doi.org/10.1080/03004430.2014.901012.

[62] Inter-Agency Standing Committee, IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings, IASC, Geneva, Switzerland, 2006, 2006, https://www.who.int/mental_health/emergencies/guidelines_iasc_mental_health_psychosocial_june_2007.pdf.

[63] Sphere, Minimum Standards in Humanitarian Response, The Sphere Handbook, 2018. https://spherestandards.org/wp-content/uploads/Sphere-Handbook-2018-EN.pdf.

[64] S. Woolf, J. Twigg, P. Parikh, A. Karaoglou, T. Cheaib, Towards measurable resilience: a novel framework tool for the assessment of resilience levels in slums, Int. J. Disaster Risk Reduction 19 (2016) 280–302, https://doi.org/10.1007/s10802-009-9352-y.

[65] World Health Organization [WHO], Fact sheet: drinking-water. https://www.who.int/news-room/fact-sheets/detail/drinking-water, 14 June 2019.

[66] United Nations Office for Disaster Risk Reduction [UNDRR], Sendai framework for disaster risk reduction 2015-2030. https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf, 2015.

[67] United Nations Development Programme [UNDP], GFDRR, European Union [EU], & World Bank, Disaster recovery framework guide: revised version March 2020. https://reliefweb.int/sites/reliefweb.int/files/resources/DRF%20Guide.pdf, 2020.

[68] United Nations Department of Economic and Social Affairs [UNDESA], Transforming our world: the 2030 agenda for sustainable development. https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf, 2015.

[69] United Nations [UN], Sustainable development goals report 2020. https://unstats.un.org/sdgs/report/2020/The-Sustainable-Development-Goals-Report-2020.pdf, 2020.

[70] United Nations Children's Fund [UNICEF], Ending preventable child deaths: how Britain can lead the way. https://downloads.unicef.org.uk/wp-content/uploads/2020/01/Unicef-UK-Ending-Preventable-Child-Deaths_Report-2020.pdf, January 2020.

[71] S. Krishnan, Water, sanitation and hygiene (WASH) and disaster recovery for community resilience: a mixed methods study from Odisha, India, Int. J. Disaster Risk Reduction 35 (2019) 1, https://doi.org/10.1016/j.ijdrr.2018.12.023.

[72] D. Mara, J. Lane, B. Scott, D. Trouba, Sanitation and health, PLoS Med. 7 (11) (2010), e1000363, https://doi.org/10.1371/journal.pmed.1000363.

[73] E.M. Wanda, M. Manda, J. Kushe, O. Msiska, C. Mphande, D. Kamlomo, J. Kaunda, Using citizen science approach to monitor water, sanitation and hygiene related risks in Karonga town, Malawi, Afr. J. Environ. Sci. Technol. 11 (6) (2017) 304–323, https://doi.org/10.5897/AJEST2017.2308.

[74] Association of Southeast Asian Nations [ASEAN], AADMER work programme 2016-2020. https://www.asean.org/wp-content/uploads/2016/02/AADMER-Work-Programme-2016-2020-v1.6.pdf, 2016.

[75] Association of Southeast Asian Nations [ASEAN], ASEAN public toilet standard. https://www.asean.org/wp-content/uploads/2012/05/ASEAN-Public-Toilet-Standard.pdf, 2016.

[76] T. Rheinländer, F. Konradsen, B. Keraita, P. Apoya, M. Gyapong, Redefining shared sanitation, Bull. World Health Organ. 93 (2015) 509–510, https://doi.org/10.2471/BLT.14.149980.

[77] S. Krishnan, J. Twigg, C. Johnson, Building community resilience through water, sanitation, and hygiene programmes during post-disaster recovery, in: G. Lizarralde, J.D. Barenstein, G. Cardosi, A. Oliver (Eds.), 2013 International I-Rec Conference Proceedings: Sustainable Post-Disaster Reconstruction: from Recovery to Risk Reduction, 2013, pp. 65–76. Groupe de Recherche IF (grif), Faculté de l'aménagement, Université de Montréal: Montréal, Canada. (2013).

[78] P. Parikh, L. Diep, J. Gupte, M. Lakhanpaul, COVID-19 Challenges and WASH in Informal Settlements: Integrated Action Supported by the Sustainable Development Goals, vol. 107, 2020, p. 102871, https://doi.org/10.1016/j.cities.2020.102871. Cities (London, England).

[79] I. Morse, Indonesia's Palu Endured a Triple Disaster, Now Coronavirus Looms: Thousands Still without Housing or Hospitals after 2018 Earthquake, Tsunami and Liquefaction Destroyed Area, Al Jazeera, 21 April 2020. https://www.aljazeera.com/news/2020/04/21/indonesias-palu-endured-a-triple-disaster-now-coronavirus-looms/.

[80] Relief Web, Indonesia: sulawesi earthquakes and tsunami, emergency plan of action. https://reliefweb.int/report/indonesia/indonesia-sulawesi-earthquakes-and-tsunami-emergency-plan-action-epoa-n-mdrid013, 13 July 2020.

[81] F. Dery, E. Bisung, S. Dickin, M. Dyer, Understanding empowerment in water, sanitation, and hygiene (WASH): a scoping review, J. Water, Sanit. Hyg. Dev. 10 (1) (2020) 5–15, https://doi.org/10.2166/washdev.2019.077.

[82] E.G.J. Stevenson, A. Ambelu, B.A. Caruso, Y. Tesfaye, M.C. Freeman, Community water improvement, household water insecurity, and women's psychological distress: an intervention and control study in Ethiopia, PloS One 11 (4) (2016), e0153432, https://doi.org/10.1371/journal.pone.0153432.

[83] F. Sultana, Suffering for water, suffering from water: emotional geographies of resource access, control and conflict, Geoforum 42 (2) (2011) 163–172, https://doi.org/10.1016/j.geoforum.2010.12.002.

[84] P. Parikh, L. Diep, P. Hofmann, J. Tomei, L. Campos, T. Tse-Hui, Y. Mulugetta, B. Milligan, M. Lakhanpaul, Synergies and trade-offs between sanitation and the sustainable development goals. *UCL open: environment.* https://dx.doi.org/10.14324/111.444/ucloe.000016, 2021.

[85] E. Bisung, S.J. Elliott, Psychosocial impacts of the lack of access to water and sanitation in low-and middle-income countries: a scoping review, J. Water Health 15 (1) (2017) 17–30, https://doi.org/10.2166/wh.2016.158.

[86] K.C. Sahoo, K.R. Hulland, B.A. Caruso, R. Swain, M.C. Freeman, P. Panigrahi, R. Dreibelbis, Sanitation-related psychosocial stress: a grounded theory study of women across the life-course in Odisha, India, Soc. Sci. Med. 139 (2015) 80–89, https://doi.org/10.1016/j.socscimed.2015.06.031.

[87] A. Wutich, K. Ragsdale, Water insecurity and emotional distress: coping with supply, access, and seasonal variability of water in a Bolivian squatter settlement, Soc. Sci. Med. 67 (12) (2008) 2116–2125, https://doi.org/10.1016/j.socscimed.2008.09.042.

[88] P. Parikh, K. Fu, H. Parikh, A. McRobie, G. George, Infrastructure provision, gender, and poverty in Indian slums, World Dev. 66 (2015) 468–486, https://doi.org/10.1016/j.worlddev.2014.09.014.

[89] E.G. Stevenson, L.E. Greene, K.C. Maes, A. Ambelu, Y.A. Tesfaye, R. Rheingans, C. Hadley, Water insecurity in 3 dimensions: an anthropological perspective on water and women's psychosocial distress in Ethiopia, Soc. Sci. Med. 75 (2) (2012) 392–400, https://doi.org/10.1016/j.socscimed.2012.03.022.

[90] G.A. Bonanno, S. Galea, A. Bucciarelli, D. Vlahov, What predicts psychological resilience after disaster? The role of demographics, resources, and life stress, J. Consult. Clin. Psychol. 75 (5) (2007) 671, https://doi.org/10.1037/0022-006X.75.5.671.

[91] C.R. Brewin, B. Andrews, J.D. Valentine, Meta-analysis of risk factors for post-traumatic stress disorder in trauma-exposed adults, J. Consult. Clin. Psychol. 68 (5) (2000) 748, https://doi.org/10.1037/0022-006X.68.5.748.

[92] L. Cluver, D.S. Fincham, S. Seedat, Post-traumatic stress in AIDS-orphaned children exposed to high levels of trauma: the protective role of perceived social support, J. Trauma Stress: Off. Pub. Int. Soc. Traumatic Stress Studies 22 (2) (2009) 106–112, https://doi.org/10.1002/jts.20396.

[93] S.O. Salami, Moderating effects of resilience, self-esteem and social support on adolescents' reactions to violence, Asian Soc. Sci. 6 (12) (2010) 101.

[94] S. Galea, A. Nandi, D. Vlahov, The epidemiology of post-traumatic stress disorder after disasters, Epidemiol. Rev. 27 (1) (2005) 78–91, https://doi.org/10.1093/epirev/mxi003.

[95] L. Evans, J. Oehler-Stinnett, Children and natural disasters: a primer for school psychologists, Sch. Psychol. Int. 27 (1) (2006) 33–55, https://doi.org/10.1177/0143034306062814.

[96] Joint Monitoring Program [JMP], Progress on household drinking water, sanitation and hygiene 2000-2017: special Focus on Inequalities. https://www.who.int/water_sanitation_health/publications/jmp-2019-full-report.pdf, 2019.

[97] Association of Southeast Asian Nations [ASEAN], ASEAN vision 2025 on disaster management. https://www.asean.org/storage/2012/05/fa-220416_DM2025_email.pdf, 2015.

[98] Association of Southeast Asian Nations [ASEAN] & United Nations [UN], ASEAN-UN Joint strategic plan of action on disaster management 2016-2020. https://asean.org/storage/2017/12/ASEAN-UN-JSPADM-2016-2020_final.pdf, 2017.

[99] World Bank, Global program for safer schools (GPSS). https://www.worldbank.or g/en/topic/disasterriskmanagement/brief/global-program-for-safer-schools.print , 18 October 2017.

[100] P. Parikh, I. Bisaga, C. Loggia, M.C. Georgiadou, J. Ojo-Aromokudu, Barriers and opportunities for participatory environmental upgrading: case study of Havelock informal settlement, Durban City Environ. Interactions 5 (2020) 100041, https:// doi.org/10.1016/j.cacint.2020.100041.

[101] F. Waqabaca, M. Panko, R. Potangaroa, The seemingly simple? Community engagement and construction management in Samoa, post tsunami 2009, https ://unitec.researchbank.ac.nz/bitstream/handle/10652/2283/Community.pdf? sequence=1&isAllowed=y, 2013.

[102] World Bank, Global program for safer schools (GPSS). https://gpss.worldbank.org /en/about-us, 2014.

[103] X. Cao, L. Wang, C. Cao, J. Zhang, J.D. Elhai, PTSD latent classes and class transitions predicted by distress and fear disorders in disaster-exposed adolescents, J. Clin. Child Adolesc. Psychol. 48 (2) (2019) 332–342, https://doi. org/10.1080/15374416.2017.1410825.

[104] A.M. Terranova, P. Boxer, A.S. Morris, Factors influencing the course of post-traumatic stress following a natural disaster: children's reactions to Hurricane Katrina, J. Appl. Dev. Psychol. 30 (3) (2009) 344–355, https://doi.org/10.1016/j. appdev.2008.12.017.

[105] W. Yule, O. Udwin, K. Murdoch, The 'Jupiter' sinking: effects on children's fears, depression and anxiety, JCPP (J. Child Psychol. Psychiatry) 31 (7) (1990) 1051–1061, https://doi.org/10.1111/j.1469-7610.1990.tb00845.x.

[106] S. Cohen, T.A. Wills, Stress, social support, and the buffering hypothesis, Psychol. Bull. 98 (2) (1985) 310, https://doi.org/10.1037/0033-2909.98.2.310.

[107] P. Páramo, The city as an environment for urban experiences and the learning of cultural practices, in: Handbook of Environmental Psychology and Quality of Life Research, Springer, Cham, 2017, pp. 275–290.

[108] A.E. van den Berg, H. Staats, Environmental psychology. *Oxford textbook of nature and public health: The role of nature in improving the health of a population.* http://www.agnesvandenberg.nl/hoofdstuk_oxfordbook.pdf, 2018, 51-56.

[109] Global Facility for Disaster Reduction and Recovery [GFDRR], Guide to developing disaster recovery frameworks: Sendai conference version. https://www.gfdrr.org/sites/default/files/publication/DRF-Guide.pdf, 2015. March a.

[110] Global Facility for Disaster Reduction and Recovery [GFDRR], Resilient Recovery: an imperative for sustainable development. https://www.preventionweb.net/fi les/44171_resilientrecoveryanimperativeforsus.pdf, 2015.

[111] Association of Southeast Asian Nations [ASEAN], ASEAN agreement on disaster management and emergency response (AADMER): work programme for 2010-2015. https://www.asean.org/wp-content/uploads/images/2012/publications/ AADMER%20WP%202011.pdf, 2009.

[112] Association of Southeast Asian Nations [ASEAN], ASEAN Common framework for comprehensive school safety (ACFCSS). https://aseansafeschoolsinitiative.org/ wp-content/uploads/2019/07/publication_ASEANCommonFramework.pdf, 2019.

[113] Global Facility for Disaster Reduction and Recovery [GFDRR], Building back better. https://www.gfdrr.org/sites/default/files/publication/Building%20Back %20Better.pdf, 2018.

[114] Inter-agency Network for Education in Emergencies [INEE], Strategic framework 2018-2023. https://inee.org/system/files/resources/INEE_Strategic_Framewor k_2018-2023_ENG.pdf, 2018.

[115] United Nations International Strategy for Disaster Reductions [UNISDR], Build Back Better in recovery, rehabilitation and reconstruction. https://www.unisdr. org/files/53213_bbb.pdf, 2017.

[116] United Nations International Strategy for Disaster Reductions [UNISDR] & Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector [GADRRRES], Worldwide Initiative for Safe Schools: for every new school to be safe from disaster. https://www.wcdrr.org/uploads/Worldwide-Initiative-for-Safe-Schools-Generic.pdf, 2015.

[117] United Nations Office for Disaster Risk Reduction [UNDRR], Comprehensive school safety (CSS). https://www.preventionweb.net/files/55548_cssframewor k2017.pdf, 2017.