

VII. The Great Fire of Bumthang, Bhutan in 2010

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Preface

Whilst Asia is ranked as the most disaster-prone region in the world in terms of both natural and man-made disasters, research and training in the Asia-Pacific region is limited. Better understanding of the disaster epidemiological profile and human health impact will enhance response, preparedness and mitigation of the adverse human impacts of disaster. The concept of case-teaching method has been used extensively in research and teaching of disasters and humanitarian studies at schools of public health around the world, including Harvard School of Public Health, Johns Hopkins Bloomberg School of Public Health and London School of Hygiene and Tropical Medicine. Through the existing partners and networks of The Jockey Club School of Public Health and Primary Care, the Public Health Humanitarian Initiatives of The Chinese University of Hong Kong, and the Collaborating Centre for Oxford University and CUHK for Disaster and Medical Humanitarian Response (CCOUC), this disaster and humanitarian relief monograph series composed of eight case study reports has been developed using a standardised analytical and reporting framework. Methods for case study including literature reviews, stakeholder interviews and retrospective data analyses have been employed.

The main objective of this 2010 Bhutan Bumthang fire disaster case study is to highlight the key lessons learnt in disaster medical and public health response in the region. The goal is to develop Asia-specific teaching materials for public health and medicine in disaster and humanitarian response.

The “Guidelines for Reports on Health Crises and Critical Health Events” framework has been adopted as a reference for the literature search and the identification of key areas for analysis (1). We acknowledge that disaster management is a multidisciplinary area and involves much more than health issues, but we believe that the public health impact of all interventions should be appreciated across all disciplines.

This report is developed from a research conducted by Emily Ying Yang CHAN, Polly Po Yi LEE, Rinzin JAMTSHO, Kevin Kei Ching HUNG, Eliza Y.L. CHEUNG, Dr Sergio KOO and Alvin H. WONG in 2011. Mr Jamtsho was then Regional Fellow, Dr Hung Research Manager and Dr Koo

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Executive Summary

Whilst Asia is ranked as the most disaster prone region of the world in both natural and man-made disasters, research in the Asia-Pacific region is limited. This study is part of a 24 months, multi-country, multidisciplinary partner based project that aims to develop a series of disaster medical and public health case study in the Asia Pacific region. Using an internationally standardized disaster incident reporting template (1), this specific project aims to delineate and to critically evaluate the health implications of a fire disaster in Bhutan that destroyed its major town, Bumthang on 26 October 2010.

A four-person field based study to Bumthang, Bhutan was conducted within 1 week post disaster on 3-10 November 2011. The team conducted 18 stakeholder interviews, public record retrieval in ministries with disaster response responsibilities and had visited several disaster temporary settlements. Results of this study trip was reported according to the standardized disaster reporting template "*Guidelines for reports on health crises and critical health events*" developed by Kulling et al. (1) Definitions used in the report were compatible with UN-ISDR terminology and WADEM publications.

The final report included evaluation of the pre-event status (background, public health preparedness, hazard involved, risk, vulnerability and resilience); the health crisis (primary event, secondary associated events), disaster response, lessons learnt and potential implications to future disaster related public health policy development to the study context. The result also included a discussion of the merits and constraints of applying the disaster reporting template for the evaluation of a real-time disaster.

The project provides a critical public health evaluation a recent fire disaster in Bhutan. The advantages and challenges of using an international standardized disaster case study reporting framework were also examined.

1. Introduction/Material/Methodology

1.1 Introduction

On 26 October 2010, a fire disaster occurred in Chamkhar town in Bumthang, Bhutan. The tragic fire disaster took away two lives and destroyed 59 shops and hotels. 267 residents were rendered homeless and the psychological symptoms reported by the affected population include mood swings, sleeplessness and anxiety. Socio-economic implications included the loss of most of the victims' life savings.

Fires are a frequent occurrence in Bhutan. This is due to the heavy reliance on wood for building houses and as fuel. Many houses have yet to be electrified, and those that do sometimes have faulty wiring which increase the risk of fire. Often, as in the case of Bumthang, houses are built closely together enabling the town to be burnt down in a matter of hours. Bhutan is a rapidly developing country but scarce information is available to outsiders. The government has made great efforts in the prevention and mitigation of disasters. In 2006, the Disaster Management Division published the National Disaster Risk Management Framework and in 2012, the Disaster Management Bill was passed. However, to date, there has not been any extensive evaluation on the cause, prevention and management of urban fires in Bhutan. This study aims to fill the existing knowledge gap.

1.2 Material

Information on the Bhutan fire case comes from existing literature, results of the field based study (further described in the methods section) and Mr Rinzin Jamtsho, Head of Public Grievance Redressal Affairs at Prime Minister's Office from the Kingdom of Bhutan and a past CCOUC Regional Fellow

A four-person field based study to Chamkhar town at Bumthang, Bhutan was conducted within 1 week post disaster on November 3-10th 2010. The team met with staff from the Office of His Majesty's Representative for People's Welfare to understand the situation and the need of the fire victims and performed interviews with a number of victims. Formal interviews, using a semi-

structured questionnaire, were conducted and a total of 18 stakeholder interviews were conducted. Public records on fire disasters in the country were retrieved in national libraries and ministries with disaster response responsibilities and had visited several disaster temporary settlements, school and hospital. Results of this study trip was reported according to the standardized disaster reporting template “*Guidelines for reports on health crises and critical health events*” developed by Kulling et al. (1) Definitions used in the report were compatible with UNISDR terminology and WADEM publications. From 4 to 10 November 2010, the Public Health Humanitarian Initiative (PHHI) team members performed a field assessment trip in Bhutan as part of the disaster case study project with the aim to understand disaster preparedness and response in Bhutan.

The main objective of this Bhutan fire disaster case study is to highlight the key lessons learnt in disaster medical and public health response in the region. The goal is to identify future public health implication of disaster response in countries like Bhutan.

1.3 Methodology and a theoretical framework for a fire case study

To achieve a systematic examination of the case, major public health principles of disaster response and the disaster cycle model will form the theoretical framework for this analysis.

I. Public health principles of disaster response

According to the *Oxford Handbook of Public Health Practice*, the three main principles of public health response to disasters include securing basic human needs required to maintain health, determining the current and the likely health threats to the affected community, and acquiring and providing the resources to address the above two principles (2). The discussion in this case study will focus on the five basic human health needs.

The five basic requirements for health include food, health services, information, clean water and sanitation, as well as shelter and clothing. Securing the access to the basic needs is considered as the main goal of the emergency relief.

As a global effort in setting the standard for emergency relief, the international Sphere Project hosted by the International Council of Voluntary Agencies (ICVA) in Geneva is “a voluntary initiative that brings a wide range of humanitarian agencies together around a common aim - to improve the quality of humanitarian assistance and the accountability of humanitarian actors to their constituents, donors and affected populations.” The Sphere Handbook, *Humanitarian Charter and Minimum Standards in Humanitarian Response*, provides a level of standard that has been agreed upon by a multitude of front line agencies (3). It contains the minimum standards for most aspects of the basic requirements for health, specifically water supply, sanitation and hygiene promotion; food security and nutrition; shelter, settlement and non-food items; and health action. For each specific sector, it has distinct indicators to measure whether the minimum standards are being reached.

II. *Definition of health*

Health is a state of complete physical, mental and social well-being instead of the mere absence of disease or infirmity (4). Specifically public health is defined as “[t]he science and art of preventing disease, prolonging life and promoting health through the organized efforts of society”, according to Sir Donald Acheson (5).

III. The disaster cycle model

Apart from the general public health principles, it is important to recognise the different actions required during the various phases of disasters. The disaster cycle model helps highlight the key stages in post-disaster emergency response. It can serve as a useful reference for different parties to take actions during disaster management.

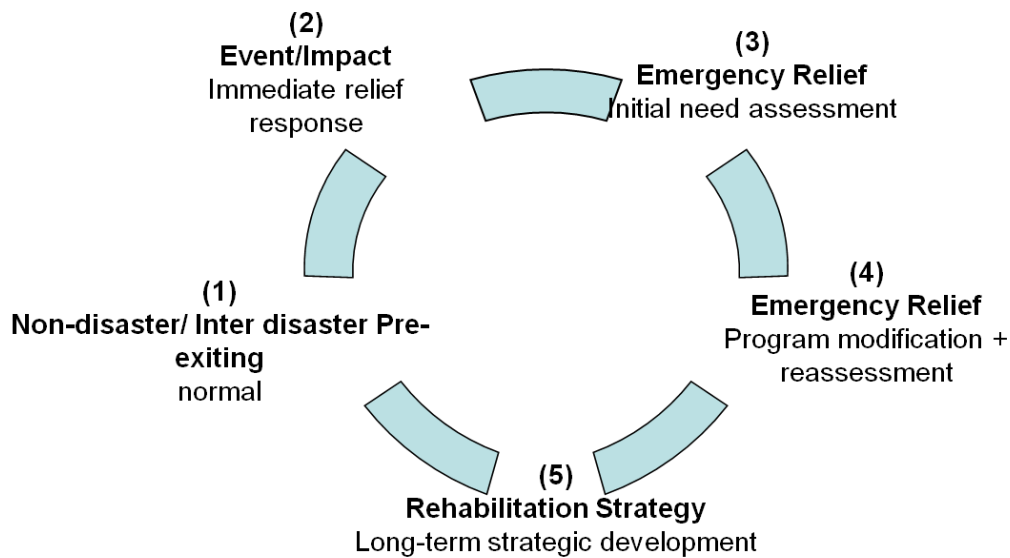


Figure 1 Disaster cycle

Source: Chan EYY, Sondorp E. Natural disaster medical intervention: missed opportunity to deal with chronic medical needs? An analytical framework. *Asia Pacific Journal of Public Health*. October 2007;19(Special Issue):45-51.

This is a disaster case study which will examine the health impact of the 2010 Bhutan Bumthang fire. This case study will focus on the emergency relief: initial need assessment stage of the disaster cycle.

2. Pre-Event Status

2.1 Background

Bhutan is a landlocked and developing country sandwiched between China in the north and India in the south, west and east. Bhutan is vulnerable to various natural disasters such as earthquake and floods. Due to its vulnerability to impact of climate change, the country is committed to a high level of environmental protection. However, it remains at significant risk of the localized impacts caused by global climate change. While Bhutan is a net carbon sink, it is prone to disasters like Glacier Lake Outburst Flood (GLOF), fire, earthquake, landslide and storm of which fire and flash floods being a recurrent phenomenon causing extensive damages to infrastructures and properties every year.



Figure 2 Map of Bhutan and its neighbours



Figure 3 Map of Bhutan, with Bumthang indicated with star

General statistics about the characteristics of Bhutan’s population and health services are summarised in the table below, followed by information about its earthquake risk, vulnerability and preparedness.

Information	Data	Reference
Population	733,003	Bhutan at a glance, National Statistics Bureau, Royal Government of Bhutan, October 2013
Population resided in urban area	31%	Population and Housing Census of Bhutan (PHCB) 2005
Major Ethnicity	Bhote 50%	The World Factbook, Central Intelligence Agency (CIA)
Other Minor Ethnicities	Ethnic Nepalese 35% (includes Lhotsampas - one of several Nepalese ethnic groups), indigenous or migrant tribes 15%	The World Factbook, Central Intelligence Agency (CIA)
Territorial size	38,394 (sq.km)	National Statistics Bureau, Royal Government of Bhutan, October 2013
Life expectancy	67.9	UNICEF, 2012
Adult literacy rate	52.8%	UNICEF, 2008-2012
Average size of household (cities)	5	Bhutan Living Standard Survey 2007, Royal Government of Bhutan
Persons per hospital bed	556	National Statistics Bureau, Royal Government of Bhutan, October 2013
Doctors	3/10,000	National Statistics Bureau, Royal Government of Bhutan, October 2013
Registered physicians available	194	National Statistics Bureau, Royal Government of Bhutan, October 2013

In a report published in 2002 by the US Federal Emergency Management Agency titled “America at Risk: America Burning Re-commissioned”, the findings highlighted the importance of a few key areas: community based loss prevention strategies including the use of smoke alarms and public education; the importance of good data record and research; forming codes and standards for fire loss reduction; the fire training and national accreditation; the safety of fire-fighters and the emergency medical services, and the quality treatment of the casualties (6). It was also commented that both the fire-fighters and the communities they serve would benefit if the approach avoiding loss from fires and other hazards was equal to the dedication shown in fire-fighting and rescue operations.

Fire especially wildfire is a common in Bhutan according to the local statistics, especially during the dry months of November to March. From 1993 to 2005, there were 868 cases of wildfires on forest and other wooded land affected 128,368 hectares of pristine forest area (7). The main cause of the wildfires (60%) were due to intentional burning for new grass for cattle, agriculture debris burning and the lemon grass harvesters (7). With the law in Bhutan against setting the forests on fire and its heavy penalties, it is hoped that the widespread practice of burning forested areas to promote new grass growth for oil and also as cattle feed will be deterred.

For buildings and house fires, they are largely attributable to the defective heating systems, faulty electrical wiring and the unsafe handling of flammable liquids and gases (8). According to statistics of Bhumthang, 22.7% villagers use electricity, LPG 32.1%, 45.2% use wood as cooking fuel (9). The frequent occurrence of household fire incidents including historical buildings and monuments have led to great concerns and the implementation of some of the Building/House Fire Prevention Measures.

2.2 Preparedness

The national disaster risk management framework proposes an institutional framework at different levels, national, district, sub district, municipality and community levels to discharge responsibilities in both the pre-disaster phase as well as the post-disaster phase (10). This was further consolidated in

2012 when the disaster management bill was passed (11). The main reason for setting up institutional arrangements for disaster management is that initiatives and efforts of various organizations will lead to a coordinated and synchronized disaster management set-up in the country and help create a disaster resilient nation. At the national level, the national disaster management authority chaired by the Prime Minister, national committee for disaster management chaired by the Secretary, ministry of home and cultural affairs followed by committees at district, sub district, municipality and local level. The department of disaster management under the ministry of home and cultural affairs is the nodal agency coordinating national disaster risk mitigation, response, relief and rescue operations. Since September 2006, the framework spells out sectoral mandates and responsibilities to strengthen systematic and effective steps in reducing the risk of disasters in Bhutan based on the multi-disciplinary approach. The Royal Government has made systematic efforts to move towards adopting a strategy of holistic disaster management involving and encompassing every administrative wing as well as the common people to inculcate a mind-set of disaster prevention, mitigation and preparedness in the pre-disaster phase while at the same time developing speedy and effective disaster response capabilities at all levels of administration and among the common people. The key objectives of the framework are as under:

1. Hazard, Vulnerability and Risk Assessment
2. Disaster Management Systems
3. Early Warning System
4. Disaster Preparedness Plans
5. Mitigation and Integration of DRR in Development Sectors
6. Public Awareness and Education
7. Capacity Development
8. Communication and Transportation

The department of disaster management under the Ministry of Home and Cultural Affairs (MoHCA) prepared the national disaster management planning guidelines to assist the districts, sub-districts,

municipalities and blocks of Bhutan to develop their disaster management plan. The district prepares their disaster management plan based on the national disaster management planning guidelines. Apart from national disaster management planning guidelines, a school disaster management planning guidelines have also been developed to assist the school in developing their school disaster management plan. Disaster risk management has been defined as the systematic process of using administrative decisions, organizational and operational skills and capacities to implement policies, strategies and coping capacities of communities to lessen the impacts of natural hazards and related environmental and technological disasters. The primary responsibility of formulating a DRM framework lies with the government, its effective implementation will require active participation of all stakeholders including communities, volunteers, religious organizations, local governments, academia, scientific and technical institutions. Development cannot be sustainable unless disaster prevention arrangements are integrated resolutely into national planning and policy frameworks.

At the district level, district disaster management committee has been set up with district administrator as the chairman for the committee. This committee is mandated to implement all cross-sectoral risk reduction initiatives at the district level and develop capacities to respond to disasters. The disaster management committee at the sub district, municipal and community levels are also constituted to respond to disasters within their respective jurisdictions. In addition, the Bhutan disaster knowledge network exists to provide knowledge of disasters to enable better management, although there is no report on fires (12).

2.3 Hazard, vulnerability and risk

From field assessment and discussion with government stakeholders, locations that are prone to fire might due to factors such as defective heating systems, unsafe handling of flammable liquids and gases; faulty electrical wiring; careless smoking, insufficient emphasis on prevention and responsibility; lack of application of available fire-protection engineering expertise; the increasing use of electrical installations which are potential sources of ignition; deliberate lighting of fires and the negligence. In Bhutan, although smoking should not be the cause of the fire as smoking is ban in the

country, vulnerability might be due to the use of flammable materials for building (wooden houses), inadequate response system and population movement (migration) (8). In addition, per capita electricity supply in Bhutan was well below the world average in the last government report. 57.7% of energy supply comes from firewood with the residential sector consuming the most energy (48.7%). Per capita fuel wood consumption in Bhutan is the highest in the world, accounting for 91% of residential energy use. The heavy reliance on firewood for cooking, heating and lighting increases the risk of fires. In Bumthang, 40% of households were un-electrified. In some sectors, such as Gasa, up to 100% of households were un-electrified (12).

2.4 Resilience

The Bhutanese people have been well known for their dedication to their religion and the use of happiness as the measurement as their development indicator (13). The Gross National Happiness (GNH) index composed of four pillars including the relationship with environment, equitability, the preservation of culture and good governance. National survey was scheduled in 2008, 2010 and 2012 by the Centre of Bhutan Studies, chaired by the Prime Minister. The survey contained nine domains and 72 indicators (14).

The GNH indicators are not only used as surveys to monitor the changes brought about by government policies, but also as a screening tool for policy formulation. The screening tool used contained 23 variables that was taken out of the GNH indicators, and each of the policy makers had to rate the policy in terms of the impact to these variables with one of the four options: positive, neutral, negative or don't know. It was found that the use of the indicators lead to a deeper level of discussions among the different policy makers.

The GNH Commission also highlighted the importance of commitment from the Bhutanese government to GNH in order to have the current success from the GNHC. The GNHC currently has the function of being the central government body for coordinating and spearheading policy

formulation, to ensure that all policies, irrespective of their origin, are processed in line with the attached Protocol for Policy Formulation.

3. Health Crisis and Critical Health Events

The fire disaster occurred at 0145 on 26 October 2010 in Chamkhar town in Bumthang; the tragic fire disaster took away two lives and destroyed 59 shops including hotels. According to news reports, fire started in a mobile phone shop and lasted for 3 hours (15).

4. Damage & Consequences of Damage

4.1 Damage & disturbances (human)

I. *The human toll* was reported to be 2 deaths, and 267 people lost their homes.

II. *Psychological problems* were found in the affected population, they experienced mood swings and sleeplessness, as well as even anxiety when seeing fire, especially children. Mood problems were also reported in some victims. However, there was no data on accurate number of people affected.

4.2 Damage & disturbances (environment)

Fifty nine shops including hotels were destroyed in the fire and shopkeepers also suffered from other property loss.

5. Responses

The Bhutanese government was very committed to the relief of the fire disaster, shortly after the disaster the King himself along with the Prime Minister and the different Ministers went to the disaster site and stayed there with the people. They mobilized different resources within and from outside the government to help the people affected, providing free services and reconstruction for the survivors, including more than 300 army personals deployed. The King and the ministers visited the victims and provided food, clothing and blankets, and free medical care. The students of Institute of Civil Engineering built temporary shelters. Overall the response adopted the national plan in its

response by using a multi-sectorial approach institutionalizing a sustainable and decentralized disaster management mechanism at National, District, Block and Municipality level.

The emotional support was equally well received by the people, “Although it is tough to have lost everything in the fire, the fact that the King is here with us and the government has been providing so many supports for us made us feel fortunate and proud to be Bhutanese.”

After the fire, investigation by police was done for 1 month, due to claims by citizens that fire was non-accidental. No evidence was found. However, government official claimed that secret investigation would continue until evidence was found (16). UNDP gave USD 82,000 to procure roofing materials for the fire victims (17).

6. Discussion

Strong and dedicated leadership in Bhutan and resilience in Bhutanese people were the key success factors towards to response and recovery of this fire disaster. Disaster management system in place, but still needs improvement into the implementation and the coordination issues. Among the various issues, it is important to point out three major issues were identified, namely, information, environmental and system immaturity.

6.1 Information factor

As of today, the cause of the fire was not confirmed. The only conclusion drawn from the case is the flammable materials used for housing construction in the affected town. In addition, the lack of information about migrating population in Bhutan also hampered the initial rescuing effort. As a result, this made estimation of disaster affected population challenging. There lacked official information on occupations of Bumthang citizens, number of people affected by psychological symptoms, number of migrant workers, the time it took to rebuild the town and any improvement in housing design to make the town less susceptible to fire. This made it difficult to comprehensively evaluate the effect and response of the fire.

6.2 Environmental factor

Winter months are common for household and forest fires due to both heating issues and also the dry vegetation and abundance of ground fuels (7). At the time of the fire, the effect of cold weather and the lack of fire engines in close proximity severely impacted the capability to respond adequately and in time.

6.3 Lack of emergency preparedness

In realization of disasters and its impacts, the Government of Bhutan adopted a more proactive strategy, beginning with the decision of the 15th session of the cabinet to upgrade the disaster management division under department of local governance to a full-fledged department under the ministry of home and cultural affairs in 2008. Despite the detailed planning and the formation of the organisational framework for response, Bhutan still suffers from inadequate fire management and the emergency service equipment and technologies. According to the Fire Services Division of the Royal Bhutan Police, they have been increasing their response capacities with 27 fire engines and 86 fire-fighters to provide fire service to the Thimphu city and all the towns of 20 Dzongkhags (18). Under a project with the Japanese government, Bhutan has received 24 fire engines, bringing the total number of fire engines in the country to 54 (19).

However, indigenous fire-fighting methods are still in use for many of the forest fires due to the limitation on the equipment availability. The equipment currently provided to Bhutanese villagers/foresters includes walkie-talkie handsets, knife spades, rakes and backpack pumps for fighting fire, but unfortunately the supplies have been inadequate (7).

6.4 Public awareness and education

Building awareness among the people about the hazards, vulnerabilities and disaster risks and the steps that can be taken for mitigating the same was initiated in different sectors for building their knowledge, aptitude and skills for effective disaster risk management in the country. Incorporation of

disaster risk management issues in the school, college and technical curricula was also initiated to facilitate creation of a generation alive and sensitive to risk reduction and amount to a wise investment for mitigating and managing future risks. Cross-sectoral partnership and concerted efforts at disseminating the agenda of disaster management to the younger generation through school curricula and through conduct of preparedness drills at regular intervals will go a long way in inculcating a culture of disaster safety and risk management among people at large. In addition, community awareness was enhanced by developing posters on preparedness and safety measures for fire. Reports were issued to monitor, document and report lessons learnt after disasters. Training classes were conducted on fire safety and evacuation (17).

7. Lessons Identified and Actions Recommended

7.1 Pre-Event Preparedness

Several factors contributed to the increased risk of fire outbreak during October 2010. The dry weather, reliance on wood for construction and energy and faulty electrical wiring helped to play a part. However, Bhutan also tried to prepare for disasters through the Disaster Management Framework in 2006 as well as education and awareness activities managed by the Disaster Management Division. Baseline information on ethnicity of citizens and migrants were not available for Bumthang.

7.2 Immediate response

The initial fire-fighting efforts were hampered by the lack of fire-fighting equipment available. There is no information on whether the victims were able to seek timely medical care, how long it took for the fire-engines to arrive and what informal fire-fighting measures were used by the citizens at the time. There is also no information on what shelter was offered for the homeless.

7.3 Needs assessment

No official report of needs assessment after the 2010 Bumthang fire has been made available. Did the health of the citizens decline after being rendered homeless? How many suffered psychological

symptoms? Were citizens in need of new occupations after the fire? Were children able to resume education? These are questions that have been difficult to answer due to the lack of information available.

7.4 Programme modification and reassessment

Bhutan has made great efforts in restructuring policies and government division to ensure there is room for development in disaster prevention and mitigation. This has been shown in the Disaster Management Bill and the education and awareness activities. Unfortunately, there is no official reassessment report on what programme modification needs to be carried out after the 2010 Bumthang fire. An evaluation on whether the fire risk factors had been mitigated and whether fire response had improved could have prevented the subsequent 2 fires that occurred in Bumthang again in the preceding months (20)(21).

7.5 Rehabilitation strategy

There is lack of information on whether Bumthang citizens were able to resume normal activities after the fire and how long they were displaced from their homes. This makes evaluation of the rehabilitation strategy difficult.

8. Conclusions

The commitment of the government to provide relief and the proximity of the King his majesty and the officials to the affected population both physically in geographic location and also psychologically was demonstrated in this unfortunate fire disaster. Tackling the local impacts must also take on a national character. In disaster related issues, the development philosophy of gross national happiness (GNH) and its concepts at the grassroots can be applied. The ministry of home and cultural affairs had already upgraded the disaster management division into a full-fledged Department of Disaster Management (DDM). As the main nodal agency of the government, the DDM has already launched its national disaster risk management framework with the support of the UN System in Bhutan. It is therefore laudable that after having adopted the Hyogo framework for action, which aims to reduce

our collective vulnerability to natural hazards, the Government of Bhutan is working actively towards implementing the national disaster risk management framework as well. However, more evaluation and information needs to be made available on the impact of individual disasters and effectiveness of measures carried out subsequently.

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10. Appendices

Table 1 Overview of data sources related to this case study

Key information categories as highlighted in <i>Guidelines for Reports on Health Crises and Critical Health Events</i>	Primary Source ^a Authors (Year)	Secondary Source ^b Authors (Year)
Methodology		<ul style="list-style-type: none"> ♦ Kulling, Birnbaum , Murray & Rockenschaub (2010)(1)
Pre-event status 1) Background 2) Preparedness 3) Hazard 4) Risks 5) Vulnerability 6) Resilience	<ul style="list-style-type: none"> ♦ Field-based assessment and interview with local stakeholders 	<ul style="list-style-type: none"> ♦ US Federal Emergency Management Agency (2002)(6) ♦ Fire Situation in Bhutan. International Forest Fire News (2006)(7) ♦ Dargye(8) ♦ Department of Local Governance, Ministry of Home and Cultural Affairs, Royal Government of Bhutan (9) ♦ United Nations Development Programme (2008) (14)

		<ul style="list-style-type: none"> ♦ Gross National Happiness Commission, Royal government of Bhutan (15)
Health crises & critical events	<ul style="list-style-type: none"> ♦ Field-based assessment and interview with local stakeholders 	<ul style="list-style-type: none"> ♦ The People's Government of Liangshan Yi Autonomous Prefecture (2012)
Responses	<ul style="list-style-type: none"> ♦ Field-based assessment and interview with local stakeholders 	
Discussion		<ul style="list-style-type: none"> ♦ Fire Situation in Bhutan. International Forest Fire News (2006) (7) ♦ Fire Services Division of Royal Bhutan Police, Royal government of Bhutan (7)

^a *Data and information collected by interview, focus group and observation.*

^b *Data and information obtained from government sources, journals and other agencies working paper/report.*

11. Keywords

Bhutan; community resilience; Disaster Case Study; fire; health emergency risk response

12. Abbreviations

DDM	Department of Disaster Management
GLOF	Glacier lake outburst flood
GNH	Gross National Happiness
ICVA	International Council of Voluntary Agencies
IFFN	International Forest Fire News
MoHCA	Ministry of Home and Cultural Affairs
PHCB	Population and Housing Census of Bhutan
UNICEF	United Nations Children’s Fund
UNISDR	United Nations International Strategy for Disaster Reduction
WADEM	World Association for Disaster and Emergency Medicine