

# Introduction to the Gorkha Earthquake

*Hanna A. Rusczyk and Tom Robinson*

## 1.1 THE EARTHQUAKE

On 25 April 2015 at 11:56 a.m., the first jolts of a major earthquake were felt in the small town of Gorkha in central Nepal. Almost 9000 people died, over 22,000 injured, 1 million homes either destroyed or damaged (Government of Nepal, Ministry of Home Affairs and Disaster Preparedness Network-Nepal 2015), thus resulting in a further 2.8 million people homeless across 14 districts of Nepal. Although felt in India, China and as far away as Bangladesh, the Gorkha earthquake, as it became known, and the aftershocks that followed, gave the brunt of its devastation in Nepal. The earthquake, with a magnitude of 7.8 (USGS 2015) and the subsequent magnitude 7.3 aftershock in Sindhupalchok district on 12 May, was the largest earthquake and worst natural hazard to strike the country in 81 years. Not since the devastating 1934 Nepal-Bihar earthquake, estimated to have had a magnitude of 8+, had Nepal suffered such a devastating event (Fig. 1.1).

Yet this was not the *big one* that many scientists, humanitarians, politicians and members of the public had feared and discussed in the years before 2015. This was not the feared mega-quake that would unzip several hundreds of kilometres of the main Himalayan Fault and strike the

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H.A. Rusczyk (✉) • T. Robinson  
Department of Geography, Durham University,  
Durham, UK



**Fig. 1.1** Efforts post-earthquake to help affected people and to assess damage (Source: NSET)

direct hit on Kathmandu (Feldl and Bilham 2006). The Gorkha earthquake was certainly big—not just the worst disaster in Nepal in recent memory but the worst natural disaster of 2015 globally. But the threat of the big one remains, thus not alleviating fear of further destruction.

Disasters do not occur in political, social or economic vacuums. National and local geographies of inequality, ethnicity, caste, gender relations and social and economic marginalisation shape response and long-term recovery for those who remain (Hyndman 2011; Sidaway et al. 2008) to rebuild their lives, communities and country. Only five months after the Gorkha earthquake, the long-discussed but never agreed constitution was unexpectedly approved with a large majority by the constituent assembly. This was greeted with controversy, especially in southern Nepal along the border with India, where protests had already been visible during the summer months and even more so after the signing in September. Within 48 hours of the passage of the constitution, there were sit-ins on the key border crossings, and India ceased all movement of trade into Nepal through these routes, through which 85% of all goods enter Nepal.

The impact of the Gorkha earthquake and subsequent political and economic crisis has thus been felt in many different ways across different

communities throughout Nepal. The World Bank (2016a, 1) appropriately stated that ‘2015 will be remembered as the year of twin shocks for Nepal’. The impact of the dual disasters will continue to be felt for many years.

## 1.2 BACKGROUND

Nepal is a land-locked Himalayan country located between the Asian giants of China and India. Nepal has a population of over 26 million people according to the most recent census (Government of Nepal, National Planning Commission 2012), although difficulties with data collection means the World Bank estimates the population is closer to 30 million (World Bank 2013). Over 80% of Nepal is mountainous, and the remaining 20% is made up of flat, low-lying fertile land along the Indian border, known in Nepal as the Terai. Effectively a closed nation until the mid-twentieth century, this former kingdom has seen significant changes in the past 60 years. In 1950, Nepal had few roads, now 43% of the rural population has access to an all-season road and over 17,000 km of roads exist (World Bank 2017). Adult literacy has increased from 21% in 1980 to 60% in 2010 (Rigg et al. 2016), while the percentage of people living below the national poverty line declined from 42% in 1996 to 25% in 2010 (Government of Nepal, National Planning Commission and the UNDP 2011).

Nepal was governed by royal dynasties until the early 1990s, when several political parties launched a popular prodemocracy movement. The political changes raised expectations of social and economic progress for most Nepalese, in a country highly managed by caste and other hierarchies that left most people very poor. Since democracy was adopted in 1990, Nepal has had over 23 governments. In 1995, the Community Party of Nepal made plans to launch an armed struggle, the People’s War, with the goal to better the standard of living for Nepalese people. In 1996, the armed insurgency against the government began. This Maoist-led insurgency lasted a decade, ending in 2006, and resulted in over 13,000 deaths and significantly stifled national socioeconomic development. A Maoist-dominated government was democratically elected in August 2007. Long-term political instability has reigned, and the country is struggling to overcome the legacy of the conflict. As of early 2017, politicians continue to disagree on the new promulgated constitution of September 2015 and discussions leading to a federal state for Nepal continue.

Along with agriculture, which contributes 30% of the gross domestic product (GDP), remittances and the service sector have emerged as major contributors to the economy. Today, Nepal's economy relies on a combination of agriculture (predominantly rice and wheat), tourism and remittances from its young men who work mainly in Malaysia, Qatar, Saudi Arabia, UAE and Kuwait (Government of Nepal, Ministry of Labour and Employment 2014, 6). In 2014, remittances contributed 29% of the GDP (*ibid.*, 36; World Bank databank 2016b) and currently are one of the leading factors behind Nepal's remarkable successes in human development in the last 40 years, contributing significantly to the reduction of poverty since 1995 (United Nations 2011). It is these remittances that are fuelling people's ability to rebuild post-earthquake.

Despite the contribution to the economy and poverty reduction, this reliance on remittances has notable downsides. The number of Nepalese households receiving remittance has increased from 23% in 1995–96 to 56% of all households in 2010–11 (Government of Nepal, Central Bureau of Statistics 2011). Of the households receiving remittances, such monies make up 31% of the household's total income (*ibid.*), and daily consumption uses 79% of total remittances received. It is clear Nepal's households depend heavily on its young male international migrants rather than on the country's own economy. This leaves many young Nepalese men with a difficult choice: stay and help rebuild after the earthquake or leave and send back their earnings.

### 1.3 DISASTER RISK IN NEPAL

Over the last five centuries, deaths from earthquake disasters globally have consistently averaged 100,000 per year, with some experts suggesting this rate is increasing (Bilham 2004). With more than 90% of all earthquakes affecting the Asia-Pacific region (hence the colloquial term Pacific 'Ring of Fire'), it is not surprising that the largest number of deaths from earthquakes each year is in Asia (International Federation of Red Cross 2009). Nepal is ranked 11th in the world in terms of vulnerability to earthquakes (UNDP 2004). Situated in the middle portion of the Hindu Kush Himalayan region, a high seismic risk zone, Nepal has a long history of destructive earthquakes (Mugnier et al. 2013; Government of Nepal, Ministry of Home Affairs 2011). It is prone to other natural hazards as well, such as flooding and landslides, both of which occur annually during the summer monsoon, and the latter of which occur in the thousands during a major earthquake (Kargel et al. 2016). This

combination of ‘multiple hazard events poses a severe threat to national development processes’ (ADPC et al. 2010, xii), and the World Bank (Dilley et al. 2005) considers Nepal one of the global hot spots for natural disasters.

While strong earthquakes in Nepal are infrequent, they almost always result in some level of loss. In 1833, two major earthquakes were experienced in the Kathmandu Valley, causing widespread damage. In 1834, four major earthquakes occurred in just two months. On 16 January 1934, perhaps Nepal’s most infamous earthquake occurred: the great Nepal-Bihar earthquake, which, as the name suggests, also affected Bihar, India. This earthquake had an estimated moment magnitude ( $M_w$ ) of 8.4 and according to Rana (1935, translated into English Lall 2013) killed 8519 people across eastern Nepal. In the recent past, on 18 September 2011, an earthquake of  $M_w$  6.8 struck Nepal’s eastern region as well as the capital Kathmandu, in the central region. This resulted in damage to houses, buildings and schools in 13 districts.

#### 1.4 SCOPE OF THE BOOK

Disasters are not natural; they are human made (O’Keefe et al. 1976). Building codes, zoning policies, environmental regulations and enforcement of laws all influence outcomes of major events such as earthquakes (Hyndman 2011). Earthquakes are a particularly special hazard event: There is a rupturing that earthquakes create that is beyond our control and understanding (Simpson 2013; Hyndman 2011). An earthquake is more than the physical shaking. The ramifications are complex and interconnected. The impact of an earthquake is expressed in fits and bursts over a protracted period of time. At one point, the earthquake blends into the everyday but in reality it continues to cause ruptures in different ways over many years.

Disaster studies scholar Kenneth Hewitt suggests ‘disaster is a disruption and unravelling of spatial or geographic order’ (1997, 41), which is multidimensional and percolates over a long period of time. This book describes the Gorkha earthquake from a multitude of different dimensions and perspectives, taking a deliberate multidisciplinary view to highlight the complex interactions and connections that result from an earthquake. In doing so, it is hoped that this collection can highlight what can be learnt from the Gorkha earthquake before the next big one, whether it occurs in Nepal or elsewhere.

The genealogy of this book is based on two events organised by the Institute of Hazard, Risk and Resilience at Durham University related to the Gorkha earthquake. The following chapters are contributions from researchers who experienced the earthquake or who supported Nepal and its citizen's post-earthquake. Practitioners, both Nepalese and international, have contributed to the book as well, in order to give a more nuanced and grounded view of the earthquake. Clark (2011, 73) suggests 'the disaster is the event so severe that in its tearing away of the foundations, structures and relations that make the world legible, it also deprives those it afflicts of their capacity to absorb and process the event, to render it intelligible'. This book is our collective attempt, two years after the earthquake, to sort through and attempt to process the earthquake and render it and its aftermath intelligible to ourselves and to readers. This volume contains a range of academic research, perspectives and reflections from people who experienced the earthquake, were involved in managing the response and recovery or have a relationship with Nepal.

The ways in which we have been working with disasters has not worked very well in the past, and only by combining our efforts and assessing these events from a multidisciplinary perspective can we attempt to understand more fully and hope to minimise the short- and long-term impacts of earthquakes in the future. Perspectives from geography (human and physical), long-term efforts in disaster risk reduction, cultural heritage protection, anthropology, health, social work and emergency response will be discussed.

## 1.5 PART I: EARTHQUAKE PREPAREDNESS AND RESPONSE (CHAPTERS 2–6)

Chapter 2 is written by Amod Dixit of the National Society for Earthquake Technology—Nepal (NSET) and several colleagues. They outline NSET's strategy over a period of two decades to increase awareness and preparedness in relation to earthquake risk management within Nepal (Fig. 1.2). They present the most impactful programmes: school earthquake safety programme, the building code implementation programme in Nepal and the enhancement of emergency response capacities at the national and community levels. In this chapter, attention is also given to the effectiveness of the programmes in relation to the Gorkha earthquake. The necessity to consider the long term and to engage with the international, national and local levels is stressed.

Chapter 3 is written by Gopi Basyal, who provides an overview and reflections on the emergency response during the first 100 hours of the



**Fig. 1.2** A NSET social mobiliser with community members to help communicate risk (Source: NSET)

earthquake. He outlines Nepal's emergency response structure and looks at how pre-event training of local people in various emergency-response skills influenced the resulting losses. Limitations in the response structure and procedures are identified and potential avenues for improving this structure for future events are briefly discussed.

Chapter 4 is written by Ramjee Bhandari, Chandika Shrestha and Shiva Raj Mishra. They explore the direct and indirect influences of the Gorkha earthquake on the overall health and well-being of people. They suggest this primarily rural-based earthquake devastated the healthcare infrastructure in remote areas and particularly impacted women, the poor and those with pre-existing physical and mental health problems. The event also created a new vulnerable group: people with physical and mental disabilities. They also consider the future and the possibility of universal health coverage in a changing political climate.

Chapter 5 is written by Sanchita Neupane, who discusses traditional methods for estimating the timing and extent of earthquake impacts and compares these with the traditional lay knowledge of many Nepalese people. The chapter uses simple mathematical equations along with observations of historic earthquakes in Nepal and the wider Himalaya to shed light on how frequently events like the Gorkha earthquake occur.

Chapter 6 is written by Tom Robinson, who details the ways in which high level planning is used to try to pre-empt future earthquake events and identify issues for emergency response that can be improved and made ready for future earthquakes. He provides an overview of a major

earthquake simulation held in Nepal shortly after the Gorkha earthquake that aimed to identify and improve on flaws in the emergency response to that event. The simulation resulted in myriad findings and recommendations for improvements to Nepal's emergency planning and structure, and several of these are addressed in detail. The chapter also highlights the difficulties facing national governments in the wake of such simulations in regard to investments in disaster risk reduction activities.

## 1.6 PART 2: DISCIPLINARY PERSPECTIVES (CHAPTERS 7–11)

Chapter 7 is written by Ben Campbell, who explores the way in which the impact of the earthquake was felt unequally across districts and communities in Nepal. The earthquake could be considered an ethnic (Tamang) earthquake, in which communities were destroyed and the greatest number of deaths were in the Tamang areas. The Tamang community mechanisms to rebuild are considered, and their inability to access government support (including the national park) is highlighted. Consideration is also given to the significant role of community-based renewable energy systems. Communities were devastated by the loss of electricity and their access to modernity.

Chapter 8 is written by Hanna Ruszczyk, who explores the impact of the earthquake on the lives of residents in a large city (Bharatpur) not directly impacted by the earthquake. Based on her experience of the earthquake and the aftermath of the constitution, she proposes that implementation of urban planning measures as well as the political implications of the constitution and the ensuing economic blockade were as important as the earthquake for large parts of the country.

Chapter 9 is written by Lena Dominelli, who explores how green social work (GSW), a holistic, transdisciplinary model of social work disaster intervention, is applied throughout the disaster cycle from immediate relief to reconstruction. This chapter considers the Nepal School of Social Work's (NSSW's) use of GSW at all stages of a disaster after the earthquake in Nepal's Sindhupalchok area.

Chapter 10 is written by Robin Coningham and colleagues. The authors argue for the necessity to consider heritage impacts in a time of disaster. They discuss postdisaster destruction of subsurface heritage sites and postdisaster rescue archaeology interventions that took place in the Kathmandu Valley. Last, they propose protocols to be used in future events



to safeguard and protect not only UNESCO sites but also local heritage sites while still allowing rapid response during search and rescue efforts.

Chapter 11 provides a synthesis of the book's contributions and is written by Tom Robinson, Hanna Ruszczuk and Louise Bracken. The chapter summarises emerging themes, such as the differences in impact on rural and urban centres, the role of the local, national and international levels in immediate response and long-term recovery from the earthquake as well as the role of science and technology. This collection of perspectives gives visibility to groups and topics often not readily discussed. Response to the earthquake from first responders in the community, by the government, by community groups and by the humanitarian sector are considered. Last, the future is tentatively considered. Written 24 months after the earthquake, the chapter acknowledges that much is still in turmoil and transition due to the earthquake, the constitution and the economic downturn caused by the informal blockade. The rebuilding has yet to take place on a large scale. Reflections from the disaster will, we hope, contribute to considerations for Nepal and other seismically active countries for their future safety and general well-being.

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