

3/15/17

Dissecting the 2015 Nepal Earthquake

Rural response and way forward for Nepal

**Ramu Kharel
UT Southwestern Medical Center
Distinction of Global Health**

Abstract

Introduction: In 2015, a protracted 7.8 Richter-magnitude earthquake, 50 seconds in duration, ravaged Nepal. Officials were not fully-prepared for the impact of this catastrophe and mitigation protocols have since been implemented. Based on the Gorkha earthquake experience, however, many response shortcomings persist. This study was designed to review the Gorkha earthquake in the context of other earthquakes worldwide and, in turn, analyze current preparedness strategies for Nepal. Additional recommendations were to be derived based on those findings.

Methods: The Nepali government's home ministry and ministry of health's documents on disaster response protocols were reviewed in detail. Published reports addressing earthquakes in Nepal, Armenia, Japan and Haiti were analyzed for comparison including those discussing banditry and rural politics. Based on these findings and the additional expert advice of disaster specialists, recommendations were assimilated with the intention of augmenting current preparedness strategies for the people of Nepal.

Results: A major finding of the analysis was that, although detailed response protocols were developed for Nepal, the focus was largely limited to the urban (high-population) areas. Detailed plans for rural settings were not specifically addressed even though the recent earthquake affected non-urban districts massively. Also, sparse resources, logistical barriers and distance challenges were faced by the rural jurisdictions further hampering the response and recovery and escalating the disparities.

Conclusion: In the context of other global experience, disaster preparedness, response and recovery protocols are essential to lessening the impact of earthquakes and can change outcomes. Based on the Gorkha earthquake experience, it has been recommended that the Nepali government should now take steps (detailed in the text) to facilitate the first 72 hours of response to its high-risk, logistically-challenged rural jurisdictions by strengthening the local health systems and emergency management response frameworks, ensuring improved parity in disaster preparedness for all citizens.

TABLE OF CONTENTS

INTRODUCTION
..... 4

METHODS
..... 5

RESULTS AND RECOMMENDATIONS
..... 11

DISCUSSION
..... 15

CONCLUSION
..... 21

APPENDICES
..... 23

REFERENCES
..... 25

VITAE
..... 27

INTRODUCTION:

Using clinical jargon and often depending upon the setting, earthquakes can be described as “acute on chronic” event.¹ The nation of Nepal experienced an earthquake of 8.2 Richter magnitudes in 1934 resulting in 19,000 casualties.² Even at a time when seismology was not as advanced, it was widely known that such as seismic event was not an isolated occurrence for Nepal. Located in one of the most seismically-prone regions worldwide, the United Nations Development Programme (UNDP) ranked Nepal 11th globally among countries most vulnerable to earthquakes.² The slow, ongoing collision of the India and Eurasia tectonic plates have placed Nepal in that high-risk category and, over the decades, many government initiatives for disaster risk reduction (DRR) were created for these inevitable crises.³ Various government departments have taken roles in seismic zone mapping. The seismic zoning map indicates that the nation’s middle region is at a slightly higher risk than the northern and the southern parts. The plains of Terai show the highest levels of liquefaction, and the middle hills and higher mountains are thus susceptible to landslides.⁴ In 2013, the National Disaster Response Framework (NDRF) was established in Nepal with the creation of sector specific response strategies. To make Nepal more disaster resilient, NDRF-2013 formed central, regional, district and local level disaster relief committees (DRCs), and functional emergency operation centers at the local level. Plans for simulation exercises, rubble clearance, utilization of local volunteers, early warning systems, and dead body management all were part of this protocol.⁵ With these initiatives, the Nepali government was indeed more prepared for a major earthquake. Despite those promising initiatives, however, a less than optimal response was observed in the aftermath of the 7.8 Richter magnitude earthquake that affected the rural Gorkha region of Nepal on April 25, 2015. Among the many issues identified, the DRR plans for community-level training were well-indicated in the protocols, yet there was no evidence that these plans had been implemented.

The purpose of this paper therefore is to explore and analyze the early post-earthquake events (those within the critical first 72 hours) in the context of the planned community resilience and capacity-building methods in Nepal. Using expert advice and comparative lessons learned from other earthquakes across the globe, recommendations for the next steps in planning were derived in the hopes of augmenting future response plans for Nepal. Specifically, this study was intended to address what resilience and capacity-building mechanisms that were actually in place in the higher-risk settings of rural Nepal and to determine what was lacking.

METHODS:

Description of the Earthquake, Locations, Observations and Comparisons

Just before midday on Saturday (11:56 am) April 25th, 2015, Nepal experienced a protracted 7.8 Richter magnitude earthquake that lasted approximately 50 seconds with the epicenter located in the Gorkha district, only 77 km *northwest* of the capital city, Katmandu. This initial event, referred to as the Gorkha earthquake, was followed by many aftershock including a major tremor of 7.3 Richter magnitude occurring a little over two weeks later, on May 12th, in the district of Dolakha, located 76 km *east* of Kathmandu.

Of Nepal's 75 designated districts, almost half were affected.⁶ The Ministry of Health and Population identified that 14 of the 35 districts were severely affected with the majority of these jurisdictions being rural districts.² To place the devastating sequelae in context, it was estimated that over 50,000 classrooms and 1,000 health facilities were destroyed. the earthquake initially displaced almost 3 million people, nearly 10% of Nepal's entire population.^{2,6} It was reported that an estimated 8,700 people were killed and more than 22,000 were injured, but actual numbers were likely higher. Although the post-earthquake media coverage was focused on Kathmandu and other urban districts like Pokhara, the majority of economic damage, human and livestock casualties, and most of the infrastructure damage occurred in the rural areas of Nepal.⁶

By way of comparison, that same year in Chile, an 8.3-magnitude earthquake lasting almost 3 minutes resulted in 13 fatalities and 6 missing in a city of 30,000 people.^{7,8} In Haiti, on January 12, 2010, a 7.0 magnitude quake struck near the city of Port au Prince where 3.5 million people were affected and 220,000 people died. Haiti is a country that has suffered politically and economically throughout its history, yet this resulted in billions of U.S. dollars-worth of damage exacerbating their situation. Although the location and time of the day affect casualties of these quakes, deeper systemic roots of each country contributed to the damage, on-going sequelae and casualties.⁴⁴

Resilience is defined in the Webster dictionary as an ability to return to an original shape after being pulled, stretched, pressed, or bent.⁹ When a ball is bounced, physical principles tell us that some energy is lost, and it loses the bounce-back distance after each subsequent bounce. New energy has to be invested in it to bring it back to its original location.

Similarly, after a disaster like the Gorkha earthquake, sustained energy must be invested in resilience mechanisms to bring communities back to the pre-disaster states. In that respect, the Government of Nepal must be commended for anticipating the earthquake and creating protocols around multiple sectors and for collaborating with United Nations organizations for international recommendations. More importantly, the Nepal army and Nepal police must be commended for their rapid response and adapting to the situation as best they could. However, the limited resources, distance challenges and logistical barriers of the rural setting present additional challenges to that response and resilience, especially in terms of the critical early hours after disaster strikes.

The early hours after an earthquake have been shown to be the most important in terms of reducing the mortality and morbidity following a catastrophic event including both the physical and psychological consequences. Studies and experiences from the 2010 Haiti Earthquake and 1988 Soviet-Armenia earthquake show the

importance of having community resilience early on in the post-acute phase of an earthquake.¹⁰ The maximal life-saving potential exists when all available resources are applied within the first 48 hours. However, as observed in the Gorkha earthquake, authorities faced many difficulties getting to the affected people in a timely manner. Local members of the community became the first responders by default.¹⁰ In Nepal's rural areas, where first responders would normally be men and youth of communities, there were additional challenges in the response because of the lack of younger and stronger men in the villages due to massive out-migration in pursuit of employment.³²

Nepal's disaster risk reduction (DRR) protocols addressed the need for resilience and capacity building by the government, but mostly focused on Kathmandu, where, beyond population numbers, the majority of political and economic capital lies. With good rationale, the capital city had always been prioritized as the center of resilience-building and disaster preparedness. For example, the Nepal Red Cross Society identified 12 key items for risk management and preparedness for response and established those in the Kathmandu valley, given that it was one of the fastest growing cities in South Asia. Rural Nepal was not considered in that analysis. It is logical that the damage that can be done in this rapidly-growing and congested city with an earthquake is much more massive compared to rural areas, but the majority of Nepal, and the majority of seismic regions in nation, are rural.¹¹ The Gorkha earthquake indeed resulted in massive damage and loss of life. Thus it was, in a way, an eye-opener that demonstrated the massive devastation that could occur outside of the capital. Lack of proper roads and telecommunication infrastructure left many rural communities totally isolated and left to their own resources for many days following the earthquake. Community members and volunteers played a big role in rescuing people and helping the disabled, but, despite the proscribed DRR plan, there were no trained community leaders or organized volunteers available.³²

Context and Setting of the Disaster: Recent History of Nepal

The Federal Democratic Republic of Nepal is a South Asian country with a population of 31.5 million, of which 83% live in rural areas.³⁷ Geographically, Nepal is roughly

divided into three main areas: the Mountains, the Hills and Terai (the plains). Nepal has significant disparities in health, education, wealth and access to care between 126 ethnic/caste groups, and between people living in different regions.³⁸ Nepal has a long, unstable political history. After experimentations with parliamentary democracy in 1950s, party politics were banned and power was centralized to the royal palace. Nationalistic politics took a spotlight during this period with the royal kingdom pushing for a “Nepali” identity. In particular, a brand of Hinduism, a National dress, one Nepali language, and loyalty to state and dynasty were advocated by the government. The ruling elite inspired most of these nationalistic agendas, and in the process, it also led alienation and even oppression for many ethnic groups, especially the people of Terai.³⁹

A multi-party system and rule by an elected government permanently returned to Nepal in 1990. While Kathmandu was adjusting to the new system during this transition period, a major rebellion in the form of Maoist insurgency was developing in rural Nepal. After a decade-long civil war with the Maoist movement, Nepal was eventually declared a federal democratic republic in 2006. A 9-year drafting process finally ended with Nepal’s new constitution being ratified on September 2015, but the nation had experienced a prolonged absence of elected representatives at the local level which, in turn, stagnated the concept of leadership at the local levels. This continued political fragileness has been somewhat of a constraint and obstacle for democratic, progressive and accountable national development.

Already prone to natural disasters, the risk arising from natural disasters is further exacerbated by the poor socio-economic condition of the country’s population. Nepal is one of the poorest and least developed countries in the world with a Gross Domestic Product (GDP) per capita of \$694.³⁷ Remittances make up 30% of Nepal’s GDP and Nepal has a young population, with more than half under the age of 24.³². Agriculture still remains the mainstay of the economy, which accounts for a third of the national GDP. Nepal has a very high labor force of 16 million (over 50% of the entire population), with majority being unskilled workers. Although free healthcare is a

constitutional right of all Nepali citizens, out-of-pocket expenditure in healthcare put millions of Nepali families into financial hardship every year.³⁸

Observations Regarding the Early Hours After Earthquake

Before the Gorkha earthquake, many experts predicted a higher death toll and damage if an earthquake were to hit central Nepal.² Although the timing of the earthquake (Saturday morning while children were not in school) allowed the 2015 earthquake's damage to be much less than predicted, these predictions still should be taken seriously for the future planning. Only a portion of the fault line was ruptured in the Gorkha earthquake and high amount of geological energy remains stored in the fault line, 11 km beneath the valley of Kathmandu. Even more serious earthquakes, sooner or later, are bound to occur with less fortunate circumstances, further establishing that it would be wise to invest in building communities that are resilient to future, inevitable earthquakes.³⁶

Again, after an earthquake, there is limited time to save those trapped under the rubble.²⁰ Instantaneous deaths occur in earthquakes because of severe injuries or drowning. Delayed deaths can occur within days due to dehydration, hypothermia, hyperthermia, crush syndrome, and wound infection.³³ With an exception to personnel from other countries that might be in close geographical proximity, external medical assistance typically arrives after the local authorities provide the emergency medical care.¹⁰ To save lives, emergent cases like crush syndromes, pneumothorax, and traumatic bleeding, have to be attended to as early as possible. In Nepal, the lack of transportation and risk of mudslides after an earthquake makes it more difficult, even for local providers, to reach rural areas on time. Similar to the Armenian earthquake, the first responders in Nepal were friends, neighbors, volunteers and relatives of victims.¹⁰

The hardships of out-migration were felt in rural Nepal, where internal and external out-migrations are very high. Between 2013 and 2014, about half a million Nepali young men left the country for foreign employment.³² Of the 14 severely affected

districts, 80% of the absentees in 2011 were male. This has some positive impact on disaster preparedness—remittance received from the migrants improves economic and social resilience and fosters disaster preparedness indirectly. For example, people who received remittances from abroad had stronger, concrete houses because they want “modern” housing for social standings. Most of the houses damaged were old, mud houses; concrete houses were among the least affected houses in rural areas. However, a major disadvantage of out-migration was the physical absence of many young men in the villages. This brought further difficulties being placed upon the women, children and elderly in those locales. A survey showed that 73% of households that had reported an absence of a household member due to migration had also expressed a negative emotional impact in terms of coping mechanisms.³² Thus preparing communities to work together through organized leadership would also benefit rural women, elderly and children who remain in their villages when their men leave.

In the NDRF 2013, simulation exercises and drill plans are described and listed as part of disaster preparedness. Early plans for rubble clearance, saving and rescuing with the help of locals, and an action plan for dead body management in urban areas are detailed.⁵ The responsibilities for multiple departments and ministries have been laid out without coordination. There are notable gaps in plans for rural-specific disaster response. For example, plans for dead body management in rural areas do not exist. In this framework, “capacity building” at national and local level is mandated, but there is no specific plan exists for this “capacity building”.

Harsh weather, difficult transport, lack of human resources, bureaucracy, injuries, and psychological reactions can delay the governmental response to major disasters in rural areas. In Nepal, as in Armenia, many rural communities were left to respond on their own for many days. Locals are the first ones to respond, so the first priority of disaster preparedness is to increase community resilience is to equip them with enough resources and training that will save lives. In training and equipping communities, it should be recognized that majority of responders in rural Nepal will be

women. Five mechanisms to increase rural communities resilience are described below: form local leadership, conduct simulations and drills, equip the communities, use social media, and foster hope.

RESULTS AND RECOMMENDATIONS:

Based on the analysis of what transpired in Nepal in 2015, the response observations and comparisons to other disasters, the following recommendations were derived in collaboration with expert disaster specialists:

Formation of local disaster leadership committee

The 1988 Soviet-Armenia earthquake showed the importance of having trained community leaders and organized local volunteers to foster resilience in the early hours after a major natural disaster.¹⁰ Local level DRC should identify high earthquake-risk communities across the country and form community specific disaster leadership committees (DLC). There is an important aspect in disaster response of ensuring the first responders can perform rescues safely. The Gorkha earthquake response revealed that locals responded to help without proper training. Having a trained, organized local response will make local response more effective and safe.^{10,23} As in Armenia, pictures of many men and women—standing around without coordination, without safety gears like hard hats and proper shoes, and without proper tools—can be found removing rubble and looking for survivors. In early response settings, family members can be seen following these volunteers in hopes that their lost ones would be found. How demoralizing and tragic this process is for the responders and the affected families is unimaginable! For the volunteers to endure these without having proper training affects them negatively physically and psychologically. The issues identified in Armenia repeated themselves in Nepal 27 years after the Armenia earthquake.²⁴ Proper leadership must be created in local communities (urban and rural alike) and

lessons from other earthquake prone regions, like California, community preparedness techniques should be adopted within Nepal's context.⁴⁰

Furthermore, community members and DLC should be equipped with first aid training. These include safe extrication measures, application of extremity pressure when necessary, CPR, wound care, and bleeding control. More advanced practice would include lung decompression and IV fluids administration—these should be trained to local level health provider who is from the specific community. In many seismically active parts of the world, the public is completely dependent on the professional health personnel like physicians and nurses.¹⁰ Earthquakes can be unpredictable and health professionals' availability is not guaranteed, especially in the rural areas. In Armenia, a large number of health care personnel was killed and injured, and the hospitals were damaged and rendered non-functional. It is imperative that first responders are ready to take care of common medical emergencies until authorities get there.

Simulations and drills

Once local committee leadership for disaster response is established, disaster simulations and drills should be conducted on a regular basis. The type of building and occupants behaviors have been shown to affect morbidity and mortality; so, evidence based information dissemination and training must be given to all living in high-risk zones.¹⁰ Risk factors that increase mortality include entrapment, older age, location, behavior and time until rescue.³³ Drills should also cover individual behavior—when to escape, where to escape, and what to take. The training should also include recognizing safe spaces within home, fire evacuation and safety plans, proper placement of heavy items at home, what to do if inside vs. outside, etc. Furthermore, households in rural areas must be trained on what to do with livestock. Almost 500,000 livestock were dead in the Gorkha earthquake.⁶ Fire hazards are also high after an

earthquake. Training on proper actions to take to put out a fire is also important.⁴¹

DLCs should be trained on where to meet and what to do after an earthquake. Lessons on proper clothing (long pants, gloves, hard shoes) and avoidance of unstable buildings when rescuing should be emphasized.⁴¹ Special training for taking care of unaccompanied minors should be given as well. Major disasters are known to increase human right violations and trafficking. Counting and identifying the dead and missing presents a challenge for government during disaster. Community volunteers can also be trained to keep a log of the dead, missing and unaccompanied minors.

Furthermore, community leaders should be trained and provided with a proper and efficient reporting mechanism in each of their communities.³⁰ Media reporting in earthquake settings in Nepal and Haiti proved challenging—media mostly focuses its efforts in urban areas, different NGOs' successes, and reports on disease outbreaks and violence. Hence, reliable information gathered from community members could be beneficial to the government's efforts and make response effective.

Equip the communities

For rescue efforts and first aid to be successful, first responders must have proper tools and supplies. The demand for rescue supplies and equipment increases, and lack of them can expose laypersons participating in rescue efforts in safety hazard. It is recommended that both the DRC and community leaders create an earthquake resistant storage area that is accessible to the DLC when an earthquake happens. Tools for rubble removal, gloves, hard hats, flashlights, MRE (meal ready to eat), water filters, portable radio and first aid supplies must be available in these storages. The keys for the storage unit should be distributed to several DLC leaders and community members. Partnering with unilateral and multilateral organizations to equip the

communities could prove beneficial. For example, WHO has an interagency emergency health kits sets of 10 boxes that can meet needs of 10,000 people for three months.⁴³

Additionally, individuals must also be encouraged to store some essential items in a “go-bag”—a bag that one can run out with in case of an earthquake. Sturdy shoes, flashlight, essential medications, warm clothing, MRE, water, cash and copies of official documents are some essentials that should be included in the go-bag. It was shown that better equipped families were the ones who had more cash saving, food stocks and jewelry. Financial literacy and savings plan for a post-earthquake setting can provide a valuable safety net as well.³²

Social Media

Many out-migrants in the Gulf countries were not able to return home on time because of semi-bondage nature of their contract work. Others could only return after relative's death rituals were over. This forced separation indirectly caused psychological grief to the out-migrants who were not living in Nepal and to their relatives at home.²³ The urban victims of the Gorkha earthquake had access to technology and social media to reach their relatives, but the rural were left helpless and unable to access the internet or use their phones for days. Being able to connect to others replaces “helplessness with dignity and control” and increase resilience.¹⁰ The government must prioritize restoring phone towers and making data network available as soon as possible after an earthquake. The major phone providers around the world had made incoming and outgoing calls free for the first few days (some for months) in the 2015 earthquake, but rural Nepalese were not able to reap the early benefit of these services because their network towers were not functioning for many days. If access to social media were made possible early on, it can provide a forum for collectiveness and social convergence.²⁶

Hope-a necessary ingredient

A post-disaster study out of Japan found that prolonged stress and low self-esteem could have long lasting structural changes in the brain.²⁷ The post-earthquake setting is a vulnerable one where people and communities are fragile. Theft and burglary among communities can arise as they did in the 2010 Chile earthquake. In Chile, the search for food degenerated into stealing of non-essentials and this led to general feeling of insecurity to communities.²⁹ Worsening of human rights violations, corruption (especially in pre-existing conflict areas) and lack of accountability were found in the 2004 Indonesia Tsunami.³⁰ Declining physical health and loss of sense of community is related to PTSD symptoms as well.²⁸

After major calamities, hope becomes a necessary ingredient in reducing stress.²² Access to community responders and DLC, and availability of social media can serve as a support system early on to provide hope. Consistent communication and information by government representatives can also give a sense that a community is not forgotten about. Plans and support to conduct community specific cremations and death rituals, and availability of space for religious leaders and prayers (community and religion specific) can play important role in providing hope as well. These issues must be incorporated in planning for disaster in order to build resilience.

DISCUSSION:

The first 72 hours after disastrous earthquake have their own significance, but what follows also plays a major part in morbidity and mortality of the affected. Resettlement can take weeks or months, so communities must be prepared accordingly. In urban areas, most individuals rented houses that were damaged in the earthquake, so they had to resettle in other areas. For those who have houses they can resettle in, they might have incentives to stay in camps because government and health services are available more easily in the camps. This was the case in Haiti.²¹ Rubble removal can

be a major impediment to resettling and rebuilding houses as well. In Nepal, the National Reconstruction Authority (NRA), which is the main body of the government that is in charge of reconstruction, formed 8 months after the Gorkha earthquake. This delay stalled the survivors who faced the harsh winter, living in thin tents and huts made from metal sheets and bamboo. Six earthquake survivors were reported to have died from cold this winter because of living conditions.²⁵ The community's capacity to be resilient in the early hours is vital for their survival, but the government and authorities must be ready to take concrete actions in the days, months and years following an earthquake.

Building disaster resilience in a community is closely tied to its politics, jobs, migration, economies, and infrastructures. The examples of hurricane Katrina and Haiti earthquakes show that disaster resilience is closely tied to communities' social roots.¹⁸ The Nepal Ministry of Home Affairs developed and deployed an information platform (NDRRIP) after the earthquake to create a hub for earthquake-related information for use by government ministries and other stakeholders engaged in disaster recovery and reconstruction.⁶ This platform shows that most people affected were in rural districts, although most medical admissions were in Kathmandu hospitals. Kathmandu is the medical hub of Nepal, and many severely injured individuals from the rural areas were transported to Kathmandu. Highest number of damaged toilets and damaged water supply were all in the rural dense districts of Gorkha, Nuwakot, Sindhupalchowk, and Dhading. An international inter-agency geohazard team mapped 545 landslides following the earthquake, mostly in rural districts of Gorkha, Raswa and Dhading. The damage of roads and highways and net economic loss was highest in the rural districts of Sindhupalchowk, Dhading and Nuwakot as well.⁶ Out of the 14 severely affected districts, 12 were in the mountain and central hill regions.³²

Even if a major earthquake did not damage the rural areas, Nepal's rural areas are important as the majority of Nepalese live there. Following disasters in urban areas, these regions are the escape for the majority of individuals living in Kathmandu and

other urban centers. This was seen in Haiti after the 2010 earthquake as well. In 2010, the heavy exodus from Port au Prince, Haiti to the rural areas placed a severe strain on the local host families who struggled to feed themselves.²¹ In the days following the earthquake in Nepal, fear of more earthquakes, infections, and food insecurity led to an exodus of Nepalese in Kathmandu to rural areas as well.

Unrest after natural disasters can lead to political turmoil. Eric Hobsbawm argues that social rebellions are not just the symptoms of crises in a society; they are also a cry for self-help of social circumstances—“rich exploiting the poor, strong oppressing the weak”.¹ In societies based on agriculture, oppression and exploitation by governments can lead to social banditry. Historically, banditry has been known to be epidemic in times of massive poverty and economic crises, and tends to last longer if governments are weak or divided. Peasant rebellion and banditry are one result of “bad government, oppression, and neglect”.¹² In a country like Nepal—a mountainous country where modern technology is hard to reach—uncontrolled rebellions are much more likely to escalate before state realizes its threats.

This is exactly what happened in Nepal. Nepal has a very fresh history of a decade long Maoist insurgency, one that started as a rural rebellion. The Maoist insurgency that began in early 1996 in Nepal started in mid-western hills, in the districts of Rolpa and Rukum districts. This insurgency was fuelled by “various local grievances, particularly decline of living standards, which the inhabitants reportedly ascribed to the government’s suppression of hashish production in the 1970s.”¹³ These rural areas are mostly comprise of groups that do not speak Nepali, and practice their own religion. The rural population was hesitant to accept the nationalistic propagandas that forced a particular language and particular way to practice Hinduism. The leaders of the Maoist insurgency influenced these communities to join the rebellion by playing the “ethnic card” to stress minority right. In 1995, aggressive recruitment targeted vulnerable communities, and by 1998, the rebellion had extended over wider areas of country.¹³ In the early phase of this uprising, the state essentially ignored these uprising because these areas were of no political or economic interest to the

leaders in Kathmandu. Local Maoists insurgents' influence grew in a few years to a point that peasants understood they were not to anger Maoists if they were to remain safe in their villages.¹³

The Maoists relied on local resources, gradually collecting weapons from police raids and financing themselves through extortion and robbery.¹³ While growing up in a rural village of Gulmi, Nepal, I witnessed numerous times Maoists insurgents demanded food and money from our families. My grandmother would obediently make them food and gave them whatever they wanted. Once a significant minority of dedicated supporters was banded, the state was forced to recognize and act to stop this rebellion, but it was too late. What resulted was more than a decade of political instability, economic damage, and massive out-migration—some due to fear and other due to lack of economic opportunities. There were more than 15,000 dead and around 150,000 internally displaced.¹⁹ Government and civilians, alike, were forced to come to terms the rebellions, and the rebels eventually became integrated into the state.¹⁵ The Maoist insurgency was seen as a hope for justice to the rural peasants, who had been its earliest supports, but the rural people continue to be vulnerable and their issues continue to be ignored even after the Maoist movement has reached its zenith.

History, not too long ago, shows that these rural areas can be sleeping-giants. It is within the political interest that country invests in taking care of the rural people: capacity building and investment in community resilience is one way to do this. Existing unemployment and lack of job creation within the country paves way for young males and able-bodied men to be rebels of the government.¹⁴ People do not join rebellions because they understand the complexities of democratic or socialist theories, but because the revolutions provide a hope that their issues might be finally heard.¹⁶

Given this history, it is no surprise that most disaster risk reduction planning and policies in Nepal are Kathmandu- and urban-focused. The aftermath of the Maoist

rebellion was a stagnant and broken country—lack of economic opportunities have put the country at the verge of missing a major demographic dividend.⁴² After the earthquake, a step towards political stability came with ratification of the constitution. Nepal cannot afford another rural rebellion as it is rebuilding and recovering its infrastructure and economy. The rural communities must not be disregarded by the state. Disasters are seen as opportunities for countries to change their narratives. There is not a better time for Nepal to start making rural issues a priority. Investing in earthquake resilience and capacity building will show the country that the state is there to support all its citizens.

A secondary intent of this study was to help generate an on-going dialogue regarding community resilience between the Nepali government and local community leadership in a continued effort to further mitigate the physical, personal, psychological and economic damage that follows such catastrophic events. In addition, well-prepared governments can also take advantage of high-magnitude disaster concerns to expand resilience and preparedness in areas not directly affected by the 2015 earthquake as well, an alternative reason to invest in resilience and capacity building in rural areas. Nepal is vulnerable to other natural disasters. For example, the Terai region is also known for droughts and fire outbreaks on an annual basis and the World Health Organization (WHO) has reported that 22 glacial lakes in Nepal are in imminent danger of bursting.² 2015 Gorkha earthquake should be a wake-up call to put in place proper mechanisms to allow communities to be resilient—a process that links a network of adaptive capacities after a major disaster.¹¹ A community that is resilient to major earthquakes may be able to respond to other disasters as well.

In that respect, Nepal needs and deserves a plan that rebuilds its public institutions, creates jobs outside the agriculture sector and provides such resources for the rural youth and takes advantage of the window of opportunity created by the demographic transition in the country. ‘Building back better’²² requires building resilient communities—both urban and rural. This task includes, but is not limited to, building

disaster resistant homes, choosing location and building sites wisely, rendering infrastructures to support its people, building roads and bridges to access rural areas more easily, improving the water and sewage systems, repairing old hospitals and building new ones, and making sure schools will stand their ground, and creating jobs.^{21, 35}

As this study's recommendations are mostly surrounding the first response to the earthquake, this focus involves empowering and creating capacity-building in the community. There are other options to consider for the initial response period that were not discussed in this current analysis. For example, the first ever use of drones for a major disaster was in the Nepal earthquake. Nepal's geography and road infrastructure made it very difficult for the outside response to reach the communities in rural areas. This experience indicated that drones provide room for major interventions during the acute settings.

The Gorkha earthquake was expected to kill 100,000 people, but fortunately, the number was not as high as expected likely due, in part, to the time of day and day of the week when many children were outside in playgrounds and office workers were not inside buildings while rural farmers were in their fields. The timing of the earthquake could not have been better from the perspective of casualties. What would the damage be if it occurred on Monday at 11:56 am? With the 50,000 classrooms damaged, what would be the toll of children dead? With 1000 health facilities damaged, how many patients and health workers would be lost in the rubble? Without better preparing local communities and optimizing the resilience mechanisms for rural areas, the aftermath of this magnitude event will be much worse in the future.

The Gorkha earthquake should pave opportunity to make Nepal a country of resilience and a country of inclusiveness. When it comes to the next big disaster, what does Nepal desire? A country where it is every man and women for themselves, where rural communities' have less chance of survival and recovery, where there is

no plan of action in the first hours of earthquake? Or communities that are able to pick themselves back up, communities that lend hands to each other, a partnership between community and government that foster resilience?

“Man has an insatiable longing for justice...man is filled with strange urge to...change things...”²² The marginalized rural population of Nepal has longed for justice and the Maoist rebellion was a result of the longing. The Nepal government must make policies that are inclusive of rural areas and follow them through by rigorous implementation. Well-informed and well-prepared local governments and local communities can minimize the impact of an earthquake. In Nepal, where communities vary from place to place, it is important to have decentralized plans for building resilience based on local needs and priorities. Resilient communities will prove politically and economically beneficial for the country of Nepal, where next major earthquake can occur at any time.³¹

Even in the midst of major political conflict, progress did not stop completely for Nepal. Since the 1990s, indicators like maternal and infant mortality have decreased, life expectancy has risen, road network expanded, telephone lines increased, and literacy rate rose.¹³ The country has begun to take a step towards the right direction, but a lot of work exists, especially in making communities resilient to calamities. In the words of a great India-Pakistan partition Urdu poet, Faiz Ahmed Faiz:

chale chalo ke woh manzil abhi nahi aaie

(Let's keep on moving—the destination is yet to come)

CONCLUSIONS:

In Nepal, a country with political and economic instability for decades, the Gorkha earthquake caused thousands of lives to be affected and billions of dollars in damage as well. As was the case in other nations with an underlying infrastructure of poverty, political instability and largely rural in nature, the differential impact in these cases reflect that the resulting damage and outcomes following an earthquake or other

natural disasters are not merely the damage from an act of nature, but also the underlying social-economic roots that constrain resilience. The burdens of such chronic social and infrastructure weaknesses become overtly apparent in the acute phases of a disaster, but these may be mitigated by an improved focus on local community training and resources that will sustain an initial response in the critical first 2 – 3 days after the initiating event.

APPENDICES:

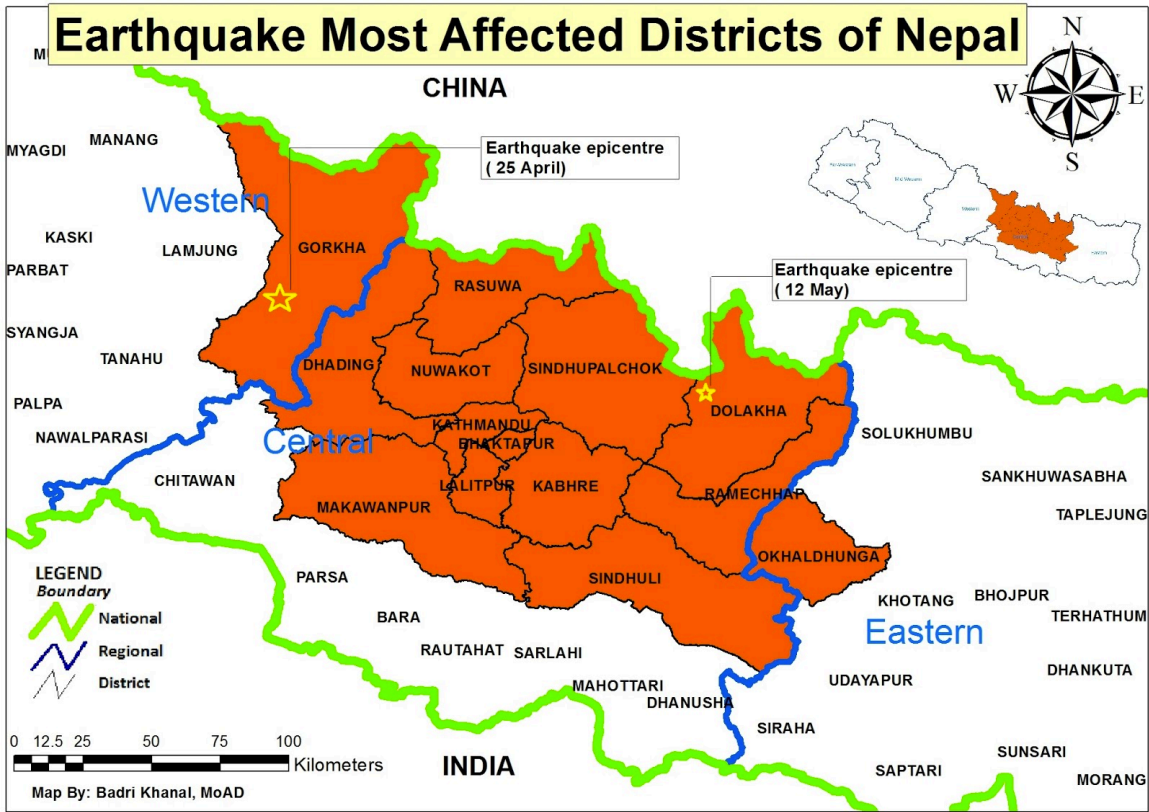
A) Abbreviations

UNDP:	United Nations Development Programs
NDRF:	National Disaster Response Framework
UNOCHA:	United Nations Office of Coordination for Humanitarian Affairs
NDRRIP:	National Disaster Relief and Recovery Information Platform
KM:	kilometers
DRR:	Disaster Risk Reduction
DRC:	Disaster Relief Committee
DLC:	Disaster Leadership Committee

B) Maoist expansion across Nepal: 2003



C) Severely affected districts in the 2015 Gorkha Earthquake



References:

- ¹ Farmer, P. (2011). *Haiti after the earthquake*. New York: PublicAffairs.
- ² WHO. (n.d.). Humanitarian crisis after the Nepal earthquakes 2015.
- ³ M7.8 - 36km E of Khudi, Nepal. (n.d.). Retrieved March 10, 2016, from http://earthquake.usgs.gov/earthquakes/eventpage/us20002926#general_region
- ⁴ NSET, & UNDP. (n.d.). National Strategy for Disaster Risk Management in Nepal.
- ⁵ Nepal, Government of Nepal, Ministry of Home Affairs. (2013). *National Disaster Risk Framework*. Retrieved from [http://www.ifrc.org/docs/IDRL/2011 National Disaster Response Framework \(unofficial translation \).pdf](http://www.ifrc.org/docs/IDRL/2011%20National%20Disaster%20Response%20Framework%20(unofficial%20translation).pdf)
- ⁶ Nepal Earthquake 2015. (n.d.). Retrieved March 1, 2016, from <http://apps.geoportal.icimod.org/NDRRIP/>
- ⁷ Chile Quake Death Toll. (n.d.). Retrieved March 10, 2016, from <http://www.skynews.com.au/news/world/sthamera/2015/09/19/chile-quake-death-toll-hits-13.html>
- ⁸ Tsunami warning after powerful earthquake hits Chile. (2015). Retrieved March 10, 2016, from <http://www.colliemail.com.au/story/3355449/tsunami-warning-after-powerful-earthquake-hits-chile/>
- ⁹ (n.d.). Retrieved March 10, 2016, from <http://www.merriam-webster.com/dictionary/resilience>
- ¹⁰ Noji, E. K. (1989). The 1988 Earthquake in Soviet Armenia: Implications for Earthquake Preparedness. *Disasters*, 13(3), 255-262.
- ¹¹ URD, British Red Cross, & Nepal Red Cross. (n.d.). Urban preparedness, lessons from Kathmandu valley.
- ¹² Hobsbawm, E. J. (1969). *Bandits Chapter 1*. New York: Delacorte Press.
- ¹³ Whelpton, J. (2005). *A history of Nepal, Democracy and disillusionment*. Cambridge: Cambridge University Press.
- ¹⁴ Hobsbawm, E. J. (1969). *Bandits Chapter 2*. New York: Delacorte Press.
- ¹⁵ Hobsbawm, E. J. (1969). *Bandits Chapter 6*. New York: Delacorte Press.
- ¹⁶ Hobsbawm, E. J. (1969). *Bandits Chapter 7*. New York: Delacorte Press.
- ¹⁷ Buhle, P., Hutchinson, C., Dumm, G., & Rudahl, S. (2011). *Robin Hood: People's outlaw and forest hero: A graphic guide*. Oakland, CA: PM Press.
- ¹⁸ Farmer, P., Gardner, A. M., Der, H. H., & Mukherjee, J. (2011). *Haiti after the earthquake Chapter 2*. New York: PublicAffairs.
- ¹⁹ Ed Douglas. "Inside Nepal's Revolution". *National Geographic Magazine*, p. 54, November 2005. Douglas lists the following figures: "Nepalis killed by Maoists from 1996 to 2005: 4,500. Nepalis killed by government in same period:
- ²⁰ Farmer, P., Gardner, A. M., Der, H. H., & Mukherjee, J. (2011). *Haiti after the earthquake Chapter 3*. New York: PublicAffairs.
- ²¹ Farmer, P., Gardner, A. M., Der, H. H., & Mukherjee, J. (2011). *Haiti after the earthquake Chapter 6*. New York: PublicAffairs.
- ²² Farmer, P., Gardner, A. M., Der, H. H., & Mukherjee, J. (2011). *Haiti after the earthquake Chapter 8*. New York: PublicAffairs.
- ²³ The hurt of distance. (n.d.). Retrieved March 2, 2016, from <http://kathmandupost.ekantipur.com/printedition/news/2015-05-11/the-hurt-of-distance.html>
- ²⁴ Leaning, J. (n.d.). *Armenia Earthquake*. Lecture.
- ²⁵ Nepal: After winter, a ray of hope for quake survivors. (n.d.). Retrieved March 1, 2016, from <http://www.aljazeera.com/indepth/features/2016/03/nepal-winter-ray-hope-quake-survivors-160301134310892.html>

-
- ²⁶ Keim, M., & Noji, E. (2011). (A302) Emergent use of Social Media: A New Age of Opportunity for Disaster Resilience. *Prehospital and Disaster Medicine Prehosp. Disaster Med.*, 26(S1).
- ²⁷ Sekiguchi, A., Kotozaki, Y., Sugiura, M., Nouchi, R., Takeuchi, H., Hanawa, S., . . . Kawashima, R. (2014). Resilience after 3/11: Structural brain changes 1 year after the Japanese earthquake. *Molecular Psychiatry Mol Psychiatry*, 20(5), 553-554.
- ²⁸ Tuerk, P. W., Hall, B., Nagae, N., Mccauley, J. L., Yoder, M., Rauch, S. A., . . . Dussich, J. (2013). Forty Days After the Great East Japan Earthquake: Field Research Investigating Community Engagement and Traumatic Stress Screening in a Post-Disaster Community Mental Health Training. *The International Journal of Psychiatry in Medicine*, 45(2), 159-174.
- ²⁹ Dussaillant, F., & Guzmán, E. (2014). Trust via disasters: The case of Chile's 2010 earthquake. *Disasters*, 38(4), 808-832.
- ³⁰ Stover, E. (n.d.). Human rights and mass disaster: Lessons from the 2004 tsunami. Retrieved March 2, 2016, from <http://www.ncbi.nlm.nih.gov/pubmed/18277529>
- ³¹ A., & Shaw, R. (2014). Introduction and Approaches of Disaster Risk Reduction in Pakistan. *Disaster Risk Reduction Disaster Risk Reduction Approaches in Pakistan*, 3-29.
- ³² Sijapati, B. (n.d.). *Migration and Resilience: Experience from Nepal's 2015 earthquake* [Scholarly project].
- ³³ Noji, E. (n.d.). *Geophysical Events Chapter 8 Earthquakes*.
- ³⁴ Lorch, D. (2015). Uncertainty and Helplessness Become a Way of Life in Nepal. Retrieved March 2, 2016, from http://www.nytimes.com/2015/05/25/world/asia/in-nepal-dread-of-another-earthquake-keeps-residents-on-edge.html?_r=0
- ³⁵ Sinha, S. (2015). How to Rebuild After an Earthquake Like Nepal's. Retrieved March 10, 2016, from <http://www.nytimes.com/interactive/2015/05/14/world/asia/nepal-rebuild-earthquake-tips.html>
- ³⁶ The Nepal Earthquake: A warning for the future? - Geographical. (n.d.). Retrieved March 2, 2016, from <http://geographical.co.uk/nature/tectonics/item/1513-the-nepal-earthquake-a-warning-for-the-future>
- ³⁷ (n.d.). Retrieved March 10, 2016, from <https://www.cia.gov/library/publications/the-world-factbook/>
- ³⁸ World Health Organization. (n.d.). Retrieved March 10, 2016, from <http://www.who.int/en/>
- ³⁹ Whelpton, J. (2005). *A history of Nepal, Introduction*. Cambridge: Cambridge University Press.
- ⁴⁰ Community Resilience. (n.d.). Retrieved March 10, 2016, from <http://resilience.abag.ca.gov/resilience/>
- ⁴¹ Earthquake Preparedness & Safety | What to Do | American Red Cross. (n.d.). Retrieved March 9, 2016, from <http://www.redcross.org/prepare/disaster/earthquake>
- ⁴² Demographic dividend | UNFPA - United Nations Population Fund. (n.d.). Retrieved March 10, 2016, from <http://www.unfpa.org/demographic-dividend>
- ⁴³ World Health Organization. (n.d.). Retrieved March 25, 2017, from <http://www.who.int/emergencies/nepal/en/>
- ⁴⁴ Haiti Earthquake Facts and Figures. (2015, May 01). Retrieved March 25, 2017, from <https://www.dec.org.uk/articles/haiti-earthquake-facts-and-figures>

VITAE:

Ramu Kharel is a candidate for M.D. from UT Southwestern Medical Center. Kharel is pursuing emergency medicine residency at Emory University from July 2017. Kharel was born in Nepal. He founded a non-profit organization, HAPSA, to promote community centric health care in Nepali villages. Kharel's academic interests lie in disaster resilience, health system strengthening and emergency response systems. Kharel has a Masters of Public Health degree from Harvard University. Kharel enjoys Urdu poetry and Basketball!