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A continuum of perceived urban risk - from the Gorkha earthquake to economic insecurity

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ABSTRACT Global discussions of risk in the disaster risk reduction literature do not necessarily reflect the range of risk as understood by residents in the urban South. This intra-urban comparison from Bharatpur, Nepal, where the Gorkha earthquake struck in 2015, shows how residents in two different wards perceive risks related to themselves, their families and their urban environment. The continuum of perceived urban risk includes events such as the Gorkha earthquake and the administrative change as well as everyday concerns such as poor quality of infrastructure provision and economic insecurity. By contrasting the views of these residents of an “ordinary” city in the urban South, and comparing them also with the views of the local authority, this paper allows for an enriched understanding of how risk is understood, highlighting the breadth of concerns involved, and the tensions in understandings of the full spectrum of urban risk. Understandings and definitions of risk matter. If perceptions of risk from the local level are not included within the broader DRR discourse, then this shapes and in effect, limits the risks that are actually managed through policy and practice.

I INTRODUCTION

On the 25th April 2015, the Gorkha earthquake struck Nepal, causing 8,896 fatalities, 22,303 injuries, and US\$ 7 billion worth of damages and losses¹. Overnight, questions of ‘risk’ were on the agendas of the government of Nepal and many international agencies. But risk did not begin – or end – with the Gorkha earthquake. Disaster risk reduction – in policy, experiential and scholarly terms – sits within a continuum of risks, spread over different timescales and modes of risk production, each risk with its own quite discrete spatial footprint and social texture. New insights into the scale and nature of urban risk are needed if we are to unpack and make sense of the range of urban risk².

¹ Government of Nepal, Ministry of Home Affairs and Disaster Preparedness Network-Nepal (2015) *Nepal Disaster Report 2015*. [Online]. Ministry of Home Affairs (MoHA), Government of Nepal; and Disaster Preparedness Network-Nepal (DPNet-Nepal). Available at: <http://www.drrportal.gov.np/uploads/document/329.pdf> (Accessed: 9 February 2017).

² Manda M and Wanda E. (2017) Understanding the natural and scale of risks in Karonga, Malawi. *Environment and Urbanization*. [Online] 29 (1), 15–32. Available at: doi:10.1177/0956247816686905.

Satterthwaite D. and Bartlett S. (2017) Editorial: The full spectrum of risk in urban centres: changing perceptions, changing priorities. *Environment and Urbanization*. [Online] 29 (1), 3–14. Available at: doi:10.1177/0956247816686905.

Ziervogel G., Pelling M., Cartwright A., Chu E., et al. (2017) Inserting rights and justice into urban resilience: a focus on everyday risk. *Environment and Urbanization*. [Online] 29 (1), 123–138. Available at: doi:10.1177/0956247816686905.

Bull-Kamanga L., Diagne K., Lavell A., Leon E., et al. (2003) From everyday hazards to disasters: the accumulation of risk in urban areas. *Environment and Urbanization*. 15 (1), 193–204.

Global discussions of risk in the disaster risk reduction literature³ do not necessarily reflect the range of risk as understood by residents in the urban South. Urban residents face a continuum of risks that cannot and should not be analyzed as separate and distinct. In this paper, a continuum of perceived urban risk is explored based on the views of residents through an intra-urban comparison. Drawing on a case study from Bharatpur, Nepal, this paper demonstrates how residents' perceptions of hazard (including the Gorkha earthquake of 2015) and risk may differ based on their location in the city and their income levels. Interpretations of risk in the city are also explored from the viewpoint of the local authority in Bharatpur.

In the global South, urban residents often live in conditions where there is a relative absence of key provision from the state including for basic welfare, social services and infrastructure⁴. Bharatpur, Nepal is an 'ordinary' medium-sized city⁵ with no particular claim to fame, which may appear to be globally, economically, politically and spatially irrelevant. In reality, this type of 'ordinary' city is where most of the world's urban residents live today⁶. Cities like Bharatpur are also where most of the projected global population growth will occur over coming decades, in urban centers with less than half a million inhabitants⁷. Many of these small and medium-sized cities face a number of challenges, including significant inward migration resulting in rapid urbanization, limited, if any, urban planning, insecure livelihoods, rapidly reconfiguring social networks, a lack of regular or adequate provision for electricity, solid waste management, water and sanitation⁸.

This paper complements the urban risk literature from the Environment & Urbanization's April 2017 issue '*Understanding the full spectrum of risk in urban areas*'⁹. In the context of rapidly evolving urban risk in Nepal, this paper provides a contribution to understanding the continuum of risk that encompasses not only vulnerability to natural hazards but also such everyday concerns as economic hardship. Generally-speaking, national governments and international agencies are improving their disaster risk reduction (DRR) policies. The level of preparation for and response to events such as the Gorkha earthquake, notwithstanding the loss of life, reflect such improvements. Where matters have not progressed to an equivalent degree, it is argued here, is in the placement of such events within the wider evolving risk context.

II CONCEPTUAL FRAMEWORK

³ United Nations Office for Disaster Risk Reduction (2015) *Sendai Framework for Disaster Risk Reduction 2015 – 2030*.

⁴ Mitlin D. and Satterthwaite D. (2013) *Urban Poverty in the Global South Scale and Nature*. London, Routledge.

⁵ Robinson J. (2006) *Ordinary cities: between modernity and development*. Questioning cities. London; New York, Routledge.

⁶ United Nations, Department of Economic and Social Affairs and Population Division (2014) *World urbanization prospects: the 2014 revision: highlights*.

⁷ Dodman D., Brown D., Francis K., Hardoy J., et al. (2013) *Understanding the nature and scale of urban risk in low- and middle-income countries and its implications for humanitarian preparedness, planning and response*. London, International Institute for Environment and Development, pg 1

⁸ See reference 4.

⁹ Ro C., Bartlett S. and Satterthwaite D. eds. (2017) *Understanding the full spectrum of risk in urban areas*. [Online] 29 (1). Available at: doi:10.1177/0956247816686905.

There is a significant body of research on large-scale, rapid onset and high impact natural hazard events¹⁰ such as earthquakes or volcanic eruptions, often referred to in terms of “intensive risk”¹¹. In recent years, a number of researchers have also explored smaller scale, but more chronically recurring events that cumulatively can have a significant impact at the individual, household and community level – everyday or “extensive risk”¹². The research presented here sits between these two bodies of work. A large scale, rapid onset hazard event (Gorkha earthquake) is discussed in this paper, but only as part of a broader understanding of risk from the perspective of urban residents and local authorities.

A social constructivist lens is utilized in the effort to understand people’s perceptions of risk. According to Pidgeon et al, this perspective: “Involves people’s beliefs, attitudes, judgements and feelings, as well as the wider social or cultural values and dispositions that people adopt, towards hazards and their benefits”¹³. Risk perception is multidimensional, whereas a particular hazard can signify “different things to different people”¹⁴. The starting point for considering the everyday involves “ordinary people, everyday actions and commonplace events”¹⁵. With a focus on normal living rather than abnormal events, a concern with the everyday acknowledges the necessity to consider ordinary people who live and conduct their lives in the best way they can. What can be considered risk from the perspective of urban residents differs from ideas of risk calculation and the management of risk¹⁶ as understood by governments, the IAC¹⁷ and the academic community.

¹⁰ Wisner B., Gaillard J.C. and Kelman I. eds. (2012) *The Routledge handbook of hazards and disaster risk reduction*. London ; New York, Routledge.

Wisner B., Blaikie P.M., Cannon T. and Davis I. (2004) *At risk: natural hazards, people’s vulnerability, and disasters*. 2nd ed. London ; New York, Routledge.

¹¹ See reference 7, pg 5.

¹² Wamsler C. and Brink E. (2014) Moving beyond short-term coping and adaptation. *Environment and Urbanization*. [Online] 26 (1), 86–111. Available at: doi:10.1177/0956247813516061.

Sou G. (2014) *Risk Perceptions and responses in disaster - prone cities of the Global South*. Manchester, University of Manchester.

Bull-Kamanga L., Diagne K., Lavell A., Leon E., et al. (2003), see reference 2.

¹³ Pidgeon N., Hood C., Jones D., Turner B., et al. (1992) Risk Perception. In: Royal Society (ed.). *Risk: analysis, perception and management*. London, Royal Society. pg. 89.

¹⁴ See reference 13.

¹⁵ Rigg J. (2007) *An everyday geography of the global south*. London; New York, Routledge. Pg 16.

¹⁶ For a short comprehensive literature review of the three major theoretical perspectives on risk, see Lupton (1999, pp 1-6) Lupton D. (1999) Introduction. In: Lupton D. (ed.). *Risk and sociocultural theory: new directions and perspectives*. Cambridge; New York, Cambridge University Press. pp. 1–11.

¹⁷ International aid community

The UNISDR's¹⁸ definition of hazard is utilized in this research: "A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Hazards can include latent conditions that may represent future threats and can have different origins: natural (geological, hydro meteorological and biological) or induced by human processes (environmental degradation and technological hazards)". The interlinkages between disasters and risk highlights the need to pay "more attention to people's own priorities, perceptions and belief systems" in relation to everyday risks and hazard events, according to Bankoff et al¹⁹.

The way we conceive the "urban" needs increasingly to be based on the reality of cities and towns in the global South. In this context, there is an intersection of different forms of risk that render urban existence itself a risky undertaking for many residents. It is increasingly difficult for urban residents to avoid or resist political instability, conflict, economic precarity, health crises, and ecological disaster, all of which can occur at different scales with an impact on the urban everyday. As Dodman and colleagues argue, "The scale and nature of urban risk depends on how risk is conceived".²⁰ There is a pressing need to understand the full spectrum of risks in urban areas. In order to do so, it is worth extending consideration beyond disasters and disaster risk mitigation to, as Pieterse et al²¹ suggest, "imagine and develop a more credible account of everyday urbanism" which will broaden and deepen an understanding of urban risk in ordinary, global urban cities such as Bharatpur, Nepal.

Bull-Kamanga et al's²² seminal paper suggests there is a relationship between disasters and an increase in risk from poorly managed urban development. They also propose that there is a need to understand how local governments and community organizations identify and act on processes that cause the accumulation of risk in urban areas. Dodman et al²³ expand on concepts of intensive risk and extensive risk based on frequency, scale and impact. They propose that for the urban poor, the highest levels of risk from everyday hazards are usually associated with poor-quality housing and lack of infrastructure and services. They also stress the importance of relationships between low-income communities and the local government as well as the importance of mainstreaming disaster risk reduction into development policies and urban

¹⁸ United Nations Office for Disaster Risk Reduction (2015) *Sendai Framework for Disaster Risk Reduction 2015 – 2030*, pg 9.

¹⁹ Bankoff G., Cannon T., Kruger F. and Schipper E.L.F. (2015) Introduction: exploring the links between cultures and disasters. In: Krüger F., Bankoff G., Cannon T., Orłowski B., et al. (eds.). *Cultures and disasters: understanding cultural framings in disaster risk reduction*. Routledge studies in hazards, disaster risk and climate change. 1 Edition. London; New York, Routledge, Taylor & Francis Group. pg 11.

²⁰ See reference 7

²¹ Pieterse E., Simone A.M. and University of Cape Town eds. (2013) *Rogue urbanism: emergent African cities*. Auckland Park, South Africa, Jacana, pg 12.

²² See reference 2.

²³ See reference 7 pg 5, intensive risk: the risk from major disasters with the potential for 25 or more deaths and or 600 or more houses destroyed or seriously damaged in one municipality / local government area, extensive risk: the risk of premature death, injury/illness and impoverishment from all events whose impact is too small to be classified as a major disasters (or intensive disasters).

planning. UNDP and ODI's 2016 report,²⁴ focusing on the critical role of risk and resilience in addressing the financing of sustainable development, use the slightly different language of stresses and shocks to convey the relevance of including not only environmental occurrences (drought, flood, earthquake, tsunami, hurricane or cyclone) in the range of risks, but also health shocks, conflict and economic shocks.

Stressing the importance of context, the 2014 World Disasters Report²⁵ discusses the concept of risk: "Risk is itself culturally-defined... [resulting in] the problem that DRR organizations sometimes have a different definition of risk from those of the people affected". This can lead to situations where the risk perceptions and needs of urban residents are not acknowledged or are even ignored when urban risk is explored and debated on global levels. To address this gap, Wamsler and Brink²⁶ provide an overview of urban residents' coping and adaptive practices in several countries with an emphasis on disaster risk reduction and climate change. They also present insights regarding residents' risk-reducing effects. These bodies of literature collectively suggest the importance of considering a range of risks and different urban contexts.

This paper contributes to the expanding body of research on the scale and nature of urban risk in two ways. First, it provides insight into what residents view as hazards and risks in the everyday as well as how residents view – and therefore prepare for and respond to – less frequently occurring events such as the Gorkha earthquake. And second, it contributes to an understanding of how changing municipal structures and policies ameliorate, create and re-shape risks. These insights can expand knowledge in a fruitful way to contribute to a richer understanding of the continuum of urban risks. This paper also opens a space to highlight the tensions in understandings of the full spectrum of urban risk, and their evolving intersections on a local level and on a global policy level.

III LEARNING ABOUT BHARATPUR, NEPAL

This paper is informed by empirical work in the rapidly urbanizing medium-sized city of Bharatpur in Nepal. Bharatpur is the type of city that researchers have not investigated empirically to any significant degree in Nepal, where urban research has primarily focused on Kathmandu Valley, until recently the main urban hub of Nepal.²⁷ This is now changing in the context of the country's rapid urbanization.

a. Description of the study area

Bharatpur is the fifth largest city in Nepal and has a population of 200,000. It is located on the plains of Nepal, in Chitwan District bordering Bihar State, India (Figure 1). Bharatpur is a young municipality, established in 1979, which has emerged from a small market town. The municipality had 14 wards when the fieldwork began in 2014 and then it was designated a sub metropolitan city, encompassing 29 wards in December 2014. Today, Bharatpur is a heterogeneous city; the main caste and ethnic groups are Brahmin, Chhetri, Newari, Tamang and Gurung²⁸. Internal migration continues and includes new affluent high caste migrants, migrants

²⁴ Watson C. and Kellett J. (2016) *Financing sustainable development, The critical role of risk and resilience*.

²⁵ International Federation of Red Cross (2014) *World disasters report; Focus on culture & risk 2014*. [Place of publication not identified], Intl Fed Of Red Cross.

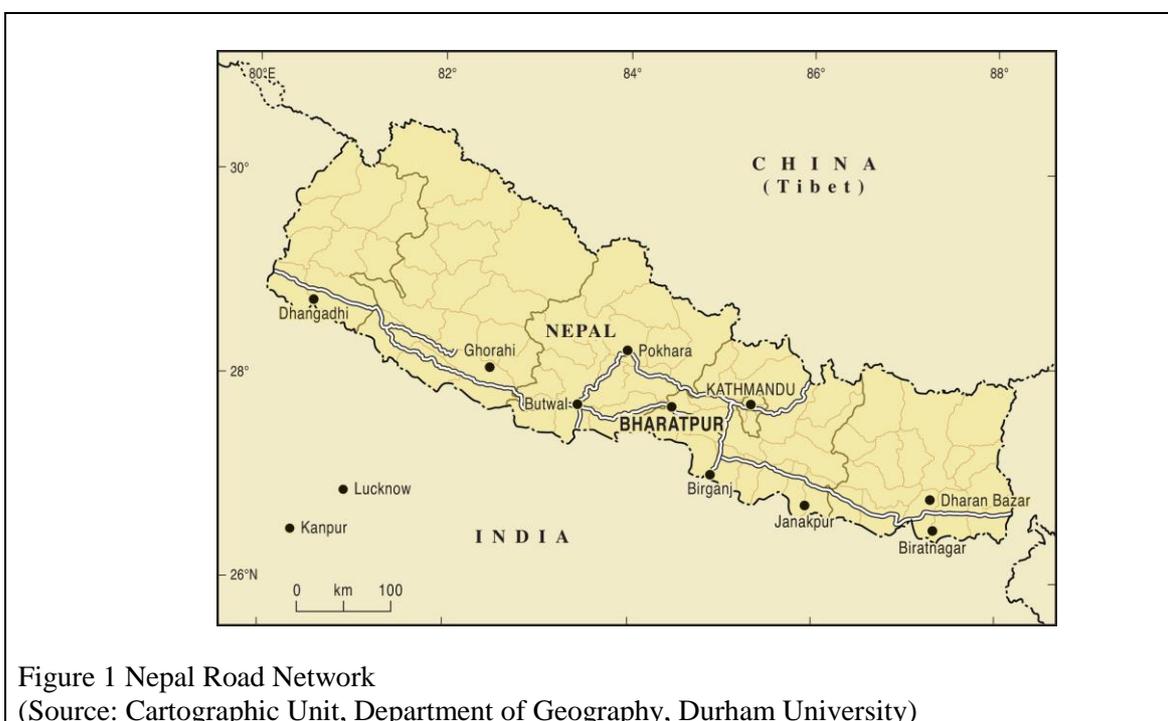
²⁶ See reference 12.

²⁷ Muzzini E., Aparicio G. and World Bank (2013) *Urban growth and spatial transition: an initial assessment*. Washington, D.C, World Bank.

²⁸ Bharatpur Municipality, Nepal (2014) *Bharatpur Municipal Profile*.

who are fleeing conflict in their villages and towns as well as economic migrants from the neighbouring Indian state of Bihar.

Bharatpur's residents have different connections to each other, to the local authority and to the urban environment. The way they live in the everyday and what they consider relevant provides an opportunity to know and learn about Bharatpur²⁹. There is not a strong economic base in the city. The local economy is largely financed by remittances from young men working in the Gulf countries and Malaysia. According to the World Bank³⁰, Chitwan District is the third highest remittance-receiving district in Nepal (out of 75 districts). The trend of international migration and remittances has increased dramatically since 2000. In 2000, remittances were 14 percent of GDP, in 2010 they were 22 percent and most recently, in 2015, remittances contributed 32 percent of GDP. The national economy is increasingly dependent on labour moving abroad. This is due in part to the ten year internal conflict during which 13,000 people died in Nepal. This research shows that reliance on international remittances accounted for a significant source of household income in Bharatpur, similar to more general figures for Nepal³¹.



For this research, two wards were chosen based on their physical differences, rates of urbanization and resident profiles. Ward 4, bordering the Narayani river, is located in the eastern part of Bharatpur. It is the oldest part of the city - the commercial, retail and financial

²⁹ McFarlane C. (2010) The Comparative City: Knowledge, Learning, Urbanism: The comparative city: knowledge, learning, urbanism. *International Journal of Urban and Regional Research*. [Online] 34 (4), 725–742. Available at: doi:10.1111/j.1468-2427.2010.00917.x.

³⁰ World Bank (2011) *Large-Scale Migration and Remittance in Nepal: Issues, Challenges, and Opportunities Report NO.55390-NP*.

³¹ Practical Action and Nepal Risk Reduction Consortium (2014) *Understanding the Role of Remittances in Reducing Earthquake Risk*.

hub as well as the transportation intersection between two national highways (Figure 2). Ward 4, with its 15,000 residents, is a dense part of the city that sustains many elements of urban life. The population is diverse: there are Muslims, the business-oriented Newari ethnic group, as well as Brahmin and Chhetri groups. Ward 4 is where tenants, aspiring middle class home owners, informal settlement dwellers and transient Indian migrant workers are creating their urban lives in a diverse, fragmented setting, often socially separate from each other. This ward has many types of industries, some of which emit pollutants into the air or the river network.



Figure 2 Nepal's east-west motorway bisects Bharatpur, September 2015 (Source: author)

Ward 11, bordering the forest in central part of Bharatpur (Figure 3), was historically agricultural land inhabited by the indigenous Kumal population. Thirty years ago, people from the Lama and Tamang ethnic groups in Nepal's hill country arrived and settled in the center of ward 11, at times in conflict with the indigenous population over land. Twenty years ago, high caste Brahmins from the hills of Nepal were encouraged by the central government to settle in the Terai; some settled on the outskirts of Ward 11 near the forest. Over time, these residents have received land ownership rights from the central government for their homes but they do not own agricultural land. These residents, the indigenous group, the ethnic groups and the high caste but poorer Brahmin and Chhetri residents are marginalized, with scarce opportunities for employment, poor road networks and poor access to water. Housing 21,000 residents, Ward 11 has been described as a "patchwork combination of formal and informal infrastructures"³² evident in the road network, which is intermittently paved and unpaved.

³² McFarlane C. and Silver J. (2017) Navigating the city: dialectics of everyday urbanism. *Transactions of the Institute of British Geographers*. [Online] Available at: doi:10.1111/tran.12175 (Accessed: 10 February 2017), pg 7

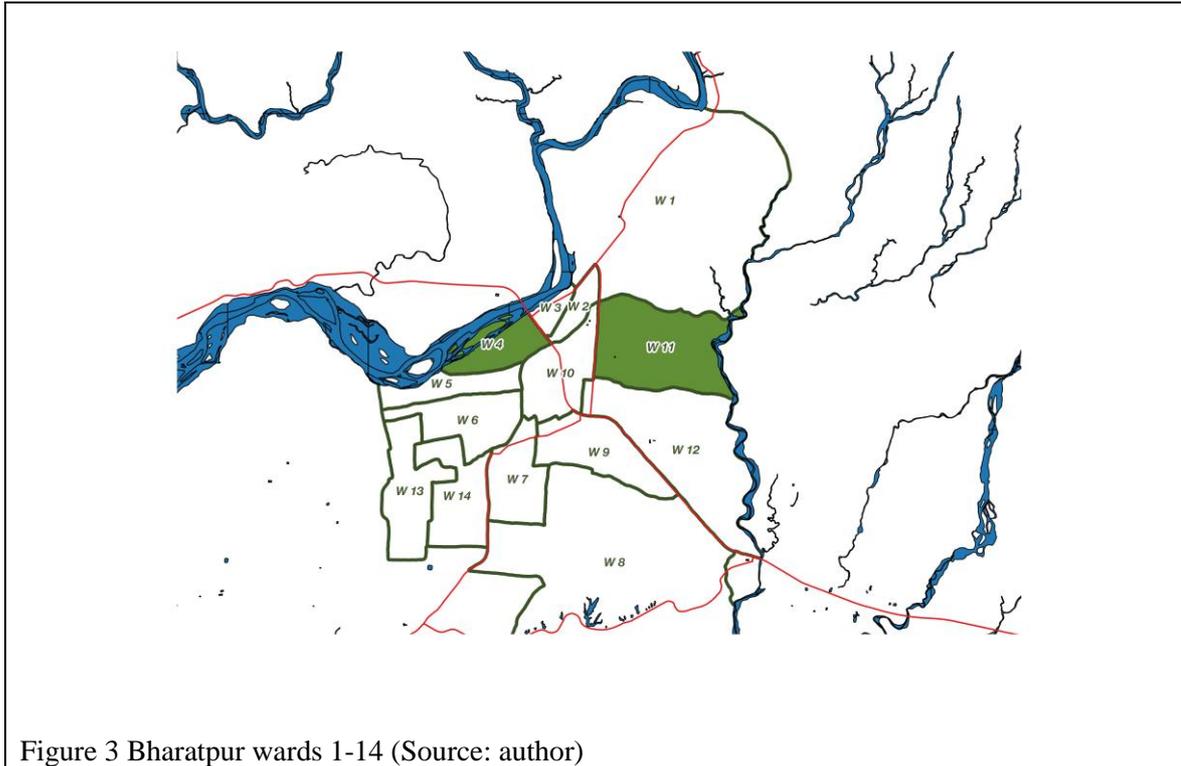


Figure 3 Bharatpur wards 1-14 (Source: author)

Most of the more affluent Brahmin and Chhetri newcomers (most of whom have arrived since the early 2000s) have settled on the southern border of Ward 11, near the city center where the good quality facilities (hospitals and schools) are located. These home-owning newcomers have tenuous relationships with the inhabitants who have been here for decades. Due to their affluence and high caste, the Brahmin and Chhetri newcomers in Ward 11 have political access to the local authorities and are able to bring local government resources to their fragment of Ward 11 in order to build infrastructure, including paved roads, where needed.

b. Methodological approach

This research utilized a qualitative approach³³ in this intra-urban comparison, investigating changes in risk perception and resilience strategies among different resident groups in Bharatpur. Research methods included semi-structured interviews, focus group discussions, photography, as well as observation of the daily flow of life. The questions were developed in English and subsequently translated by the research project's Nepali partner, the National Society for Earthquake Technology (NSET). The interviews and focus group discussions were conducted in the Nepali language through the support of a research assistant, or in English where appropriate. The research took a multi-scale perspective, exploring how different scales³⁴ impact each other and how power and influence flows between the scales (household, community level, local authority, national level and international). This research was carried out in an iterative manner over a period of one year (November 2014 – October 2015) during which I, as the researcher, conducted three fieldwork trips to Bharatpur as well as interviews in Kathmandu and the USA.

³³ McFarlane C., Silver J. and Truelove Y. (2016) Cities within cities: intra-urban comparison of infrastructure in Mumbai, Delhi and Cape Town. *Urban Geography*. [Online] pg 1-25. Available at: doi:10.1080/02723638.2016.1243386.

³⁴ For a detailed explanation of scales see Swyngedouw E. (1997) Neither Global nor Local: 'Glocalization' and the Politics of Scale. In: Cox K.R. (ed.). *Spaces of globalization: reasserting the power of the local*. Perspectives on economic change. New York, Guilford Press. pp. 137–166.

I observed a number of changes over the period of this study. As part of the political changes on a national level, the national constituent assembly promulgated a new constitution after deliberating for seven years, and the number of municipalities in Nepal was increased by 275%, creating a nominally more urban country. During this same year, the devastating Gorkha earthquake struck. The three fieldwork trips coincided with the phases referred to by the IAC: “before, during and after” the high intensity earthquake of April 2015³⁵ that killed almost 9,000 people.

Respondents from Wards 4 and 11

During the fieldwork trips in Bharatpur, semi-structured interviews were conducted with 42 residents from wards 4 and 11. Twenty three of these residents answered questions regarding their every day worries and views of natural hazards. The other 19 residents, along with participants in seven focus group discussions (with neighborhood groups and women’s groups), provided additional empirical data for this study.

These respondents were selected from a pre-existing data set. In 2013, NSET had chosen Bharatpur as the pilot city to conduct a Baseline Survey on Earthquake Risk Perception and Preparedness. This survey of 2,000 residents from all 14 wards was an entry point for NSET to understand people’s risk perception of natural hazards as well as epidemics and fires. No dataset of this size and scope existed in Nepal at the time. NSET allowed me to access the dataset for my research project. In preparation for my second fieldwork trip to Bharatpur in April 2015, I utilized NSET’s dataset to select respondents, based on criteria of gender, age, education levels and income levels, for my semi-structured interviews in both wards I was investigating. I was interested to interview residents with a range of profiles in order to gain a broader understanding of the risk perceptions and resilience mechanisms of urban residents.

The questions that were asked focused first on understanding the range of natural hazards that residents perceive as risks in Bharatpur that could cause them harm (drawing on NSET’s Baseline Survey questions regarding hazards). Subsequently, questions were posed regarding what people viewed as everyday risks, if these differed from natural hazards. Last, questions were asked about residents’ coping strategies and what would keep them safe for the future. The words ‘risk perceptions’ were not used with respondents. Instead the Nepali word for ‘worries’ was chosen. NSET used the word ‘worries’ in their research as well.³⁶ The word ‘resilience’ was also not used with Bharatpur respondents, since it does not translate directly into Nepali.³⁷

³⁵ Government of Nepal, Ministry of Home Affairs, ICIMOD and ESRI (2015) *Nepal Earthquake 2015: Disaster Recovery and Reconstruction Information Platform (NDRRIP)* [Online]. Available at: <http://apps.geoportal.icimod.org/ndrrip/profile?id=Municipality&Lang=en> (Accessed: 17 April 2017).

³⁶ In Barberi et al’s (2008) research on volcanic risk perception they also utilized the word ‘worry’ in their interview questions to represent risk perception Barberi F., Davis M.S., Isaia R., Nave R., et al. (2008) Volcanic risk perception in the Vesuvius population. *Journal of Volcanology and Geothermal Research*. [Online] 172 (33ology and Geothermal Research:10.1016/j.jvolgeores.2007.12.011.

³⁷ Ruszczyk H.A. (2014) *Local understandings of community resilience in earthquake prone Nepal*. Master of Arts by Research. Durham University.

Instead, the word ‘safety’ was chosen after consultation with NSET, MoFALD³⁸ and my Nepali research assistant.

Other respondents

In addition to semi-structured interviews with residents, I conducted 39 semi-structured interviews with local, district and national level government officials as well as key stakeholders on a municipal level. These stakeholders include a politician, a radio station owner, a head teacher at a private school, teachers, nurses, and representatives from a housing NGO, business associations and the construction sector (masons, business owners and engineers). Information from these interviews set the context for understanding urbanization, understanding risk perceptions and governance structures, changing urban relationships as well as earthquake resistant construction initiatives. Interviews also explored the evolving urban governance relationships between local authorities and groups of residents as well as the relationship between government and businesses.

In addition, 15 semi-structured interviews were organized with members of the international aid community in Bharatpur, Kathmandu and the USA in order to understand how urban disaster resilience projects were being structured. In total, over 96 semi-structured interviews were conducted as part of this research project. Interviews were transcribed, and data was coded into emerging themes and analyzed.

In addition to the qualitative work, a desk review of national government reports and international aid reports was carried out as well as an analysis of my photographs and the photographs taken by residents using disposable cameras. Triangulating findings between the different research methods provided a more detailed and nuanced appreciation of the complexity of urban life and understandings of perceived risk.

IV PERCEPTIONS OF RISK

In the following discussion, two main arguments are made. First, I point to a significant gap both in how different Bharatpur residents define and perceive risk, and between the perceptions of these residents and other groups, including the Nepal government, local authorities, scholars, and multilateral agencies. And second, I argue that this gap in understanding matters. Defining risk according to different criteria creates a context where only some concerns matter and have policy traction, while other concerns do not matter and are not reflected in policy.

a. The Gorkha earthquake

On 25th April 2015 at 11:56 am, the first jolts of a major earthquake were felt in the small town of Gorkha in central Nepal. The earthquake, with a magnitude of 7.8,³⁹ was Nepal’s largest earthquake since 1934, and along with the subsequent magnitude 7.3 aftershock in Sindhupalchok district on May 12th, it was the worst natural disaster to strike the country since 1934. Bharatpur, Nepal, only 38 miles south of the April 25th epicenter, is where I was conducting my long term research on urban disaster community resilience when the earthquake struck. These excerpts are from my research blog⁴⁰:

³⁸ Ministry of Federal Affairs and Local Development

³⁹ USGS (2015) *USGS Earthquake Hazards Program: Magnitude 7.8 - 36 km E of Khudi, Nepal April 25, 2015* [Online]. Available at: <https://earthquake.usgs.gov/earthquakes/eventpage/us20002926#impact> (Accessed: 23 March 2017).

⁴⁰ For my impressions of the hours and days after the Gorkha earthquake, please read <http://community.dur.ac.uk/geopad/2015/04/>

“The earthquake started at 11:56 a.m. on the day of rest (Saturday), therefore there were few vehicles traveling, the shops were still closed and few people were out in Bharatpur. My research assistant and I were walking on New Road in the industrial area of town where the India bound trucks get serviced, where buses are made etc. The metal was shaking on the commercial building near me. I asked R what he thought was going on. He said, “earthquake”.

...

The city’s infrastructure was intact and only a few buildings were damaged. In the first 72 hours, we experienced 68 aftershocks. It was, quite simply, terrifying”.

For international disaster risk reduction experts, earthquakes are an infrequent but highly dangerous hazard event for Nepal, and are viewed as particularly risky. For example, the UNDP⁴¹ ranks Nepal as one of the world’s hotspots for disasters⁴². Most residents and the local authority in Bharatpur, however, do not share this view, despite the intensity of the earthquake sequence of 2015. No one died in Bharatpur due to the earthquake, although the built infrastructure was damaged. One hundred buildings were destroyed and 300 buildings partially collapsed. A further 3,000 buildings needed to be assessed for structural integrity due to damage caused by the May 12th aftershock. The local authority was responsible for this task of assessing 7.5% of the building stock in the summer of 2015, with support from trained volunteer engineers.

When asked about hazards, all respondents interviewed in wards 4 and 11 mention infrequent fires, infrequent floods and infrequent earthquakes. However, it is worth noting here that even after the Gorkha earthquake occurred, earthquakes were not ranked as the most important hazard. Respondents in ward 11 were more worried about attacks from tigers and rhinoceroses from the adjoining community forest. In ward 4, residents were more worried about electrical fires and flooding from the adjoining Narayani river. Even after the hundreds of aftershocks in the first five months, many respondents in wards 4 and 11 continued to assert, “Chitwan (district) is safe, Bharatpur is safe”.

For most respondents, attitudes towards earthquake risk were similar whether they were interviewed before or after the high magnitude earthquake of April 2015. Nor did ward 4 respondents change their minds in terms of the priority they gave to earthquake hazard relative to the everyday risks they perceived (the quality of physical infrastructure or the lack of economic security, explored below). Earthquakes did not rank high as a source of concern because residents felt they were aware of how to respond during the seismic activity. There was one group that was an exception on this front. These were the poor ethnic residents in ward 11 whom the local authority ignored in the aftermath of the earthquake. These residents had not viewed earthquakes as especially risky before the 2015 earthquake, but their views changed with their experience after the quake. Several residents explained that they had requested structural integrity assessments of their homes after the May aftershock because their homes had cracks. The local authority did not provide this service and the ward 11 residents were unsure whether their homes were safe, and had to live in fear of another quake. The poor, who could not ignore the earthquake risk, felt exposed and vulnerable. The wealthier residents and high caste groups, who were able to get their homes assessed by the local authority, felt some control over the effects of the earthquake and could afford to discount its impact. The experience of the

⁴¹ UNDP Bureau for Crisis Prevention and Recovery (2004) *A Global Report Reducing Disaster Risk, A Challenge for Development*.

⁴² Nepal is also ranked 11th in the world in terms of vulnerability to earthquakes. See reference 41.

earthquake reinforced everyday forms of marginalization of the poor and those without political connections to the local authority. Residents who were marginalized in the everyday were also marginalized after the earthquake.

b. Administrative change

Another infrequent event was perceived as a risk by some residents in both wards 4 and 11, but for different reasons in each ward. In December 2014, Bharatpur became a sub metropolitan city, and 15 new wards were added to the existing 14 wards. The city's physical area increased by 50 per cent and its population increased by 50 per cent to 200,000 people. The five amalgamated villages in the southeast and southwest of the city brought their poverty and the specific hazards they faced (river flooding and wild animal attacks from the jungle) to the newly created SMCB. Four months after the creation of the SMCB, the earthquake struck.

For some residents, this administrative change emerged as a more critical risk than the Gorkha earthquake. This perception was due either to the potential introduction of new taxes or the possibility of the loss of political influence. These concerns would not be seen as risks by the international aid community but ignoring these administrative changes in the risk equation is a failure to appreciate the understanding of risk on the part of residents. Considering their perceptions means in effect extending the range of risk. Residents in both wards 4 and 11 explained that the SMCB would need to honor its political commitments in the form of physical infrastructure provision to the amalgamated rural areas. This would have to occur without additional funding from the central government⁴³. The two routes through which the local authority can potentially raise the required funding to provide the physical infrastructural requirements of the new wards is to raise new local taxes or to divert resources away from the original 14 wards of the city – hence the concerns of the longer term residents.

Most respondents who lived in agriculturally-based ward 11 (the poor ethnic and indigenous population) stressed the financial risk associated with the administrative change. For example, after the earthquake, respondents from the Kumal indigenous group did not view floods, earthquakes or fires as a cause for concern, but did fear the possibility of increased municipal taxes in the near future. These residents, who were landless laborers or who survived on subsistence agriculture, possessed little in the way of cash-based financial resources. If the local authority introduced new taxes, the Kumal community feared they would be forced to sell their agricultural land and move away from Bharatpur. This economic stress was significant.

In the city center, ward 4, the administrative change was seen as a significant risk for a different reason. Some ward 4 home owners are organized into neighborhood groups and they fear an erosion of their fledging political influence over the local authority. Until recently, the neighborhood groups provided co-financing for the provision of paved roads and drainage pipes to their neighborhoods. Historically, the neighborhood groups in ward 4 were not particularly powerful in comparison to those from other wards but from time to time they had been able to get some infrastructure into their neighborhoods. These residents feared that their nascent ability to influence infrastructure provision in the city would diminish to the benefit of the new wards, which have extremely poor provision of infrastructure. The administrative change presents a perceived risk whose manifestation is unclear and uncertain, and residents do not know how to respond.

The local authority is also concerned by the administrative change, the associated growth in population and the accompanying responsibilities. The decision to make Bharatpur a sub

⁴³ For further insight on the issue of inadequacy of funding from central government to local authority please read Satterthwaite and Bartlett 2017, see reference 2.

metropolitan city was made at central government level⁴⁴ in consultation with local politicians. According to Bharatpur's new CEO⁴⁵, the centrally appointed leader of the sub metropolitan city of Bharatpur, there are five important challenges facing the city post-earthquake and post-administrative change. These include: urbanization (in the form of expanded boundaries for the city and the incorporation of new villages), lack of solid waste management facilities for the city, the introduction of street lighting throughout the city, the need to increase the local authority's tax base, and lastly, the implementation of the national building code, with an emphasis on earthquake resistant construction for all new construction.

Urbanization is considered the most important challenge because "cities are no longer just upper middle class places, now cities have lower middle classes and renters as well" according to the CEO. Until recently, Nepal was a rural country and people have been migrating to the cities with aspirations for a better quality of life and better education opportunities for their children. Many new comers also had financial resources to build homes in the cities. The local authority has generally ignored the poor, the tenants, the landless or informal settlement dwellers in its vision for Bharatpur, an oversight that is likely to cause tensions in the future. These residents express a desire to be "in the light" of the local authority and to have a relationship where they can influence the local authority to provide needed physical infrastructure.

According to the city's leader, disaster risk reduction in the form of an enforceable building code is at the bottom on the list of challenges Bharatpur faces. From the perspective of the local authority, DRR is important, but is only one of the many more pressing issues facing this rapidly changing city. This is at odds with the perception of the international DRR community, which emphasizes the importance of DRR to the central government without fully appreciating the complexity of urban challenges on a local level. Understandings and definitions of risk matter. It is imperative to acknowledge the tensions between local risk perceptions and what is considered relevant within the broader DRR discourse, which shapes how we think about and address risk. The impact of the administrative change on the precariously positioned poor and the politically ineffectual neighbourhood groups may in fact turn out to be more devastating in the long term than natural hazards in Bharatpur. This is certainly the view of respondents in wards 4 and 11 as well as the local authority, and this finding – that everyday worries take precedence - is internationally supported by the research of Dodman et al, 2013⁴⁶; Mitlin and Satterthwaite, 2013⁴⁷ and Satterthwaite and Dodman, 2013⁴⁸.

c. Poor quality of infrastructure provision

Everyday life in Bharatpur, Nepal is difficult for most residents due in part to fragmented physical infrastructure: daily twelve-hour electrical power outages, a lack of solid waste management for the city and poor quality roads. Respondents' location in the city influenced which elements of physical infrastructure they perceived as a risk.

⁴⁴ The rapid change Nepal is undergoing to be become an urban country is led by the Ministry of Federal Affairs and Local Development.

⁴⁵ Chief Executive Officer

⁴⁶ See reference 7.

⁴⁷ See reference 4.

⁴⁸ Satterthwaite D. and Dodman D. (2013) Towards resilience and transformation for cities within a finite planet. *Environment and Urbanization*. [Online] 25 (2), 291–298. Available at: doi:10.1177/0956247813501421.

In the densely populated city center of ward 4, the relationship between poor quality infrastructure and the close proximity of industry and neighborhoods was an issue. Residents here were concerned about poor air quality due to international road traffic on the east-west motorway that borders their community. Ward 4 residents also highlighted the degradation of the natural environment by the industrial waste entering the tributary of the Narayani River. There was also the ongoing lack of proper solid waste management. Solid waste was being temporarily stored in ward 4 and the residents living near the area expressed concern about the quality of water they were drinking. Lastly, the poor quality of the road network was mentioned by neighborhood groups aspiring for paved roads in the center of the city.

In the rapidly urbanizing ward 11, residents were concerned about different risks related to physical infrastructure of the city. They worried about the poor quality dirt roads that were difficult to use during monsoon season as well as a lack of access to piped municipal water. They were also concerned about the lack of accessible public transport given their distance from the city center. This meant limited mobility for many people who did not have sufficient funds to purchase a bicycle or a motorbike. These poor residents needed to walk over an hour to access health facilities and other services, the local authority or possible job opportunities in the city center. The poor quality dirt roads and lack of transport made everyday life more difficult than the earthquake, according to these respondents.

In Bharatpur, the only physical infrastructure that residents had any control over was the road network. If residents organized themselves into informal neighborhood groups and provided the 30 per cent co-financing required by the local authority, then some roads were paved. The local authority decided which roads, after consultation with local politicians. Unless residents organized, they had little chance to engage with the local authority and influence the city's infrastructure provision. Understanding how to influence the local authority was a frequently voiced concern in both wards, another reason why the administrative change was perceived as such a significant risk for residents in ward 4 as well. The change in administrative status influenced some residents' opinion of everyday risks associated with the provision of physical infrastructure.

d. Economic insecurity

In contrast with the international aid community, which views natural hazards such as earthquakes as the overriding risk for Nepal, all the residents interviewed perceived economic insecurity as the overriding urban risk. Without economic security, residents were not able to focus on other aspects of their lives in the city. The significance of striving for economic security and income generation cannot be overstated here -- all residents discussed economic hardship and their lack of economic security, and often it was the most significant stressor in their lives.

In the city center, many respondents earn at least a portion of their meager income from the local economy. Many respondents self identify as businessmen. This loose term includes a range of income generation strategies focused on the retail sector. Those respondents who rented work premises and accommodation for their families were also concerned about their lack of house ownership. The tenants, all of whom were in the city center (ward 11 did not have any tenants) were less worried about the long term than about the present and the next twelve months⁴⁹. Their concern regarding not owning a house was in part related to being excluded from access to emerging forms of social support networks (the neighborhood groups) which are based on home ownership. This issue is not explored further in this paper, but gaining access to social networks in the city was an important concern for respondents who were recent migrants to the city.

⁴⁹ Douglas and Wildavsky expand on this temporal focus. Douglas M. and Wildavsky A.B. (1982) *Risk and culture: an essay on the selection of technical and environmental dangers*. Berkeley, University of California Press.

Ward 11 is primarily agricultural land, and most farming there is focused on subsistence, so there were few opportunities to engage in the local economy. In this ward, residents who had lived here for decades gained income through the sale of fertile agricultural land on which they had been historically dependent. This change from agricultural subsistence with some income generation from the sale of land for survival may introduce a new set of tensions in the long term related to food and economic security in rapidly urbanizing Bharatpur. For most residents in rapidly urbanizing ward 11, employment and securing income for everyday living was most widely perceived as the primary source of urban risk. Most respondents in ward 11 explained that income from agriculture was meager and men were forced to migrate internationally for income generation.

Residents in both wards stressed their desire for more stable livelihood opportunities in Bharatpur, a route they preferred to having their male family members or themselves travel internationally to generate income. Over half of the residents interviewed (in both wards) received international remittances and/or had family living abroad permanently. This is similar to research findings for the nation⁵⁰. The dependence of local economic security on the global movements of some residents represents a precarious situation in Bharatpur, where many residents do not have direct control in managing their perceived economic risk.

V CONCLUSION

This empirically grounded research contributes conceptually to debates within the field of urban risk perception and governance by arguing for the necessity of incorporating the risk perceptions of residents in complex urban environments. The continuum of perceived risk from the perspective of urban residents is centered on a range of events and realities that directly impact them in their immediate lives, challenging their capacity to manage and thrive. The four perceived risks described in this paper include the kind of infrequent and intensive event, such as the Gorkha earthquake, that would of course rank high in the traditional understanding of hazard and risk. But they also include changes to Bharatpur's administrative boundaries, as well as more everyday concerns such as the lack of physical infrastructure and challenges to economic security. The perceived continuum of risk differs based on the residents' location in the city and their level of affluence. For many of the risks described above (the Gorkha earthquake, change in administrative status of the local authority and poor quality of physical infrastructure) the quality of the relationship with the local authority is key to people's perception and/or mitigation of urban risk.

Nepal is transforming from a rural to an urban-based country⁵¹ within a dramatically changing social, economic, political and environmental landscape. Within this context, the central government and the international aid community are increasingly pressuring local authorities to implement both development and disaster risk reduction efforts in simultaneous and integrated ways⁵². This is occurring in an environment where local authorities have received little training and insufficient additional financial or human resources from the central government they represent in implementing these duties. This integrated focus on development and DRR is appropriate but implementation is likely to be a source of tension between the local authorities, residents and other levels of power that will be influencing the urban risk governance framework

⁵⁰ See reference 30, pg 26.

⁵¹ See reference 27.

⁵² Jones S., Owen K.J., Manyena S.B. and Aryal K. (2014) Governance struggles and policy processes in disaster risk reduction: A case study from Nepal. *Geoforum*. [Online] 5778–90. Available at: doi:10.1016/j.geoforum.2014.07.011.

in the future. The potential to continue to ignore or discount residents' perceptions of risk is high but the necessity to include them is significant. Reflecting upon a range of interpretations of hazards and risks can allow for an enriched understanding of how risk is experienced and understood in an ordinary city in the world. Positioning a multi-perspective approach to risk at the center of urban discussions is warranted in any consideration of mechanisms to support resilience, preparation and response to a continuum of urban risk.

This paper highlights the breadth of the spectrum of urban risk, and the tensions in understanding this breadth. It makes two contributions to the literature describing the spectrum of risk in urban areas: First, it points to a significant divergence in the perception and definition of risk among different groups of residents. Second, it indicates the way this divergence in understanding matters to the global discourse framing understandings of urban risk. By failing to include the perceptions of residents in the framing of risk, some types of risk are overlooked in international discourse and policy frameworks. Definitions of risk matter. If perceptions of risk from the local level are not included, then this shapes and in effect, limits the risks that are actually managed through policy and practice.

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BIOGRAPHY

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