

**Tying our scooters down:
Urban governance of flooding in Bago, Myanmar**

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ABSTRACT

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Urban flooding poses significant challenges to cities in Southeast Asia including loss of life, human displacement, and damaged infrastructure. As cities in the region grow and as the effects of climate change worsen, urban flooding is becoming more frequent and severe. As such, both local governments and international networks have taken on the task of preparing for and managing urban floods. This research situates flood governance in Bago City, Myanmar in the literature on environmental governance and urban political ecology, investigating how local governance actors interpret the significance of flooding and how they are influenced by the discourse of international networks that promote urban climate governance. Using the 2015 Bago floods as a point of entry, results were derived from semi-structured interviews with (10) government officials and a document review of (4) international networks with diverse structures and goals, as well as (23) key informant interviews. Broadly, this research found that government officials interpreted the 2015 floods as extreme but also as an example of the government's increasing capacity to respond to disasters, that local and regional governments lack the human and capital resources to take on the greater responsibility for flood management that they wish to, that government often fails to act on their knowledge about external causes of flooding such as land use and climate changes, and that government officials strategically adopt neoliberal paradigms advanced by international networks while reinterpreting them to advance their own goals of expanding the role of the state. This research also found that government officials often failed to acknowledge the pre-existing community methods of flood management and risked undermining those methods through their interventions. Analysis considers how critical resilience, vulnerability, and adaptation perspectives were absent from the flood governance discourse in Bago, and further, that research challenging the ideological assumptions of the international networks was not acknowledged in their knowledge production. This thesis posits that although the discourses of the government driven international networks and the private-sector foundation driven networks were not engaged in conversation with one another, urban climate impacts in the global south could serve as a catalyst for productive debate over the application of global climate justice frameworks to the local scale.

FOREWORD

My aim in pursuing a Masters in Environmental Studies was to study urban climate impacts and adaptation. I was presented with the opportunity to study urban climate resilience in Bago, and I hoped to build a case study that would build greater understanding of how urban adaptation operates on the ground. I also hoped to interrogate the impacts of dominant international discourse on climate impacts and adaptation.

As per my POS, I developed my knowledge and understanding of current topics and methods in natural disasters, urban planning, policy research, and global cities, and I applied them to this major paper research. My research contributed to my learning objectives by giving me an opportunity to define urban climate adaptation and resilience (Objective 1.1), understand urban climate impacts (1.2), identify implemented climate adaptation strategies (1.3), and read urban climate adaptation plans (2.3).

Doing field research in Myanmar was a new experience for me. Designing the research, arranging and carrying out interviews, processing field materials, and writing this MRP were challenges that pushed me to grow as a student and a researcher. I also presented my preliminary findings at the Canadian Association of Geographers annual meeting as well as the Urban Climate Resilience in Southeast Asia partners meeting in Cambodia in May 2017, these presentations helped me hone my analysis and build my presentation skills.

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Table of Contents

ABSTRACT.....	i
FOREWORD.....	ii
ACKNOWLEDGEMENTS.....	iii
CHAPTER ONE – INTRODUCTION.....	7
1.1 Research Context.....	7
1.2 Research aim and objectives.....	8
1.3 Report structure.....	9
1.4 Contributions of this research to knowledge.....	10
CHAPTER TWO – LITERATURE REVIEW.....	11
2.1 Flood management.....	11
2.2 Myanmar’s history of urban and environmental governance.....	11
2.3 Ideological divides in the three flooding frameworks.....	14
2.3.1 Resilience.....	18
2.3.2 Adaptation.....	21
2.3.3 Disaster Risk.....	23
CHAPTER THREE – METHODOLOGY.....	27
3.1 Regional Context.....	28
3.2 Study Population and Sampling.....	30
3.3 Interview Plan.....	33
3.4 Data Collection.....	35
3.4.1 Document Review.....	35
3.4.2 Semi-Structured Interviews.....	38
3.4.3 Key Informant Interviews.....	39
3.5 Data Analysis.....	40
3.6 Ethics.....	41
3.7 Positionality.....	41
CHAPTER FOUR – RESULTS	43
4.1 How do government actors interpret the significance of flooding, and the 2015 floods in particular?	43
4.2 What role do government actors see for the government and other actors in flood preparedness?	45
4.3 What roles do climate change or other external factors play in driving floods and/or shaping government responses to floods?	48
4.4 How are government actors’ perceptions of flood management shaped by international discourse on urban climate impacts?	50
4.4.1 International networks.....	50
4.4.2 Government.....	54
4.4.3 Comparing international networks and government.....	56

4.5 Reflections on Silences in Discourses.....	57
4.6 Summary of Results.....	58
CHAPTER FIVE – DISCUSSION.....	61
5.1 How do government actors interpret the significance of flooding, and the 2015 floods in particular?	61
5.2 What role do government actors see for the government and other actors in flood preparedness?	62
5.3 What roles do climate change or other external factors play in driving floods and/or shaping government responses to floods?	64
5.4 How are government actors’ perceptions of flood management shaped by international discourse on urban climate impacts?	65
CHAPTER SIX – CONCLUSION.....	67
6.1 Summary of Arguments and Findings.....	67
6.2 Research contributions and implications.....	68
6.3 Limitations and Future Research.....	69
REFERENCES.....	71
APPENDICES.....	81
Appendix 1: Full list of documents reviewed.....	81
Appendix 2: Sample Government interview guide.....	84
Appendix 3: Ethics consent form.....	86

LIST OF FIGURES:

Figure 1: Bago Region.....	8
Figure 2: Bago City.....	28
Figure 3: Waste in a local canal.....	48
Figure 4: Damaged levee near the main road.....	49
Figure 5: Typical household built on stilts in the floodplain.....	57
Figure 6: Waste beginning to pile up against a drainage canal grate.....	62
Figure 7: Monastery and pond used for flood mitigation.....	63
Figure 8: Drainage canal being dredged by hand.....	63

LIST OF TABLES:

Table 2.1: Flood Management Frameworks.....	12
Table 2.2: DAO Responsibilities.....	15
Table 3.1: Categories represented by the study’s sample.....	31
Table 3.2: Overview of documents reviewed 1.....	36
Table 3.3: Overview of documents reviewed 2.....	36
Table 3.4: Questions driving development of interview guide.....	39
Table 3.5: Document coding pass.....	40
Table 3.6: Interview/field note coding pass.....	40
Table 4.1: Summary of findings.....	58

CHAPTER ONE – INTRODUCTION

1.1 Research context

Climate change is expected to bring rises in temperature, weather variability, and elevated sea levels that will impact communities globally, but especially in the global south (IPCC 2014). Flooding is expected to occur in regions that have not previously flooded, and to worsen in those that flood regularly, particularly affecting populations that live near tropical coastlines, where sea level rise is expected to be the most extreme and where tropical storm activity is expected to increase in frequency and severity (Nicholls & Cazenave 2010). Countries that are both in geographically sensitive regions and lack material resources to prepare for climate impacts are particularly vulnerable to the impacts of climate change, and therefore the Global Climate Change Risk Index ranked Myanmar the 2nd most vulnerable country to climate change on earth in 2017. Myanmar has begun facing two major impacts already: drought in the central dry zone, and increased flooding along its rivers and coastline (Wassmann et al. 2009; Kreft et al. 2017). In this context, climate change impacts are a glaring problem for Myanmar, and preparing for climate impacts has been taken up by government, development-concerned institutes, non-governmental organizations (NGOs), and grassroots groups (MoNREC 2017).

Flooding has challenged river and coastal cities around the world for as long as they have existed (Dundes 1988). Despite many cities in the industrialized world being protected by extensive heavy flood-control infrastructures such as dams, levees, and canals, the twenty-first century has already seen massive flooding disasters in Taipei, Taiwan (2001); Dresden, Germany (2002); New Orleans, USA (2005); Guangdong, China (2007); Bangkok, Thailand (2011); Brisbane, Australia (2011); New York, USA (2012); New Delhi, India (2013); Obrenovac, Serbia (2014); and Colombo, Sri Lanka (2016). As these flood-control infrastructures continue to fail, scholars and practitioners have raised concerns about the harm they do to riverine ecosystems as well as their potential to increase flood risk in the long term (Burby et al. 2000, Smits et al. 2006). While many scholars continue to defend urban flood-control infrastructure (Birkland et al. 2003, Godschalk 2003), the growing body of evidence pointing to the impacts of climate change on flood patterns have undermined the core assumption of flood control: that flow variability remains unchanged over time (Zeyenbergen and Gersonius 2007).

Myanmar was hit by a series of devastating floods over a three month period from July to September 2015 that resulted in 103 deaths and displaced an estimated 1 million people in twelve of the country's fourteen states. Then-president Thein Sein declared a state of emergency, the first declaration of its kind for a natural disaster since 2008's Cyclone Nargis devastated the country, killing over 138,000 (Fritz et al. 2009). Bago Region, a large Region in the centre of the main southern coast of the country was one of the hardest hit

Regions along with Ayeyarwady and Sagaing. Bago City (hereafter referred to as Bago) is the Region's capital as well as its largest settlement with a population of just under 300,000 and a metro region of nearly 6 million. Located 91 kilometres north-east of Yangon, the city region is undergoing rapid urbanization. Growth in the greater Yangon region and Bago's location on the Yangon-Myawaddy highway corridor that connects Yangon to Thailand and much of Southeast Asia make Bago poised to become among the major emerging secondary cities of Southeast Asia.

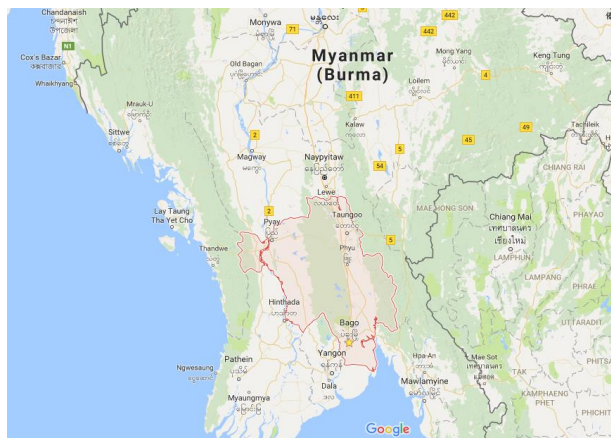


Figure 1: Bago Region

As multilateral efforts to combat climate change stalled at the UN in the mid-2010s, private foundations began major initiatives to mobilize cities as champions of climate action. The Clinton Foundation's C40 initiative created a network of the world's cities committed to addressing climate change through inter-urban cooperation and collaboration, while the Rockefeller Foundation's Asian Cities Climate Change Resilience Network (ACCCRN) built a platform for climate professionals to promote best practices and conducted risk assessments in key partner cities in the region. Meanwhile, existing regional organizations like the Association of Southeast Asian Nations (ASEAN) have also added climate change policy coordination to their existing mandates of government reform and trade coordination, while some inter-governmental affinity groups like the Least Developed Countries group (LDCs) emerged explicitly out of the international climate negotiations in order to coordinate and amplify advocacy efforts. All of these international networks have divergent missions but their work consistently includes climate change adaptation. Climate change adaptation refers to the adjustments undertaken in ecological, social, and/or economic systems to reduce vulnerability or increase resilience to the actual or anticipated impacts of climate change (Smit and Wandel 2006; Fussler and Klein 2006; IPCC 2014). This paper will build on critiques of transnational private sector climate governance initiatives, namely that they are too focused on technological solutions (Sonnenschein 2016), mask power relations (Bouteligier 2013), and strengthen the private sector's role in climate governance at the expense of actual adaptation results (Whitehead 2013).

1.2 Research aim and objectives

Considering the emerging focus in the international sphere on urban climate impacts, the underlying question this major research paper asks is: how are floods governed in the context of climate change in Bago, Myanmar? Does the open-endedness of climate adaptation and resilience create an opportunity for creating context-specific solutions, or are international activities around urban climate resilience driving ecological

modernization and environmental entrepreneurialism at the urban scale? To answer this question, it is important to look at how flooding is being prepared for by development actors at the sub-national level. Because international development agencies and NGOs have a limited or non-existent role in Bago's development, this research sought to determine how government officials understand and prepare for flooding in the context of international discourse about climate change. Four sub-questions were explored in order to link government interpretations of flooding to their exposure to climate change discourse:

1. How do government actors interpret the significance of flooding, and the 2015 floods in particular?
2. What role do they see for the government and other actors in flood preparedness?
3. What roles do climate change or other external factors play in driving floods and/or shaping their responses to floods?
4. How are government perceptions of flood management shaped by international discourse on urban climate impacts?

To answer these questions, as will be described below, I took a mixed methods qualitative approach, using semi-structured interviews with government officials (n=10) in Bago and key informant interviews (n=23) with local academics, religious officials, NGOs, and residents., as well as a document review of four international networks that do climate change work (n=4). Analysis involved discourse analysis of coded interview transcripts supported by the NVivo qualitative analysis software, and a discourse analysis of the international networks' documents.

1.3 Report structure

This major research paper consists of five further chapters. Chapter two reviews the literature concerning flood management, providing practical and scholarly background for the study. It also explores the history of environmental governance in Myanmar as well as providing a brief overview of Myanmar's recent government reforms and new constitutional structure. Finally, the literature review outlines three key approaches to flooding for this study: resilience, adaptation, and disaster risk reduction. Chapter three is a methodology section that outlines the regional context for this research; the study population and sampling strategy; the process of data collection and analysis; ethics, and researcher positionality. Chapter four is a results section that lays out key findings to each sub-question derived from the analysis of the semi-structured interviews and from the document reviews. Chapter five is a discussion section that ties my results to my main research question, and chapter six offers a broader conclusion, with a summary of findings, practical and scholarly contributions, and reflections on research limitations and future research questions.

1.4 Contribution of this research to knowledge

Broadly, this research found that government actors in Bago interpreted flooding to advance their own institutional agendas. The 2015 floods were seen as both evidence that government expansion and reform is helping Myanmar citizens and that larger-scale interventions are needed. Government in Bago is eager to take on greater responsibility for flood management, but acknowledges that it lacks the human and financial resources to do so. Government also fails to acknowledge, and sometimes undermines, pre-existing community methods of flood management such as building houses on raised stilts and using monasteries as flood shelters. While government officials acknowledge that deforestation and climate change are underlying drivers of flooding, their solutions to flooding do little or nothing to address these root causes. The document review showed that two international networks funded by private foundations, the C40 initiative and ACCCRN, advance an ecological modernist approach to urban climate impacts that promotes standardization and private sector expansion while minimizing questions of equity and justice. Two government-driven networks, the Least Developed Countries group (LDCs) and the ASEAN, focus instead on intergovernmental cooperation and support but largely ignore the urban scale as a site of climate action. In turn, government actors strategically adopt the discourses and frameworks advanced by all four international networks, but use them to advance their own agenda of expanding government's role in environmental management. This paper argues that the private sector framework of managing disaster risk in perpetuity through market forces is in conflict with Bago's government agenda to assert the role of the state through large infrastructural interventions, but that both ignore the strategies that community members have developed over time to manage flood risk on their own.

This is among the first studies of the urban governance of flooding in Myanmar, and Bago in particular. This work is an attempt to help fill some of the research gaps on secondary cities in Southeast Asia and on climate impacts at the urban scale. This research contributes to the study of climate resilience in Southeast Asia by showing how the role that international networks play in urban climate action could serve as a harbinger of a new environmental discourse that links neoliberal policies to urban climate change adaptation, and by providing case research of how urban environmental governance is emerging in the context of Myanmar's democratic reforms.

CHAPTER TWO – LITERATURE REVIEW

The purpose of this literature review is threefold: it provides practical and scholarly background for urban flooding as a concept; explores illustrative divergent and competing discourses within each of the three frameworks of flood response, adaptation, disaster risk, and resilience; and contextualizes flooding within the literature on environmental governance. Overall, it shows that while the flooding literature focuses on causes and responses to disaster events, there is a lack of literature exploring how flooding interacts with competing discourses and power relations in urban climate impacts. It also establishes that further research is needed into how and by whom the concept of flood management is applied in specific contexts.

Section 2.1 further elaborates the study of flood management summarizes the trends in flood literature, and provides additional context for research around flood policy. Section 2.2 explores the literature on Myanmar governance, placing the literature in the context of Southeast Asian governance, decentralization, and transitions to democracy. Section 2.3 shows that each of the three frameworks of flood response – resilience, adaptation, disaster risk – are fields with rich debate and competing discourses by reviewing selected, oppositional discourses, and situates urban flooding literature within those discourses, concluding that there is not one ‘best’ way to approach resilience, adaptation, disaster risk and that interventions under each framework are deeply political.

2.1 Flood management

While human settlements have been experiencing and managing floods for as long as they have existed, the study of flood risk emerged in the mid-20th century as a much more complex issue than previously anticipated. Dundes notes that while “modern technology and medicine have succeeded in eliminating many of the dread diseases and in reducing the dire consequences of natural disasters which have plagued mankind over the centuries” they have “failed to check the ravages of fire and flood” (Dundes 1988 1). Pre-modern methods of managing floods consisted mainly of either migration or attempts to keep flooding away from the settled population by building embankments, channels, and elevating structures. Throughout the mid-20th century, engineers and emergency managers harnessed new tools including flood-proofing, early warning systems, building codes, and land-use management. These new tools started from the premise that some flooding is inevitable and that complex engineering systems to prevent flooding had their limits (National Research Council 2013, 33). Towards the end of the 20th century, the scholarship of flood control reoriented towards flood risk management, and insurance became a major component of flood response. Despite this new scholarship, engineering based flood control solutions remain the dominant approach to floods in practice (Liao 2012).

The study of flood risk has typically focused on two broad issues, one following from the other: understanding the causes of flooding and determining the most effective methods to reduce flooding. The literature identifies three major causes of ‘natural’ floods: coastal surge floods, fluvial floods, and pluvial flooding. Coastal surge floods occur when severe weather such as hurricanes push water from a large body of water onshore, particularly on low-lying land (Nicholls 2004). Fluvial floods occur when increased rainfall over an extended period of time or heavy snow melt causes a river to exceed its capacity. In urban areas, these floods can be significantly exacerbated by the build-up of sedimentation in cement river canals, creating the need for canal dredging in order to maintain low enough water levels. Overbank flowing, when water gradually overflows the edges of a river, is the most common type of riverine flooding, while flash flooding, when high velocity torrents of water pass through and often damage a river channel, is the most dangerous type of riverine flooding (Jonkman & Kelman 2005). Finally, pluvial flooding occurs when heavy rainfall creates a flood on land that is not necessarily adjacent to a water body. This type of flooding includes the saturation of urban drainage systems and hillside saturation that can cause mudslides (Douglas et al. 2010). The above ‘natural’ causes of flood do not include man-made flooding, such as intentional irrigation, dams, and infrastructure failure.

Contemporary scholarship views flooding as more than simply an engineering problem, particularly in light of the study of fluvial geomorphology, which shows how river flow patterns vary greatly over time (Milly et al 2008). Though many scholars continue to stress the centrality of flood control measures (Birkland et al. 2003, Godschalk 2003), climate change has driven a shift in paradigms that have brought approaches from the fields of resilience, adaptation, and disaster risk reduction to the fore (Zevengbergen and Gersonius 2007; Liao 2012; Berkes 2007). Though distinct traditions, overlaps exist between these three fields’ approach to urban flooding. These are summarized in Table 2.1

Table 2.1: Flood management frameworks

Framework	Communities of Practice	Timescale	Geographic Scale
Resilience	Development	Long	Community or individual/household
Adaptation	Climate change	Medium-long	Community or Ecosystem
Disaster Risk Reduction	Engineering/Insurance/	Short-medium	Community or infrastructure unit

	Humanitarian Relief		
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While there are many ways to classify measures to respond to flood risk, Warren et al. (2014) have built a useful taxonomy consisting of four categories. The first consists of measures to reduce the magnitude of flood events, typically accomplished by building reservoirs and flood embankments: this is known as ‘flood defence’. The second uses land use planning, building and facility design, and building retro-fitting in order to reduce exposure to flood loss. The third method uses flood forecasting, early warnings, and emergency response to mitigate the consequences of events when they occur. Finally, the fourth consists of measures to aid in recovery from loss, and include flood relief aid, insurance, and tax relief schemes. All four types of measures are typically used in tandem to manage flood risks in any one place, although the emphasis on each varies over time and from place to place.

A number of important contributions to the study have been made in the field of urban political ecology. Pelling’s (1998) work on the political ecology of hazards illustrated how social capital relations that emerged from noneconomic functions are a necessary component of coping with flood hazard in Guyana, showing hazards to exist “both as discursive constructs and as actually felt phenomena, (...) operating at the level of political discourse as well as political action” (Pelling 1998, 250). Pelling also brought urban flooding into focus by highlighting the unique vulnerabilities and resources of urban regions as opposed to rural communities, which are typically the focus of development and relief interventions. James and Paton (2015) applied Pelling’s social capital lens to disaster recovery in Myanmar, specifically in the context of Cyclone Nargis.

Bankoff (2004) challenged scholars to think about the social and historical context in which hazards are construed as disasters, particularly the colonial process of framing the non-Western world as unsafe for European conquerors and therefore in need of intervention (26). Collins (2010) disrupted the previous assumption that marginalization is the ultimate producer of exposure to disaster by showing how the poor and otherwise marginalized can possess unique assets in facing hazards that wealthier communities may not.

In 1989, Harvey observed that urban governance had been shifting from a managerial approach throughout most of the 20th century to entrepreneurialism, in which cities saw themselves as competing markets for a global investor class under the burgeoning globalization of the late 20th century.

Southeast Asia has emerged as a priority region for scholars who study urban flooding. It is the most rapidly urbanizing region in the world and has a long history of flooding that is clashing dramatically with new

urban landscapes (UN-DESA 2014; Rosenzweig et al. 2011; Garshagen and Romero-Lankao 2013; UN-HABITAT 2011), particularly in low-lying or coastal areas (McGranahan et al. 2007). Myanmar in particular is among the top ten fastest growing economies globally (World Bank Group 2017). These social and physical transformations are occurring alongside dramatic political and economic transformation processes. Garshagen (2015) notes that “Cities in those countries are most often the forerunners of administrative reform, changing political economies and transforming power-actor-networks” and calls for an integrated approach to analysing urban risk governance in Southeast Asian countries that places “the shifting political negotiation of responsibilities for risk reduction and the adaptation of the very institutions for risk governance at the centre of attention.” (600). Marks (2015) has argued that incomplete decentralization in Thai cities has resulted in a political imbalance that makes cities particularly vulnerable to flooding without giving them the power to respond effectively or equitably.

The review now turns to an overview of governance reform, urban governance, and environmental governance in the context of Myanmar.

2.2 Myanmar’s history of urban and environmental governance

Myanmar’s history is too rich and its politics too fast-changing to summarize adequately in this report. Instead, this section will endeavour to summarize contemporary scholarship that concerns public sector reform, urban governance, and environmental governance in modern Myanmar.

Hook et al. (2015) divide Myanmar’s experience of public-sector reform into four eras, noting that “while there were many changes over these years, there was also much continuity:”

- (1) post-independence democratic governments from 1948 to 1962,
- (2) the Revolutionary Council years from 1962 to 1974,
- (3) Burma Socialist Program Party rule from 1974 to 1988, and
- (4) the military regime from 1988 to 2011 (Hook et al. 2015 2).

Under these systems, policies were developed by a small group of senior generals and ministries and the civil service primarily played a policy implementation role. This has resulted in a civil service that lacks policy development and consultation experience and capacity, making participatory governance a challenge (Hook et al 2015, 7).

Since 2011, a fifth era of reform has begun, characterized by a growing share of power for elected representatives, diminished but still significant power for the military, and decentralized decision-making from the capital of Nay Pyi Taw to the states, regions, districts, and townships (Hook et al 2015). In 2008, the military regime established a new Myanmar constitution that allowed for multi-party elections at the Union (National) level as well as within the 14 Regions and States. States and Regions are divided into

districts, which are further divided into townships, which are divided into village tracts in rural areas and wards in urban areas. Myanmar does not have a system of elected local governments, but rather has Development Affairs Offices (DAOs) that are staffed by the Ministry of Home Affairs at the Union level and advised by a local semi-elected Township Development Affairs Committee (TDAC). Since 2011, the DAC elections have introduced Myanmar citizens to local level electoral politics and has pushed the Union and State/Region governments to allocate larger proportions of their budgets to local priorities (Nixon and Joelene 2014, 3). Larger cities like Yangon, Mandalay, and Nay Pyi Taw have city development corporations that provide municipal services, but elections in these cities were still in development according to Hook et al. (2015).

As a result of the inexperienced civil service, expert advisors have come to play a significant role in Union level governance. Advisors mostly include Myanmar citizens who have been educated abroad, many of whom were once exiled pro-democracy activists or UN officials (Hook et al 2015, 7). The fact that the civil service is entirely run through the General Administration Department (GAD) under the Ministry of Home Affairs, one of the few large ministries still under the control of the military, means that democratic reform is kept at arm's length from its management (Chit Saw and Arnold 2015, 9). GAD offices are uniform in size, regardless of township population, consisting of 34 staff who report to a township administrator and assistant director. Because GAD's are responsible for population and land registration as well as tax collection, most are staffed almost entirely by clerks and accountants, leaving little room for urban planning, engineers, or environmental assessments (Chit Saw and Arnold, 9).

Table 2.2: DAO responsibilities

Social Services	Economic Governance	Revenue Collection
Town planning	Business licences for market vendors, roadside stalls, butchers, hotels, and restaurants	User fees charged to households and businesses for services including land, street lighting, garbage collection, water supply, billboard use, and heavy vehicle road use
Water supply	Issuing of commercial and residential construction permits for projects in urban areas	Licensing fees for regular business
Sanitation	Conducting routine inspections of businesses	Tender license fees for slaughterhouses, ferries, pawnshops, and jetty management
Sewage disposal	Conducting public auctions for operating licenses of	

	slaughterhouses and supervising the sale of meat	
Disaster preparedness	Administration of small ferries across rivers and lakes in urban areas	
Street lighting	Managing local markets, some of which are owned by DAOs	
Roads and bridges	Road construction and drainage improvement for new business areas	
Vagrant persons on streets		
Animal control		
Parks, swimming pools, public baths, and recreation centers		
Road rules, street naming, and addresses		
Cemeteries and crematoriums		
Removal of cemeteries		
Some public buildings		
Demolition of squatter buildings		
Construction permission for private buildings		
Other development works in the public interest		
Other duties as needed		

The prominence of the Ministry of Home Affairs in municipal level planning and development is controversial. The GAD is widely perceived to have accepted and facilitated land grabs and other forms of corruption, making it difficult for citizens to trust it with the increased powers and financing that it will receive as powers and responsibilities are devolved to the local level (Chit Saw and Arnold 2015, 9). DAOs are, for better or worse, the only form of truly devolved government in Myanmar, and are unique in that they raise all revenue from their own township and have significant discretion over spending (Arnold et al 2015, 1). Though DAO are staffed by the GAD, the TDAC that oversee them has ultimate decision-making power and is composed of a majority of locally elected members (Arnold et al 2015, 1).

Jones et al (2014) have critiqued dominant discourse about Myanmar's reform for falling into the trap of treating development and reform as apolitical, arguing that they have ignored the empowerment of a small class of crony capitalists who have benefited enormously from the liberalization of trade. "The turn from politics to development and the generally oppressive political climate have demobilised the old resistance organisations and channelled "civil society" organisations towards apolitical "development" activities, leaving most people with no collective political voice (152). He also challenges the idea that international sanctions helped empower citizens and crippled the military government, noting that in 2011 the military was at its largest in history and that:

...by constraining the country's development, Western sanctions intensified the struggle for survival, making it harder for Myanmar's poorest to participate in political struggle. Ironically, the sector hardest hit by US sanctions was the private-sector garments industry, where labour militancy was strongest; up to 340,000 urban workers lost their jobs, mostly returning to their villages, emigrating or allegedly becoming sex workers (interview with Zaw Win Min and Khine Khine Nwe, July 13, 2012). The foreign investment which did enter Myanmar, concentrated in the borderlands, empowered illiberal elites while fuelling land grabs and the marginalisation of small farmers (166).

Myanmar is among the most fertile and mineral-rich nations in all of Asia and has long been a country with "stunning ecological diversity" (Smith 1994, 12), with ecosystems that vary from rainforests, tropical islands, mangrove, and rice-growing plains in the south to temperate Himalayan peaks and evergreen forests in the north (Myint 2007, 191). Over 50% of Myanmar's total GDP is generated in the agriculture sector, which employs 60% of the country's workforce. Rare mineral mining and teak forestry through state enterprises provide major sources of revenue for the government, with the result that deforestation has devastated vast swaths of the country's landscape (UNDP et al. 2000).

In 1992, the Myanmar SPDC government established a National Commission on Environmental Affairs (NCEA) along with a policy framework that would form the roadmap towards developing a national environmental action plan. Myint (2007) wrote that the NCEA's establishment under the Ministry of Foreign Affairs signals the SPCD's true intentions, arguing that the NCEA effectively served as an international public relations stunt to relieve international pressure and clean up the military government's image abroad (197). Myint fails to recognize, however, that many global south governments have established environmental commissions or offices under or in partnership with their foreign affairs ministries, largely due to their reliance on international partnerships and finance to implement environmental and conservation initiatives (Duda & El-Ashry 2000). However, the critique that the NCEA failed to substantively curb rapacious resource exploitation among the forestry and mining state enterprises rings true. The Myanmar Ministry of Natural Resources and Environmental Conservation was by and large exclusively focused on ensuring that Myanmar exploited as much of its vast mineral wealth as possible,

with conservation concerns a clear afterthought. Perhaps more significantly, the NCEA provided sufficient justification for the SPDC government to treat Myanmar's rivers and other waterways as 'governable spaces' (Rose 1999, 31), extending governmentality (Foucault 1991) to riverine and coastal territories and creating a new mechanism by which to manage space and human activity (Maclean 2007).

Myanmar's environmental governance has made significant strides in the period since constitutional reform. The Ministry of Natural Resources and Environmental Conservation finalized a Climate Change Strategy and Action Plan for 2016-2030 in July of 2016, accomplishing this plan in partnership with the European Union, UN-Habitat, UNEP, and a number of local and international NGOs and expert technical advisors. Flooding is acknowledged in this plan as a particular cause for concern in the context of climate change, particularly its impact on agricultural production, and the action plan mainly addressed this by developing hydrological analysis capacity to survey flood-prone areas (MCAA 2016, 83). The Ministry has also recently finalized a national climate change policy. Still to be publicly released, it will touch on agriculture, irrigation, energy, transportation, industry, health, and social welfare ministries (Sway 2017).

Seint Sann Zaw's work on institutional change in the wake of Cyclone Nargis highlights 2008 as a key moment in the "opening up" of Myanmar to the world, setting the stage for the presence of the international community in the form of government aid, foreign direct investment, and INGOs and marking Myanmar as a fledgling democracy in need of "aid." Nargis also shook public confidence in the managerial power of the SPDC military government and is widely viewed as a key event in the democratic reform process.

2.3 Ideological divides in the three flooding frameworks

This section outlines some important areas of the literature on resilience, adaptation, and disaster risk that bear on flooding. In doing so, the section provides the reader with evaluative reference points to contextualize findings about flood policy in Myanmar.

2.3.1 Resilience:

The term *resilience* was first introduced in 1973 by Holling to refer to the concept of ecological resilience. He explained that "Resilience determines the persistence of relationships within a system and is a measure of the ability of these systems to absorb change of state variables, driving variables, and parameters, and still persist" (Holling 1973: 17). Put simply, ecological resilience is the extent to which an ecosystem can withstand *shocks* and *stresses* and regain function (Adger 2000: 349). Chambers and Conway (1992) define stresses as usually being predictable, cumulative, and seasonal such as seasonal shortages or declining resources, which shocks are usually unforeseen and traumatic. Marschke and Berkes (2006) note, however, that the line between stresses and shocks is not always very clear – what can be a shock for one system may

be a stress to another. The attention to the speed of recovery from a disturbance is one aspect of resilience that distinguishes it from “response”, a term describing the direct reaction to impacts of stressors.

The use of resilience as a concept in connection to social systems began gaining popularity in the late 1980s (Janssen & Ostrom 2006: 241). As opposed to ecological resilience, the resilience of social systems broadens its focus to include foreseeing and adapting to potential changes (Adger 2000). Walker *et al.*'s (2002) definition of resilience as the degree to which a system is capable of learning and adopting new solutions follows a similar line of thought. Resilient systems are able to absorb larger shocks without having to fundamentally transform. To some extent, however, changes in social and ecological systems are inevitable, and can allow resilient systems the possibility of developing new capacity, adapting themselves to match new circumstances (Folke *et al.* 2002: 18). Folke *et al.*'s definition of resilience establishes a link to the concept of *adaptive capacity*, which they define as the ability of social and ecological systems to cope with novel situations without losing options for the future (2002: 17). Arguing that building resilience is the key to enhancing adaptive capacity, resilience is considered particularly through its links to adaptation in their study.

The resilience of social systems is closely linked to that of the ecological systems that sustain them. While this is particularly observed among communities where livelihoods are strongly dependent on natural resources, it remains true for communities whose ties are less direct. The capacity of social systems to adapt and develop is highly dependent on the support capacity of the ecosystems on which it relies, as well as its ability to access those ecosystems. Reducing this capacity may lead to increased vulnerability in the social system unless a new support ecosystem can be accessed. Likewise, the resilience of an ecological system depends on its healthy management by the communities that rely on it. This dynamic interdependence between social and ecological systems, in which human activities are capable of dramatically changing the environments upon which they depend, is known as socio-ecological resilience (Folke *et al.* 2002).

Adger (2000), however, questions whether the linkages between social and ecological resilience are so straightforward, particularly when it comes to the resilience of communities' dependence on that of ecological systems. The globalization of commodities has complicated the relationship between the wellbeing of societies and their natural environments. For example, a crash in the price of rice could devastate a community that relies on it as a cash crop without having any impact on the health of the natural system. Conversely, a wealthy city can rely on imports from distant ecological systems to maintain a resilient population in an unproductive ecosystem. (Adger 2000).

Tensions can emerge between the short term success of a community and its long-term resilience (Sapountzaki 2007: 283). Short-term management or development efforts, such as investing in monoculture

development or paving a landscape with concrete, may lead to a decrease in the long-term resilience of the system, such as a loss of biodiversity or an increased susceptibility to flash-floods. In these cases, the resilience framework favours the long-term health of a community or a system over short term gains and promotes development that can be sustained in the long term. In this sense, resilience is often associated with the concept of sustainable development (Perrings 2006), in which social and ecological development are seen as intertwined and long-term projects.

Key factors that make resilience difficult to assess are the unpredictability of environmental change, technological development, and political shifts. Tsunamis, agro-chemicals, military coups and events like them have resulted in unpredictable dramatic shifts in resilience for communities for better and worse. Sapountzaki (2007: 283) stresses the differences between individual and societal resilience, particularly noting that certain stakeholders or social groups can be excluded from development of resilience in a wider community.

While some present vulnerability as the converse side of resilience (Folke *et al.* 2002: 34), the concept of vulnerability comes from a different tradition altogether and has a crucially distinct meaning in the context of flood studies. Resilience can be described as coming from a positivist tradition which seeks to measure and verify social and ecological systems, while vulnerability is derived from a constructivist tradition that views conditions as culturally situated and normative, taking an individualized approach to development that attempts to avoid imposing external metrics of success or failure on distinct communities and individuals. Miller *et al.* (2010) describe vulnerability as “as a condition, encompassing characteristics of exposure, susceptibility, and coping capacity, shaped by dynamic historical processes, differential entitlements, political economy, and power relations, rather than as a direct outcome of a perturbation or stress” (12).

Given its massive popularity as both a theoretical framework and a development buzzword (Cornwall 2007), it is perhaps unsurprising that critiques of resilience abound. Walker and Cooper (2011) argue that the success of resilience in ‘colonizing multiple arenas of governance’ reflects its ideological fit with neoliberalism. They observe that the concept of resilience has become “a pervasive idiom of global governance”, being “abstract and malleable enough to encompass the worlds of high finance, defence and urban infrastructure” (2011: 144). Swyngedouw and Heynen (2003) argue that the apolitical ecology of resilience privileges social structures that are established, often defending those shaped by unequal power relations and injustice. O’Malley (2010) points out that the way resilience is mobilized by state agencies and other expert power holders in a top-down fashion places the onus of being resilient on communities and the vulnerable rather than the state or the elite. Finally, MacKinnon and Derickson (2012) argue that

resilience policy relies “on an underlying local-global divide whereby different scales such as the national, regional, urban and local are defined as arenas for ensuring adaptability in the face of immutable global threats”, but that in reality, “the processes which shape resilience operate primarily at the scale of capitalist social relations” (255).

Particular attention to ‘urban resilience’ in cities located the Global South began to emerge in the past decade (Field et al. 2012; Dai et al. 2014; McKinnon and Derickson, 2012) as a result of rapid urbanization in developing countries as well as growing threats being posed to urban communities by hazards associated with climate change, including droughts, floods, and powerful storms (Cannon and Muller-Mahn 2010; Friend and Moench 2013). Ford et al. (2015) note that this is because “developing nations are believed to be particularly susceptible to the impacts of climate change...[due to] the dependence of livelihoods on climate-sensitive sectors...climate sensitive-infrastructure...and limited adaptive capacity to cope with impacts” (p. 801).

2.3.2 Adaptation

The second framework of flood response, climate change adaptation, refers to adjustments undertaken in ecological, social and/or economic systems to reduce vulnerability or increase resilience to the actual or anticipated impacts of climate change (Smit and Wandel 2006; Fussel and Klein 2006; IPCC 20014). Scholars generally agree that human-environmental systems are complex, interconnected, context-dependent systems (Adger 2006; O’Brien et al 2007; Cote and Nightingale 2012; Fraser and Stringer 2009) and that environmental, social, economic, and institutional factors play important roles adaptive capacity among flood-prone communities (Adger 2000; Smit and Wandel 2006; O’Brien et al 2007; Béné et al 2012; Tschakert and Shaffer 2014). Coastal and riverine communities in the developing world are particularly vulnerable to the negative impacts of climate change because they are exposed to multiple environmental, economic, and social stressors (O’Brien and Leichenko 2000; Warren *et al.* 2014), and improving economic or social resilience as well as environmental resilience is accepted as climate change adaptation (Ayers and Dodman 2010; Adger 2000, 2006; Smit and Wandel 2006; Fraser and Stringer 2009).

While adaptation literature is extensive and diverse, this review focuses on one key disagreement in the field of adaptation – that of “scientific” versus “human security” framings of adaptation (O’Brien et al 2007) and divisions within human security framing about engaging with power (Taylor 2015). Some scholars view adaptation in scientific terms, producing “a managerial discourse that privileges technical solutions to adaptation” (Taylor 2015: xii). To these scholars, adaptation involves technical adjustments in socioecological systems to external environmental/climatic stressors. Scientific adaptation discourses frame complex human-environmental systems as measurable and quantifiable, and therefore manageable and

governable (Taylor 2015). The scientific framing is exemplified in much of the flood management literature and offers a broad range of adaptation solutions that can:

- Prioritize flood-control through engineering, such as dykes, levies, sea-walls, and dams (Birkland et al. 2003; Godschalk 2003);
- Focus on moving water through urban areas as quickly as possible (Grigg 1996); or
- Develop ecologically-inspired technology solutions such as permeable pavements that divert water into bio-swales or other systems that mimic natural rivers (Everett et al. 2015).

A human security adaptation discourse “builds from the question of why some groups and regions are more vulnerable than others, therein facilitating a different politics of adaptation” Taylor 2015: xii). To these scholars, adaptation involves addressing the root causes of vulnerability to climate change among marginalized groups (O’Brien et al 2007), and recognizing that vulnerability is socially reproduced through decisions taken in the market, by governments and by institutions (Holt-Gimenez and Patel 2009). An example of this approach is examining unequal access to early-warning systems between rich and poor (Cannon 1994). Tun Myint (2007) found that in Myanmar, non-climatic structural factors like ethnic politics and political economy “loom larger” than climate variability in flood-prone residents’ lives.

Some adaptation literature (Yohe and Tol 2002; Neufeldt *et al* 2013) approaches floods from an explicitly human security framing, focusing on how flood reduction and readiness must confront current social inequities to be effective. However, they also emphasize the need to make those issues measurable, through indicators and metrics, to make them governable:

Establishing scientifically credible indicators and metrics of long-term safe operating spaces in the context of a changing climate and growing social-ecological challenges is critical to creating the societal demand and political will required to motivate deep transformations. Answering questions on how the needed transformational change can be achieved will require actively setting and testing hypotheses to refine and characterize our concepts of safer spaces for social-ecological systems across scales. (Neufeldt et al 2013: 1).

Recent work on the politics of adaptation argues that when adaptation scholars render human security questions technical, they obscure questions of power (Taylor 2015; Symons 2015; Weisser *et al.* 2014). Taylor (2015: 78) asserts that “the unwillingness to unlock questions of power [is what] makes the resilience perspective so amenable for purposes aimed at safeguarding the status quo,” in which human security adaptation scholars can identify and describe inequality, but prescribe depoliticized solutions that fit within existing power relations. Taylor (2015) recognizes the human security framing as “a useful entry point for investigation” but characterizes it as “unwilling to engage systematically with the socio-ecological determinants of vulnerability (Taylor 2015 83). Instead of depoliticising human systems and ‘adapting’ the status quo, Taylor argues that,

we need to understand climate change in the context of the uneven commercialisation of agriculture, changing property relations, forms of capital accumulation, the dynamics of state formation, macro-projects of environmental engineering, migratory flows, technological change and the emergence of new rural subjectivities and political movements (2015: xiv).

The concept of adaptation made its way slowly into the realm of international and national policy. The international climate policy effort began by focusing predominantly on mitigation—the reduction of greenhouse gas emissions to prevent dangerous climate change (Burton *et al.* 2006). Policymakers and advocates alike saw efforts toward adaptation in the 1980s as defeatist, representing a lack of focus on the pressing challenges of mitigation (Oppenheimer and Petsonk 2005). Scholars and advocates such as Pielke (1998) began advocating for adaptation to occupy a “more prominent role in climate policy” in the late 90s, arguing that regardless of mitigation efforts, some adaptation would be necessary. After putting adaptation on the IPCC research agenda, policymakers focused on developing a framework for National Adaptation Plans of Action for the Least Developed Countries. These pilot adaptation projects were designed to address the urgent and immediate adaptation needs of the world’s poorest nations and are being implemented to this day (Schipper 2006). Climate adaptation policy saw major progress at the international climate negotiations in 2010 with the adoption of the Cancun Adaptation Framework. This established the Adaptation Committee as the international adaptation policy oversight body, the Nairobi Work Programme as the clearinghouse for turning adaptation research into policy recommendations, the National Adaptation Plans as the national planning and implementation mechanism of adaptation actions, and the work programme on Loss and Damage as a further field of research to understand the limits of adaptation and how losses and damages associated with climate change will be addressed (UNFCCC 2010). Since the Paris Climate Accord, Adaptation policy has been largely downscaled to the national and regional scales with the onus on nations to set priorities and implement action (Lesnikowski *et al.* 2016).

2.3.3 Disaster Risk

The third framework of flood response, disaster risk reduction (DRR) focuses on better anticipating, reducing, managing, and responding to disaster risk by integrating risk reduction measured into sustainable development planning and policies (Alexander 2013). DRR employs measures at all levels to curb disaster losses by reducing exposure to different hazards as well as by enhancing coping and adaptive capacities of vulnerable populations. Effective disaster risk reduction practices take a systemic approach to reduce the human, social, economic and environmental vulnerability to natural hazards. Prevention, mitigation, preparedness, response, rehabilitation and recovery are crucial entry points for risk reduction, with the aim of building resilience to future hazards. DRR emerged out of the schools of hazard management in the 1970s and has become progressively more holistic and integrated in its approach to reducing the impacts of human and environmental hazards on society (Alexander 2013).

DRR has historically taken an approach that foregrounds risk management from an engineering and natural science perspective. Traditionally, it has focused on event and exposure and has favoured technological solutions. In recent years, a shift from response and recovery towards awareness and preparedness and from short-term towards long-term planning has taken root. This has particularly been the result of the acknowledgement of the intersections between DRR and climate adaptation (O'Brien *et al.* 2006). Some of its strengths are its longstanding traditions of community-based work at the local scale that favours bottom-up approaches to reducing vulnerability (Thomalla *et al.* 2006). That being said, top-down disaster management has been more likely to be implemented in LDCs and middle-income countries than in wealthier contexts. Contemporary DRR 'best practices' are contrasted with historically rooted or spontaneous actions based on local knowledge and made by households and communities autonomously (Cannon 2000; Wister *et al.* 2004; Wisner and Walker 2005). Benson and Clay (2004) demonstrate that disasters cause major distortions in national budgets, shifting government spending from capital expenditure towards relief and rehabilitation.

According to O'Brien *et al.* (2006), three groupings of hazards have been met with two different response regimes, "often with little cross-fertilisation or sharing of knowledge between them. One utilises risk assessment as a starting point, while the other begins with a needs assessment" (66). Natural and technological hazards such as flooding have been met with planning regimes that focus on risk assessment and reduction, whereas with humanitarian and complex emergencies such as a refugee crisis, needs assessment models of planning are pursued. Much of DRR programming comes under the rubric of natural resource management. Some organizations do much of their DRR work on soil and water conservation, conservation agriculture, healing environmental 'hot-spots,' drought mitigation, livestock asset protection, irrigation, drought resistant seeds, and agroforestry (Vatsa 2004).

In 2005, Kobe, Japan hosted the UN World Conference on Disaster Reduction, from which emerged the Hyogo Framework for Action, designed to guide DRR policy and action from 2005-2015. The Hyogo Framework (HFA) lays out a detailed set of priorities in order to reduce disaster losses by 2015, guided by 5 key priorities for action:

- Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.
- Identify, assess and monitor disaster risks and enhance early warning.
- Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
- Reduce the underlying risk factors.
- Strengthen disaster preparedness for effective response at all levels (Hyogo Framework 2005)

The HFA works alongside the United Nations International Strategy for Disaster Reduction (UNISDR) system in which 131 member countries have designated focal points and international DRR protocols are established in order to guide nations and aid agencies.

Disaster Risk Management has emerged in recent years as a more comprehensive approach which integrates DRR into development. Disaster risk management addresses some important scale processes by sharing the burden of disaster impacts through insurance mechanisms (Mechler and Pflug, 2002). Though the use of insurance schemes for DRR in developing nations has also been critiqued as exacerbating vulnerability (Cardona 2003, 3) One approach organizations have taken to reducing exposure and increasing a household's or community's ability to cope with hazards is to adopt the principle of 'building back better' (Kennedy et al 2008). Though 'building back better' is mainly about recovery it can enhance DRR by creating opportunities for 'transformation' and the reduction of future risk.

The post-2015 Sendai Framework was developed to replace the HFA and sets out global targets as well as four priorities for action:

- Understanding disaster risk
- Strengthening disaster risk governance to manage disaster risk
- Investing in disaster risk reduction for resilience
- Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction (UNISDR 2015).

The new framework reflects the developments in the field over the last decade, in particular the shift from hazard response to the identification and assessment of vulnerabilities and risks. In other words, that it is “often not the hazard that determines a disaster, but the vulnerability, exposure, and ability of the population to anticipate, respond to, and recover from its effects” (Aitsi-Selmi et al. 2015). Greater attention to the impacts of climate change is also present in the Sendai Framework, though Kelman (2015) offers the critique that it overemphasizes climate change as a single hazard driver rather than incorporating it more comprehensively with DRR and sustainable development efforts.

In his critique of the “risk society” (Beck 1992) that we have created through rapid technological change, Harvey (1996) points to the proliferation of risk and risk reduction as symptoms of ecological modernization. Ecological modernization is an ideological movement whereby human activity is observed to cause harm to natural systems and must therefore be managed in order to mitigate that harm. Though seemingly benign, Harvey traced how the widespread adoption of ecological modernization by large swaths of the modern environmental movement led it to shift its discourse from moral arguments and allowed for wide-scale cooptation by greenwashing capitalism (378). Roanne van Voorst (2016) examines the heterogeneous approaches to risk at the local and individual level within groups that share structural

vulnerabilities, framing risk responses as both a product of social stratification and individual lived experiences with the state and other flood response actors.

CHAPTER THREE – METHODOLOGY

To investigate how urban flooding is governed in Bago, Myanmar, this research sought to determine how floods are perceived and prepared for, exploring four sub-questions:

1. How do government actors interpret the significance of flooding, and the 2015 floods in particular?
2. What role do government actors see for the government and other actors in flood preparedness?
3. What roles do climate change or other external factors play in driving floods and/or shaping government responses to floods?
4. How are government actors' perceptions of flood management shaped by international discourse on urban climate impacts?

Given the types of data required to fulfil the research questions that drove this research, it was determined that a qualitative mixed-methods approach would best provide the necessary depth and context to understand local policy response in Bago. Discourse analysis of international non-governmental organization (INGO) reports (section 3.4.1), semi-structured interviews with government officials (section 3.4.2), and key informant interviews with flood affected residents and local flood response actors (section 3.4.3) provided the data for my analysis. Given the influence of development discourse on local policy, this research used discourse analysis to make sense of government interpretations of flooding.

Discourse analysis is a method for unpacking the implications of different framings, investigating how social realities are “discursively constructed and maintained” (Alvesson and Kärreman 2000). Drawing from Hunsberger (2012), who foregrounds the effects of development discourses on problems and solutions in development: “competing perspectives on the concept of development have enormous influence on the ways in which people understand what is happening in the world, identify the root causes of problems, and recommend particular courses of action” (19). In turn, these discourses influence how projects are designed, funded and implemented. Because of the political nature of climate impacts and disaster risk reduction (Taylor 2015; Alexander 2013), it is worthwhile to take a discourse-based approach to examining how climate adaptation translates into policy priorities and projects on the ground, and how those priorities and projects fit into broader debates about managing the environment. Discourse analysis, as understood by Rose (2001), Waitt (2010), and Dryzek (2012), follows a series of technical and reflexive steps that include multiple reading of texts to situate them in their social and historical contexts (texts understood as both written materials and transcribed interviews). This approach is detailed in section 3.5.

This chapter will first outline the regional context for this research in Bago. The sampling procedures followed and the study populations will follow. Next, how data were collected through a mixed methods approach using document review, semi-structured interviews, and key informant interviews will be outlined. How data were analysed through discourse analysis will follow. The section concludes with reflections on ethics and positionality.

3.1 Regional Context

This research focuses on government officials that are responsible for managing flood readiness and response in Bago, Myanmar. Bago is the capital of the Bago Region, the 6th most populous state or region in Myanmar and the fifth most populous urban centre in Myanmar. The city has a population of approximately 250,000 and is among the fastest growing cities in the country. Just 91 kilometres northeast of Yangon, Myanmar's commercial capital, Bago's growth is intimately tied to the growth of the greater Yangon Region, particularly along the Yangon-Myawaddy highway corridor that connects Yangon to Thailand and much of Southeast Asia. A Special Economic Zone with half a dozen garment factories and the Hanthawaddy International Airport project are both under construction on the outskirts of the city and are expected by the central government to bring significant development to the region.

Beginning in July 2015, unusually heavy monsoon rainfall caused rivers and creeks to overflow with rainwater, flooding low-lying surrounding areas. The causes of the flooding are widely disputed and include mismanaged irrigation projects, deforestation, higher-than-average rainfall, and Cyclone Komen, which struck land in Bangladesh in late July (Burki 2015). The floods resulted in 103 deaths and displaced up to 1 million people. Though the worst effects were felt in the Ayeyarwaddy Delta Region, Bago Region was among the hardest hit, particularly in the rural northwestern region and the greater Bago urban region. All of the region's 28 townships and half of its village tracts were affected, and up to 100,000 displaced people came to Bago to seek shelter and emergency relief. Bago has a long history of dealing with floods and other natural disasters. The city is located



Figure 2: Bago City

on the banks of the Bago River and is in close proximity to the larger Sittaung River, which connects to the Bago River via a canal just south of the city. The broader area is prone to recurrent flooding in the monsoon season along the river and has more recently experienced flash flooding. Earthquakes and landslides have been historically recorded to seriously affect the region, and drought conditions have occurred several times in the northern part of the region.

Due to its location, local geological conditions, and stagnant development, Myanmar is considered among the most vulnerable countries to climate change. Germanwatch's Global Climate Risk Index (CRI) 2017 ranked Myanmar second most vulnerable in its Long-Term CRI from 1996-2015 and 6th most affected by climate change in 2015. Cyclone Nargis (2008), responsible for an estimated loss of 140 000 lives and the

displacement of nearly 1 million and lost property for approximately 2.4 million people is by far the most significant environmental disaster to have affected the country since recording began.

Myanmar is among the group of 49 countries known as the Least Developed Countries (LDCs), considered the world's poorest countries. LDCs have unique vulnerabilities to climate change impacts derived from their lack of financial and institutional capacity to manage climate risks. (Huq et al 2004) The cruel irony of climate change is that LDCs are among the most vulnerable in the world to climate change despite having contributed the least to the problem in the first place. "When affected by a natural disaster, the LDCs are dependent on external aid, as they do not have the necessary funds available to deal with the problems themselves. The LDCs also have the least capacity to adapt to climate change, as they lack the resources and money to both carry out adaptation studies and implement the strategies that would come out of these studies" (Huq et al 2004). Coastal zones and low lying delta areas in Asia, such as those in Myanmar, Bangladesh, and Cambodia, are expected to be increasingly at risk from sea level rise and more frequent and severe storms (IPCC 2014). Climate change is expected to add stress to the Bago Region in particular, with decreased rainfall expected during the winter and summer and increased rainfall expected during the rainy season (Ye Htut 2014).

Myanmar is currently undergoing a radical transition in governance in the wake of constitutional reform in 2008 and successful multi-party elections in 2015. One of the biggest changes that has come with democratic reform is a shift from centralized directives and commands to a model that includes decentralized and democratic decision-making. "As the government of President U Thein Sein has begun to reform the public sector, as part of its 'people-centered development' agenda, it has decentralized decision-making from Nay Pyi Taw to states/regions, districts, and townships. Township committees have also been created, with some members drawn from society to increase the public voice in decision-making" (Hook, Muang Than, and Ninh 2015). Myanmar now has two tiers of government (the Union and the state/region levels) with distinct responsibilities and revenue sources.

Though it lacks a constitutionally distinct municipal level of government across the board, the Yangon City Development Committee and the Naypyidaw Union Territory are administered distinctly from local governance in the rest of the country. In the rest of the country, each township has a development affairs organization (DAO) made up of a Township Development Affairs Committee (TDAC) and a township DAO office. The TDAC is composed of a majority of locally elected members and oversees the work of the DAO, which is staffed by the General Administration Department (GAD) under the Ministry of Home Affairs—one of three important ministries that remain under the control of the military under the 2008 constitution. This means that while elements of the regional and local government are under democratically

elected control, a significant amount of the civil service is controlled by the military. Indeed, former military officers still occupy almost all senior civil service positions, constituting “an administration within an administration” (Hook, Muang Than, and Ninh 2015).

Theravada Buddhism plays a vital role in Myanmar’s social life (James & Paton 2015), nearly every citizen spends at least some time as either a monk or a nun and local temples operate extensive charity networks funded by community donations.

Bago’s experience with flooding, vulnerability to climate change, changing governance systems, and reliance on international disaster flooding made it an ideal case study for this research on flooding and climate change governance. Bago was also chosen because the researcher benefitted from an established network of research support and key informants from the Renewable Energy Association of Myanmar (REAM), which aided the execution of this research, and the Urban Climate Resilience in Southeast Asia Partnership, which funded this research.

3.2 Study Population and Sampling

While all government actor interviews took place in Bago, two key informant interviews with INGOs took place in Yangon. The close proximity of Bago to Yangon has allowed most non-governmental organizations that operate in Bago to ground their operations from Yangon headquarters.

The study population of this research consisted of regional and local government officials engaged in flood response and readiness in Bago. This population was chosen because an initial internet search, as well as discussions with REAM, indicated that these government officials were the primary drivers of flood policy and response in Bago. While Union level officials do have influence in shaping national policy related to disasters and the environment, flood management and readiness is mainly coordinated at the Region level in cooperation with local DAOs. These interviews were supplemented and informed by key informant interviews with non-governmental actors who are involved in flood management and response in Bago. For this research, non-governmental actors are defined as NGOs or other non-profit organizations that are separate from the Myanmar state. A final set of interviews was conducted with flood affected residents of Bago. Though the original research design did not include residents in the study population, key informants encouraged the researcher to talk with “locals” in order to develop a richer picture of how floods are governed in Bago. Finally, four international networks were studied through document review, but were not interviewed because the purpose of the study was not to understand the motivations of these networks so much as to understand the impact of their discourse on local policymakers.

Purposive and snowball opportunistic sampling was employed for this research in which participants were chosen based on their positions of authority over flood management and readiness. In December-January 2015, before fieldwork began, an internet search was conducted to determine which government offices and non-government actors were involved in responding to the 2015 floods. Follow-up interviews with a non-governmental key informant involved in the Myanmar government's structural reform as well as several academics at Yangon University further developed an initial list of government offices to interview. Finally, a research assistant with REAM made use of the organization's established relationships with government officials to gain access to interviews. In total, ten government officials of varying seniority in both DAO and Bago Region governments, five INGOs/UN agencies involved in climate adaptation and/or disaster response, three academics at Pegu University and two at Yangon University, two monks at a Bago monastery that was involved in flood response, and ten Bago residents who were affected by the 2015 floods were interviewed for this research for a total of 33 participants.

During the data analysis, the study population was divided into four groups. These four groups, divided by nature of engagement with urban flooding in Bago were:

- (1) Government agencies responsible for flood management and/or climate change impacts (known hereafter as 'government agencies')
- (2) Bago community stakeholders that are impacted by floods and also involved in managing flood impacts (known hereafter as 'community stakeholders')
- (3) INGOs, UN agencies, and academics involved in Bago flood readiness and response work or research (known hereafter as 'civil society')
- (4) INGOs and international networks involved in urban climate resilience but without programmes or projects in Bago (known hereafter as 'international networks')

More detail is given about each group organizations below, and their different approaches to urban flooding and climate impacts are compared throughout Chapters 4 and 5.

Table 3.1: Categories represented by the study's sample

Government agencies	Community stakeholders	Civil society	International networks
Ministry of Natural Resources and Environmental Conservation (Union)	Monk 01	Bago Red Cross Committee	C40 Initiative
Ministry of Agriculture, Livestock and Irrigation (Region)	Monk 02	Academic 1 (Yangon University)	ACCCRN

Ministry of Natural Resources and Environment (Region)	Resident 01	Academic 2 (Yangon University)	ASEAN
General Administration Department (Region)	Resident 02	Academic 3 (Pegu University)	LDCs
Ministry of Mining and Forestry (Region)	Resident 03	Academic 4 (Pegu University)	
Ministry of Planning and Finance (Region)	Resident 04	Academic 5 (Pegu University)	
Bago Development Affairs Organization	Resident 05	ActionAid Myanmar (1)	
Bago Development Affairs Committee 01	Resident 06	ActionAid Myanmar (2)	
Bago Development Affairs Committee 02	Resident 07	The Asia Foundation	
Bago Planning Office	Resident 08	UNEP	
	Resident 09	UNDP	
	Resident 10		

3.3 Interview Plan

The first group, government agencies, are agencies, departments, and offices that were identified to have some jurisdiction over flood response or readiness in Bago. This group includes one Union level Ministry, four Bago Region level Ministries, one Bago Region level Department, and three local level administrative/electoral bodies. These agencies and offices were identified during the first document review in Canada (detailed below). Upon arrival in Myanmar, one-on-one and group semi-structured interviews of approximately 1.5 hours in length were conducted with representatives of varying seniority from each

office. The specific positions occupied by the interviewees are not identified in this report in order to protect the interview subjects' anonymity, though subjects ranged from relevant programmatic staff to senior level management. A stronger emphasis was placed on regional level government agencies because under the Myanmar Constitution, most development and environmental management falls under the purview of regional level governments (Chit Saw & Arnold 2015) and because key informant interviews revealed that the local DAO lacks the resources to effectively take a significant role in flood management and response. As is often the case when it comes to senior level government officials in Myanmar, government interviewees were exclusively men.

The second group, community stakeholders, consists of ten flood affected residents and two monks in central Bago. The residents were identified using a snowballing method, starting in a neighbourhood that had been identified as regularly experiencing floods in a key-informant interview, residents were surveyed with semi-structured interviews of approximately 30 minutes in length and were asked to identify other neighbourhoods they thought or knew had flooded in 2015. 8 of the residents interviewed were women, 7 had lived in Bago for their whole lives, and all lived in households with multiple breadwinners. The monks were interviewed after several residents identified their monastery as a key site of flood management and response, the first was a resident monk at the downtown Bago monastery and the second was a senior monk that operates a charity network throughout Bago.

The third group, civil society, is made up of academics, INGOs, and UN agencies who operate or study flooding and disaster response in the Bago Region. Two academics in the Department of Geography at Yangon University and three academics in the Departments of Geography and Geology at Pegu University in Bago provided key informant interviews to help identify the drivers of flooding in the region as well as key players in government and among INGOs and UN agencies. The deputy leader of the Bago Red Cross Committee was interviewed and had extensive experience in managing the response to the 2015 floods as well as other periods of flooding in the region. Though the Myanmar Red Cross Committee does not engage in disaster risk reduction or flood preparedness programmes, they are key players in disaster relief efforts and make use of their extensive country-wide network to distribute emergency shelter, food, and water.

The project leaders for ActionAid Myanmar's climate change programme and its disaster risk reduction programme were interviewed in Yangon. ActionAid has been involved in developing Myanmar's national climate change policy as well as its National Adaptation Programme of Action and is deeply involved in both disaster risk reduction and disaster response across Myanmar, including in Bago Region.

A deputy country representative of The Asia Foundation was interviewed early in my research in order to better understand Myanmar government structure. The Asia Foundation has been a key advisor to the

Myanmar Government during constitutional reform and throughout its efforts to decentralize its operations, this interview helped deepen my understanding of Myanmar government operations established in my document review and informed my interviews with the first group of interviewees.

Finally, Myanmar officers of both the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP) were interviewed in Yangon. UNEP is an implementing partner of the Myanmar Climate Change Alliance, a platform for mainstreaming climate change into Myanmar policy development and reform within the Ministry of Natural Resources and Environmental Conservation. UNDP operates major climate change adaptation and disaster risk reduction programmes throughout Myanmar, including in Bago Region. These semi-structured interviews of varying length helped identify subjects for the first group and shaped the in-depth interviews conducted with them.

The fourth group, international networks, consists of two intergovernmental networks—the Association of Southeast Asian Nations (ASEAN) and the Least Developed Countries Group (LDCs)—as well as two international NGO networks—the C40 Cities Climate Leadership Group (C40) and the Asian Cities Climate Change Resilience Network (ACCCRN). ASEAN is a regional organization made up of ten Southeast Asian nations that promotes pan-Asian intergovernmental cooperation. Myanmar joined ASEAN in 1997 alongside Laos and was followed soon after by Cambodia. ASEAN serves as the diplomatic base on which the ASEAN Free Trade Area (AFTA) was built and served as an important pressure point in the democratization of Myanmar (Wilson 2007).

As noted above, the LDCs are a group of 48 nations that are considered the world's most impoverished and vulnerable to climate change. The group was founded at the 1981 UN Conference on the LDCs in Paris, and has served as an advocacy bloc in international negotiations as well as a mechanism of distributing development and climate funds (Huq et al. 2003). The LDC Fund is the mechanism by which Myanmar's National Adaptation Programme of Action was developed and implemented and through which Myanmar is now developing its National Adaptation Plan.

The C40 initiative, a “network of the world's megacities committed to addressing climate change” that “supports cities to collaborate effectively, share knowledge and drive meaningful, measurable and sustainable action on climate change” (C40 Cities 2015). The C40 initiative is the driving institutional force behind a powerful narrative about how cities can be leaders in the fight against climate change. Though the initiative was founded in 2005 with a focus on Megacities, it has since broadened its focus to include secondary cities. No cities in Myanmar have yet qualified as members of the C40 initiative, though it was identified as an aspiration of the Myanmar government in several key informant interviews. Currently, the Southeast Asian cities involved in the initiative include Kuala Lumpur, Bangkok, Hanoi, Ho Chi Minh City

and Quezon City as Megacities, Singapore as an Observer City, and Jakarta as a member city of the Steering Committee. The C40 initiative is funded by the Clinton Global Initiative.

ACCCRN is “a leading regional network connecting professionals and communities across Asia to build inclusive urban climate change resilience that focuses on poor and vulnerable people affected by climate change (ACCCRN 2017). Its core countries are Bangladesh, India, Indonesia, Thailand, and Vietnam, and it maintains an international network of technical specialists across Southeast Asia. ACCCRN is funded by the Rockefeller Foundation and partners with various private consulting firms and INGOs. Data about the fourth group were gathered through a comprehensive document review and discourse analysis. See section 3.4 below for details.

3.4 Data Collection

3.4.1 Document Review

The first data collection method employed in this research was a document review which aimed to understand how the Myanmar government delegates responsibility for flood management and response. A second document review aimed to understand how international urban climate change networks, INGOs, and UN agencies were framing the issue of floods as a climate change impact. Document reviews were selected as the most appropriate method for gathering data on these groups of actors for two different reasons: the first review provided a baseline understanding to build on during the semi-structured interview process and allowed for more detailed discussion. The second review allowed the researcher to identify the common discourses that are openly available to local policymakers. Because these networks do not send staff to Bago, it is through their prolific publications and relationships with INGOs that their discourse is disseminated. Interviewing staff would therefore give little insight into how local government is adopting their frameworks. It was possible to access “rich texts” that allowed the researcher to “interpret the effects of discourse in normalizing understandings” (Waitt 2010: 220) from documents.

Two types of documents were analysed in the first document search, outlined in Table 3.2. To identify documents for this document review, a list of criteria was created to ensure that the documents selected were relevant to government structure in Bago. A full list of documents, webpages and other materials reviewed is included in Appendix 1.

Table 3.2: Overview of documents reviewed 1

Document type	Research purpose	Selection criteria
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Government website, report, or other document that describes government structure	To understand government structure, roles, and responsibilities	Document or webpage published by the Myanmar Union or Bago Region government Document or webpage describes government structure, roles, and responsibilities
Non-government entity report that describes government structure	To understand government structure, roles, and responsibilities	Document or webpage published by the a non-government entity Document or webpage describes government structure, roles, and responsibilities

Three types of documents were analysed in the second document search, outlined in Table 3.3. To identify documents for this document review, a list of criteria was created to ensure that the documents selected were relevant to urban climate impacts in Southeast Asia. A full list of documents, webpages and other materials reviewed is included in Appendix 1.

Table 3.3: Overview of documents reviewed 2

Document type	Research purpose	Selection criteria
Public-facing promotional materials, such as “what is adaptation” landing pages on organizational websites, or promotional brochures	To understand basic definitions and understandings of urban climate impacts, adaptation, and resilience and to understand how these organizations frame appropriate responses	Document or webpage published by C40, ACCCRN, ASEAN, or the LDCs Document or webpage about their definition of adaptation, resilience, or urban climate impacts or about urban climate solutions

Publicly accessible technical documents, reports, and working papers	To collect more detail about organization’s practices and understandings of urban climate impacts and responses	Document gives detailed information about urban climate change impacts and how to respond to them Relates to Myanmar (most desirable) or Southeast Asia (regionally-relevant) if no Myanmar-specific documents exist
Publicly accessible contracts, pacts, or treaties	To understand how each organization is coordinating implementation of urban climate change adaptation	Document/webpage about urban climate impacts in the global south Pact is ongoing or recently completed after 2015 (the year prior to research)

Documents were identified by navigating each organizations’ webpage and finding sections about urban climate impacts responses. Screenshots of “key terms” or “about our work” pages were imported into the qualitative analysis software package NVivo and coded (see section 3.4). By using each organization’s website search function, publications related to “Myanmar”, “Southeast Asia”, “adaptation”, and “flood” and found their relevant reports and publications. Bibliographies and internal hyperlinks in webpages were followed, leading to further reports and pages that elaborated organizational frameworks and key messages. I considered the sample complete when new documents did not offer any new insights into the organizations’ work or perspectives.

Document collection and scoping posed a few challenges for C40, ACCCRN, ASEAN and the LDCs. C40 and ACCCRN, though deeply engaged in urban climate impacts work in Southeast Asia, have not identified any cities in Myanmar as priority cities or project partners. Conversely, while ASEAN and the LDC network are deeply involved in Myanmar’s environmental governance and overall development, they have not identified urban climate impacts as a priority area. Simple and direct links are therefore impossible to draw between the Bago government responses to flooding and the work of these four networks. The present study focused instead on what parallels exist between the framing of flooding as a climate issue in Bago and the broader normative discourse on urban climate impacts and climate change put forward by each network.

3.4.2 Semi-Structured Interviews

The second data collection method employed in this research was semi-structured interviews with government officials. The aim of semi-structured interviews with government was to gather rich discourse

from government, to understand the flood management discourse under which the government operates, and to gather individual perspectives on flooding that would not be available in official statements or publications written by NGOs. To elicit this information, semi-structured interviews were selected as the most appropriate tool because they are “useful for investigating complex behaviours, opinions and emotions and for collecting a diversity of experiences” (Longhurst 2003:112). Semi-structured interviews have some determined structure and questions in the form of an interview guide, but they maintain flexibility—the interview is allowed to flow more conversationally, and the informant has some agency in shaping the chosen topics by focusing on those they think are most relevant to the researcher’s themes (Dunn 2010).

To identify interview participants, suitable government officials with portfolios that fit the previously described criteria were found either using the Google searches previously described, or were snowball sampled from key-informant interview participants in the NGO and academic community. The most senior level manager available at each ministry or department was selected as an interviewee because of their broad knowledge of both activities and goals.

Government officials, identified in the “contact” section of government websites or by other interview participants, were initially contacted by email or telephone, depending on the preferred method of contact given online or identified by the ‘connecting’ participant. Participants were asked to participate in a two hour long interview process in person. Interviews were conducted in a location of the participants’ choosing – most frequently, these locations were semi-private rooms in the organization office. Interviews were electronically recorded if permission was granted, and subsequently transcribed by the researcher. Unless the informant was comfortable and eager to do the interview in English, interviews were conducted in the Myanmar language and an interpreter was used. Only two government interviews took place in English.

Interviews with the 10 government officials were conducted with the assistance of an interview guide with prompts tailored to the agency’s specific purview, and whether the agency has been involved in flood management. Questions that drove the development of the interview guide are detailed in Table 3.4. A sample interview guide is included in Appendix 2.

Table 3.4: Questions driving development of interview guide

Interview line of inquiry	Purpose
How does the participant frame the impacts and significance of the 2015 floods and of flooding in general?	To understand if and why flooding matters to the agency

What caused the 2015 floods, what has been done since, and what should be done about flooding?	To understand what framework the agency uses to understand the causes of floods and what solutions they would like to see
Who is responsible for managing floods?	To understand how the agency views responsibility for flood management
What will happen with flooding in the future? What will impact flooding in the future?	To understand how the agency is expecting climate change or other factors to influence future flooding

3.4.3 Key Informant Interviews

Key informant interviews were used to gain contextual understanding of the Myanmar and Bago governance context. A full list of key informants is available in table 3.1. A total of 23 key informant interviews were undertaken, with flood affected residents (10), monks (2), INGOs (4), UN agencies (2) and academics (5). Speaking with a variety of actors, not just government agencies, is important for understanding the broader context of flood management and governance in the context of climate change, and understanding what is left out or made invisible in the discourse of flood management by government officials (Wiatt 2010) – what actors and potential alternative trajectories for the region are absent from the dominant flooding discourses in Bago?

Key informants possess specialized knowledge that can directly address key research questions, and allow for “the gathering of the kinds of qualitative and descriptive data that are difficult or time-consuming to unearth” (Tremblay 1957: 688). Key informants were identified based on three criteria developed by Tremblay (1957): 1) the informant’s role in the community and whether it exposes them to the information desired in this research; (2) knowledge or the meaningful absorption of the information to which they have access; (3) the informant’s willingness to communicate that knowledge to the researcher.

Due to the limited nature of this study as well as the small relative sample sizes of key informants, data from these interviews were used to supplement and deepen analysis, but were not analysed extensively in their own right. Key informants provided both critical counter-arguments and support for claims made by government officials as well as helpful contextual information, but most data collected were outside the limited scope of the present study.

3.5 Data Analysis

Documents, interview transcripts and field notes were coded and analyzed with assistance of NVivo software. All were coded in a three-step process of descriptive, manifest, and latent content analysis – see

Tables 3.5 and 3.6 for document and interview/field note coding passes. Descriptive codes were used to categorize materials. Manifest content analysis categorizes data within the text (Cope 2010). Latent content analysis is attentive to a deeper meaning than explicitly stated in the text (Kondracki et al 2002).

Table 3.5: Document coding passes

Pass	Nodes
First: descriptive coding	Type of document – webpage, public, technical, research, policy paper
Second: manifest content coding	Interpretation of climate change impacts or flooding Method of responding to climate change impacts or flooding Problems – climate impacts, adaptation, resilience Solutions – climate impacts, adaptation, resilience
Third: latent content coding	Ideological framework; responsibility for impacts; policy; stakeholders; knowledge-production; funding

Table 3.6: Interview/field note coding passes

Pass	Nodes
First: descriptive coding	Agency and role Training and time spent Participant – male, female
Second: manifest content coding	Perceptions of flood impacts and significance Perceptions of flood causes and responses Perceptions of flood responsibility Anticipation of future flood impacts
Third: latent content coding	Technical, policy, scale, buzzwords, funding

Practically, Dryzek’s (2012) approach to discourse analysis informed both manifest and latent content analysis. This involved attention to “key metaphors and other rhetorical devices (17); “agents and motives” – the contextual position of individuals or authors within the broader political terrain (17); and recognizing the underlying ontologies of different discourses during latent content analysis (17). During latent content

analysis, attention was paid to the social and historical contexts of texts as well. This involved reflecting on the effects of power, knowledge, and persuasion (investigating texts for underlying assumptions about what is ‘truth’); taking notice of ‘rupture and resilience’ – persistent inconsistencies within or across texts; and silences – “silences as discourse and discourses that silence” (Waitt 2010: 220).

3.6 Ethics

This research was approved by the Research Ethics Board at the York University. Before interviews, participants were asked to sign a consent form that assured them their identity would be kept anonymous and their interview recordings and transcripts would be securely stored and managed by the researcher. They were informed that they could refuse to answer any question they wished. To protect their anonymity, quotes in this research have not been attributed to individuals. The Bago Region government and NGO community working on disaster risk reduction and climate adaptation are small and tight-knit. It is therefore possible that the identity of informants could be revealed through deductive disclosure. As an extra measure to prevent this, the report excludes the seniority of government officers unless consent was explicitly given, even though that information is publicly available online.

During the field research in Bago, a key informant with research experience in Myanmar warned me that it may be culturally and politically inappropriate to ask for written signatures on consent forms of government officials because informants might be concerned about their identity being compromised. This was verified by a second key informant. To comply with this previously-unknown political consideration, partway through the research process gathering verbal consent from participants replaced signatures – participants would be given a consent form and walked through the process, but not required to return a signed copy.

A copy of an ethics-approved consent form is included in Appendix 3

3.7 Positionality

Reflecting on positionality recognizes “the implications of the social position of the researcher with respect to the subjects, particularly with regard to power relations or cultural differences that may influence the process of the research and its interpretation” (Clifford et al 2016: 534). It is therefore necessary to reflect on “the difference our presence makes in research, and how the process of research itself can shape social relations” (Smith 2010: 165).

“‘First World’ researchers investigating ‘Third World’ ‘subjects’ need to be highly sensitive to local codes of conduct” (Valentine 2005 in Longhurst 2003: 112). Throughout the process of this research, the researcher was cognizant of and reflective about his positionality as a Caucasian Canadian male student

doing research in a developing country context. This could have had implications for how my interviewees perceived or related to the researcher. Where necessary, the researcher clarified that they were doing the research for their own independent Master's project, not for the government of Canada or the University, and complied with cultural norms around professionalism, respect, and communication.

Additionally, there is a history of extractive research between Northern researchers and Southern communities. Most of the interviewees were government officials and NGO project managers with high levels of education and status, whose organizations are also engaged in non-academic research and programming. The researcher did however speak with some flood affected residents who would be considered more vulnerable to exploitation through research. In these case, particular care was taken not to do harm to the participants. Interviews conducted with flood affected residents were kept short and conversational, and it was made clear from the start that the interviews were elective and non-remunerated. The researcher chose not to provide gifts or remuneration beyond a customary small gift of fruit in order to avoid establishing a new norm of transaction-based research from which non-Northern researchers would be excluded. The researcher has been careful throughout his analysis to not presume to evaluate the effectiveness of flood response for residents because that would require more extensive, community-based research.

The researcher was also aware that participating in this research was likely low on the priorities of participants, many of whom were juggling very large workloads, and that there was potentially little benefit to the interviewee from participating this research. Because of this, the researcher was careful not to impose himself and was not persistent in following up with potential participants who did not reply to emails, phone calls, or requests via REAM. It was also made clear that interviews could be scheduled around their scheduling constraints.

Though engagement with academics, NGOs, and social movements on the issues of climate impacts, adaptation, and justice is what prompted this research endeavour, the researcher was careful not to display any bias about flood management and climate impacts in interviews with NGOs and key informants. The researcher has endeavoured to minimize the effect of his prior knowledge and engagement with global politics of climate change during analysis and writing.

CHAPTER FOUR – RESULTS

The following chapter outlines the findings of semi-structured interviews and document reviews, which sought to shed light on how international climate discourse shapes local flood governance by examining how Government in Bago interprets and prepares for flooding. Findings are organized around the study's four research sub-questions:

1. How do government actors interpret the significance of flooding, and the 2015 floods in particular?
2. What role do government actors see for the government and other actors in flood preparedness?
3. What roles do climate change or other external factors play in driving floods and/or shaping government responses to floods?
4. How are government actors' perceptions of flood management shaped by international discourse on urban climate impacts?

Key findings are summarized in Table 4.1

4.1 How do government actors interpret the significance of flooding, and the 2015 floods in particular?

Government officials interviewed universally acknowledged flooding as among the most significant challenges for Bago. Flooding has caused loss of human life, destroyed vital crops, and damaged important infrastructure in the city. One regional official said:

In Bago, flooding is our big problem, other cities have to deal with earthquakes and rebels but Bago has to deal with flooding, that is what kills in Bago, not violence but water. Our crops get ruined sometimes or even our buildings and we have to get help from outside to feed everyone and rebuild.

Similarly, a city official said:

Floods are a big problem in Bago, they are our biggest problem every year. If we had no floods Bago would be a perfect city, but that is the cost of being near two rivers. Normally we can manage the floods but sometimes they get out of control and it becomes a disaster for us.

Several officials noted that flooding is something that happens regularly in Bago, though the severity and breadth of flooding can vary greatly.

The whole region of Bago floods, smaller townships too. In 2015 27 of 28 townships flooded, it was very bad. In 2016 it was 16 of 28 townships, there were paddy fields flooded in 17 townships.

Every year we get flooding in Bago, but it depends how bad the flooding is, sometimes it will hit many neighbourhoods and areas, other times just the houses near the riverbanks and canals...

Normally [the flooding] is not so bad, sometimes it can get really bad and kill people or destroy a road, but normally it is only some flooding and the water level is not so high, maybe 10 extra centimeters over the riverbank.

I remember when I was young it only flooded every few years and we could almost always manage it, sometimes there would be a larger flood that would hit other areas that weren't used to flooding and that would cause more problems but normally the flooding just hits the places that flood every year or every few years.

July, August, and September every year there are heavy rains, sometimes continuous rain for 25 days. Sittaung, Ayeyarwady, Myitmaka, Bago river all flood, especially when it is high tide at the Andaman Sea, not only in the city but also in the townships, one to three weeks of floods.

The widespread nature of the flooding in the Bago Region made it difficult for officials to separate urban flooding from that of the surrounding rural areas. One regional government official explained:

One of the biggest problems when it floods in Bago is that we have trouble helping the rural parts of the Region, when our roads are flooded it is difficult to get food and water distributed from Yangon because everything needs to go through the city.

Meanwhile, a city official noted the impacts of rural flooding on the city:

When the countryside floods, when the farms flood, it becomes a big problem for the whole city. We rely on rice grown in the countryside to keep our economy healthy and to feed the people so when we lose crops, the whole Region suffers, and even the whole country can suffer.

Another noted that:

Usually when it floods too much in the rural areas, people come to the city for shelter and food, sometimes they come here and stay with their families in the city but usually they don't have homes in the city and we must help them here in the city. That can be even more difficult when the city is also flooded.

While some degree of annual flooding is expected in Bago, the 2015 floods were widely understood as out of the ordinary. One government worker described the floods by saying:

Yes, the 2015 floods were much worse than normal, the flooding was up to shoulder height for many people and even higher. Many houses were damaged and the roads were washed out. Nobody had food or water at first and many people did not have places to stay so they had to stay in the stadium or find somewhere else.

Other government officials reiterated the severity of the floods in 2015 but discussed other years with significant flooding:

2015 were the worst floods in this country since Nargis (2008), and definitely the worst in Bago city.

Two years ago (2015) the flooding was very bad, it was not like normal flooding, everything was flooded, not just the normal parts of the city to flood.

Oh yes 2015 had severe flooding, the streams and rivers flooded many homes and we could not do anything, we tried our best but the flooding was very bad, very extreme.

Around the riverbank, certain crops were very damaged, *gailan* crops, vegetable crops flooded, groundnut, sesame.

2015 was even worse than 1997 and 1992, those were other bad years for flooding but 2015 was worse, it has definitely gotten worse.

Some government officials stressed that not only were the 2015 floods worse than usual, but they showed that Myanmar was better prepared for flooding than in the past:

We had the early warning system in place for the 2015 rainy season. When there are high rains and floods are coming farmers will harvest early and store their seeds safely, farmers also need notice to stop harvesting when floods are coming. There are two kinds of flooded areas, one is deep water area and the other one is the inundated areas, so there are two kinds of defense lines for deep water and inundated areas.

Even though the flooding was almost as bad as 2008 in Bago city, the damages were much less and the loss of life was much less, this is because we are getting better with this, with preparing for floods. We have prepared more and we knew the floods were coming so we prepared, we did not pretend there were no floods like Nargis, we prepared and it helped us deal with the floods.

Overall, government officials believed the 2015 floods were significant not just for their abnormality, but for the ways in which they showed Bago's progress in flood management efforts.

4.2 What role do government actors see for the government and other actors in flood preparedness?

Government officials interviewed universally thought that that the government should be involved in flood management:

Flooding and other disasters, that is the government's job, we must prepare for them because the people cannot do it themselves, we need to do it for them.

Of course the government will prepare for floods, it is our job to make sure the people are safe and in Bago it is floods that makes them unsafe, so we will make them safe from the floods.

Yes, we must prepare for floods, otherwise the floods will come and people will suffer. It is what the people want us to do also, they want us to help them by making the floods stop.

There was less agreement between the officials on the subject of what levels of government should take responsibility for flooding:

The responsibility is with the region government but it shouldn't be, it should be with the Union government, they are the ones with the most money to prepare, or they should just give us the money and we can do it but they don't, they tell us we must prepare but we don't have enough money to do it.

Regional government should be participating in this kind of risk management, central agencies should too. Local communities should enthusiastically participate in risk reduction, the flood impacts hit them directly so the public participation is very important.

Not only the floods, every disaster, at the Union level there is a committee, Union level is the highest level and also at the regional level there is a committee to challenge the disaster risk, not only floods but also landslides and the storms. They have the policy, but at the regional level, this policy exists. The coordinating committee is to challenge the risk of disaster. The Union level should take responsibility.

I think the DAO should have more responsibility than we do now, the DAO structure is new but we have the closest connection to Bago city, we know the community and can help it better, they should let us take more responsibility.

There was also some divergence of opinion when asked what role the government should play in flood management:

They have the policy and the committee to address risk from disasters, this committee is the most powerful to do the risk [reduction]. The team collaborate and coordinate each other for responding to disaster. Not only the government but also the other CSOs like Red Cross Society. For this kind of disaster, the committee takes care of the responsibility by teamwork, not only by who is the most powerful or important, no, they discuss which areas should be prioritized, for example number 1, number 2, number 3 or like that. They decide by committee wide, not by one department or other departments.

For the disaster risk, for the flood risk, they think they can reduce the risk and the disasters but 100% reduction is not possible, the challenge is, we have in the Sittaung river region and the Bago region, we have dykes to reduce the flooding. But we need regular maintenance for the dykes, this requires regular funding from the central government. Also advanced technology to upgrade the dykes, so that's a major issue for this kind of flood risk.

When the flooding hits, we give instructions to the farmers, first, timing, sowing time, we give instructions on how to adjust and when to sow. second is strains and varieties, some strains are resistant to floods, deep water resistant variety and also plantation systems and techniques that we give to the farmers.

So for the deep water area, the department of agriculture gives instructions, for example, in April and May, we suggest direct seeding, but for the flooding period or inundated period, they have to prepare seed beds at the higher level and then transplant to the flooding area. First prepare the seedling beds and then transplant to flood area, that's how we prepare for the floods, the department's main duties, this is very important for the farmers, who have suffered a lot and so they get their instructions from the department and they do very well, all this goes very well.

Common themes of a lack of financial and human resources emerged when asked what barriers existed to flood preparedness. Though several officials were quick to point out that the government reforms had removed a significant barrier to flood readiness:

Because of the budget, and funding, regular maintenance cannot happen regularly. Our country is, as you know, a poor country, and they are doing their best to reduce the floods, but we think if the budget should be reaching the people who are doing the serious work on the ground. The government should just transfer the funding to the local authorities I think. International funders are starting to fund also.

In terms of risk reduction, we think it is not enough for preparedness happening, but it is very difficult because of human resources and budget also lacking. The good thing is now, they can advise to the regional government or give suggestions to the regional government transparently. Previously no, but now it is changing. To reduce the flood effect, this department gives training and visits to the farmers, and also demonstration plots. They think this is very good, seeing is believing for them. And also the crop pattern, changing the crop patterns. These technicians are very good and previously they knew they should change the crop patterns, but the government didn't listen to the technical resource person, they do what they like to do. Now they think the regional government listens to them, I don't know if they do it or not, but they can share their knowledge to the regional government transparently. Previously it came from the top, top down, now it is changing and there is a bottom up approach. So I think this is a good change that will be better.

Money is our biggest barrier, maybe also we don't have enough good water engineers who know how to stop the flooding, but we need money to build and maintain dykes and to build early warning systems and track weather patterns. Now that the dictatorship is over, other countries can help us with that because the sanctions are over too, and now the government will listen to what the people need and the Union budget can go to development instead of the military.

Government officials agreed that non-government actors, including the general public, should be involved in flood preparation:

We need the help of CSOs and the public, we cannot do it alone because there are important community networks and they can help us prepare with less money if they participate.

International governments and charities, INGOs, they can help us prepare for floods, they have experience from other countries and we like to learn from them best practices.

If the public does not participate, the flood preparation does not work, but the government has to be in charge for it to work also, we cannot just let the public do it themselves or let an INGO take over, it is our sovereign duty to protect the people from floods.

The last 4 or 5 years there were floods, the lower areas of the city were heavily flooded. Last year the government renovated the drainage canals, big drainage canals. So where in the previous 4 or 5 years there were big floods, last year it was not flooded, this year also, because of the renovation of the big drainage canal. That's on the government side what they are doing that is a good thing. The bad thing is the public participation, some of the household throw away their waste materials, garbage, into the small canals near their houses, they need proper and regular garbage disposal. It depends on the individual households, they should also throw their garbage away systematically, the small drainage canals are filled with garbage so they cannot reach to the main drainage canal, so they are flooded. But now the main drainage canal is renovated by the government, so some areas were not flooded last year and this year also.



Figure 3: Waste in a local canal.

4.3 What roles do climate change or other external factors play in driving floods and/or shaping government responses to floods?

When asked about the causes of flooding in Bago, particularly in 2015, officials identified the floods as rooted in natural causes such as increased rainfall and higher water levels.

In 2015 the severe flooding was because the streams and rivers flooded and those floods came down, higher water flow rates that the canals couldn't handle in the city so the water came over and flooded.

There is monsoon season, we have a lot of rainfall during that season, rainfall is falling from the eastern part of Bago and floods the city, the Bago River is one of the flooding ones because it is very wide.

The flooding in 2015 had two causes, higher than average monsoon rainfall filled the rivers and Cyclone Komen hit Bangladesh and so the Andaman Sea and the Bay of Bengal were higher than usual because of storm surge, these two factors combined and made the flooding worse than usual.

When pressed further to think about root causes or other factors, several came up. Deforestation is seen as an underlying cause of increased flooding by many in the government.

Deforestation is a major cause of making the floods worse definitely, we must clear-cut less in the Bago Region Mountains, that is making the flooding worse and making it a disaster for us.

Yes in the past there was too much deforestation, the last government used forestry to raise revenues but didn't think about the ecological consequences of it, they didn't realize that it would make flooding worse downstream from the forests, now the monsoon doesn't get absorbed as much and goes straight into the river, and erosion fills up the bottoms of the rivers so they fill more easily.

Oh yes deforestation is definitely making it worse, we are working on reducing that but it is difficult.

Land use changes were identified by some municipal officials.

Bago City is growing too fast, we are paving over things and so the water is flowing faster and faster instead of slowing down, that is making the floods worse.

There are less farms and forests in the area that can soak up the water, more urban areas that get flooded because they are in the way of the river, people are building everywhere without paying attention to what floods.

Failing infrastructure was also a recurring theme among respondents.

The drains and dykes are not good enough, that is why the flooding gets bad. The drains are clogged with rubbish and the dykes are old and leaky so the river comes through and over.



Figure 4: Damaged levee near main road.

One of our biggest problems is with the drainage canals and flood walls that we build, with our dams and our dykes. These things require maintenance but we do not have the money to maintain them, so they fall into disrepair and then it makes the floods even worse than before we first built them. It is better to have no dyke than a broken dyke. So I guess I can say that one of the causes of the floods were the broken canals and walls, that made the floods worse than before.

Flooding is understood both as a hindrance to development and a result of it.

It can be a problem for us because we must develop, we must build our cities and exploit our forests and mines to pay for development for the people, but that also makes the flooding worse for the people and we don't have the money to help, it becomes a cycle that we must break out of, we need sustainable development, resilient development.

The flooding is because we have too fast development, it has all happened so fast and the city is growing so fast, that is why we have the flooding, but the development is also good for the people, so we must have it, just slower.

When asked about climate change, all respondents agreed that it was an underlying cause of worsening floods, many referring back to the points they had made when asked about the initial cause of flooding.

The reason for the flooding and the very bad situations in 2015 and 16, especially in the north, one reason is the geographical situation, it is lower than the plain level, the other is because of climate change. The rain is not regular and that causes flooding.

Oh yes, climate change is what we are talking about, it is climate change that makes the water levels higher and the rainfall greater in the monsoon.

Climate change is causing more severe rainy seasons as well as dry seasons, the hot dry seasons kill off vegetation that makes erosion worse when the rainy season comes and that makes the floods worse, so even when it is dry, that is making the floods worse.

The climate is definitely changing here in Myanmar and in Bago Region, the monsoon is longer and more severe, the dry season is worse, the coastal areas are struggling because the sea level is getting higher and we get more cyclones that are severe, it is worse than ever before.

According to the officials being interviewed, some of these causes are being addressed, while others are being ignored or are out of their hands.

Floods will more and more effect the country and the region. It depends on the climate change, not only in the region but also deforestation, there are lots and lots of causes. But if we can be aware of climate change and do something about it, prioritize reforestation. If we don't do that, we think the future conditions will be worse. They think that climate change effect, out of the question, that it will effect and more disasters will come. But the forestry department is preparing for reforestation to prepare and make the climate better. It will take time, we cannot do anything for this kind of problem. Regional climate change adaptation should do things, but will not be quick enough to recover the climate.

We built a wetlands area to protect from flooding, but it's not enough, every rainy season the wetlands flood and it keeps flooding past, because the waterway that goes through the city, Sittaung River and Bago River are partially urban rivers and they will always flood.

We are doing what we can about the floods, we are trying to prevent climate change and deforestation in the country, we are building better flood infrastructure to deal with the monsoon, we are working with other countries to do climate change work here and agreed to the Paris treaty.

4.4 How are government actors' perceptions of flood management shaped by international discourse on urban climate impacts?

4.4.1 International networks

Analysis of the international networks studied in the document review (see section 3.4.1) revealed three different frames for urban climate change: opportunity, risk, and responsibility.

Opportunity:

The language of opportunity is perhaps most central to the C40 initiative's major *Climate Action in Megacities 3.0* (Watts *et al.* 2015) report, the two driving research questions for that report were "What are the potential opportunities for further climate action in C40 cities?" and "How can cities unlock this potential?" (Watts *et al.* 2015, 12). The opportunity frame presupposes that cities are a major source of unlocked potential action on climate change, and that focusing on city action can significantly scale up

overall actions being taken to reduce greenhouse gases and adapt to climate change's impacts. The megacities report focuses on the ways in which cities have increased both the number and scale of actions taken to combat climate change, but also highlights the significant number of potential future actions, calculated in remarkable detail at 26, 820.

Gregory Hodkinson, Chairman of global consulting firm ARUP and C40 partner for the megacities report, framed climate change as an opportunity for cities to become sites of publicly subsidised private investment. "Cities are seeking opportunities to leverage support from central governments and mobilising the private sector to scale up actions city-wide. As cities are investing in climate action they are making themselves highly investable" (Watts *et al.*, 2015, 7). C40's other major institutional partner, the Clinton Foundation, has led the way in restructuring charity into a system whereby foundations interfere in foreign politics in order to create investment opportunities for US corporations (Chorev, 2010, 135).

ACCCRN reports repeatedly bring up the opportunities presented by urban climate change. Urban climate resilience building is described as an opportunity for the private sector to complement government efforts in one ACCCRN report authored by Intellectap, a private impact investment firm, entitled *Opportunities for Private Sector Engagement in Urban Climate Change Resilience Building*. In it, "The Rockefeller Foundation and Intellectap set out to identify business opportunities in UCCRB [Urban Climate Change Resilience Building], and to understand the drivers and inhibitors to private sector participation." (Parmeshwar & Pellech 2010). In its 2014 evaluation report, the ACCCRN identified strategic opportunism as one of its key arenas for growth, and identified a desire to gain influence over "national and global policy processes to identify strategic opportunities to promote the UCCR agenda."

According to ACCCRN reports, the opportunities urban climate change raise for government and the private sector include micro-insurance, healthcare, micro-finance, waste and sanitation, housing, and energy, and Southeast Asian cities are sites of untapped potential in the fight against climate change.

ASEAN and the LDC group use the opportunity framing significantly less often than the above two networks. As intergovernmental initiatives, ASEAN and LDCs both stress the importance of cross-border cooperation, arguing that their initiatives provide opportunities for countries to develop best practices and share lessons learned. ASEAN has held best practices workshops on "Climate Resilient Cities" and "Risks and Impacts from Extreme Events of Floods and Droughts in ASEAN Countries" (ASEAN 2017). The LDCs have used the language of opportunity uniquely among the four groups, arguing in a submission to the UNFCCC that climate change impacts limit the opportunities of women and other vulnerable groups of people rather than creating an opportunity for unique market interventions (LDC Climate 2012, 1).

Risk

The second major frame that the analysis of documents revealed was the language of risk. Risk is mostly used to talk about actions that cities are taking to adapt to climate change. Within the C40 initiative, acknowledgement of risks associated with climate change is ubiquitous, the initiative reports that 98% of C40 cities have formally identified climate risks in municipal policy and 52% have taken steps to adapt (Watts *et al.*, 2015, 23). The central logic of urban climate risk is based on the simple math of concentrated populations: the more people in any given area, the greater the cumulative impact of climate change in that area. The language of risk may resonate so widely because it avoids culpability: one does not have to believe that climate change is anthropogenic in order to recognise it as a risk. The broadly defined need for adaptation and risk reduction has, in fact, been one of the few issues on which advocates from across the global political spectrum can agree, from extremist climate deniers to advocates for global climate justice (King, 2004, 176). The widespread understanding that climate change poses risks and requires adaptation, however, should not be interpreted as consensus as to what should be done about that risk.

The C40's particular approach to risk, as illustrated by its Climate Risk and Adaptation Framework and Taxonomy (CRAFT), is an attempt to standardize a global approach to risk that can be applied in a wide range of local contexts uniformly. The C40 claims that the CRAFT "will allow city policymakers and practitioners to enhance their climate adaptation efforts by understanding city experiences of climate hazards and risks and identifying actions cities are taking to respond to those risks" (Watts *et al.*, 2015, 36). By standardizing risk, global networks of governance, capital, and finance are able to easily integrate diverse contexts into their various markets.

Risk is central to ACCCRN's framing climate change as well as their programming in their partner cities in Asian cities. The organization has conducted vulnerability and risk assessments in all 10 of their partner cities in Southeast Asia and India. ACCCRN reported greater difficulty having their risk assessments used by policy makers than their vulnerability assessments, which are less quantitative and use more community engagement than risk assessments. In discussing why the risk assessments were often unsuccessful, they report that "overall the results were not practical because they aggregated hazards and referred to a hazard index rather than specific hazards" (ACCCRN 2012, 14). The language of risk is particularly geared towards extreme events in ACCCRN materials and is not used in reference to slow-onset climate change impacts such as sea level rise or soil salinification (ACCCRN 201_, 1). A major concern for ACCCRN is the lack of standardized methods and tools needed to undertake rapid urban climate risk assessment, "to address uncertain climate risks to urban ecosystem, it becomes a challenge for decision makers at city level and other urban climate resilience practitioners to select a suitable methodology for assessment of hazard

risks, vulnerability & capacity assessment and risk analysis of cities to develop “City Level Climate Action Plan” in a given scenario” (ACCCRN 201_, 2). Flood risk is identified as a secondary impact in the ACCCRN literature, a result of climate change’s cascading effects on poor drainage systems (Rockefeller Foundation 2015, 6).

In its *Declaration on Institutionalising the Resilience of ASEAN and its Communities and Peoples to Disasters and Climate Change* (ASEAN 2015). ASEAN commits to “systematically mainstream disaster risk management and climate change adaptation in relevant sectoral policies, strategies, plans, programmes, and projects” (2). In this way ASEAN has framed disaster risk management and climate adaptation as different but interconnected goals, viewing hazards and climate change as contexts in which vulnerability, capacity, and exposure come together to generate risk (3). The ASEAN declaration includes an emphasis on the underlying drivers of risk and commits to:

Address underlying risk drivers and compounding factors, such as climate change and climate variability, uncontrolled urbanisation, ecosystem degradation, weak governance, limited risk management capacity especially at the local scale, poor management of urban and rural development, consequences of poverty and inequality, and conflict situations (3).

The LDCs do not use the language of risk in the above manners, instead opting for language of losses and vulnerabilities. In most papers and submissions that the present study reviewed, the LDCs stressed the impacts of climate change already being felt, generating a sense of urgency to act as well as painting a clear picture of impacts to come. They argue that the impacts being felt “risk undermining efforts to eradicate poverty, therefore effective and timely adaptation action will be essential to reduce damages, limit loss, and stay on track to achieve the sustainable development goals” (LDC Group 2012, 1). Climate impacts are put in the context of development and poverty eradication and are not treated as standalone risks.

Responsibility

Finally, the document analysis revealed that the international networks used language or responsibility to establish a moral imperative to act on climate change. Though not used as explicitly as the other two frames, the C40 regularly reinforces that cities have a responsibility to act on climate change. This responsibility is largely derived from the urgent nature of the problem, “recent research by C40 in collaboration with SEI shows that based on current trends of consumption and infrastructure development, within five years the world will be “locked-in” to sufficient future emissions to exceed the globally safe carbon budget” (Watts *et al.*, 2015, 10). But is also derived from the role that cities play in causing the problem in the first place, “in fact, the research indicates that a third of these emissions will be determined by cities, demonstrating

that the climate problem cannot be solved without city mayors and citizens” (Watts *et al.*, 2015, 10). The C40 recognizes that the rapid expansion of cities across the globe, as well as the shifts in the proportion of the world’s population, consumption, and capital that are concentrated in cities are both currently drivers of climate change. This means that no matter what changes are made to rural livelihoods, the question of global urbanisation must be addressed in any comprehensive solution to the climate crisis. The analysis showed that ACCCRN documents avoided the language of responsibility altogether.

As inter-governmental bodies, ASEAN and the LDC group used the language of responsibility regularly but differently. ASEAN used the term to address Southeast Asian governments’ responsibility to prepare for climate impacts, whereas the LDC group used it to address the responsibilities of developed country governments to prevent climate change and finance adaptation in poor countries. ASEAN reports set out government responsibilities and priorities for climate impacts and disasters, noting that “Planning and management of [long-term recovery] are a government responsibility, it may be supported by others” (ASEAN 2017, 14). The LDC’s website cites two major aims, the first of which is to “demand that wealthier nations act in accordance with their responsibility for creating the problem and their capability for addressing it,” the second of which is to “play a leadership role in global efforts to prevent dangerous climate change” (LDC Group, 2017). These different approaches can largely be attributed to the respective audiences for which their publications and materials exist. While the ASEAN’s work is internal, focused on coordinating governance among a small regional group of nations, the LDCs work is external, focused on providing coordinated input to multilateral global negotiation processes.

4.4.2 Government

For their part, government actors were keen to stress that they were open to and sought out input from international networks. According to government actors interviewed for the study, this openness took form in several different ways, with some regional government officials attending international workshops and reading reports, and others remaining more passive, being open to advice from experts when it was offered.

Myanmar was closed off from the world for so long, it was difficult for people here to get expert advice from outside, but now we have INGOs and development agencies here that teach us about resilience and disaster risk reduction, about flood management techniques, we get the technical experts here and they help fund our responses so it is all working much better now, much faster.

My department has done several workshops with international experts on flooding and climate change, it is useful because we learn lessons from other countries and learn the best science, we don’t have the money to do all that research ourselves and have our own experts, so it is very useful to have trainings and advice and reports to know what to do.

We are open to experts' advice, there are many experts out there from other places that flood like Amsterdam and London who can teach us about how they manage their rivers when they have rainy seasons.

The Union level climate change alliance has experts and INGOs that study best practices from all over the world and they are developing the national climate change policies, we build our Region level policies off of that so we are probably influenced by them in that way.

In some cases, government officials called for greater input from international networks:

We would love it if there was more input from the international community, they have a lot of experience and Myanmar doesn't have very many engineers, we can learn from them. It is difficult because we are not used to so much looking outside of our country for experts, we were isolated for so long, but now we can get help from outside.

Yes, we need help and support from outside governments and INGOs, I wish that they would give us more support so that we could do more about the flooding and for climate change. The international community does not help us enough with preparing for climate change and because we don't have the resources and expertise to do it ourselves, we make mistakes or we cannot do it at all, this is because we need the capacity building from the countries with more success and experience reducing disasters and adapting to climate change.

Some, however, expressed reservations about seeking too much outside support:

We don't mind getting advice from international experts, but we also have our own experts and ultimately it is the government of Bago that must make the decisions about what is best for Bago, we cannot give up our sovereignty to DfID (United Kingdom Department for International Development) or USAID (United States Agency for International Development), we appreciate their support but it is still Myanmar, we make the decisions here and they must not do anything without our supervision and permission.

International advice is good, we like to cooperate with the international community, but sometimes we must address things locally, we have our own solutions to our own problems and sometimes the problems are different. Maybe climate change is different here than it is in America, or maybe floods are different than in the UK, where they can't even deal with their own floods, so we have to be careful when they come and tell us what to do with our floods, we have to be proud of our own ways of doing things and say no sometimes.

While others spoke about the barriers to accessing international support:

INGOs are good, they give us a lot of support, as well as foreign governments and the UN, but sometimes there are so many rules, so much to change and to report, sometimes making all these reports for projects is too much, it becomes more work than its worth, and we just go without the money or fail to report because we can't keep up. There are too many requirements, if we did all the reporting that international people wanted us to do, that the INGOs, the UN, the other governments, if we did all that reporting all we would do is reporting, just writing reports and never doing anything else. Then we would be flooded with reports haha!

Sometimes it is too hard to apply expert advice, our government does not have so much capacity, it can be hard to keep up with reports and literature out there, it can be hard to understand everything

that is out there and apply it here. Some literature is helpful, sometimes they take so long to say very little, we need briefs and summary reports and key lessons or we need workshops to build our capacity, we cannot process everything out there and we will not find it unless it is given to us, sometimes these things just stay in a report somewhere and nobody reads it, what is the point of that? No, we get expert advice from people we trust and they give it to us.

4.4.3 Comparing International Networks and Government

Throughout the interviews, government officials regularly used all three of the frameworks from the international networks when discussing the governance of climate change.

Now with climate change, we have a unique **opportunity** to think bigger, floods used to be just a local issue and weren't so bad but now we can cooperate with the whole world to keep climate change limited, and we can develop sustainably.

Regional government should be participating in this kind of **risk** management, central agencies should too. Local communities should enthusiastically participate in **risk** reduction, the flood impacts hit them directly so the public participation is very important.

Climate change, it makes disaster **risk** worse, we had the disasters before but now the **risk** is higher.

The **responsibility** is with the region government but it shouldn't be, it should be with the Union government, they are the ones with the most money to prepare, or they should just give us the money and we can do it but they don't, they tell us we must prepare but we don't have enough money to do it.

I think the DAO should have more **responsibility** than we do now, the DAO structure is new but we have the closest connection to Bago city, we know the community and can help it better, they should let us take more **responsibility**.

When asked for clarification however, it became apparent that these terms were being used with varying definitions, often to suit the needs of those who were using them:

Now that everybody is talking about climate change, it is a big **opportunity** for us in Myanmar, because we are one of the most vulnerable countries, so we have a big **opportunity** to get help from the international community, now they have things like the LDCF (Least Developed Country Fund) and the Adaptation Fund, so if we have adaptation projects, we can get good development money to help us and they will invest, so we put climate change aspects to all of our projects now, it's a very good **opportunity**.

For the disaster **risk**, for the flood **risk**, they think they can reduce the **risk** and the disasters but 100% reduction is not possible, the challenge is, we have in the Sittaung river region and the Bago region, we have dykes to reduce the flooding. But we need regular maintenance for the dykes, this requires regular funding from the central government. Also advanced technology to upgrade the dykes, so that's a major issue for this kind of flood **risk**.

We did not cause the climate change, so it is not our **responsibility** to reduce greenhouse gasses, to solve the problem. That is the **responsibility** of the western countries, of the developed countries,

it is them who must stop climate change and help us deal with the impacts in our country, because it is not our fault.

4.5 Reflections on Silences in Discourses

Stepping back from which elements of international discourse on climate change are represented in Bago government discourse on flooding, it becomes apparent that several key elements of the broader discussion outlined in the literature review on flood policy are not represented: the critical resilience framework (outlined in section 2.3.1) and more radical vulnerability and adaptation discourses (section 2.3.2) are missing from flood policy discourse in Bago Region. Waitt (2010), Rose (2001) and Edwards (2003) argue that it is important to pay attention to silences in discourse analysis. Considering silences can reveal how a dominant discourse “operates to silence different understandings of the world” (Waitt 2010: 236). To do so, researchers must be attuned to the broader social context of their projects and texts (Waitt 2010).

Key informant interviews were able to illuminate silences in government discourse on flood management.



Figure 5: Typical household built on stilts in the floodplain.

While residents and INGOs regularly spoke of Buddhist monks and monasteries as key components of Bago’s disaster management tradition, government officials never mentioned these social infrastructures as relevant components of flood management. Strategies that residents had come up with to manage flood risk, such as building their houses on wooden stilts reinforced with concrete bases and storing small canoes to navigate flooded streets were similarly absent from government actor responses about local flood management.

There are two interrelated silences in the international network’s climate change discourses worth noting. First, the documents produced by the international networks do not recognize the growing body of research and knowledge that identifies how a neoliberal, investment-oriented disaster recovery system can reproduce poverty and vulnerability among urban dwellers (Kaussen 2011; Jones et al. 2014; Van Riet 2016). In Myanmar specifically, Sann Zaw’s (2016) research on post Cyclone Nargis recovery shows how private sector housing and micro-credit initiatives were largely ineffective at providing anything other than very short term relief and were ultimately rejected by many affected communities.

Second, prominent critical voices within the Climate Justice Movements and scholarship were absent from the C40 and ACCCRN’s documentation of their work in global south cities. Specifically, I could locate no analysis that attributed greater responsibility for climate change action with either wealthy nations or

corporations and individuals. The flattening of responsibility across all major cities ignores both global and local inequities inherent in climate change and urban systems. As Bond (2011) notes, these Climate Justice Movements have been particularly critical of the financialisation of climate change responses and have combined local activism with internationalist analysis to build power over the last three decades (2). The implications of these gaps in the discourse will be considered in the following section, which returns to the overarching research question.

4.6 Summary of Results

Investigating the means through which different actors engaged with the concepts of climate change and flooding revealed that the so-called “international networks” are positioned as powerful ‘legitimizing’ actors in climate change discourse (Escobar 1995). As international research and development organizations that are deeply influential over government and INGO discourse and practice, the international networks actively shape the parameters of government interventions in flooding and climate change by bringing together key influential actors and co-creating adaptation interventions based around their frameworks, and to encourage the replication of those projects in other jurisdictions through ‘best practices’. Table 4.1, below, distills the key take-aways of the findings under each research question. Chapter 5 returns to the original research question.

Table 4.1: Summary of Findings

Research Question	Government perspective	International network perspective
Q1. How do government actors interpret the significance of flooding, and the 2015 floods in particular?	Flooding is acknowledged as among Bago’s most significant challenges Though flooding occurs regularly, the severity and breadth of it can vary Flooding is understood to be worsening Urban and rural flooding are deeply connected The 2015 floods were understood to be more severe than usual The 2015 floods also showed how much progress the government has made in disaster risk reduction	N/A
Q2. What role do government actors see for the government	The government should be involved in flood management There is no agreement on which level of government should be	N/A

<p>and other actors in flood preparedness?</p>	<p>ultimately responsible for flood management There is no agreement in terms of what role the government should play in flood management The government is seen to lack financial and human resources for managing floods Government reform is seen to have helped the government manage floods better Non-government actors, including the general public, should be involved in flood management</p>	
<p>Q3. What roles do climate change or other external factors play in driving floods and/or shaping government responses to floods?</p>	<p>The floods are generally seen to come from natural causes such as seasonal rainfall Forestry is seen as an underlying cause of increased flooding Land use changes are seen as an underlying cause of increased flooding Failing infrastructure is seen as a cause of severe flooding Flooding is understood as both a hindrance to development and a result of it Climate change is universally understood to be making floods worse While some underlying causes are being addressed, others are seen as out of the government's hands</p>	<p>N/A</p>
<p>Q4. How are government actors' perceptions of flood management shaped by international discourse on urban climate impacts?</p>	<p>Government officials were open to input from international networks and actors Some wanted to see greater input and intervention from international networks Attention to local context and maintaining sovereignty were conditions for international intervention Burdensome reporting requirements and inaccessible information are barriers to accessing international advising</p>	<p>Cities, particularly those in the global south and Southeast Asia, are seen as sites of opportunity for climate action by some networks Climate change is viewed as an opportunity to involve the private sector in sustainable development initiatives Inter-governmental networks stress the limiting effects of climate change on their development rights and opportunities The language of risk is used by three of the four networks in a manner that advances technocratic ecological</p>

	<p>Government officials regularly used terms and frameworks put forward by international networks</p> <p>Government officials changed the meaning of key terms or reinterpreted frameworks to suit their local contexts and needs</p>	<p>managerialism and depoliticizes climate change and flooding</p> <p>The LDCs opt for more explicitly political language around climate impacts that challenges the value-neutral language of risk</p> <p>The largest gap between foundation-funded networks and inter-governmental networks is in their interpretation of who is responsible for addressing climate change</p> <p>The C40 initiative attributes responsibility to cities in general, with no attention to disparities between them</p> <p>ACCCRN avoids the question of responsibility altogether</p> <p>ASEAN uses responsibility to motivate member governments to act on climate change</p> <p>LDCs use responsibility to call for accountability from developed countries for cleaning up their messes</p>
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CHAPTER FIVE – DISCUSSION

The overarching question that motivated this research was derived from the debate in the international political sphere about urban climate impacts: to what extent does the open-endedness of climate adaptation and resilience create an opportunity for creating context-specific solutions (Cannon 2000; Wister et al. 2004; Wisner and Walker 2005), and to what extent are international activities around urban climate resilience encouraging ecological modernization and environmental entrepreneurialism at the urban scale (Harvey 1989). This section will interpret results through the literature on ecological modernization to shed light on that overarching question by indicating the extent to which the study's findings answered the four research sub-questions.

To reiterate the literature reviewed in section 2.3.3, ecological modernization is a tenet of late capitalism that sees new technology and the creation of new markets as the solutions to environmental challenges (Harvey 1996). I argue here that while this may be the agenda advanced by some international networks, this case study of Bago shows that local government is capable of manipulating the discourse of ecological modernization to suit their own ends, both as a means of expanding the state's managerial role and replacing traditional forms of flood management with modernist approaches.

5.1 How do government actors interpret the significance of flooding, and the 2015 floods in particular?

Though Bago has a long history of floods and flood management, 2015 was the first year that the national government declared a state of disaster in the Region. This was in large part due to how widespread the flooding was: the widespread nature of the flooding drove rural residents into the city to seek food, water, and shelter as well as temporary livelihoods after having rice crops destroyed. The regional government has since implemented planting advisories and workshops in order to encourage flood resistant crops and to align planting and harvest times with meteorological data.

Residents and government officials diverged on the question of whether flooding is necessarily a disaster. One resident and shop owner framed flooding as a welcome disruption of everyday urban life:

Yeah we can deal with floods, it's like a holiday for us, we can close the shop and stay home, but then we have to clean the rubbish after and we don't like that. When all the tables go away with the water we don't get any compensation but if the locals see them they will bring them back. Because flooding happens here all the time, it's not a strong problem, it's a holiday. People are used to it and they see it so we don't really prepare anything, it's really just once in a while or once in a year, it's just like normal life for us. We just tie our scooters down.

Similar themes emerged from the study about the lack of a waste disposal creating problems for residents in urban areas while the tight social networks in the city helped residents recover from the effects of floods. Residents have developed strategies such as building their homes on stilts in the floodplain and owning small boats to navigate the village when small streets have flooded.

Residents and government officials alike agreed that while flooding has gotten more frequent and worse in the last decade, the government's capacity to respond to floods has also increased. Government officials were careful to point out that flooding could not be eliminated and must be accepted as part of everyday life in Bago, but that government and civil society interventions have the potential to reduce the negative impacts of and risk associated with floods. Government also stressed that part of what made the 2015 floods significant was that the global community could see how much better prepared Myanmar was than in 2008 when Cyclone Nargis hit. Nargis was seen by government officials as an embarrassing failure, and the difference between the two events interpreted as a sign of how much progress Myanmar governance has made in the last decade of reforms.

5.2 What role do government actors see for the government and other actors in flood preparedness?

As the Myanmar government undergoes gradual but incomplete decentralization (Marks 2015) and empowers regional and local democratic governments to take on greater responsibility from the pre-existing military governance structures, government officials and residents alike spoke about a marked improvement in the ability of experts and citizens to provide input and advice in order to improve flood readiness, but also of an expansion of the role of the state in meeting community needs. An important example given was that of the Union government's replacing of storm drains after the 2015 floods in which the lack of community engagement in the project as well as the lack of waste collection services or infrastructure meant that the drains filled with trash and were clogged by the next flood season, causing even worse flooding in certain areas of the city. State-run flood management techniques, in trying to find a quick engineering fix, ultimately worsened flooding over the long-term for many residents. In this instance, the assumption that modern technology would solve flooding without systems in place to ensure the viability of that technology worsened flooding and made residents more vulnerable.



Figure 6: Waste beginning to pile up against a drainage canal grate.

Residents and INGOs interviewed during key informant interviews regularly reported that temples are traditional sites of refuge for people displaced by floods, landslides, and earthquakes. One temple in



Figure 7: Monastery and pond used for flood mitigation.

downtown Bago is surrounded by a pond that was attached to a tributary canal of the Bago River after 2015 to accommodate extra storm-water. Monks reported that because of the water flow, sedimentation and pollution has killed off the natural fish and flora and that the temple is no longer a viable shelter during floods because of this. In this way, the government intervention to reduce flooding has replaced a more traditional approach to flood management.

Though flooding has been a regular occurrence throughout Bago's history, changes to both the surrounding environment driven by climate change and deforestation and the urban environment driven by land use change and river canalization have made flooding worse. Government officials recognized the futility of attempts to eliminate flood risk altogether: "For the disaster risk, for the flood risk, they think they can reduce the risk and the disasters but 100% reduction is not possible, the challenge is, we have in the Thayarwady river region and the Bago region, we have dykes to reduce the flooding. But we need regular maintenance for the dykes, this requires regular funding from the central government. Also advanced technology to upgrade the dykes, so that's a major issue for this kind of flood risk." Cazdyn (2012) writes about "the new chronic," a state in which crisis is mobilized to eschew transformative solutions and create new markets in providing relief. As dykes and concrete drainage canals are built to respond to transforming urbanized landscapes, traditional flood-management techniques become impossible and flood management as well as the maintenance for its infrastructure is removed from the hands of the local community and put into those of the state and the international community.



Figure 8: Drainage canal being dredged by hand.

The extent to which flooding is framed as a disaster is not consistent across Bago, let alone Myanmar. Residents regularly spoke about how some amount of flooding is considered a normal part of their lives in Bago and seemed to take pride in having a greater capacity to cope with flooding than other parts of the country. Flooding is understood as a disaster under specific circumstances which are shaped by social and economic forces in the community as well as the state (Pelling 1998; Bankoff 2004). Disaster framing is also derived from the international discourse on Disaster Risk Reduction and in some situations may risk inappropriately imposing a narrative of vulnerability used to weaken local social networks and traditional coping methods, such as by flooding a traditional site of refuge.

5.3 What roles do climate change or other external factors play in driving floods and/or shaping government responses to floods?

Because flooding is not a new phenomenon in Bago, external factors are seen as risk amplifiers or multipliers (Renn 2011) rather than sources of flooding in and of themselves. Government officials showed nuanced understanding of how existing flood-prone environments would become more vulnerable to more extreme and more regular flooding under conditions such as increased rainfall, erosion, loss of forest cover, and higher sea levels. Residents were much quicker to point to external factors that fell within the realm of local politics, such as deforestation or poorly maintained infrastructure, than government officials, who were more comfortable discussing the impacts of climate change. Climate change can be used as a way for local authorities to abdicate responsibility for immediate concerns within the community, shifting the blame for flooding away from their decisions to pave over a natural drainage system or encourage deforestation. It should be said, however, that local authorities have little say in the natural resource industry and that local DAOs have found themselves increasingly at odds with Union level state enterprises partnering with international firms that cause environmental harm at the local level (Phillips 2017).

While local government officials interviewed attributed increased flooding to external factors, these factors did not significantly appear to be affecting the way that floods are prepared for and responded to at this time, according to informants. Flooding was still responded to as though it were a natural phenomenon, unchanged by urbanization, deforestation, or climate change. Many of the lessons learned in other jurisdictions about how paving canals and building dykes and flood walls can actually worsen flooding when it becomes more extreme are not widely understood among local government officials and are not being taken into consideration. As a result, significant infrastructure investments risk being wasted on short-term solutions like concrete drainage canals that fill with litter and sediment instead of investing in natural drainage systems that slow water down and distribute it into natural systems that can absorb it. More importantly, the study demonstrated that root causes are not being addressed, given that there are no major

initiatives in Myanmar or Bago Region that address the impacts of deforestation on flooding, and dams and other hard infrastructure riverine projects are expanding rapidly (Win et al 2009; Zin 2015). In this context, it is safe to observe that flooding will likely worsen in the next decade until transformative solutions are pursued.

5.4 How are government actors' perceptions of flood management shaped by international discourse on urban climate impacts?

The three frameworks (opportunity, risk, and responsibility) advanced by international networks, particularly in the manner that they are advanced by the C40 and ACCCRN initiatives, are all bound to the ideology of ecological modernization.

Implicit in the language of opportunity is the idea that a changing climate opens new opportunities for different actors. While it remains to be seen who those actors will be and who might benefit from these changes, C40's choice of partners gives some clues as to where this idea leads. Neither of these partnerships bode well for the C40's credibility when it comes to truly tackling climate change at a systemic level, but they do help us understand what opportunities the initiative might have in mind; namely, opportunities for the private sector to turn a profit from whatever actions city governments are compelled to take.

When it comes to the ways in which the networks use risk, standardisation can benefit cities in that those with less local capacity can receive training and expertise from global partnerships like the C40 at a lower cost, but it belies a normative approach to development, the environment, and capital that fails to account for local context and diversity in a meaningful way. Risk is a fundamentally social phenomenon (Beck 1992). Quantifying risk depends on assigning relative value to certain elements of city life over others, and these value judgements can be shaped by powerful elites without close attention. Local government officials in Bago seen in the study demonstrated both enthusiasm for standardised best practices and recommendations and a weariness of solutions that were not specifically tailored to their local context, a contradiction made necessary by a lack of government resources to generate and implement home-grown adaptation and development initiatives.

The responsibility that C40 attributes to cities is also symptomatic of a core facet of global urbanisation: the decline of centrality of the nation-state. Before globalization, it would have been difficult to conceive of cities around the world accepting mutual responsibility for a problem for which some of the nation-states in which those cities exist find themselves incapable of even admitting there is a problem in the first place. This is not to say that the nation-state is irrelevant, rather, "an overriding finding throughout this work has been that nearly three quarters of the challenges our cities are facing cannot be managed unilaterally by

cities – they require collaboration with national governments, the private sector and other actors” (Watts *et al.*, 2015, 7). What this frame does tell us is that the nation-state now shares responsibility for tackling global crises with other actors, including cities. The ASEAN and LDC uses of responsibility each show in their own way that there are still grounds for active debate about where responsibility should lie, and that having a responsibility to act should not be confused with culpability for creating the problem. Government officials in Bago were aware of international debates around responsibility for climate change but were also eager to assert their responsibility to drive adaptation at home. They demonstrated an understanding that while developed countries have an obligation to reduce greenhouse gas emissions, it will be local governments in the global south who end up shouldering the burden of climate impacts.

Bago government officials can be seen using the language and frameworks used by initiatives like C40 and ACCCRN, but are more often seen replicating the ideologies of ASEAN and the LDCs. Words like ‘resilience’, ‘risk’, ‘opportunity’, and ‘responsibility’ are all used, but often to advance an agenda of government expansion rather than one of private-sector intervention. Local and regional government officials in Bago have selectively adopted elements of the discourse advanced by international networks to suit their own goal of expanding the government’s role in managing everyday life while eschewing or reinterpreting other elements of that discourse that does not suit their needs. The discursive power of international networks is therefore limited by the extent to which local governments are aligned with their interests.

From examining the material of these international networks, this study has shown that the initiatives saw themselves as networks that hope to tackle climate change by sharing knowledge in the form of best practices. Their discourses of climate change reflected their core structures, with networks coordinated by neoliberal foundations mirroring technocratic adaptation discourses and those coordinated by governments reflecting multilateral and regional political dynamics. While government officials demonstrated a variety of flooding and climate adaptation discourses, their work on flooding and climate was limited to the local scale and most officials did not have a wider political vision for environmental governance. However, this research demonstrated that critical discourses of resilience, disaster risk, and adaptation were nonetheless flourishing among government actors studied in Bago.

CHAPTER SIX – CONCLUSION

6.1 Summary of Arguments and Findings

The study of urban climate change adaptation is growing in prominence among researchers, governments, and the development community, but is still under-studied for most secondary cities in the global south. This major research paper explored the ways in which local and regional government understand and respond to one climate impact—flooding—in Bago, Myanmar. This paper also explored the discourses used by international networks that promote climate change adaptation and the extent to which these networks influence Bago’s flood governance, and how they ultimately promoted a vision of ecological modernization and environmental entrepreneurialism at the urban scale. While my research assumes that there is no one ‘right’ way to prepare for climate impacts, the study found that local government actors in Bago had eschewed local and traditional flood management methods in favour of heavy infrastructure solutions that risk further entrenching urban flooding for decades to come. I found that local government in Bago had selectively adopted elements of the discourse advanced by international networks to suit their own goal of expanding the government’s role in managing everyday life while eschewing or reinterpreting other elements of that discourse that did not suit its needs. This research illustrated how the 2015 floods in Bago served as a catalyzing moment for Bago’s government, showing that both the international community and local citizens were prepared to take on greater responsibility for environmental management and had made significant progress since 2008’s Cyclone Nargis.

The study explored the connection between the governance of flooding in Bago and international climate discourse by answering four sub-questions:

1. How do government actors interpret the significance of flooding, and the 2015 floods in particular?
2. What role do government actors see for the government and other actors in flood preparedness?
3. What roles do climate change or other external factors play in driving floods and/or shaping government responses to floods?
4. How are government actors’ perceptions of flood management shaped by international discourse on urban climate impacts?

For sub-question (1), it was found that government officials interpreted the 2015 floods as particularly significant, not only because they were more extreme than usual, but because Bago was seen to have responded well to the crisis. For sub-question (2), it was found that while local and regional governments are keen to take on greater responsibility for flood management, they often lack the human and capital resources to do so. It was also found that government often fails to acknowledge the pre-existing community methods of flood management and view their interventions in a vacuum. For sub-question (3), it was found that while government actors acknowledge the role of external factors such as deforestation, land use

change, and climate change in worsening floods, little to nothing is done about mitigating these underlying causes of flooding. Instead, flooding is understood as an engineering problem to be solved with hard infrastructure. Finally, for sub-question (4), it was found that while some international networks advance an agenda of private sector-intervention and standardization, government actors in Bago are capable of selectively interpreting this discourse to suit their own agenda of government expansion and that international networks must rely on government alliances in order to implement their vision of urban climate resilience.

This research also found that critical resilience, vulnerability, and adaptation perspectives were absent from the flood governance discourse in Bago, and further, that research challenging the ideological assumptions of the international networks was not acknowledged in their knowledge production, and that the discourses of the government driven international networks and the private-sector foundation driven networks were not engaged in conversation with one another. This indicates that urban climate impacts in the global south could serve as a catalyst for productive debate over the application of global climate justice frameworks to the local scale.

6.2 Research Contributions and Implications

For scholars of disaster risk reduction (DRR), this research serves as an invitation to consider how DRR could affect local communities where risk is transforming in the context of urbanization and climate change. This research strengthens critiques of approaches to disaster risk that aim to standardize and quantify across diverse local contexts, challenging scholars to consider local priorities and unexpected assets when developing indicators for a community's risk. DRR scholars and practitioners alike should approach DRR with power and cultural dynamics in mind, and take seriously the empirical literature and knowledge systems that challenge the still dominant engineering-focused response to disaster risk. This research also serves as a contribution to the rapidly growing body of work that approaches climate adaptation and DRR as inter-woven responses to both static and dynamic drivers of vulnerability.

For scholars of urban flood governance, this research contributes to an understanding of how an emerging democracy in the process of decentralizing government roles and responsibilities is approaching the challenge of urban flooding. This research shows how the expanding role of government constitutes a managerial approach to the environment that fails to learn from past mistakes in flood infrastructure. Scholars must be careful to consider how new flood response and readiness methods can undermine existing community based strategies, paying particular attention to how state or INGO run projects may require long-term maintenance for which there is no budget and which require technical expertise outside of that possessed by those who managed floods before.

For scholars of climate change adaptation, the role that international networks play in urban climate action could serve as a harbinger to progressive adaptation scholars and practitioners of a new dominant environmental discourse that links neoliberal policies to urban climate change adaptation and mitigation. As progressive scholars and civil society organizations advocate for “system change” in energy, agriculture, and trade, it might be strategic to claim or disrupt the environmental urbanism, using the growing body of empirical evidence that shows the negative impacts of ecological modernization and neoliberal eco-urbanism to counter private sector urban climate resilience discourse, and frame the urban environmental justice of the poor (Harner et al. 2002; Gelobter 1993; Martinez-Alier 2003) as not only beneficial in terms of realizing the right to the city (Harvey 2003), but also in terms of adaptation to and mitigation of climate change.

For scholars of Myanmar and Southeast Asia more broadly, this research is among the first of its kind to study local environmental governance in a secondary city in Myanmar. As the current democratic reforms dramatically reshape the governance landscape of Myanmar, this research serves as a contribution to understanding how the Burmese state is reshaping its relationship to both urban residents and the natural environment. Particular attention to the ways in which local residents have developed traditional approaches to flood management builds on regional scholarship of indigenous and other community-led environmental management techniques (Nyong et al. 2007; Ishaya & Abaje 2008; Rasid & Paul 1987).

For policymakers in Bago, this research shows that government could do more to harness local knowledge about flood management, developing context specific solutions to flooding that consider how locals coped before government intervention could help strengthen their existing efforts. This research also shows that as international networks begin to play a larger role in Myanmar’s environmental governance, local governments should be attentive to underlying ideological tensions as potential sources of conflict.

6.3 Limitations and Future Research

This major research paper sought to shed light on how emerging environmental discourse is used by development actors in a specific context. A broad, discourse-based study such as this one cannot empirically evaluate the merits of different projects or approaches to flood governance and climate adaptation and as such, its findings are limited, this research contributes to scholarship on flood governance and adaptation by addressing the gap in the literature about how these concepts are interpreted differently by actors in a specific context and offers valuable insights into how adaptation and resilience operate as frameworks. International networks are also not the sole generators of international discourse on climate change, the complex and prolific nature of the UN climate change negotiations and the Intergovernmental Panel on Climate Change made it impossible to include them in this discourse analysis.

In terms of future research, this research suggests that urban climate impacts are used by powerful actors like the Rockefeller Foundation and the Clinton Global Initiative to justify policy changes that could be harmful to urban dwellers in Bago. As climate adaptation coalesces into policies and funding structures in the coming years, empirical research will be necessary, drawing from the critical urban ecology literature's attention to empirically tracing how terms like adaptation, resilience, and disaster risk can contribute to ongoing processes of accumulation and dispossession, and evaluating the material impact of flood governance discourses for the populations which the concept aims to benefit (Felli & Castree 2012).

Bago is chronically under-researched, and further research that includes a wider survey of livelihoods and knowledge and beliefs of Bago residents would be timely and relevant given the city's rapid growth and emerging national economic relevance. Further, because of the limited scope of this research that prevented observations over an extended period of time, any research on resident responses to flooding would benefit from a longitudinal design that could offer insights into the seasonality of different responses.

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Appendix 1: Full list of documents reviewed

Document Type	Document Name	Organization
Web page	About ACCCRN	ACCCRN
Web page	Working Group Overview	ACCCRN
Web page	Evidence, urbanisation and ecosystems services in Asia	ACCCRN
Annual Report	Summative Evaluation: The Rockefeller Foundation Asian Cities Climate Change Resilience Network Initiative	Rockefeller Foundation/ACCCRN
Working Paper	Water resilience for cities	ACCCRN/Arup
Research Brief	The use of financial products in mitigating natural disaster risk	ACCCRN
Working Paper	A governance approach to building urban climate resilience	ACCCRN
Technical Report	Myanmar Country Report	ACCCRN
Technical Report	Guidelines: Climate Risk Assessment (CRA)-Panduan Penyusunan Kajian Risiko Iklim (Bahasa Indonesia)	ACCCRN/Mercy Corps Indonesia
Working Paper	Catalyzing the Urban Resilience Market	100 Resilient Cities/ACCCRN
Case Study	Role of various sectors in demonstrating resilience during Chennai flood 2015	ACCCRN
Working Paper	Loss and damage: The Role of ecosystem services	ACCCRN/UNEP
Working Paper	Resilience Insights	ACCCRN/World Economic Forum
Web Page	The Power of C40 Cities	C40
Web Page	C40 Cities Snapshot Infographic: CDP Cities 2014	C40
Web Page	Programmes	C40
Press Release	100RC & C40 Cities Announce Partnership to Jointly Advance Climate Change & Resilience Efforts	100 Resilient Cities/C40
Working Paper	Measuring Benefits of Climate Action	C40
Working Paper	Co-benefits of urban climate action: A framework for cities	C40
Technical Report	Unlocking Climate Action in Megacities	C40
Technical Report	Potential for Climate Action	C40
Working Paper	Powering Climate Action: Cities as Global Changemakers	C40
Working Paper	Measurement & Planning	C40
Technical Report	Arup C40 Baseline Report	C40/Arup
Technical Report	C40 Good Practice Guides: Ho Chi Minh City – Triple-A Strategic Planning	C40
Web Page	About the LDC Group	LDCs

Policy Proposal	Submission on the Matters to be addressed at an in-session workshop on gender-responsive climate policy with a focus on adaptation and capacity-building, and training for delegates on gender issues	LDCs/Democratic Republic of Congo
Policy Proposal	Submission on technical examination process on adaptation	LDCs/Democratic Republic of Congo
Policy Proposal	Submission on agenda item 4: Further guidance in relation to the adaptation communication, including, <i>inter alia</i> , as a component of Nationally Determined Contributions, referred to in Article 7, paragraphs 10 and 11, of the Paris Agreement	LDCs/Federal Democratic Republic of Ethiopia
Working Paper	Technology development and transfer, the Least Developed Countries and the future climate regime: Considerations for the post-2020 international response to climate change	LDCs/Climate & Development Knowledge Network
Working Paper	LDC perspectives on the future of the Least Developed Countries Fund	LDCs/Climate & Development Knowledge Network
Working Paper	NAPAs and NAPs in Least Developed Countries	LDCs/Climate & Development Knowledge Network
Working Paper	Developing an Institutional Framework to Address Loss and Damage	LDCs/Climate & Development Knowledge Network
Policy Briefing Paper	NAPAs and NAPs in Least Developed Countries	LDCs/Climate & Development Knowledge Network
Web Page	ASEAN Cooperation on Climate Change	ASEAN
Brochure	ASEAN Model Cities	ASEAN
International Agreement	ASEAN Agreement on Disaster Management and Emergency Response	ASEAN
International Agreement	ASEAN Agreement on Transboundary Haze Pollution	ASEAN
Policy Proposal	Joint statement on climate change to the 21 st session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21)	ASEAN
International Agreement	Declaration on ASEAN Post-2015 Environmental Sustainability and Climate Change Agenda	ASEAN
Annual Report	Our People, Our Community, Our Vision. Annual Report 2014-2015	ASEAN
Technical Report	Thinking Globally, Pospering Regionally	ASEAN
Technical Report	Report of the ASEAN Regional Assessment of MDG Achievement and Post-2015 Development Priorities	ASEAN
Pamphlet	Energy Efficiency and Climate Change Mitigation in the Land Transport Sector in the ASEAN Region	ASEAN/GIZ
Meeting Report	58 Measures for Delivering Goods and Protecting the Environment in Asia	ASEAN/GIZ
Technical Report	Report on Project Activities 2013-2015	ASEAN/GIZ

Working Paper	Towards Policy Integration of Disaster Risk, Climate Adaptation, and Development in ASEAN: A Baseline Assessment	ASEAN/Nanyang Technological University
Web Page	About the Myanmar Climate Change Strategy & Action Plan (MCCSAP)	Myanmar Climate Change Alliance
Draft Policy	Myanmar Climate Change Strategy and Action Plan (MCCSAP) 2016-2030	Myanmar Climate Change Alliance

Appendix 2: Sample Government interview guide

Thank you very much for agreeing to speak with me in this interview. I am excited to talk with you about your work in this region, and on flooding more specifically. Today's interview is an opportunity to share your thoughts and ideas about your work on flood management and the significance of the 2015 floods in particular. I am holding a series of interviews on the same topic with other government officials in the City and Region.

Before we begin, please be assured that the thoughts and perspectives you share will undergo a rigorous process so as not to be identified with you personally. You have the right to terminate this interview at any time, and you have the right to refuse to answer any questions to which you might not want to respond.

[if agrees to electronic recording] For data analysis purposes, this interview will be recorded electronically. If at any time, you change your mind about electronic recording, or wish to say something off the record, recording can be stopped or paused. If you choose to withdraw from the interview at any time, the audio file will be destroyed immediately.

Do you have any questions about the project, the consent form, or the interview process before we start?

Excellent, let us continue.

First, I'd like to ask some simple questions about your work here.

1. What is the full name of your department/office/ministry?
2. Can you speak to the mission of your department/office/ministry?
3. What is your role within the department/office/ministry?
4. How long have you been working with the department/office/ministry? In this role?

2015 Floods

1. What were some of the impacts of the floods in 2015? Were some people or groups more impacted than others?
2. How significant were the 2015 floods compared to other floods or disasters?
3. What was the main reason for the 2015 floods? Was it different from other floods? Were the floods natural or human caused?
4. In your view, how prepared was Bago for the floods in 2015? Did people receive warnings in time? How has this changed since the 2015 floods?
5. After the floods subsided, what has been done to reduce the risk of floods? Which agencies/organisations have done this? Do you agree with these actions?

Future Floods

1. What do you think Bago should do to reduce the risk of floods? What barriers exist for those actions to be done?
2. Who has the most responsibility for preparing for floods in Bago? Who should be responsible?
3. Who else should participate in preparing for floods?
4. In your view, are there efforts to reduce the risk of floods that were ineffective? Why do you think they were ineffective? Why do you think they happened?
5. Do you think the government policies for floods are fair? Do some people benefit more than others?
6. How did government policies affect the floods? Which agencies have the most power to manage floods? How do you work with the national and regional government to manage floods?

External Factors and influence

1. How do you think the severity of flooding will change in the future? Will climate change affect floods in Bago? What else will affect floods in the future?
2. How did land use change or climate change affect the floods in 2015?
3. Do you read international or local reports about climate change? Do you work with international organizations that do climate change work? If so, what/who/how? If not, why?
4. How does the work of international organizations and networks that focus on climate change influence your work?

Appendix 3: Ethics consent form



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Consent Form Urban Governance of Flooding in Myanmar: A Case Study of Bago

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Please read this form carefully. If you want to take part in the study, sign one copy. Keep the other copy for your records.

About the study:

We are conducting a research study that explores the governance of flood response and preparedness in Bago. Historically the research on flooding in Southeast Asia has emphasized **vulnerability**. Few studies have examined the **strengths and resilience** of communities like Bago. We are particularly interested in learning more about the **practices and planning** of community institutions and leaders regarding the response to the 2015 floods and what has changed since then. Our intent is to examine those practices from the perspectives of **urban governance** and **climate resilience**. We also wish to examine the flood intervention and preparedness practices of the Bago Development Affairs Organization and the Bago Region Government.

This study is funded by the Urban Climate Resilience in Southeast Asia Partnership (UCRSEA) and is being carried out by Mr. Graham Reeder under the supervision of Dr. Abidin Kusno. The research will form the basis for Mr. Reeder's Major Research for the degree of Master of Environmental Studies at York University and will be presented at the Canadian Association of Geographers 2017 conference as well as other conferences in the future. This research has been reviewed and approved by the FES Human Participants Research Committee on behalf of York University.

About the interviews:

You are being contacted because you have been identified as a local expert or stakeholder in flood response, preparedness, and prevention in Bago.

The data collection methods used during this research will include interviews, focus groups, and document analysis. If you take part in this project, you will be asked to take part in a focus group or one-

on-one interview, depending on your preference and availability, and discuss flood response and planning practices in Bago. The focus group will take approximately one to two hours and will take place at a mutually agreed upon location, the interview will take approximately one hour and will take place at a mutually agreed upon location. The interviews and focus groups will be audiorecorded. The risks involved in participation in this study include recollecting a potentially stressful memory of the 2015 floods in Bago, there are no other obvious risks to participating in this study. A potential benefit of participating is the chance to share your beliefs and insights about flood and climate change preparedness in Bago. The results of this study may help to build upon flood intervention and response knowledge and practices in preparing communities for flood events.

Participation in the study is completely voluntary and participants have the right to withdraw at any time. Should a participant withdraw from the study, all data generated as a consequence of their participation shall be destroyed. Participants have the right not to answer questions.

Protecting your identity:

The information you give us is confidential. Participants will not be identified by name in the paper and will instead be referred to by pseudonyms or by their job title, depending on the preference of the participant. Records of the interview will be kept in password-protected files and will be destroyed in 2019. The only people who will have access to the information you give us are the researchers working on this project. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report. We cannot promise confidentiality for the focus group. Though we will encourage participants not to discuss the content of the focus group to people outside the group, we cannot control what participants do with the information discussed.

More information:

If you have any questions about the research study, we will be happy to answer any questions about the research at any time. Please do not hesitate to contact the Principal Investigator, Graham Reeder at the phone or email listed above. If you have questions or concerns about your rights as a research subject and/or your experiences while participating in this study, you may contact the Senior Manager and Policy Advisor for the Office of Research Ethics, you may contact them at ore@yorku.ca or at 1-416-736-5814.

By signing below, you confirm that you want to take part in the project and that you have received a copy of this consent form for your own records.

Signature to participate in the study

Printed Name of the Participant

Date