Final Program Report:
August 1, 2014 – February 28, 2019

May 31, 2019

Complex Emergencies and Political Stability in Asia

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Grant #W911NF-14-1-0528

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The program on Complex Emergencies and Political Stability in Asia (CEPSA) explores the confluence of insecurities that impact vulnerability in Asia and potential strategies for response. In doing so, the program investigates the following questions: What are the diverse forces that contribute to climate-related disaster vulnerability and complex emergencies in Asia? What are the implications of such events for local and regional security? How can investments in preparedness, supported by international donors, minimize impacts and build resilience? CEPSA explores the impacts and potential responses related to climate-related hazards in Southern and Southeast Asia.

The program focuses on six countries in South Asia (Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka) and five countries in the Mekong region of Southeast Asia (Cambodia, Laos, Myanmar, Thailand, and Vietnam). By exploring the confluence of insecurities that impact vulnerability in Asia and strategies for response, CEPSA will address the following questions

- What are the relationships between climate change-related disaster vulnerabilities and complex emergencies in Asia?
- What are the implications of these relationships for local, national, cross-border, and regional security?
- What kinds of investments in preparedness and prevention can lessen these vulnerabilities and the incidence of complex emergencies, and strengthen resilience and climate change adaptation?
- Where are investments in preparedness and prevention going, and how are they being targeted?

The CEPSA program's qualitative and quantitative methods include: (1) modeling climate-related disaster vulnerability using Geographic Information Systems, (2) coding and mapping conflict events in real-time by extending the Armed Conflict Location and Event Dataset (ACLED) to high-risk Asian states, (3) conducting risk assessments and forecasting using geospatial analytics, (4) mapping aid flows to identify disaster response capacity, (5) conducting consultations and fieldwork to collect primary data, ground-truth conceptual tools and models, and implement case studies, and (6) designing mapping and analytical tools to facilitate the use of Program research in policy planning and response.

The program applies these methods in two core research areas: assessing the relationship between insecurities and complex emergencies in Asia, and identifying strategies to build government response capacity and societal resilience. In this first research area, the program investigates how various insecurities converge to impact vulnerability in South and Southeast Asia, and where and how these insecurities could develop into complex emergencies. This is sought by examining the disaster, conflict, and governance components of complex emergencies, assessing the dynamics of each individual component and how they interact through feedback loops that form complex emergencies. In the second research area, the program explores the capacity of national governments and international actors to respond to climate-related disasters and complex emergencies.

The research team includes experts from a range of fields including disaster vulnerability and response, conflict assessment, complex emergencies, and Asian politics:

- **Joshua Busby** is the program's principal investigator and leads the program's Disaster Vulnerability project. This project is developing a disaster vulnerability model for Asia, which identifies the subnational locations in Southern and Southeast Asia that are most vulnerable to climate-related hazards, defined in terms of the potential for large-scale loss of life.
- **Jennifer Bussell** leads the program's National Disaster Preparedness project. This project assesses how government decisions to invest in disaster preparedness are impacted by a range of factors, including exposure to previous disasters, economic strength, electoral incentives, bureaucratic capacity, and the influence of the international community.
- **Kate Weaver** leads the program's International Aid to Mitigate Disasters and Complex Emergencies project. This project assesses whether international aid for both disaster risk reduction and management (DRRM) and disaster and humanitarian response is targeting areas of highest need and enhancing domestic efforts to build capacity in these areas.
- **Ashley Moran** and **Josh Powell** lead the program's Complex Emergencies Dashboard project. This project is designing an open access, online platform to leverage data and models produced by the program, combined with geospatial analytics designed in coordination with U.S. military and policy agencies, to provide a framework for diagnosing, analyzing, and responding to complex emergencies in Asia.
- **Paula Newberg** leads the program's Governance Implications of Complex Emergencies project. This project explores how climate and environmental factors have affected states' capacity to handle political and economic development, how the structure of governance has evolved to cope with emergencies, and how these governance dimensions contribute to the evolution of a natural hazards into a complex emergency.
- **Clionadh Raleigh** leads the program's Conflict and Complex Emergencies project. This project tracks conflict events and actors in real-time through an extension of the Armed Conflict Location and Event Dataset to high-risk Asian states. This project investigates how varied insecurities impact conflict patterns and, in turn, how conflict contributes to the development of complex emergencies.

Understanding how different insecurities coalesce to impact vulnerability in Asia—and assessing when and how these insecurities can develop into complex emergencies—has strong implications for U.S. national and international security. Major displacements or unequal distribution of costs from cyclones, tsunamis, and flooding—all on the rise in parts of Asia—can potentially lead to civil unrest and, in some cases, develop into complex emergencies.

By mapping varied regional insecurities, this program seeks to identify: the areas of chronic concern where U.S. and foreign military assets may be directed for humanitarian relief or conflict containment; the areas at risk of complex emergencies; the potential climate-related vulnerability of bases, allies, and potential adversaries; and areas where destabilization might empower extremist groups. By producing the most accurate, real-time, disaggregated, geo-referenced data on Asian political violence and its agents, program research allows for comparable assessments of conflict across states using highly curated data on which to base policy, humanitarian, and security decisions.

By identifying factors that impact national capacity to build resilience, as well as the response capacity of international actors on the ground, program research seeks to support policy planning at national and international levels to potentially diminish the impact of future events. Dynamic mapping and analytical tools in development will leverage program research to provide

integrated assessments of risks and potential intervention points, facilitating diagnosis, analysis, and responses related to complex emergencies.

Executive Summary

The Complex Emergencies and Stability in Asia (CEPSA) project facilitated the expansion of knowledge on a diverse array of topics related to climate change and security in South and Southeast Asia. A number of the research team's participants had been involved in the prior Minerva project on Climate Change and African Political Stability (CCAPS). While some members of the team already had regional expertise, the extension and expansion to the region provided a number of learning opportunities and new knowledge.

First, the research team expanded a hot spot mapping methodology for climate security vulnerability to this region, building upon the team's previous research on Africa. Second, the CEPSA project produced valuable insights on national disaster preparedness in several countries in the region, again drawing on concepts developed in the African context. Third, the team, again building off previous methods developed for CCAPS, gained insight into the provision of climate adaptation finance and the related field of disaster risk reduction. Fourth, the team partnered with Development Gateway, as it did for CCAPS, to build a new dashboard to integrate the data collected from different strands of the project. Fifth, the team brought in regional expertise to explore unique governance aspects that characterized this region. Finally, the team expanded the conflict event dataset ACLED to the region.

While there is considerable diversity in the region, the team came to understand some core differences between South and Southeast Asia, and Africa. For one, this region is much more densely populated than Africa so the challenges of urban areas loomed large, particularly but not limited to coastal areas. The cyclone and riverine flooding risks here pose a much stronger danger to large-scale loss of life than they did in Africa. Heat wave events in this region that led to large-scale loss of life in Pakistan and India prompted the team to add an indicator of heat wave events in to its climate hot spots maps.

In addition, this is a region with more hard states, that is, a number of states have jealous regard for national sovereignty and some of them have a deep history of antagonism. That makes regional cooperation for shared challenges problematic. Third, data availability and transparency in the aid space proved to be a harder lift than it was for the work in Africa. Furthermore, the conflict dynamics in the region, with many small-scale protests and riots, was a marked departure from the kinds of rebel movement and communal conflict events that were more pervasive in Africa. The sheer volume of events in countries like India made coding that data and backcoding to earlier years a real challenge.

Governance deficits in countries like Myanmar and Pakistan loomed large in our understanding of the climate risks those countries face. For countries like Bangladesh and India, their capacity to address risks from climate change has improved, but they still face considerable risks given large populations that live in areas highly exposed to climate hazards. Our research teams found that state capacity and challenges of inter-ministerial coordination also critical issues in case studies of Bangladesh and Nepal.

Our research, drawn particularly on disaggregated subnational data from India, on why some states do a better job preparing for climate hazards was revealing. The research suggested that areas that have a history of exposure to hazards, particularly those that are predictable and that affected a large proportion of the population, will be more likely to prepare. Electoral competition can encourage preparedness but only where officials likely have some say over policies how policies are designed or implemented, lest they not get any credit for their actions. If a politician can get away with not preparing, by relying on some external financing for example, they may do little.

Our research on disaster preparedness in Pakistan and Bangladesh also found considerable capacity constraints at the local level, suggesting the need for more thorough-going prioritization of disaster preparedness by the national governments. Overlapping work from our governance team on these same two countries highlighted other related sets of issues. In Pakistan, the national security state is less well equipped to deal with other issues like climate change for which local capacities are underdeveloped. In Bangladesh, despite common buzzwords like "resilience," there continue to be diverse understandings of how to implement resilience in practice, including technological approaches to agriculture and effort to manage migration. There also seems to be a concerted effort to rebrand business as usual development programs as consistent with sustainable development, though it is unclear if strengthening the export sector through new investments in the garment sector, for example, will be effective in insulating the country from climate challenges.

Climate Security Vulnerability

Joshua W. Busby (with Todd G. Smith, Nisha Krishnan, Charles Wight, Santiago Vallejo-Gutierrez)

Executive Summary

Asian countries have among the highest numbers of people exposed to the impacts of climate-related hazards and, thus, at greatest risk of mass death. Floods, droughts, and storms have always tested civilian governments and international humanitarian aid agencies. However, climate change threatens to make the problem worse by increasing the intensity and possibly the frequency of climate-related hazards. Humanitarian emergencies potentially upend and reverse progress on development priorities, making improved spatial awareness of likely hot spots a priority for adaptation and preparedness. Based on a model from the Climate Change and African Political Stability (CCAPS) program, this project mapped sub-national "climate security vulnerability" in 11 countries in South and Southeast Asia. The model was updated with a second iteration with the addition of heat wave events. The team also prepared 11 mini-briefs incorporating the maps and short narratives of each country.

Climate security vulnerability is defined as areas where large numbers of people are at risk of death due to exposure to climate-related hazards and the follow-on consequences of exposure, including but not limited to conflict. The Asian Climate Security Vulnerability Model (ACSV V1) found that Bangladesh, parts of southern Myanmar - the Ayeyarwady region - and parts of southern and northwest Pakistan - Sindh and Khyber Pakhtunkhwa - were the most vulnerable from a climate security perspective. In terms of absolute numbers, the largest numbers of people who are exposed to these pressures are in India followed by Bangladesh. The model was stress-tested by comparing results with a geo-referenced version of the EM-DAT Disaster Database and by creating alternative model specifications. In addition, researchers conducted regional ground-truthing in India, Nepal, and Bangladesh. In an updated version of the model (ACSV V2), the addition of heat wave events had similar results but showed slightly higher vulnerability in Pakistan and western India.

Introduction

As a densely populated region with many people living along rivers and low-elevation coastal zones, Asia has the highest numbers of people exposed to the impacts of climate-related hazards in the world.[i] By one count, as many as 17 of 26 megacities – cities with populations in excess of ten million people – are located in Asia.[ii] While floods, droughts, and storms have always tested civilian governments and international humanitarian aid agencies, climate change threatens to make the problem worse by increasing the intensity and possibly the frequency of climate-related hazards.[iii] From 2000 to 2012, of the 2.74 billion people killed and affected by climate-related disasters worldwide,[iv] 89% were located in Southeast, Southern, and Eastern Asia.[v]

Whether exposure to climate hazards translates into large-scale loss of life in specific places hinges crucially on other social factors and the relationship between citizens and their governments. Some governments in the region such as India and Bangladesh have over time

improved their capacity and willingness to protect their citizens, at least from the catastrophic impacts of such hazards. Other governments, such as Myanmar and Pakistan, by contrast, have been less able and/or responsive to climate-related hazards. Climate-related humanitarian emergencies have the potential to upend and reverse progress on development priorities.[vi]

The effects of climate-related emergencies are also more than humanitarian and development challenges. An emergent discussion in policy circles and among academics links climate change and security.[vii] While there are diverse ways climate change can affect security outcomes and contested understandings of security, the loss of life from exposure to extreme weather events is identified as a core security concern in the IPCC Fifth Assessment Report chapter on human security.[viii] Climate change may also indirectly lead to loss-of-life by contributing to conflict, though this relationship, as the IPCC notes, remains "contested." That said, the IPCC concluded that climate change likely has an impact on factors such as low per capita incomes, economic contraction, and weak state institutions that are strongly associated with the incidence of violent conflict.[ix]

Project Purpose

Where will the consequences of climate change be concentrated in Asia? Current data availability makes this a difficult question to answer with geographic precision and high confidence. Asia is a diverse and large region; thus, the impacts are likely to vary significantly by location. To the extent that early warning and vulnerability analysis can help limit the need for expensive emergency mobilization, improved spatial awareness of likely hot spots can help prioritize climate adaptation and disaster preparedness.[x]

This project provides a portrait of regional vulnerabilities or hot spots by mapping sub-national "climate security vulnerability" for 11 countries in South and Southeast Asia. Study countries include six countries in South Asia – Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka – and five countries in Southeast Asia – Cambodia, Laos, Myanmar, Thailand, and Vietnam.[xi] Climate security vulnerability is defined as the risk in a particular location that large numbers of people could die from either direct exposure to a natural hazard or the follow-on consequences of instability and conflict that the hazard might generate.

Study/Design Approach

To map hot spots, physical, demographic, social, and governance indicators are combined in a composite index, the Asian Climate Security Vulnerability Model Version 1 (ACSV V1). The approach is anchored at the intersection of studies of development, disasters, and security. The security emphasis distinguishes this model from other accounts of climate vulnerability that tend to focus on livelihoods.

The model views climate security vulnerability as a function of physical exposure, population density, household and community resilience, and governance. Vulnerability extends beyond mere *physical exposure*. For large numbers of people to die, an area exposed to a physical hazard has to have a large or concentrated *population*. Both exposure and population are necessary to capture human exposure. However, whether people die depends in part on what resources they have to protect themselves at the *household and community level*. Finally, some natural hazards

may exceed the capacity of communities to protect themselves so this further depends on whether their *governments* are willing and able to protect them in times of need.

The value of organizing these conceptually into four baskets makes it possible to sequentially show how vulnerability changes as you add a new dimension. Where do climate hazards occur? Where does that coincide with where people live? Do those people have the household and community resources to withstand or respond to the impacts of climate events? If that fails, is the national government able and willing to provide assistance or is it open to assistance from the international community?

Each basket save for population density is comprised of multiple indicators, about six to eight per basket.[xii] In the final composite, each basket is equally weighted, though we also explore variations in the sensitivity analysis.

Data were derived from different data sources, with varying spatial resolutions and temporal coverage. The spatial resolution in the physical and population baskets are the most fine-grained, as small as one square kilometer for some indicators. The resolution becomes increasingly coarser for the household and governance baskets. Many of the household indicators are available at the first administrative unit, while governance metrics, save for one indicator of violence, are only available nationally (see Appendix Tables for a summary of indicators).

With econometric work, one might develop empirically driven indicator weights and also inform the choice of the model's functional form. However, the varying time periods, spatial resolution, and sampling frames of these indicators makes econometric validation problematic, though this has been tried with mixed results in previous research. For that reason, the research largely follows conventions in the field of composite indices that equally weight the indicators and use an additive functional form with each basket taking on a weight of 25%.[xiii] Equal weights have the virtue of simplicity, though they raise questions about the internal validity of the resulting index. The comparison with EM-DAT data and the sensitivity analysis are intended to address these concerns.

The team first developed a comprehensive map of sub-national geographic units in the region, drawing from diverse information sources.[xiv] Subsequently, each indicator and basket was sourced, analyzed, and processed data. Each indicator was normalized on a common scale in terms of its percent rank, thus capturing the relative rank of a given geographic unit relative to the rest of the region.

The physical exposure basket includes indicators for cyclones, floods, wildfires, and water scarcity. In addition, a digital elevation model captures areas at risk of coastal inundation from storm surge and sea level rise (see *Appendix* **Table 1**). The team chose these indicators of climate hazards based initially on data available from UNEP's Global Risk Data Platform, namely for wildfires, cyclones, and floods. While drought data is available through UNEP, the team developed and refined two measures that more accurately reflected water variability and chronic aridity. These indicators, rainfall anomalies and chronic aridity, were developed using data from the Global Precipitation Climatology Centre. Finally, while cyclones capture some of the risks associated with coastal exposure, low-lying areas are also subject to sea-level rise and

storm surge. This risk is accounted for with a digital elevation model. All indicators in this basket are weighted equally, except for the two measures of water scarcity that split the weight between them.

In light of the heat waves in summer 2015 that claimed thousands of lives in Pakistan and India as well as recommendations from the expert survey, the team included a measure of heat waves in an updated physical exposure basket and integrated that new basket in an updated version of the composite (ACSV V2). That measure captures both multiple days above a temperature threshold and significant deviation from the temperature mean for that time of year (see **Table 2** of the supplementary material).

Population

Physical exposure alone does not equate to vulnerability. All else equal, policymakers likely care more about climate hazards that affect large numbers of people. While this imparts a bias to densely populated areas, the emphasis on understanding the risk of large-scale loss of life warrants this modeling choice. In the sensitivity analysis, the team also mapped what vulnerability would look like excluding population.

Unlike the other baskets, this basket consists of a single population density layer generated with data from LandScan.[xv] LandScan is a modeled dataset that seeks to measure "ambient" populations and is based on a variety of inputs such as road networks, elevation, slope, land use/land cover, and high resolution imagery (*see* **Table 3** *in the supplementary material*).

Household and Community Resilience

Inspired by indicators identified by Brooks et al., a basket of social indicators was created to reflect household and community resilience. This basket is intended to represent the ability at the household and community-level to respond to extreme events and resources that can be marshaled in a crisis. Resilience is conceptualized and operationalized in terms of high attainment of social indicators and access to services and basic necessities. In the face of exposure to climate-related hazards, the first line of defense for communities and households is the resources they have to protect themselves, proxied in our model by their (1) levels of education, (2) quality of health, (3) access to health services and (4) daily necessities. All else equal, communities that are better educated, have better health conditions, and access to services are likely to fare better and recover faster in the event of exposure to natural hazards compared to others with lower levels of achievement or access. The indicators in the model do not reflect community-level organizational capacities, particularly the kind of social solidarity that is often critical in response to crisis situations. While an important critique, comprehensive, geographically disaggregated indicators of this nature are not yet available.

For each of the four sub-processes, the team identified two relevant indicators as proxies. These included literacy and school enrollment (education), infant mortality and life expectancy (quality of health), nurses and delivery in a health facility (access to health services), and underweight children and access to improved water sources (daily necessities) (see **Table 4** *in supplementary material).*

All but two of the eight indicators (number of nurses, life expectancy) in this basket are available at the subnational level. For many countries in the region, sub-national information could be calculated at the first administrative level using the USAID Demographic and Health Surveys (DHS) or the UNICEF Multiple Indicator Cluster Survey (MICS).

As Yohe and Tol note, education and health indicators are likely highly correlated with economic well-being,[xvi] but spatially disaggregated estimates of income are scarce, though there have been efforts to use lights at night as a proxy.[xvii] These show some potential but remain in the early stages of development.

Governance

Natural hazards may exceed the coping capacities of local communities, thus requiring government mobilization to help them in times of need. The intuition here is that states that are less willing or able to respond to climate hazards, particularly in areas with a history of violence, are more vulnerable to climate change. These insights are informed by the work of Acemoglu and Robinson, North and his collaborators, and Colin Kahl on the dangers of exclusive institutions that lead to unequal provision of government services, leaving some populations more vulnerable to hazards and also serving as a source of grievance for underserved areas.[xviii]

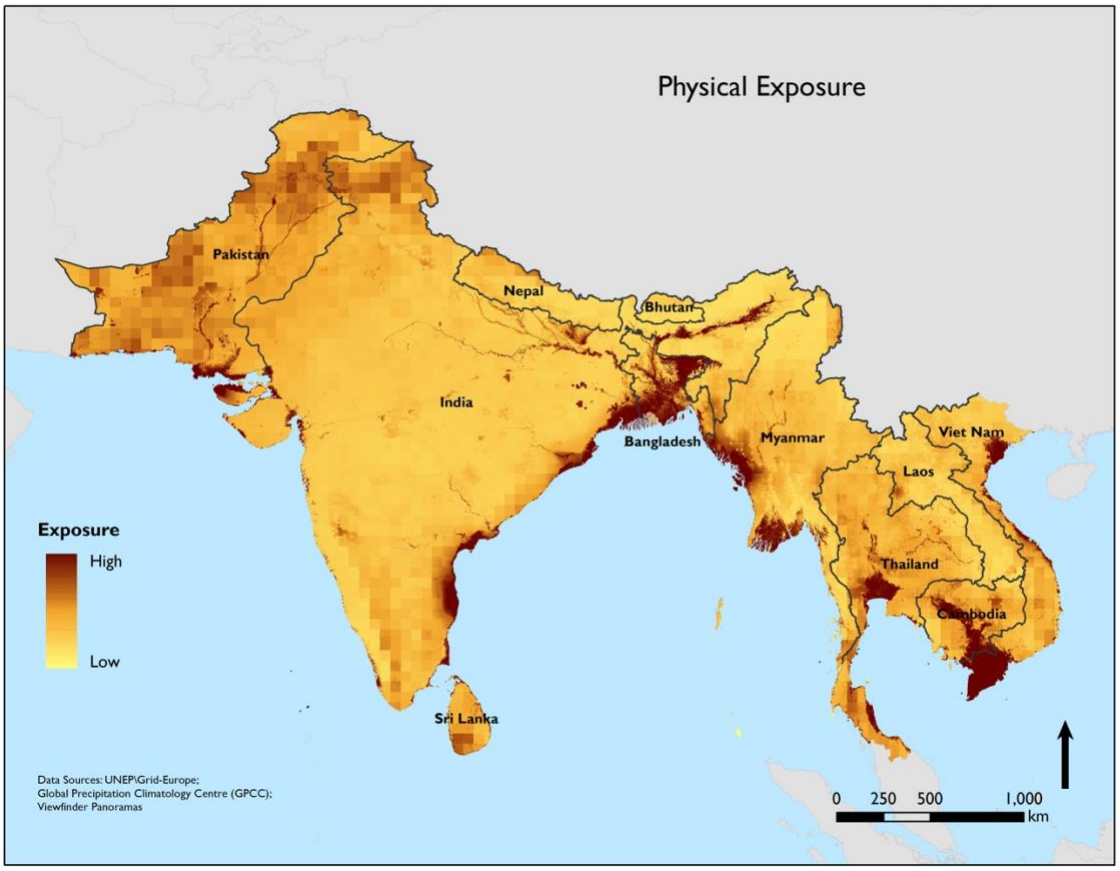
The team drew from national level indicators of government effectiveness, voice and accountability, two measures of political stability, and global integration to map regional governance. The research is informed by the Brooks et al. study and their use of government capacity and voice and accountability that reflect on a state's capacity but also its willingness to listen to the needs of the people.[xix] Both of these indicators were drawn from World Bank data. Countries that have experienced rounds of frequent political instability are also less likely to be able to respond to their populace in times of need. Two measures of political instability were developed using Polity IV data, one a measure of the polity variance in the previous ten years and another a measure of the length of time since the last major regime change. Since both indicators are slightly different methods to measure political stability, the weight is split between them. The model also includes a measure of global integration from the KOF Index of Globalization to capture the idea that countries that are weakly integrated into the global system, autarkic regimes in particular, may not be able or willing to tap into networks of global assistance in times of need. The Myanmar example with Cyclone Nargis in 2008 here is instructive. The only subnational measure in this basket is a measure of atrocities from the Political Instability Task Force (PITF) (see **Table 5** *in supplementary material).* Areas with a history of conflict may be less likely to receive assistance from the government in wake of hazard exposure, either due to neglect or open hostility by the regime in power.

Bringing in state-level governance indicators and global integration acknowledges that local vulnerability is also affected by wider national and international relationships. Other sub-national governance processes are relevant, though this is, as yet, difficult to measure. Research plans to address this are discussed in the conclusion.[xx]

Findings

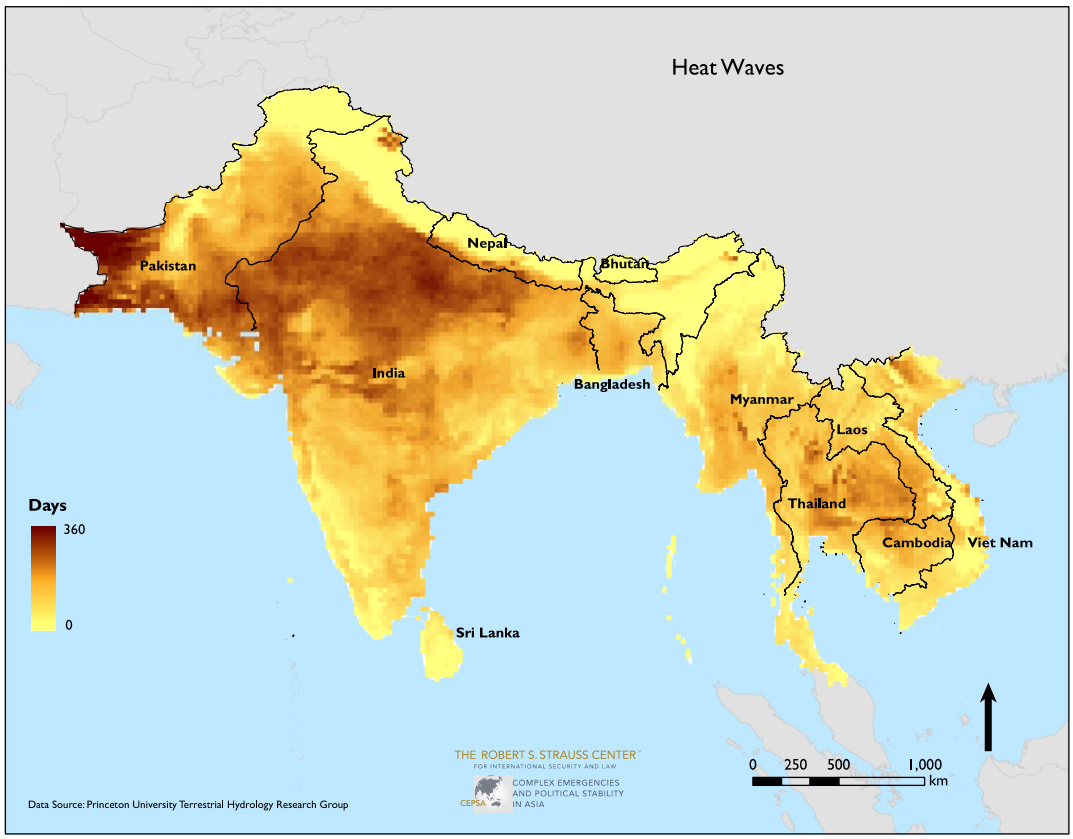
In terms of physical exposure, the patterns in **Figure 1** show that low elevation coastal areas in Bangladesh and Myanmar are especially exposed to climate hazards. Cyclone risk coupled with low elevation coastal zones radiates from Odisha and West Bengal in India through Bangladesh to Rakhine State in Myanmar. Cyclone and low elevation coastal zone exposure also extend to Andhra Pradesh and Gujarat in southeastern and northwestern India respectively, and across the Sir Creek estuary to Sindh province in southwestern Pakistan. Flood exposure follows major river systems such as the Indus through Pakistan, the Ganges through India, the Brahmaputra in Bangladesh, and the Mekong in Cambodia. Negative rainfall anomalies are concentrated in central and northern Pakistan, Sri Lanka, Thailand, Cambodia, and southern Vietnam with chronic water scarcity concentrated in Sindh province in Pakistan. Southeast Asia has the most wildfires in the region with pockets in southern Myanmar, Thailand, northern Laos and Vietnam, and eastern Cambodia.

Figure 1: Physical Exposure



In the updated maps of physical exposure, a measure of heat waves is included (see **Figure 2**) which shows heat wave events concentrated in western India and much of Pakistan.

Figure 2: Heat Wave Events



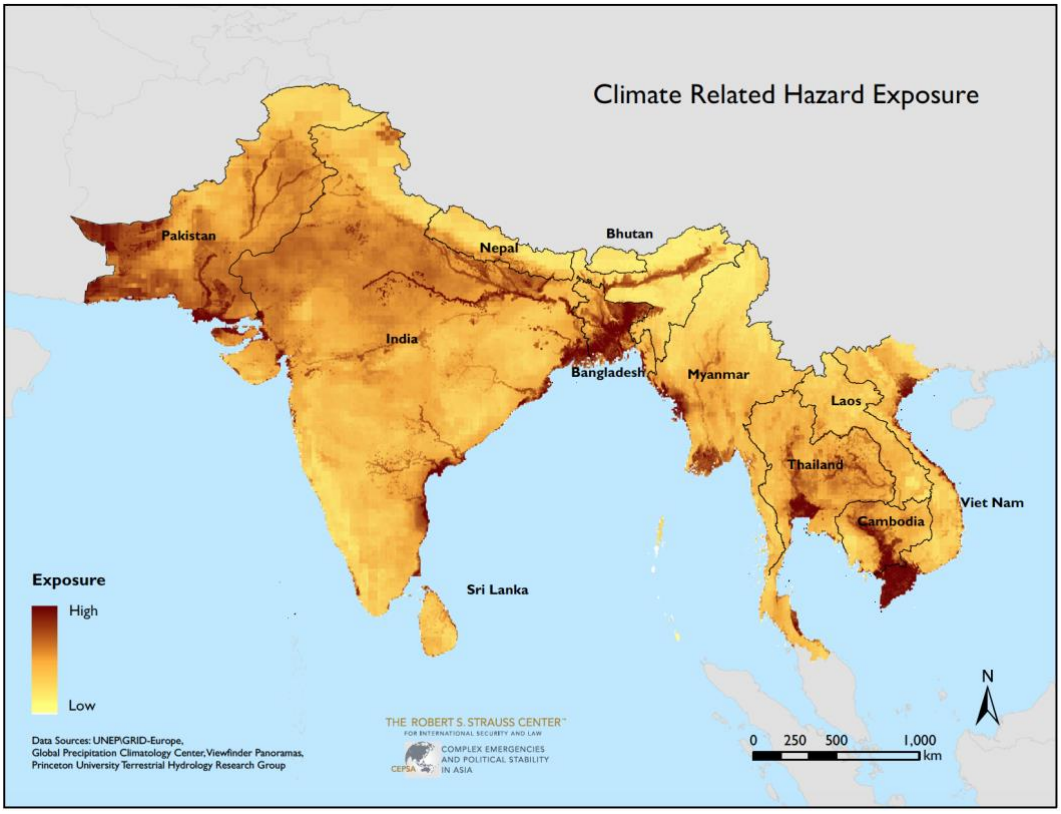
Estimating the population exposed to climate hazards reveals the largest numbers of people who are 1 or 2 standard deviations (SD) above the pixel mean for exposure are in India, followed by Bangladesh and Vietnam. In terms of the proportion of the total population in the country significantly above the pixel mean, Vietnam and Bangladesh stand out followed by Cambodia and Thailand (see **Table 1**).[xxi]

Table 1: Estimates for Population Above Pixel Mean for Exposure

Country	Total Population	Population above mean exposure	Percentage above mean exposure	Population more than 1 SD above mean exposure	Percentage more than 1 SD above mean exposure	Population more than 2 SD above mean exposure	Percentage more than 2 SD above mean exposure
Bangladesh	163,496,274	142,571,820	87.20	113,416,389	69.37	84,120,461	51.45
Bhutan	726,713	32,956	4.53	578	0.08		0.00
Cambodia	15,150,450	13,322,154	87.93	8,859,879	58.48	5,391,756	35.59
India	1,219,458,620	334,503,325	27.43	159,076,844	13.04	83,280,725	6.83
Lao DPR	6,671,234	1,769,244	26.52	231,034	3.46		0.00
Myanmar	54,821,916	22,271,833	40.63	10,155,477	18.52	5,707,483	10.41
Nepal			29.17	618,404	2.04	41,862	0.14
Pakistan	193,203,802	147,959,257	76.58	16,411,033	8.49	3,280,868	1.70
Sri Lanka	21,394,984	15,811,654	73.90	3,081,124	14.40	1,222,300	5.71
Thailand	67,401,048	47,168,014	69.98	23,632,032	35.06	15,788,112	23.42
Vietnam	92,234,358	66,384,431	71.97	48,570,945	52.66	40,986,383	44.44

When heat wave events are included in the physical exposure layer, patterns are similar to **Figure 1** but with heavier exposure in the heat wave areas in Pakistan and western India.

Figure 3: Physical Exposure including Heat Waves



The effect of adding heat waves in to the physical exposure basket can be observed by comparing **Table 1** and **Table 2**. In Table 2, the proportion of people in Pakistan who live more

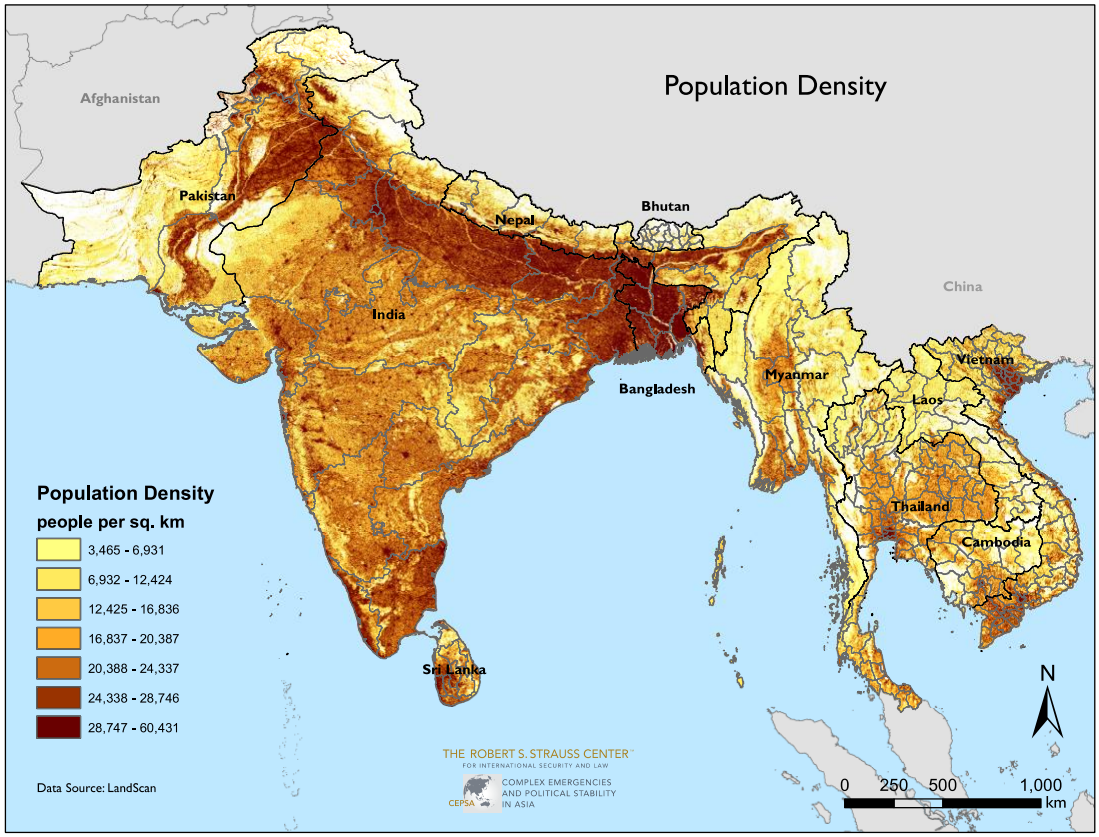
than 1 standard deviation above the exposure mean rises from 8.49% to 18.89% with a similar but smaller increase in India.

Table 2: Estimates for Population Above Pixel Mean for Exposure (with Heat Waves)

Country	Total Population	Population above mean exposure	Percentage above mean exposure	Population more than 1 SD above mean exposure	Percentage more than 1 SD above mean exposure	Population more than 2 SD above mean exposure	Percentage more than 2 SD above mean exposure
Bangladesh	163,496,274	140,526,031	85.95	104,175,975	63.72	57,825,383	35.37
Bhutan	726,713	578	0.08		0.00		0.00
Cambodia	15,150,450	12,536,282	82.75	6,623,324	43.72	2,550,521	16.83
India	1,219,458,620	687,258,432	56.36	193,691,197	15.88	55,486,302	4.55
Lao DPR	6,671,234	1,829,641	27.43	116,062	1.74		0.00
Myanmar	54,821,916	23,428,367	42.74	9,032,833	16.48	2,722,344	4.97
Nepal			42.62	2,089,805	6.88	1,268	0.00
Pakistan	193,203,802	166,320,423	86.09	36,492,395	18.89	5,709,823	2.96
Sri Lanka	21,394,984	3,204,885	14.98	921,690	4.31	360,505	1.68
Thailand	67,401,048	48,330,953	71.71	24,231,595	35.95	11,645,861	17.28
Vietnam	92,234,358	57,896,264	62.77	43,809,071	47.50	31,747,220	34.42

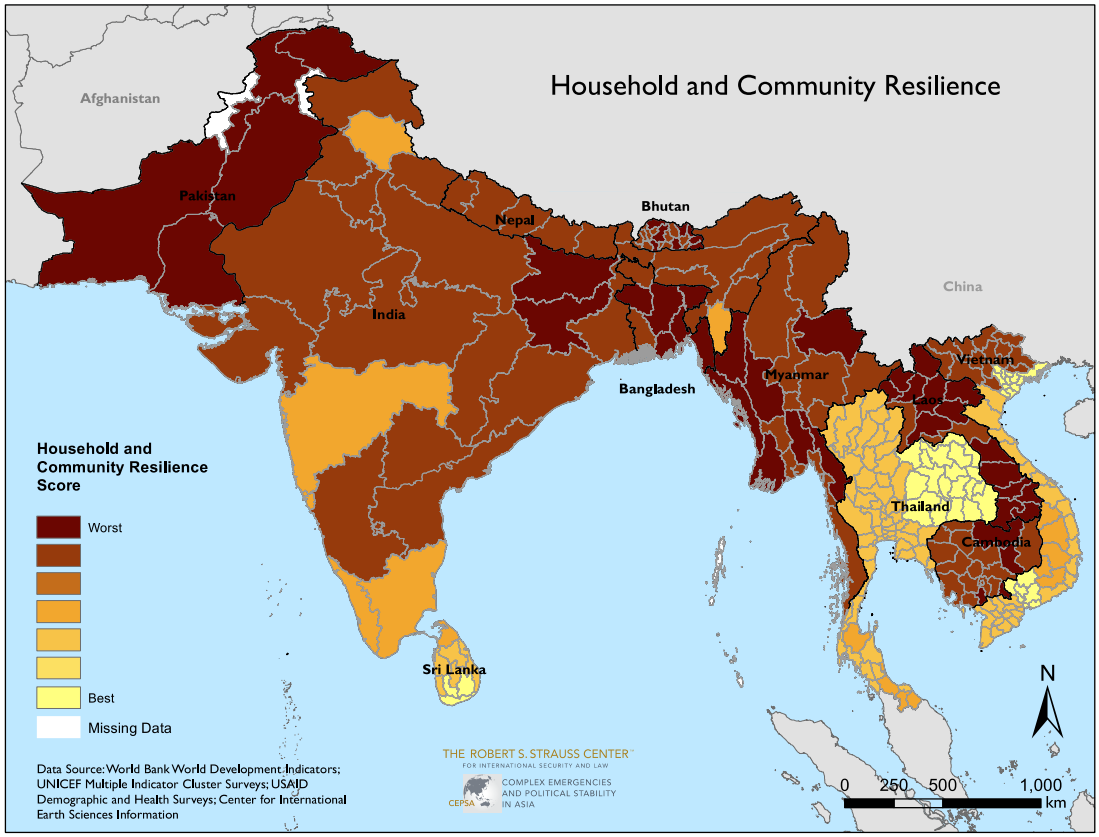
In terms of population density, **Figure 4** shows that South Asia is much more densely populated relative to Southeast Asia. These areas extend across the Indo-Gangetic plain at the base of the Himalayas, encompassing nearly all of Bangladesh and eastern India (including West Bengal and the city of Kolkata) across to the Indian states of Uttar Pradesh and Delhi and the Punjabs of western India and eastern Pakistan. Other notable areas include Kerala, a coastal southwestern state of India as well as sites around major cities including Colombo in Sri Lanka, Hanoi (Vietnam), and Bangkok (Thailand).

Figure 4: Population Density



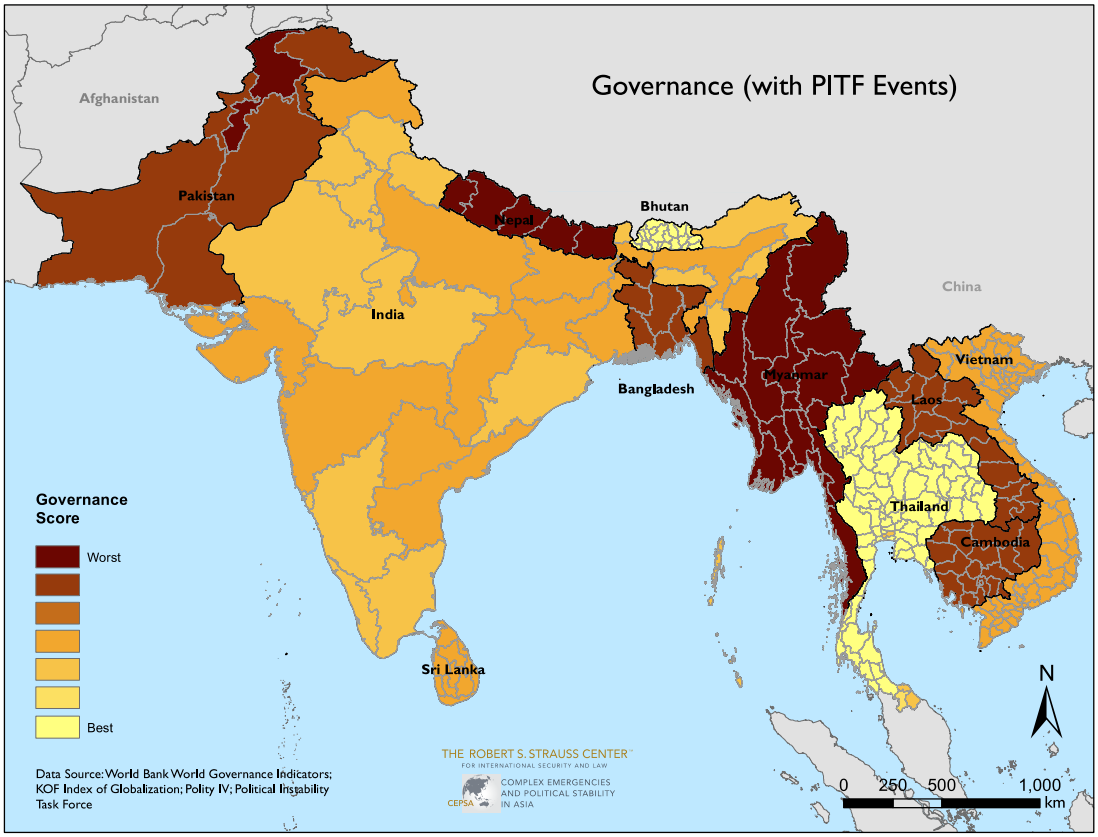
As for household and community resilience, much of Pakistan, Laos, and Bhutan were among the least resilient in the region as well as several parts of Myanmar (Ayeyarwady, Rakhine, Chin, Bago, Kayin State), two states in India (Bihar, Jharkhand), several areas of Bangladesh (Chittagong, Dhaka, and Sylhet), and one area in Cambodia (Preah Vihear/Steung Treng provinces) (see **Figure 5**).

Figure 5: Household and Community Resilience



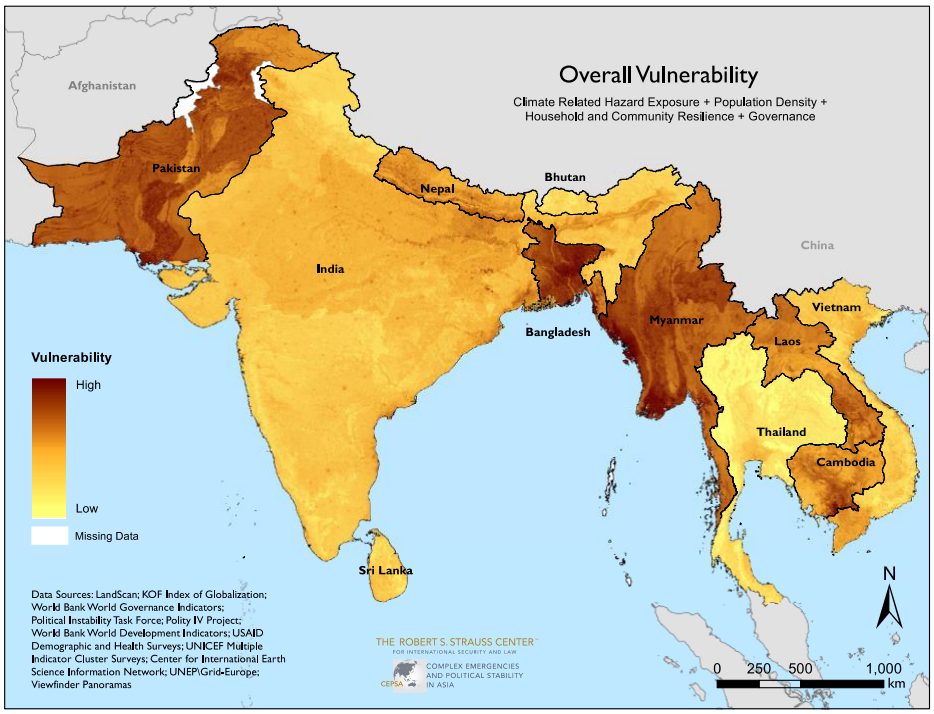
Myanmar, Laos, and Nepal had the worst governance in the region followed by pockets in Pakistan (namely, in the north of the country in Khyber Pakhtunkhwa). Thailand (notwithstanding recent challenges) and Bhutan have the best governance scores in the region (see **Figure 6**).

Figure 6: Governance



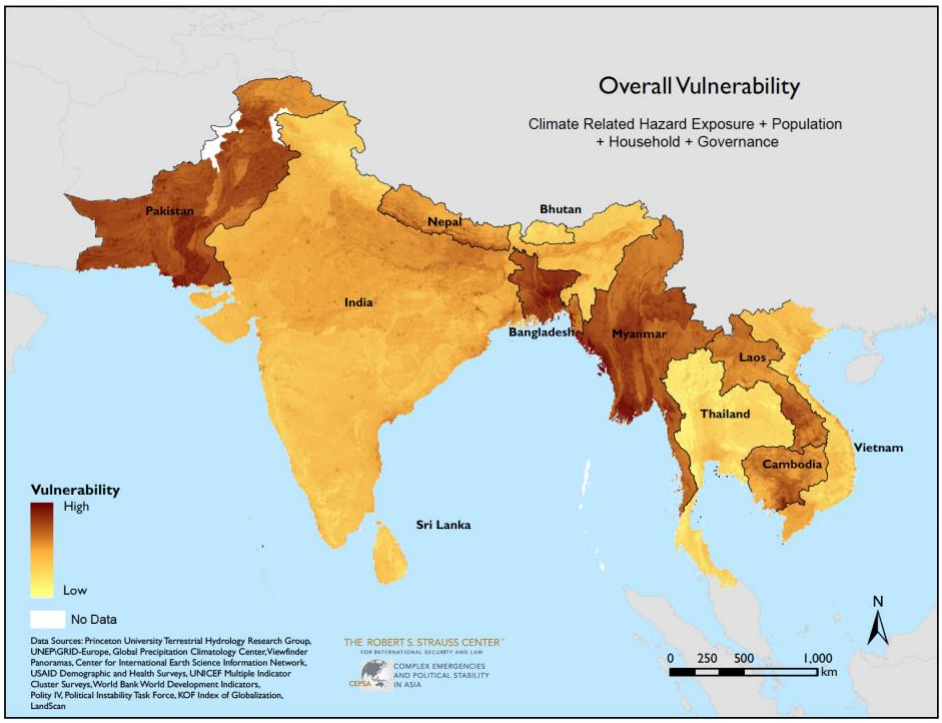
Combining these four layers yields a composite map of relative vulnerability in the eleven countries of South and Southeast Asia. Findings suggest that much of Bangladesh (notably Dhaka), parts of southern Myanmar (the Ayeyarwady region), and parts of southern Pakistan (namely Sindh province) are the most vulnerable locations from a climate security perspective (see **Figure 7** and **Appendix Figures 22-24 for three Country Pullouts**).[1]

Figure 7: Composite Vulnerability (ACSV V1)



The addition of heat wave events renders few obvious changes in the overall map pattern as Figure 8 shows.

Figure 8: Composite Vulnerability with Heat Waves (ACSV V2)



Application of Results

Do these maps reflect an underlying reality or are the artifact of model assumptions? How sensitive are these model results to alternative specifications?

The team sought to validate the research by comparing the locations featured in the EM-DAT International Disaster Database.[2] EM-DAT is the most widely used database that records disaster situations that have risen to a certain level of damage.[3] To assess the sensitivity of the results to alternative specifications, the team developed alternative models, starting with fewer baskets and then models based on alternative from an expert survey.

Comparison with EM-DAT

To assess whether the model reflects an underlying reality, the team compared the model results from ACSV V1 to the EM-DAT disaster database. EM-DAT records event particulars, including dates, locations, hazard type, casualties, numbers affected,[4] and total damages (if available). These estimates are derived from multiple sources, often Red Cross reports, and are triangulated across government and news sources and other reporting groups. Estimates likely have some errors based on reporting and challenges of counting the dead and population affected. Nonetheless, as a portrait of the relative magnitude of effects of different events, EM-DAT is the most reputable standard for which there is some open access.[5]

In previous work on Africa, the team geo-coded the EM-DAT database at the first administrative level.[6] EM-DAT typically lists the name of a city, province, or region for each disaster event, with events sometimes mentioning multiple provinces. A handful of cases fail to include geographic identifiers.[7] EM-DAT's coverage of climate-related disasters (and estimates of the number of the people killed and affected) is most closely related to the team's emphasis on threats to loss of life. The research team thus seeks to see if the patterns of the composite map possess any parallels to the distribution of events, deaths, and people affected in the EM-DAT disaster database.

With the participation of AidData,[8] the team geo-coded climate-related disaster event data for the eleven countries for the period 1998-2014, following a similar methodology. These data were coded to the first administrative level. Hazard types included droughts, floods, storms, wet landslides, wildfires, and extreme temperatures.

The team mapped the number of events, the number killed, and affected by the first administrative unit. This poses a number of challenges. Because EM-DAT does not report casualty counts by specific geographic units, casualties have to be apportioned where multiple administrative units are mentioned. Events often mention multiple provinces or subnational regions affected. These regions may be of unequal population size. Thus, the team apportioned numbers based on the respective administrative unit's population. While the data on deaths and affected come from various years, the LandScan estimates of population are for a single year, 2013. In addition, aggregate losses are

scaled in relation to the population size in the first administrative unit to take into account that first-level administrative units across the region are of varying sizes and populations.

Figures 9-11 show the number of events and normalized versions of people killed and affected for the region relative to the population size in the administrative unit. Comparisons with the composite show some overlap. In terms of event numbers, central Bangladesh is common to both. In terms of fatalities, southern Myanmar shows up across both, largely attributable to Cyclone Nargis in 2008. In terms of population affected, Odisha in northeastern India shows up more strongly in EM-DAT. Many small administrative units in Thailand, Cambodia, and Vietnam show up in these affected numbers. This may be a function of their small size and low population numbers so while large absolute numbers are not affected by disasters, relatively high proportions of the population are.

Figure 9: Climate Disaster Events in the Region

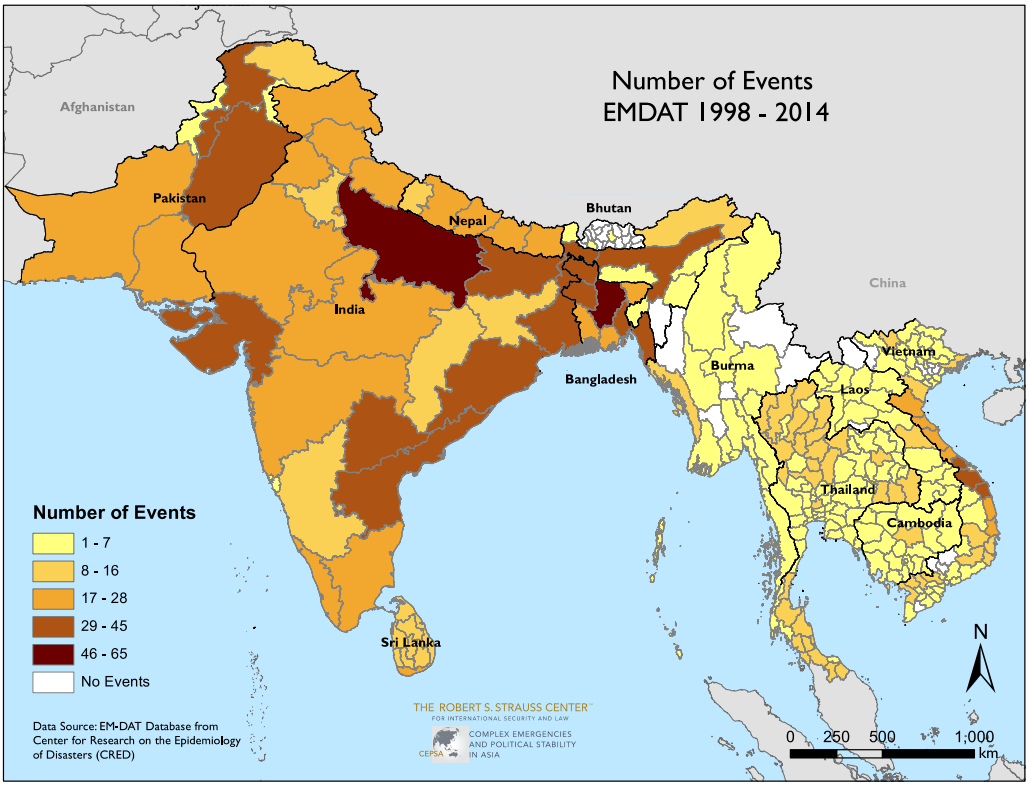


Figure 10: Climate-Related Disaster Deaths (Proportional to Population, Population Weighted)

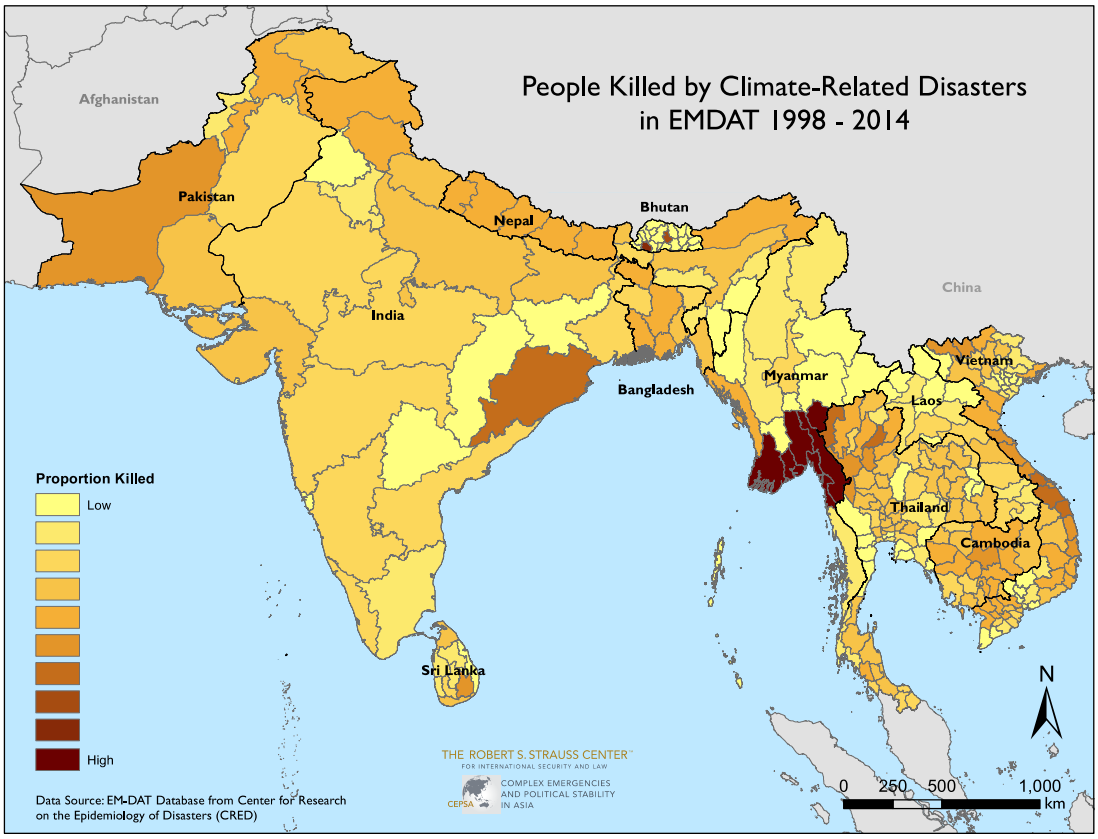
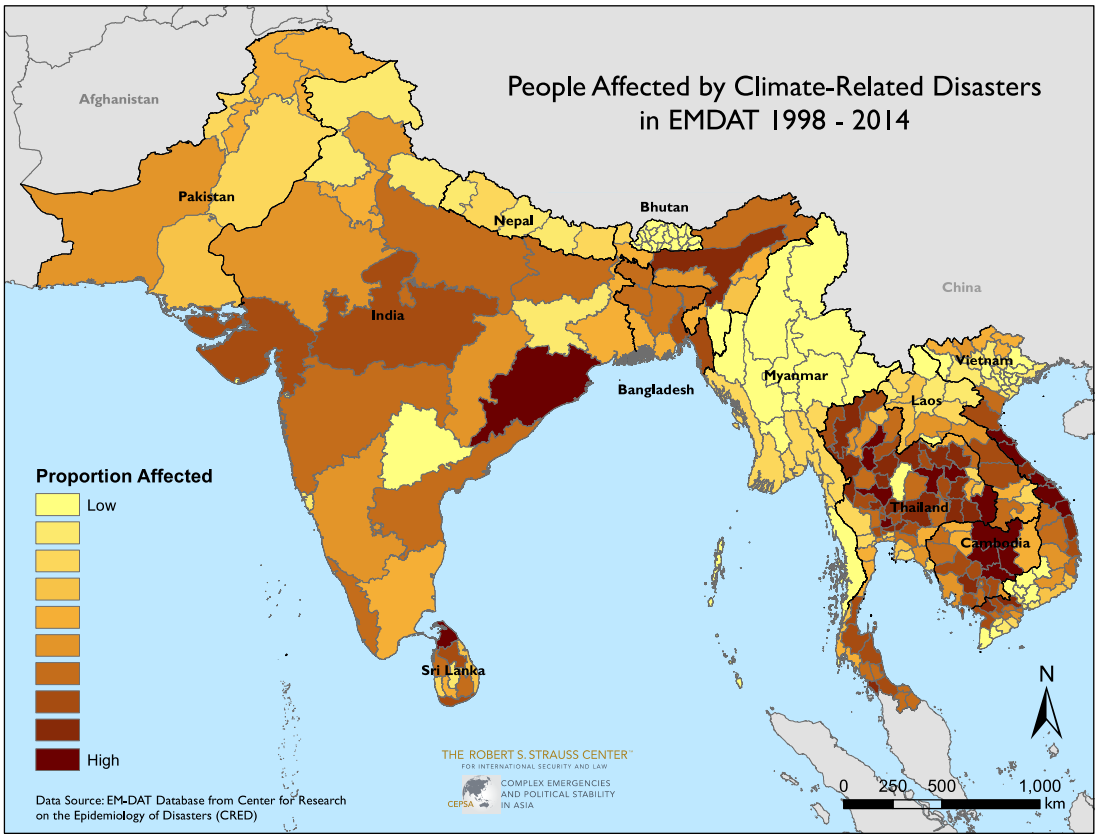


Figure 11: Climate-Related Disaster Affected (Proportional to Population, Population Weighted)



Myanmar, in particular, stands out in Figure 7 on account of Cyclone Nargis. However, Pakistan, Bangladesh, and Myanmar, which feature prominently in the composite maps, are not as disaster-prone in terms of high proportions of people affected according to EM-DAT. This may be a function of reporting differences. Casualty counts and fatality statistics in EM-DAT are derived from multiple sources like the Red Cross.[9] Violent areas or repressive regimes may not have free media or readily declare emergencies. Moreover, intergovernmental and non-governmental organizations may not be able to perform reliable assessments, whereas democratic countries like India may have more vigorous civil society organizations. Thus, whether EM-DAT patterns, ASCV, or some other model reflects the true portrait of the underlying reality bears further scrutiny.

Sensitivity of the Model

One can test the sensitivity of the model. The research team carried out sensitivity tests, including more streamlined versions of the model with fewer baskets as well as ones with alternative model weights informed by a survey of 18 regional experts.

One potential critique of the four-basket model is that it adds little beyond what can be observed by a simplified model of physical exposure and population. However, a two-basket composite of physical exposure and population brings out coastal locations in the

pathway of cyclones around the Bay of Bengal and major cities such as Bangkok and Hanoi (see Appendix **Figure 1**). The vulnerability in Myanmar and Pakistan, driven by household and governance indicators, largely recedes. This can be observed through the difference map where areas in blue reflect areas less vulnerable in the two-basket composite compared to the four-basket composite (see Appendix **Figure 2**).

The three-basket composite, which adds household to physical exposure and population, brings in more of Pakistan's challenges (see Appendix **Figure 3**). For India, low levels of household resilience in the northeastern states of Jharkhand and Bihar contribute to heightened vulnerability. Again, Myanmar's high vulnerability, due to governance, is not observed (see **Appendix Figure 4** for the difference map).

The model explicitly is biased towards large population centers based on the assumption that policymakers will care more if large numbers of people are at risk. The patterns change in our vulnerability index by removing population and by constructing a three-basket index based on physical exposure, household resilience, and governance. Without population, much of Pakistan and Myanmar, which are less densely populated, become more vulnerable while vulnerability in India and Thailand vulnerability is reduced (see **Appendix Figures 5 and 6**).

Another alternative composite overweights physical exposure by multiplying it by the sum of the other baskets. This ensures that a location with low physical exposure and high vulnerability on the other three dimensions could not be considered vulnerable. Here the patterns are similar to those in the final four-basket map, though perhaps less stark in Pakistan, Bangladesh, and Myanmar (see **Appendix Figure 7**).

Suggested basket weights varied between the regional experts (see Table 3), but the average converges towards equal weighting of each basket, with the physical and governance baskets receiving more emphasis and population less (29.8% physical, 18.5%, population, 25% household, and 26.7% governance). The Appendix shows six permutations of outliers from the expert surveys and the differences with the composite layer ACSV V1) (see **Appendices 10-20**).

Table 3: Alternative Weightings from Expert Surveys

Expert	Physical	Population	Household	Governance
1	15	10	25	50
2	15	15	30	40
3	30	20	10	40
4	15	10	45	30
5	20	10	40	30
6	30	10	30	30
7	20	20	30	30
8	20	20	30	30
9	40	20	10	30
10	35	15	25	25
11	26	24	25	25
12	25	25	25	25
13	40	10	30	20
14	40	10	30	20
15	30	40	10	20
16	35	35	15	15
17	60	20	10	10
18	40	20	30	10
Average	**29.8**	**18.6**	**25**	**26.7**

Conclusions

The research team identified several areas for future research. For example, land degradation likely makes the effects of extreme weather events worse. In late 2015, Chennai, a relatively wealthy coastal city in southeastern India, endured devastating floods that left much of the city underwater and some 280 people dead. This was a man-made disaster as the city (and cities throughout the region) have experienced significant conversion of mangroves to urban infrastructure. Much urban development, including universities, roads, housing complexes and airports, is being built on flood plains without sufficient regard for drainage and hazard exposure. Therefore, a measure of land degradation would be important to overlay on the physical exposure basket to capture the joint risk of climate hazards and land degradation. In partnership with geographers from the University of Oklahoma, the research team worked to develop a new disturbance index (DI) based on remote sensing data. The disturbance index shows changes in land cover in both rural and urban areas, reflecting deforestation as well as conversion from agriculture to buildings and impervious surfaces.[10] The challenge was whether the index could be validated to show land degradation. Results were too preliminary to include, but the research may continue beyond the grant.

Another area of interest is how to capture subnational variation in governance. India, despite high population density and pockets of physical exposure, appears to be among the least vulnerable in the region with relatively undifferentiated vulnerability. As some of the regional experts suggested, this may be misleading, as India possesses considerable variation in state-level governance quality.[11] India has better data than other countries in the region.[12] To capture internal variation within India, a possible future extension beyond the grant would be the development of sub-national governance metrics for India and a reworked vulnerability index to compare Indian states to each other.

There is also a need to think beyond the nation-state to the implications for cross-border collaboration on shared resources. What does Bangladesh's widespread vulnerability mean for India?[13] While some have offered over-wrought predictions of water wars, the reality has been one of water-sharing agreements including in key watersheds in this region such as the Ganges, Indus, and Mekong. However, many are under strain due to drought and unilateral dam-building projects.[14] The history of conflict between neighbors, nationalism, and sovereignty concerns looms large and may make continued cooperation a challenge. Transborder issues loom larger in light of the dislocation in 2017 of a half a million Rohinga refugees from Myanmar to Bangladesh, where many of them reside in areas that may be subject to monsoon rains.[15]

These maps could potentially inform both local actors' decisions and in particular, external actors' policy interventions and priorities. Foreign actors have more extensive geographic interests than specific countries and generally have less comprehensive understandings of local challenges that may be intuitive to local and national-level actors. These maps are appealing, but do they depict an underlying reality? Already, there is a sort of reverse beauty contest set in motion by climate change in which countries are auditioning for resources by seeking to portray themselves to be the most vulnerable.[16] This exercise of resource allocation is potentially fraught, and maps could be used for problematic purposes if deployed uncritically. There is no objective definition of vulnerability and different approaches may yield different results; thus, the identification of most vulnerable places is ultimately subject to political processes.[17]

These climate vulnerability maps are meant to serve as preliminary focal points for discussion and research with country and regional experts. They will inspire a reaction and critical conversation. However, if policymakers blithely embrace them as guides for investment decisions, that itself would be a disservice. Decision-makers need to be aware and critical of the assumptions of any model meant to inform their choices.

[1] IPCC, Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change, ed. Christopher B. Field et al. (Cambridge: Cambridge University Press, 2012), 240, 254, https://doi.org/10.1017/CBO9781139177245.

[2] Wendell Cox, "World Urban Areas Population and Density: A 2012 Update," New Geography, May 3, 2012, http://www.newgeography.com/content/002808-world-urban-areas-population-and-density-a-2012-update.

[3] IPCC, Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change.

[4] Climate-related disasters include storms, floods, wet mass movements, extreme temperatures, droughts, and wildfires (CRED 2012). The average was 228 million a year over this time period.

[5] These numbers are estimates derived from the EM-DAT International Disaster Database, the main dataset that compiles information and statistics on disasters. Southern Asia encompasses Afghanistan, Bhutan, India, Iran, Maldives, Nepal, Pakistan, and Sri Lanka. Southeast Asia includes Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, and Vietnam. Eastern Asia thus encompasses China, Hong Kong, Macao, North Korea, Japan, Mongolia, and South Korea. United Nations Statistics Division, http://unstats.un.org/unsd/methods/m49/m49regin.htm.

[6] Nourin Shabnam, "Natural Disasters and Economic Growth: A Review," International Journal of Disaster Risk Science 5, no. 2 (June 1, 2014): 157–63, https://doi.org/10.1007/s13753-014-0022-5; Drago Bergholt and Päivi Lujala, "Climate-Related Natural Disasters, Economic Growth, and Armed Civil Conflict," Journal of Peace Research 49, no. 1 (January 2012): 147–62, https://doi.org/10.1177/0022343311426167; Eduardo Cavallo et al., "Catastrophic Natural Disasters and Economic Growth," Review of Economics and Statistics 95, no. 5 (December 1, 2013): 1549–61, https://doi.org/10.1162/REST_a_00413.

[7] Jon Barnett, "Security and Climate Change," Global Environmental Change 13, no. 1 (April 1, 2003): 7–17, https://doi.org/10.1016/S0959-3780(02)00080-8; Idean Salehyan, "From Climate Change to Conflict?: No Consensus Yet," Journal of Peace Research 45, no. 3 (2008): 315–32; Nils Petter Gleditsch, "Whither the Weather? Climate Change and Conflict," Journal of Peace Research 49, no. 1 (January 1, 2012): 3–9, https://doi.org/10.1177/0022343311431288; Jürgen Scheffran et al., "Climate Change and Violent Conflict," Science 336, no. 6083 (May 18, 2012): 869–71, https://doi.org/10.1126/science.1221339; Idean Salehyan, "Climate Change and Conflict: Making Sense of Disparate Findings," Political Geography, Special Issue: Climate Change and Conflict, 43 (November 2014): 1–5, https://doi.org/10.1016/j.polgeo.2014.10.004.

[8] W.N. Adger et al., "2014: Human Security," in Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, ed. C.B. Field et al. (Cambridge, UK and New York, NY, USA, 2014), 762.

[9] Adger et al., 758.

[10] Sam Barrett, "Subnational Climate Justice? Adaptation Finance Distribution and Climate Vulnerability," World Development 58 (June 2014): 130–42, https://doi.org/10.1016/j.worlddev.2014.01.014.

[11] The choice of these specific Asian countries was determined by the funder of the research.

[12] The underlying maps for individual indicators are available on the study website.

[13] OECD, "Handbook on Constructing Composite Indicators: Methodology and User Guide," 2005, http://www.oecd.org/std/42495745.pdf; Lee Stapleton and Guy D. Garrod, "Keeping Things Simple: Why the Human Development Index Should Not Diverge from Its Equal Weights Assumption," Social Indicators Research 84, no. 2 (2007): 179–88. For a survey of these methodological choices and issues, see Valérie Angeon and Samuel Bates, "Reviewing Composite Vulnerability and Resilience Indexes: A Sustainable Approach and Application," World Development 72 (August 2015): 140–62, https://doi.org/10.1016/j.worlddev.2015.02.011.

[14] These include the Global Administrative Areas (GADM) and the USAID Demographic and Health Surveys (DHS).

[15] LandScan, "This Product Was Made Utilizing the LandScan (2013)TM High Resolution Global Population Data Set Copyrighted by UT-Battelle, LLC, Operator of Oak Ridge National Laboratory under Contract No. DE-AC05-00OR22725 with the United States Department of Energy.," 2013.

[16] Gary Yohe and Richard S. J. Tol, "Indicators for Social and Economic Coping Capacity—moving toward a Working Definition of Adaptive Capacity," Global Environmental Change 12, no. 1 (April 2002): 25–40, https://doi.org/10.1016/S0959-3780(01)00026-7.

[17] See Abdisalan M Noor et al., "Using Remotely Sensed Night-Time Light as a Proxy for Poverty in Africa," Population Health Metrics 6 (October 21, 2008): 5, https://doi.org/10.1186/1478-7954-6-5; Michael Xie et al., "Transfer Learning from Deep Features for Remote Sensing and Poverty Mapping," in Proceedings of the Thirtieth AAAI Conference on Artificial Intelligence, AAAI'16 (Phoenix, Arizona: AAAI Press, 2016), 3929–3935, http://dl.acm.org/citation.cfm?id=3016387.3016457.

[18] Daron Acemoglu and James Robinson, Why Nations Fail: The Origins of Power, Prosperity, and Poverty, Reprint edition (New York: Crown Business, 2013); Douglass C. North, John Joseph Wallis, and Barry R. Weingast, Violence and Social Orders: A Conceptual Framework for Interpreting Recorded Human History, 1 edition (Cambridge ; New York: Cambridge University Press, 2009); Douglass C. North et al., eds., In the Shadow of Violence: Politics, Economics, and the Problems of Development (Cambridge: Cambridge University Press, 2012); Colin H. Kahl, States, Scarcity, and Civil Strife in the Developing World (Princeton: Princeton University Press, 2006).

[19] Nick Brooks, W. Neil Adger, and P. Mick Kelly, "The Determinants of Vulnerability and Adaptive Capacity at the National Level and the Implications for Adaptation," Global Environmental Change 15, no. 2 (2005): 151–63.

[20] Francis Fukuyama, "What Is Governance?," Governance 26, no. 3 (July 1, 2013): 347–68, https://doi.org/10.1111/gove.12035.

[21] These estimates are derived from spatially intersecting LandScan 2013 measures of population and the climate exposure basket. The mean climate exposure of the region and thresholds for 1 and 2 standard deviations above the mean were calculated. Then, using these thresholds, the population data is used to estimate the numbers of people (and their location) exposed at 1 and 2 standard deviations above the mean exposure.

[22] Sindh province is site of the country's largest city Karachi with an estimated population of about 23 million.

[23] For a similar effort, see G. Naumann et al., "Exploring Drought Vulnerability in Africa: An Indicator Based Analysis to Be Used in Early Warning Systems," Hydrol. Earth Syst. Sci. 18, no. 5 (May 6, 2014): 1591–1604, https://doi.org/10.5194/hess-18-1591-2014.

[24] For a disaster to be entered into the database at least one of the following criteria must be fulfilled: ten (10) or more people reported killed, one hundred (100) or more people reported affected, a declaration of a state of emergency, or a call for international assistance (CRED 2012).

[25] Affected numbers do not include estimates of the dead.

[26] Munich Re and Swiss Re insurance companies have proprietary data.

[27] Joshua W. Busby, Todd G. Smith, and Nisha Krishnan, "Climate Security Vulnerability in Africa Mapping 3.0," Political Geography, Special Issue: Climate Change and Conflict, 43 (November 2014): 51–67, https://doi.org/10.1016/j.polgeo.2014.10.005.

[28] EM-DAT events with no specific geographic data (other than country at large) amounted to 13 out of 2,414 unique events (less than 0.1%).

[29] See http://aiddata.org/.

[30] See Appendix Table 5 for details on discrepancies in EM-DAT events.

[31] While an existing measure, the Normalized Vegetation Difference Index (NVDI), already incorporates greenness, the disturbance index is potentially better able to capture urban infrastructure through the incorporation of the other dimensions. Kirsten M. de Beurs, Braden C. Owsley, and Jason P. Julian, "Disturbance Analyses of Forests and Grasslands with MODIS and Landsat in New Zealand," International Journal of Applied Earth Observation and Geoinformation 45, Part A (March 2016): 42–54, https://doi.org/10.1016/j.jag.2015.10.009.

[32] For one assessment of the security implications of climate change for India, see T.V. Paul, "India," in Climate Change and National Security, ed. Daniel Moran (Washington, D.C.: Georgetown University Press, 2011), 73–84.

[33] For examples of a subnational Indian state level climate vulnerability mapping approach, see Antoinette L. Brenkert and Elizabeth L. Malone, "Modeling Vulnerability and Resilience to Climate Change: A Case Study of India and Indian States," Climatic Change 72, no. 1–2 (2005): 57–102; Manupriya, "Agriculture in 115 Indian Districts Most at Risk from Climate Change," The Economic Times, August 3, 2016, http://economictimes.indiatimes.com/news/economy/agriculture/agriculture-in-115-indian-districts-most-at-risk-from-climate-change/articleshow/53521700.cms.

[34] India already has some 20 million Bangladeshis in the country and has invested in a border wall to deter future migration. For discussion of climate signals and previous conflict over Bangladeshi migration to India, particularly in Assam see Arpita Bhattacharyya and Michael Werz, "Climate Change, Migration, and Resiliency in South Asia: Cooperation for Climate Security," in The U.S. Asia-Pacific Rebalance, National Security and Climate Change, ed. Caitlin E. Werrell and Francesco Femia (Washington, D.C.: Center for Climate and Security, 2015), 64–73, https://climateandsecurity.files.wordpress.com/2015/11/ccs_us_asia_pacific-rebalance_national-security-and-climate-change.pdf; Arpita Bhattacharyya and Michael Werz, "Climate Change, Migration, and Conflict in South Asia" (Center for American Progress, 2012), https://www.americanprogress.org/issues/security/report/2012/12/03/46382/climate-change-migration-and-conflict-in-south-asia/; Paul, "India.".

[35] Tariq Waseem Ghazi, A.N.M. Muniruzzaman, and A.K. Singh, "Climate Change & Security in South Asia" (Global Military Advisory Board on Climate Change, 2016), http://gmaccc.org/gmaccc-publishes-climate-change-security-in-south-asia-cooperating-for-peace/.

[36] Irwin Loy, "Mapped: How Monsoon Rains Could Submerge Rohingya Refugee Camps," IRIN, February 5, 2018, http://www.irinnews.org/maps-and-graphics/2018/02/05/mapped-how-monsoon-rains-could-submerge-rohingya-refugee-camps.

[37] Lisa Friedman, "Which Nations Are Most Vulnerable to Climate Change? The Daunting Politics of Choosing," 2010, http://www.nytimes.com/cwire/2011/02/24/24climatewire-which-nations-are-most-vulnerable-to-climate-95690.html?ref=energy-environment; Alex de Sherbinin, "Climate Change Hotspots Mapping: What Have We Learned?," Climatic Change 123, no. 1 (March 1, 2014): 23–37, https://doi.org/10.1007/s10584-013-0900-7.

[38] Richard J. T. Klein, "Identifying Countries That Are Particularly Vulnerable to the Adverse Effects of Climate Change: An Academic or Political Challenge," Carbon & Climate Law Review 2009 (2009): 284, http://heinonline.org/HOL/Page?handle=hein.journals/cclr3&id=302&div=&collection=; Richard J.T. Klein and Annett Möhner, "The Political Dimension of Vulnerability: Implications for the Green Climate Fund," IDS Bulletin 42, no. 3 (May 1, 2011): 15–22, https://doi.org/10.1111/j.179-5436.2011.00218.x.

National Disaster Preparedness

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Why do some governments develop and implement substantial disaster preparedness programs, while other states are left with minimal protections against natural hazards? This is the key question underlying the National Disaster Preparedness portion of the CEPSA initiative, which aimed to assess the dynamics that shape the incentives of national, and sub-national, governments to engage in disaster preparedness. This research builds on previous work to address these topics on the African continent and applies its focus to the South Asian subcontinent, with an emphasis on Bangladesh, India, and Pakistan.

While significant research in the social sciences has evaluated the conditions under which governments *respond* to natural hazards when they occur, substantially less has addressed the question of why governments might, or might not, invest in preparedness. This is despite the fact that we can observe substantial empirical variations across countries in levels of preparedness, even when holding constant general expectations about disaster risks. In addition, as the perceived risk of natural hazards increases alongside climate changes, it becomes even more important from a policy perspective to understand the underlying logic for variations in preparedness, and the implications for where we are most likely to see significant damages when natural hazards do hit.

In this research program, we collected evidence on disaster preparedness initiatives across the included countries and examined in these cases a set of hypotheses for why governments do or do not invest in preparedness. This resulted in the following deliverables: case studies of disaster preparedness in Bangladesh and Pakistan, and associated research briefs; an analysis of the drivers of disaster preparedness at the sub-national level in India; and a dataset on sub-national preparedness efforts in India.[i]

Our key findings are, first, that disaster preparedness has been enabled in South Asia where countries have faced significant past hazards that have both affected large portions of the population and for which forecasting of future hazards is reasonably feasible. Second, preparedness is enabled, generally, by electoral competition, but this requires that elected officials have some leverage over the design or implementation of policies. Where politicians are excluded from formal power over policies, such as would allow them to claim credit for outcomes, they are unlikely to invest resources in preparedness efforts. Finally, we find mixed evidence to support arguments related to the role of external actors and the incentives for preparedness. Regarding the argument that a strong civil society is associated with comprehensive preparedness efforts, this appears to be the case in Bangladesh but there is less evidence of civil society's role in India and Pakistan. Similarly, with regard to whether there is a moral hazard associated with expectations of external support in the time of a natural disaster, there appears to be some evidence of this in each case, but in ways that do not necessarily

conform to a traditional understanding of moral hazard, thus causing us to reevaluate what this idea means in the current context.

Our previous research on disaster preparedness in Africa offers useful comparisons for these findings. In that work, we saw an important role for past exposure and economic strength, but these characteristics interacted in significant ways with characteristics of the state. In some African cases, having economic resources was insufficient without the combination of electoral incentives and a functional bureaucracy, the latter of which seems to be less of a concern in the three countries considered here. The more general finding, then, is that having both electorally motivated political actors and a competent bureaucracy may be the most beneficial institutional setting for preparedness efforts. As in South Asia, we observed mixed findings in Africa for the role of external actors, with civil society and international aid agencies often playing the most productive role when partnered with the state, rather than acting in parallel.

The South Asia findings also highlight the importance of more nuanced hypotheses about the character of incentives for investments in preparedness. It is not simply that past exposure to natural hazards increases incentives for preparedness, but rather the character of that exposure. It is not simply that political dynamics matter, but rather the ways in which those dynamics result in particular sets of individuals who do, and do not, benefit from efforts to increase preparedness. For both researchers and policymakers, then, these analyses should push forward the ways in which we discuss disaster preparedness efforts to enable a richer and more nuanced evaluation of policy outcomes in South Asia and elsewhere around the world.

This work involved primary fieldwork, data collection, and analysis by Jennifer Bussell, Shabhanaz Diya, and Asim Fayaz.

In the remainder of this final report, I summarize the findings of our work on each of the three country cases and provide methodological details on the dataset that is now included in the broader CEPSA dashboard.

Pakistan

The Pakistan case study highlights a country that has made important strides in the past few decades in developing an institutional infrastructure for engaging in disaster preparedness. At the same time, local-level implementation of current policies faces ongoing problems and additional efforts are needed in multiple policy areas. Key changes that could enable successful outcomes in these areas would be further efforts to build capacity among local politicians, greater attention to additional types of natural hazards, and more comprehensive partnerships with the private sector.

Disaster Profile

Pakistan has endured numerous natural hazards in the last decade, beginning with a massive earthquake in 2005 in the Kashmir region that killed over 75,000 people and is remembered as one of the worst natural disasters in South Asia.[ii] 2010 saw some of the worst floods in Pakistan's history, killing 1,800 and affecting 21 million.[iii] In 2013, flooding killed 178 people and affected 1.5 million. 367 people died due to widespread flooding in 2014, which was the fourth consecutive

year of high-impact monsoon rains in Pakistan. In 2015, people in Karachi, Pakistan's largest city, experienced a heat wave that killed over 1200 people.[iv]

Different natural hazards affect different parts of Pakistan. A number of geological fault lines pass through the northern region, producing regular earthquakes of varying intensity. For instance, the boundary between the Indian and Eurasian tectonic plates runs through Kashmir where there was a magnitude 7.6 earthquake in 2005.[v] Earthquakes have also occurred in Balochistan, the western province, where the topography is mostly mountainous. In contrast, the middle of the country, comprised of the plains of Punjab and some parts of Sindh, experiences floods as the rivers swell in the summer. A significant portion of Sindh is also vulnerable to drought and heat waves. Every year, people die from the heat in the Thar Desert, but in 2015, the effect of rising temperatures extended to the coastal metropolitan city of Karachi, killing many people. Since 2005, over 40 million people have been affected by natural hazards causing an economic loss of over USD 20 billion.

Disaster Preparedness in Pakistan

In many ways, Pakistan's capacity to deal with disasters has significantly improved in recent years, but there remains significant room for improvement. This becomes most clear when the country's preparedness programs are evaluated with respect to the priorities outlined in the Hyogo Framework for Action.

Priority 1: Ensure that disaster risk reduction is a national and local priority with a strong basis for implementation

In principle, Pakistan now has a strong institutional structure to prepare for and respond to natural disasters. The National Disaster Management Authority (NDMA) is the lead agency at the federal level to deal with disaster management activities. According to their website, "in the event of a disaster all stakeholders, including Government Ministries / Departments / Organizations, Armed Forces, INGOs, NGOs, UN Agencies work through and form part of the NDMA to conduct one window operation."[vi]

Despite these institutional improvements, competing interests remain a problem at every level, especially when it comes to the political economy of disaster relief. Mission overlap between policy-making institutions also results in coordination issues and communication gaps. The Earthquake Reconstruction and Rehabilitation Authority (ERRA), instituted after the major earthquake in 2005, continues to exist despite NDMA being the federally backed body designated to lead. Recently, a Ministry of Climate Change was formed, but the issue of climate change has many overlaps with disasters and, hence, the relations between these bodies remain contentious. Thus, there remains a strong need for a coherent plan that would delineate the division of functions between the national and local level.

Priority 2: Identify, assess and monitor disaster risks and enhance early warning

With the creation of the NDMA, there is the general sense that the government's ability to assess and monitor the risk of floods has considerably improved. NDMA plays the coordination role while provincial disaster management authorities (PDMAs) are effective in tracking water inflows and mobilizing resources accordingly. Technical support to these institutions is provided by other

government and donor agencies. SUPARCO and its Space Application Center for Response in Emergency and Disaster (SACRED), affiliated with UN SPIDER, provide flood warnings. The disaster-related institutions are also helped by the military who are called by the government to serve as an aid to civil defense. Early warning systems also exist for different disasters.

Thus, the government's ability to identify, assess and monitor risks associated with floods has certainly improved considerably over the last decade. However, the understanding and ability to act on other disasters like heat waves that can potentially affect a much larger segment of the population is still primitive. Moreover, it is often lack of coordination and friction in information flow among different organizations that causes delays in government response.

Priority 3: Use knowledge, innovation and education to build a culture of safety and resilience at all levels

The government regularly uses mainstream media to raise awareness about disasters, but the programs are limited in their scope and reach. Additionally, there is little incorporation of disaster training into public educational curriculum. While NGOs also play a role in education, there is the need for a coordinated and comprehensive plan between government and the private sector, especially targeted at the smaller cities and villages that are most vulnerable.

Priority 4: Reduce the underlying risk factors

Overall, insufficient funding is allocated toward programs that would reduce the risks of natural hazards. While funds are allocated to regional disaster management bodies on an annual basis, more funds are needed specifically for risk reduction activities.

Priority 5: Strengthen disaster preparedness for response at all levels

Capacity for disaster preparedness and response at the national and, after the 18th Amendment to the constitution, at the provincial level, has been consistently improving. In principle, there is also agreement that in addition to the national and provincial level, capacity for disaster preparedness and response needs to be built at the local level. Elected or appointed representatives of the government at the local level are best placed to identify, assess and manage risks as well as respond to disasters. However, despite the explicit devolution of disaster management to the local level, de facto control is still centralized at the provincial level. In order to have effective disaster preparedness for response at all levels, capacity for disaster management has to be built at the local level so that the function and its accountability can be effectively devolved.

In sum, recent years have seen substantial improvements in Pakistan's disaster preparedness efforts, including the institution of a primary disaster management body and reasonably well-funded sub-national bodies to manage preparedness efforts. At the same time, a lack of sufficient coordination between the different actors horizontally and vertically within the state limits the success of these efforts in establishing fully functional disaster preparedness operations. In addition, insufficient funding for local risk reduction initiatives constrains the development of more forward-looking initiatives.

Drivers of Preparedness in Pakistan

Our analysis suggests that the character of national politics plays an important role in shaping disaster preparedness, particularly with regard to perceptions of disaster risk and the ability of elected officials to manage preparedness programs. First, with regard to perceived risk, where past experience and forecasting suggest the likelihood of future hazards, such as with regard to floods, considerable preparedness efforts have been made. Similarly, the government has invested in potential response measures to floods, which are seen to be electorally beneficial. But, second, politics has in many ways limited preparedness through downstream effects on bureaucratic stability. Due to frequent military coups, there is a pattern of inconsistent democratically elected local government structures. This means that political actors at higher levels have often not had a chance to develop their governing skills as municipal councilors or mayors. This lack of experience hinders processes of coordination and cooperation with bureaucrats, across government agencies, and with the private sector.

In addition, a general lack of financial resources seems to be impeding substantial efforts to implement the policies on paper. While funds are allocated to disaster management bodies, there is a general understanding that other, more basic issues like reducing the electricity shortfall and improving delivery of healthcare and education have to be addressed before the country can afford to invest in prevention and preparedness activities. While such efforts would also help, indirectly, with disaster preparedness, the more general lack of funding does impede explicit disaster preparedness and risk reduction programs.

Policy Recommendations

Based on this analysis, we make four primary policy recommendations:

First, there is a need to revisit existing disaster preparedness policies, so as to ensure that they are achieving their intended goals. Most prominently, an assessment of local level capacity is needed, as well as a strategy for incorporating local knowledge into disaster preparedness programming. This would facilitate the goal, on paper, of decentralizing disaster preparedness and response.

Second, more preparedness efforts are needed for disasters with lower perceived risk, including earthquakes and heat waves. While there appears to be an increasing risk of these hazard types, the government is investing little to no money and effort into the types of preparedness efforts needed for these risks.

Third, investment in more coordinated partnerships with the private sector, so as to leverage the knowledge and resources of both for-profit and non-profit organizations, as well as to reduce confusion and duplication of effort, would improve overall preparedness.

Fourth, the government should give more importance to disaster *preparedness* in the relevant existing institutions. This would help to shift attention from management of disasters to reducing the risk that they occur in the first place. Encouraging media attention toward these efforts will both help with educational efforts and increase the electoral benefits that would make such efforts worthwhile to politicians.

Bangladesh

The Bangladesh case study highlights quite comprehensive disaster preparedness programs, including substantial forecasting programs and early warning for floods. At the same time, coordination efforts across levels of government and with non-state actors could be improved, as could efforts to reduce the risk of hazards in general. These goals could be enabled by building local capacity among elected officials and community actors as well as expanding early warning systems to additional hazard types.

Disaster Profile

Bangladesh is often cited as one of the countries with the greatest risk of being affected by climate change and natural disasters. In 2013, the Intergovernmental Panel on Climate Change (IPCC) ranked Bangladesh as the most 'climate vulnerable country' in the world[vii], while Maplecroft's Climate Change Vulnerability Index (CVI) estimates Bangladesh to be at 'extreme risk' from the impacts of climate change by 2025.[viii] A number of demographic and geographic factors contribute to Bangladesh's climate and natural hazard sensitivity. The country is one of the most densely populated in the world, constituting 147,570 square kilometers of area with a total population of nearly 163 million.[ix] Over 80 percent of Bangladesh is floodplains, situated at the Ganges Delta with numerous tributaries flowing into the Bay of Bengal. These characteristics increase the risks associated with intense rain and cyclonic events, placing large portions of the population at risk. In contrast to flood-prone areas, the northwestern region is subject to drought conditions. Finally, a subduction zone underneath Bangladesh has recently been identified as placing the country at increased risk of earthquakes in the future.

Disaster Preparedness in Bangladesh

Overall, Bangladesh has taken substantial steps toward the goals laid out in the Hyogo Framework, though key areas for improvement remain.

<u>Priority 1: Ensure that disaster risk reduction is a national and local priority with a strong basis for implementation</u>

Bangladesh has several bodies to address disaster preparedness, risk reduction and response. The Ministry of Disaster Management and Relief is the leading authority on determining the policies and allocation of budget on disaster-related efforts. Under the leadership of the Prime Minister, the Ministry of Disaster Management and Relief also organizes the National Disaster Management Council (NDMC) that has representatives from the various institutions at national and local levels to tackle natural disasters in the country. The National Disaster Management Regulatory Framework (NDMRF) provides a set of procedures for disaster preparedness, risk reduction, and response, including efforts to mainstream risk reduction within government, NGO, and private sector activities.

While these organizations lead disaster preparedness efforts, there are limits to this approach. Budget and resource distribution for preparedness activities are determined by NDMC, and

implemented through local government and institutional bodies. As a result, emphasis has been placed primarily on infrastructure instead of community awareness and capacity building. In addition to this top-down approach, the National Disaster Management Regulatory Framework does not account for government bodies outside of the traditional hierarchy of institutions. Similarly, there is a lack of integration between the activities of international organizations and non-state actors, including the United Nations (UN) and local NGOs, and the government.

Priority 2: Identify, assess and monitor disaster risks and enhance early warning

Bangladesh's early warning system has improved significantly in recent years. In addition to technological advancements, the current early warning system involves a wide network of local volunteers and community radio to disseminate info. In 2015, the government also announced plans to expand a satellite-based forecasting and warning system developed by SERVIR to aid in improving lead time for flood warnings. The system relies on the Jason-2 satellite and was successfully able to forecast the flooding eight days in advance at nine locations of the Ganges and Brahmaputra River Basins in 2014.[x] The Cyclone Preparedness Program has invested heavily in training over 65,000 volunteers and building capacity at the local level with support from Red Cross International and USAID. There is also a useful reliance on local knowledge and community to disseminate information.

Priority 3: Use knowledge, innovation and education to build a culture of safety and resilience at all levels

In the aftermath of the catastrophic floods in 1988 and cyclone in 1991, the Government of Bangladesh has included disaster preparedness and information on early warning systems in the national curriculum of the country. Primary schools are often built as cyclone shelters, providing children and young adults with awareness from an early age about safety and resilience. There are several community interventions spearheaded by local NGOs and international agencies that work towards improving community awareness on natural disasters.

Priority 4: Reduce the underlying risk factors

While the government is investing heavily in infrastructure and mapping of natural disasters, there seems to be a lack of efforts in tackling underlying factors that contribute towards them. Landslides, for example, have been more frequent in recent years as a result of rampant deforestation and agriculture in hilly areas. Uncontrolled urbanization is contributing towards increasing risks of fatalities and widespread damage during earthquakes. This accounts for the government's negligence in addressing institutional and human resource challenges within the various verticals that are concerned with disaster management in the country.[xi] Corruption and misallocation of funds are associated with an inability to develop preventive measures instead of responsive ones.

Priority 5: Strengthen disaster preparedness for response at all levels

The government relies on local NGOs, civil society organizations, and international agencies in building capacity of communities and providing emergency relief. In spite of these efforts, central decision making has limited the impact of training programs at local levels. There is only one Disaster Relief and Rehabilitation Officer (DRRO) appointed at each district, who is in-charge of both preparing and responding to emergencies, and does not have the necessary resources to do so effectively. What is encouraging, however, is the government's initiative in developing thorough

Standing Orders on Disasters (SOD) that provide clear guidelines on the role of different parties in the event of a major natural disaster. The guidelines are robust in the sense that they emphasize collaboration and situation-based response, and are updated annually to reflect new challenges.

Drivers of Preparedness in Bangladesh

As in Pakistan, key elements of the political process, including with regard to perceived risk, play an important role in the nature of preparedness. Expectations of future hazards have clearly influence recent government preparedness efforts related to earthquakes and cyclones. At the same time, behavior of local elected officials suggests the risk of having little political incentive to engage in preparedness. Because it is bureaucratic actors who have responsibility for disaster preparedness at local levels, elected politicians have few incentives to follow through on their commitment to work with communities to tackle disasters, participate in training programs, and understate the catastrophic impact of natural disasters on the most vulnerable communities. Thus, because locally elected officials cannot claim credit for implementing preparedness initiatives, they do not offer support that would facilitate improved implementation in coordination with the bureaucracy.

In contrast to Pakistan, in Bangladesh the strength of civil society organizations does result in increased preparedness efforts. Programs of civil society groups have both played a significant role in innovative preparedness initiatives as well as provided a voice of critique where needed of government programs. This offers an important example of the ways in which civil society actors, when well established in a given context, can offer important contributions to preparedness.

Policy Recommendations

This analysis suggests four primary policy recommendations:

First, invest in local institutional capacity within the public sector, particularly for local elected officials, to build support and buy-in for national government programs.

Second, engage in capacity building within local communities, to support decentralized preparedness. These efforts will increase community resilience while also reducing reliance on the military and international actors at the time of natural hazards.

Third, further initiatives to develop advanced technologies for early warning of natural hazards, particularly beyond those already established for floods.

Fourth, place continued effort into shifting the policy agenda from an emphasis on response to attention on preparedness and risk reduction. While many current efforts address preparedness, a more explicit focus is important in particular because. Preparedness addresses a number of underlying factors that increase the risks of damage caused by a natural hazard, such as unplanned urbanization, rampant deforestation and lack of institutional capacity at local level.

India

The Indian analysis takes a different form than the Bangladesh and Pakistan cases, due to the availability of more disaggregated data that allow for rigorous quantitative testing of hypotheses about incentives for disaster preparedness. In the India working paper, I argue that understanding the political economy of preparedness policies, and in particular the ways in which natural hazard risks intersect with electoral competition, bureaucratic capacity, and expectations about external assistance in the case of a disaster (moral hazard), are key to comprehending the puzzle of disaster preparedness. Using new and unique data on disaster preparedness training from India's states, I show that it is not simply exposure to past hazards that predicts preparedness policies, but rather the character of that experience—specifically the number of individuals affected by an event. The electoral incentives of the government to deliver public goods are also key to understanding policy outcomes.

India is a compelling case for a comparative study of preparedness. The country is faced with the full range of natural hazards, including floods, cyclones, drought, and earthquakes. The risk of these hazards, however, differs quite dramatically across the country with, for example, the eastern coast being the most prone to cyclones while the northwest is more likely to face drought and earthquakes. In addition, there is substantial variation across the country in characteristics that might help to explain preparedness, suggesting a prime opportunity to evaluate the relationship between variation in these characteristics and the presence of preparedness efforts. Perhaps most importantly, as suggested by the nature of the dependent variable discussed below, state governments in India have substantial autonomy over policy-making, allowing for a truly comparative study of the incentives to make public investments in preparedness.

Investigating the nature of disaster preparedness programs in a quantitative manner is often difficult: these initiatives are frequently tricky to observe and most measures of "preparedness" are actually measures of disaster outcomes, such as total killed individuals, which are endogenous to preparedness. In addition, comparative examinations of preparedness can suffer from the difficulties of cross-national analyses, in which there are so many potentially relevant variables that differ across cases that focusing in on a few key theoretically informed characteristics can be constrained by the presence of many potential confounding variables.

In order to attempt to alleviate these difficulties, I focus on the substantial sub-national variation within India. This allows me to control for many institutional variables across sub-national units, while still allowing for variation in the environmental, economic, political, and social dynamics often hypothesized to be linked to disaster preparedness.

I also take advantage of a new and unique measure of disaster preparedness, the number of sub-national government officials trained as a part of an ongoing central government program in disaster management. In this initiative, state governments in India submit to the central training body—the National Institute for Disaster Management—their requests for disaster preparedness training, which are then incorporated into the annual training schedule.[xii] Representatives from the states are subsequently sent to the training programs when they occur. Thus, the central government makes this training program available to the states, but it is incumbent upon the state

governments to express their training needs and to put forward the individuals for training, who would otherwise be engaged in their regular day-to-day assignments. Participating in this preparedness program consequently represents an investment by state governments in the preparedness of their administration and state.

I collected data from the central training department's website on the individuals trained each year for the fiscal years 2009-10 to 2014-15 (six years), across all of India's 28 states and the union territories of Delhi and Puducherry.[xiii] I then generated a per capita measure based on the annual population estimates for each state in the Indian union. This measure reflects the relative importance that each state government places on training its bureaucrats in disaster preparedness, in particular, and their overall investments in preparedness, in general.

General data availability at the sub-national level is also quite good in India. Government statistics on population and economic conditions, in addition to the presence of civil society organizations, are freely accessible, as are independent measures of bureaucratic capacity. International organizations, such as the World Bank, via AidData, and the Centre for Research on the Epidemiology of Natural Disasters (CRED), also make available data on the provision of financial assistance to sub-national units and the human and financial costs of past natural hazards, respectively. I use these data to generate state-level measures to operationalize potential explanations for disaster preparedness.

In the analysis, I evaluate the relationship between each proposed independent variable and the number of individuals trained in disaster preparedness, per capita. I first test these relationships using bivariate regressions and then conduct a set of multivariate analyses using those measures that display strong relationships with the measure of the dependent variable. Results of the multivariate models suggest that the strongest and most consistent relationship is between the number of people affected by recent natural hazards and the number of people trained. This finding is in the predicted direction in all models and is statistically significant in three out of four specifications. States are more likely to train individuals in disaster preparedness when they have experienced past natural disasters that affected a substantial portion of their population. Also strong are the associations between people trained and both economic conditions and electoral competition. Each of these measures displays a statistically significant relationship with training levels in the expected direction in two of the four models. Thus, states with greater economic resources and those with higher levels of electoral competition are more likely to train a larger proportion of their administrative staff in disaster preparedness. Similarly, the measure of moral hazard at the international level (presence of a World Bank project) exhibits a statistically significant relationship with preparedness training in one out of the two models in which it is included. Measures of domestic moral hazard, bureaucratic capacity (petty corruption), and the presence of civil society do not display strong relationships with preparedness training.

These findings offer important support for, and evidence against, some of the most predominant theories related to the incentives for implementing disaster preparedness policies. While past exposure—as a measure of perceived risk—is an important predictor of training levels, this is only with regard to the number of people affected by hazards in the past, not the number killed or the economic effects of said hazards. Economic conditions are similarly significant, but not to

the exclusion of other factors. Evidence in support of the importance of electoral conditions—particularly the nature of party dynamics in the legislature—and the role of non-disaster-related investments by international actors—in the form of World Bank projects—also highlights the relevance of political incentives to disaster-specific policy outcomes. Politicians are less likely to make investments in preparedness if they think they can viably spend money on other kinds of programs and still retain office.

Perhaps the most compelling findings are for the combined effects of perceived risk and electoral competition, given that these measures display strong relationships in the model with the largest number of cases, suggesting their relevance across the widest range of states and years. This implies that political actors are responsive to expectations about the magnitude of the population that is likely to be affected by future hazard events, but that they are at the same time responsive to the particular nature of the constituencies that elected them. Where states have experienced hazards affecting large number of people and where there are a small number of parties in power in a state, we should expect to see the most substantial investments in disaster preparedness.

From a policy perspective, these findings suggest a number of potentially relevant implications. The results of the multivariate analyses, in particular, imply that actors with an interest in promoting disaster preparedness should be cautious about making a number of assumptions. First, non-government actors should not assume poor countries or sub-national units will not find ways to invest in preparedness, if other factors are aligned in a particular manner. Even holding constant economic conditions, perceived risk and electoral conditions display strong relationships with levels of disaster training. This suggests that all politicians may perceive there to be a sufficient political logic to preparedness when risks are high and they are likely to benefit electorally from public goods expansion, even if the economic costs of doing so may be relatively high.

Second, there is at least preliminary evidence (from the bi-variate models) to suggest that aid agencies should be cautious of preparedness investments in locations with low levels of bureaucratic capacity, particularly with regard to the presence of corruption. If sub-national governments are seemingly less willing to invest when there are risks of leakage in the processes of implementation, then external actors should perhaps have the same concerns. This does not mean that preparedness initiatives are infeasible, but rather that they should be introduced in ways that take these limitations into account, such as with the inclusion of anti-corruption provisions or the participation of non-government actors in implementation.

Finally, the dynamics of moral hazard are important, but not a given. International aid may be more relevant than domestic aid, at least in the Indian case, but the nature of the aid itself may be only tangential to political incentives. Aid agencies should expect that their presence in a location may be sufficient to induce the dynamics of moral hazard, even if the investment is relatively small. As a result, funders may want to incorporate conditionalities related to preparedness efforts into all investment—even those with no direct relationship to natural hazards—in order to reduce the risks that external actors themselves will be forced to bear substantial response costs at the time of a hazard, particularly in those countries and sub-national units prone to natural hazards.

India Disaster Preparedness Training Database

As noted in the previous section, the India analysis involved collection of state-level data on the training of government officials in disaster preparedness, which is now a component of the broader CEPSA dashboard initiative. These data span seven years and thirty-one states and union territories, for a total of 11,797 observations of individual trainees. This represents the most comprehensive survey of disaster preparedness training of which I am aware and an important lens into the character of preparedness efforts sub-nationally in India.

The data were downloaded directly from the website of the Indian central government's disaster training department, the National Institute for Disaster Management. The data were then cleaned, to add in information on the state or union territory of the trainee, as needed, and to exclude data on trainees from outside India. Other than these modifications, the data remain predominantly in their original form.

Conclusion

This collection of studies on disaster preparedness in South Asia offers important new insights into the character of incentives for, and against, preparedness for natural hazards. Based on primary research, including fieldwork and original data collection in three countries, we find that multiple factors play in to generating the incentives required for governments to make substantial investments in preparedness and risk reduction programs. Somewhat unsurprisingly, past exposure to natural hazards and, importantly, the ability to forecast future risks, plays an important role in encouraging investment. Less obvious, however, and as highlighted in the India analysis, it is not simply past exposure to hazards, or even the number of individuals killed, but the total number of affected individuals, per capita, that is associated with higher preparedness investments.

Perhaps more surprising, but substantially more relevant for associated policy implications, are the ways in which political dynamics interact with preparedness efforts. As the Pakistan and Bangladesh cases show, the character of national-level politics is important for the introduction of policies, but even more relevant for policy implementation is how these politics in these countries play out at the local level. In both cases, for somewhat different reasons, locally elected officials either do not have the incentives or the necessary experience to meaningfully engage in disaster preparedness efforts. As a result, local coordination of disaster preparedness efforts is more limited and less comprehensive than might otherwise be the case.

Sub-national evidence from India also highlights the relevance of electoral politics, showing that the nature of political competition can be closely related to the nature of preparedness efforts. Specifically, where politicians come to power with the support of a wide electoral base, they are often more likely to engage in preparedness efforts. In this way, the more that politicians feel indebted to, and reliant on, large segments of their constituency, the more likely it is that we will observe investments in disaster preparedness programs that are likely to serve the community as a whole.

In line with past work on disaster preparedness in Africa, we observe only minimal evidence of risks associated with moral hazard. Interestingly, where there is potential evidence for concern, this comes from experiences related to reliance on the domestic military for aid in responsiveness—as in Pakistan and Bangladesh—or on evidence of non-disaster related international aid—as in the case of India. Either way, there is clearly a need for greater nuance in our understanding of how expectations of external support at the time of a natural hazard may, or may not, have implications for how governments invest in preparedness.

As a whole, these studies highlight the value of detailed policy analyses with regard to natural disaster policy and rigorous evaluation of a range of potential explanations for how and why governments will make preparedness investments. Future analyses will benefit from further efforts to develop new data for quantitative, non-endogenous measures of preparedness, as well as updating standards for evaluating preparedness efforts on the basis of more recent international agreements.

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[i] Ongoing work in this research program, not directly supported by the Minerva initiative, is focused on country case studies of India and Myanmar.

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[xii] Interview with central government official, New Delhi, March 26, 2014.

[xiii] http://nidm.gov.in/default.asp, India's 29th state—Telengana—is included in these analyses as a part of its former state, Andhra Pradesh.

Aid for Climate Change and Disaster Risk Reduction on South Asia: A Critical Review of the Data and Donor Strategies

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Executive Summary

The Aid Project Team of the Complex Emergencies and Political Stability in Asia (CEPSA) program engaged in primary data collection, statistical and geospatial analysis, and qualitative (interview-based) research between 2014-2017 in order to address two overarching questions of the CEPSA research agenda:

(1) What kinds of investments in preparedness and prevention can lessen vulnerabilities to climate change-induced natural disasters and related incidences of complex emergencies, and strengthen resilience and climate change adaptation?
(2) Where are investments in preparedness and prevention going, and how are they being targeted?

These research questions were situated within the broader framework of several international initiatives and agreements. Specifically, the project team sought to provide essential data that would enable the international and domestic stakeholders of aid programs to monitor progress towards commitments set out in the 2015 Sendai Framework for Disaster Risk Reduction and the 2015 Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC). While both of these agreements signaled a strong consensus on the need to provide CCA and DRRM aid, there was little effort to create a robust monitoring and evaluation system that would empower key stakeholders to hold donor countries and agencies to account for these promises.

This work was inspired by previous research under the auspices of the Climate Change and African Political Stability Program (CCAPS). In this work, the project team developed a

sophisticated coding system to track and geo-map international development assistance for climate change adaptation in order to assess whether such global aid was going to countries and subnational regions in most need of such funds. The team subsequently used this information to provide a preliminary assessment of how well donors were meeting their commitments to multinational treaties, such as the UNFCCC Conference of the Parties 2009 agreements on fast track financing and new and additional aid for climate change in developing countries.

The team's research agenda in the CEPSA program was also shaped by our participant observation in the international aid transparency movement, in which we developed and implemented the geocoding methodology to provide the first multi-donor aid map for the country of Malawi. The quickly evolving aid transparency movement in 2014 was anchored in the pioneering work of the International Aid Transparency Initiative, Development Initiatives, Aid Data, innovations in the OECD Creditor Reporting System, the emerging data dashboards of bilateral aid donors (such as the UK's DevTracker and the US Foreign Assistance Dashboard) and the growth of aid information management systems in aid receiving countries. Progress to data suggested that the collection and analysis of detailed data on aid for climate change adaptation (CCA) and disaster risk reduction management (DRRM) was possible. However, there remain key data gaps and inconsistencies in the timeliness and quality of donor reporting that prevent, to date, the type of geomapping and data collection that would best suit policy decision-making around resource allocation for climate change adaptation and disaster risk and reduction management.

Introduction: Tracking and Evaluating Aid for CCA and DRRM

Tracking financing for climate change related activities, particularly for adaptation and disaster risk management, has become more imperative after the 2009 United Nations Framework Convention on Climate Change (UNFCCC) annual Conference of the Parties (COP) in Copenhagen. Significant amount of financial and technical resources were pledged by advanced industrial countries – up to US$100 billion per year (additional to existing official development assistance [ODA]) – to developing countries to aid their efforts to adapt to the impacts of climate change. More recently, in the 2015 Paris Agreement and the 2015 Sendai Framework for Disaster Risk Reduction under the International Strategy for Disaster Reduction (UNISDR), the international community has committed itself to increasing financial contributions and integrating climate and disaster risk considerations into their development assistance programming.

In the interests of understanding the evolving nature of foreign aid and accountability, several adaptation finance-tracking efforts were designed, including the Climate Finance Tracker,[i] the Organization for Economic Cooperation and Development (OECD) Rio Conventions, and the Climate Change and African Political Stability (CCAPS) method.[ii] As climate-related hazards more frequently result in disaster situations, similar attention is being paid to the adequacy of DRRM financing, its integration with CCA, and how best to address the changing challenge of increasing resilience.[iii,iv] Ultimately, understanding the nuances of who provides support, how much, and for what purposes (proactive versus reactionary aid, as well as specific activities) will help inform prioritization for future plans – for both national and international actors.

Furthermore, our project team was interested in discerning how practice on the ground has changed to address these commitments as awareness of climate change and DRRM has spread. Have national and international (e.g., bilateral or multilateral donor) strategies and policies substantially incorporated such commitments into their development strategies? To what extent have national actors, like the Ministries of Environment or Disaster Management, able to and act in coordinated manners to address their respective countries challenges? Here, we focus on the critical case study of Bangladesh and use extensive interviews and qualitative review of strategy document to address three main questions:

> (1) what is the extent to which international aid (from five major donors) to Bangladesh reflects action related to climate change or disaster risk reduction?
> (2) how have national government and donor strategies and policies integrated considerations of CCA and DRRM into their funding plans?
> (3) to what extent are national government policies and actions on climate change and disaster risk reduction cohesive and well-coordinated?

In addition, in the course of conducting research, a fourth question arose:

> (4) What is the quality of available data, particularly on donor partners' activities, to assess these questions?

Given expectations of more frequent and intense climate-related hazard episodes in South Asia, there is an increasing focus on preparing for and 'protecting' development gains. Yet the overlap between CCA and DRRM agendas also make it more difficult to clearly understand how patterns in practice and funding are changing without further in-depth analysis of donors' and national governments' activities in this space. By explicitly trying to quantify aid for disaster risk management, we hoped to better understand its overlap with climate change adaptation, general characteristics of climate-oriented disaster risk management, and whether the aid is spent on the expressed DRRM and CCA priorities of recipient governments. By engaging in further qualitative fieldwork, we sought to assess where political and economic opportunities and constraints exist to effectively implementing CCA and DRRM agendas.

Methodology

Overview of Methodology

The study uses a multi-method qualitative, quantitative, and spatial analysis approach to address the main questions. It combined primary data collection through interviews with donor partners, national government ministerial representatives, and civil society stakeholders in two countries (Bangladesh and Nepal), with extensive document reviews of national and international strategies and policies in the aforementioned eleven countries in South Asia.

Additionally, to gain analytical leverage on trends in climate adaptation and DRRM finance, the team searched, collected, and conducted double blind analysis of over 330 project documents from the top five international development assistance donors in Bangladesh for 2007 – 2014.

These project documents were coded for their relevance to climate change and disaster risk reduction (see the CCAPS methodology and this brief for further information). Where possible, the study geo-located these projects activities, allowing for spatial analyses against the country's climate related vulnerabilities.

Tracking Aid for CCA and DRRM: Coding Methodology and Bangladesh Case Study

The Aid Project team set out to examine all aid projects that have been (donor) classified as disaster risk related (e.g. prevention, emergency response and recovery and rehabilitation). We relied here on the extensive collection of foreign aid projects housed in AidData.[v] As DRRM activities are often integrated into other traditional sectors and are sometime not explicitly defined or categorized, this effort cast a wider net to understand the patterns of activity and financing when DRRM efforts might be integrated. We thus build on other analyses,[vi,vii] and expand their definitions to include activities like flood and desertification prevention and control.[viii]

With this wider net cast, we significantly expanded the scope of activities considered to be DRRM and/or CCA related. We then analyzed these projects using the well-established CCAPS climate coding methodology and DRRM-Related purpose coding (see summary Figure 1 and definitions in Table 1).[ix] We coded at the activity level (where possible), and followed a double-blind coding process.

Figure 1: Climate and DRRM Coding Spectrum

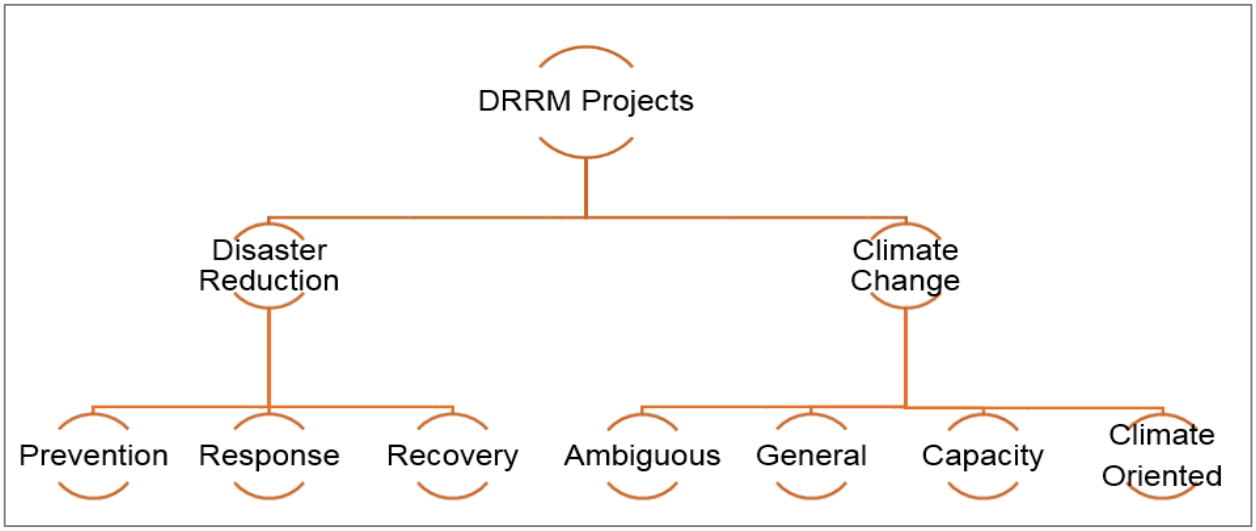


Table 1: Key Concepts and Definitions

Overall Concepts	
Vulnerability	The characteristics and circumstances of a community, system, or asset that make it susceptible to the damaging effects of a hazard. There are many aspects of

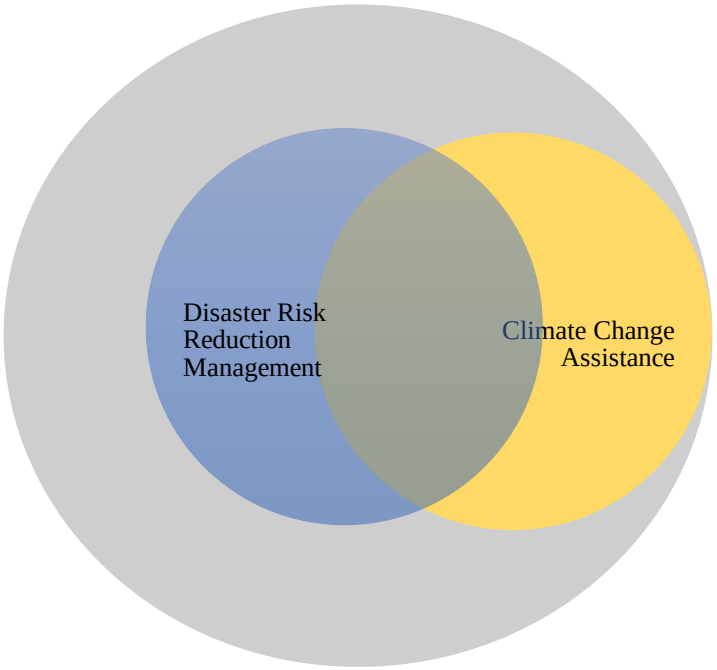
	vulnerability, arising from physical, social, economic, and environmental factors.
Resilience	The ability of a system, community, or society exposed to hazards to resist, absorb, accommodate to, and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.
Climate Change Adaptation	The adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.
Disaster Risk Management/Disaster Risk Reduction Management	The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies, and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.
Disaster Related Definitions	
Prevention	The outright avoidance of adverse impacts of hazards and related disasters.
Response	The provisions of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety, and meet the basic subsistence needs of the people affected.
Recovery	The restoration, and improvement where appropriate, of facilities, livelihoods, and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.
Climate Coding Related Definitions	
Ambiguous Development	An activity that has an indeterminate effect on the vulnerability of human or natural systems to the impacts of climate change and climate-related risks.
General Development	An activity that reduces the vulnerability of human or natural systems to the impacts of climate change and climate-related risks, by increasing the general well being of these systems.

Capacity Development	An activity that reduces the vulnerability of human or natural systems to the impacts of climate change and climate-related risks, by increasing the resilience of these systems to actual or anticipated effects of climate change.
Climate Oriented Development	An activity that intends to reduce the vulnerability of human or natural systems to the impacts of climate change and climate-related risks, by targeting enhanced adaptive capacity of these systems to actual or anticipated effects of climate change or responding to negative climate effects.

The projects' activities were evaluated on a spectrum that encapsulates the variety of purposes that a typical development project may have, but also includes more explicit categories that address climate-related factors (the spectrum spans from ambiguous to climate oriented development; see Figure 1 for the expanded version). The spectrum helps move the analysis away from a simple binary yes/no assessment of climate orientation of projects and activities, thus allowing for nuances. Projects can receive anywhere from a 0 to 2 for their climate relevance. Activities are simultaneously examined to understand the *type* and *purpose* of the DRRM activity. For example, are the activities/projects more focused on prevention and preparedness or response and recovery? This is particularly important in trying to understand the patterns of projects implemented – and how these may be changing over time as more attention is paid to CCA and the risk management component of DRRM. These two sets of categorizations were brought together, allowing us to understand what sorts of relationships exist. For example, if activities are preparedness oriented – do they also tend to be capacity building (under our climate codes)? Do general or ambiguous development activities tend to be related more to disaster response activities?

The identified projects are evaluated for their relevance to climate change (using the aforementioned CCAPS spectrum) and DRRM activities. By doing so, we will find the extent to which disaster risk management projects are motivated by climate change or vice versa, ultimately understanding the overlaps and divergence in activities. We expected that there would be some projects that were a) both climate and DRRM related, b) some that were only climate related (and not motivated by DRRM), and c) some that are only DRRM related but not motivated by climate concerns (see Figure 2). In addition, we expected that some of the projects analyzed may not have relevance to either of these concepts as we use an expanded set of activity categorizations to have the widest set of projects to analyze. In some cases, we also expected that we would be unable to climate- or disaster risk code projects due to the unavailability of project documentation – whether original planning documents, press releases, or other substantial and relevant sources of information. Many of these projects are also spatially disaggregated, allowing us to investigate the patterns (if any) of *where* DRRM and CCA funding are directed to and the extent to which such activities align with areas known to be vulnerable to climate change and disasters.

Figure 2: Explaining the Relationship Between ODA, DRRM, and Climate Change Activities



All CCA and DRRM projects are ODA funded (thus the all-encompassing circle). However, not all CCA projects are DRRM related or vice versa. For example, a renewable energy project that focused on reducing greenhouse gas emissions is coded as climate change related, but not coded as DRRM related. Similarly, a program that promotes the use of of drought-resistant seeds is, again, climate change related but not related to DRRM. However, a project that addressed flood preparedness (e.g. emergency shelters) could be considered to be both DRRM and climate change related. Lastly, efforts focused on reducing impacts from non-climate related disasters, such as earthquakes, are coded as DRRM, but not climate change related.

With the results of the aforementioned analysis, we sought to answer the following questions:

(1) To what extents are the DRRM projects examined also climate oriented? This helps us understand the underlying motivations for DRRM projects and the extent to which there are overlaps in the conceptualizations of DRRM and CCA over time.
(2) What are the significant trends in DRRM projects (with respect to preparedness, response or recovery) across time and donors?
(3) How synergistic are the projects examined with the expressed priorities and strategies of recipient governments and donors?

Bangladesh Pilot Case Study

The project team piloted the coding methodology on all project data from the top five donors in Bangladesh, one of the 11 countries under the CEPSA program. We validated findings through key stakeholder and expert interviews conducted by Dr. Krishnan in Dhaka, Bangladesh in 2016 from a range of organizations, including donor agencies and implementing partners and government officials. The project team chose Bangladesh, because it provides an excellent case study for analyzing the intersection between disaster risk management and climate change adaptation. With a long and turbulent history of natural disasters, the country has experienced over 219 natural disasters between 1980 and 2008, causing over US$16 billion in total damage.[x] Warmer temperatures are expected to exacerbate cyclones in the Bay of Bengal, while rapid snowmelt from the Himalayas is projected to result in flooding.[xi] The confluence of longer-term chronic climatic change and impacts and shorter-term acute shocks (in the form of extreme

events) highlight the extenuating circumstances that the country faces, and the need for both CCA and DRRM activities. The national government continually emphasizes these types of programs – with the government explicitly stating their intentions to holistically address disaster risk reduction through climate change adaptation activities, improving food security, and implementing proactive risk reduction efforts in their National Plan for Disaster Management.[xii]

Mapping Aid

The projects and activities were geocoded after they were arbitrated. Geonames.org's advanced search was used to find the GPS locations for the projects and activities.[xiii] Project documentation and website pages were used to find the locations for the projects and activities. Documents are not specific in that they do not always communicate *where* activities with in a project are happening, just generally where any project intervention could be. In other words, this is not a record of where every intervention in an activity is taking place but where the activities are generally taking place.

With a location name that is associated with a project or activity, coders used geonames.org to look for the coordinates of the place mentioned. If at some point, the coders were not able to find specific coordinates for that location name (e.g., a small village or town), they would go up to the next available administrative division. For example, if the village name GPS coordinates were not available, but coders were able to deduce the union or Upazila (Bangladesh specific admin divisions), then the coordinates for that location were used instead. In cases where no specific locations are mentioned and the only indication is that the money goes to the country, coders looked for Bangladesh and used the coordinates for the country (which is basically the centroid point).

The process of coding climate change documents is not scalable to other countries because of the difficulties that were encountered in finding project documentation. Only 42% of projects in our original dataset downloaded from AidData had enough project documentation to be coded. Though many donors speak of the importance of transparency, there is a big gap in what donors actually make available and how easy it is to find the documentation for their projects. As a result, our key finding was that tracking aid data for CCA and DRRM is not yet possible using existing databases. While surprising and disappointing, this provided a critical finding with respect to the current state of aid data transparency and the evidence gaps we currently have in terms of commitments versus actual aid activities on the ground.

We found that over the 2004 – 2013 period, Bangladesh received $37 billion in ODA from 47 funding organizations for 12,575 programs and projects.[xiv] Of these, we proceeded to identify the efforts that were in our categories of expanded DRRM activities (see Figure 2). These projects' activity classifications were assigned based on donors' original project documentation and are included in AidData's database. For the purposes of our analysis and because of data availability constraints, we exclusively focused on the top five donors over the 2004-2013 period. These are the World Bank Group, the Asian Development Bank, USAID, the United Kingdom's Department for International Development (DfID), and the Japanese International Cooperation Agency (JICA). These actors' contributions amount to $1.6 billion across 462 projects of the total ($2.2 billion for DRRM specifically) over the last decade or so. Roughly, 6% of the received funds went towards our expanded classification of DRRM activities.

Figure 2: Top 5 Donors for Bangladesh 2004-2013

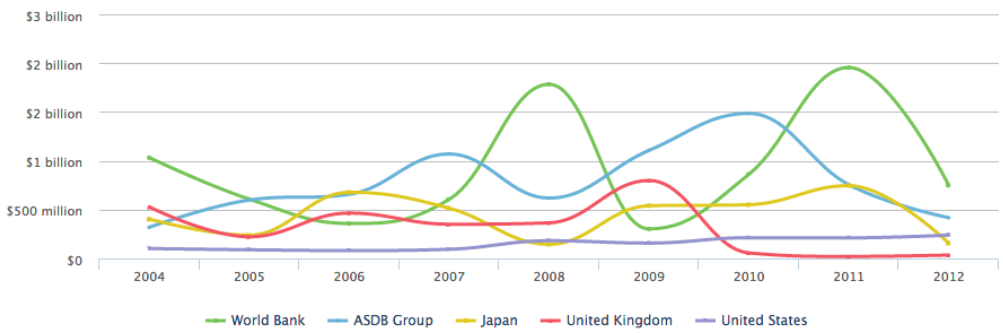


Table 2: DRRM Aid Activities in Bangladesh (2004-2013)

Categorization	GFDRR/ODI (All Donors)	CEPSA (All Donors)	CEPSA (Top 5 Donors)
Number of Projects	492	1,644	462
Amount	$825 million	$2.2 billion	$1.6 billion
Percentage of Total ODA	~2.2%	~6%	~4.3%

Even after limiting our scope of study, we discovered that the actual availability of activity-level information was very limited. In all projects for the top five donors (see Table 2), between 2004-2014, we found 335 projects in 1741 locations within Bangladesh that could actually be analyzed. This represented 42% of the 801 projects downloaded from the AidData database that we found using sector code key word search.[xv] Coders were not able to analyze 100% of the projects because of lack of documentation provided from donors. Coding was particularly difficult for JICA and DFID projects because of lack of access to project information (mainly due to broken links, missing pages, or lack of documents on the project pages in the agencies' project websites).

The original data downloaded from AidData and contained 801 projects from 2004 - 2014. Table 3 displays the number of projects that were coded per donor. This analysis does not investigate *all* projects, only projects that could be associated with climate change related activities.

Table 3: Projects coded by donor

Donor	Number coded	Total documents	Percentage coded
ADB	27	29	93%
DFID	17	99	17%
Japan	19	147	12%
USAID	181	442	40%
World Bank	83	84	99%
Total	**327**	**801**	**41%**

Overall, we found that donors are in fact paying attention to CC and DRR in their projects, and that their focus is fairly well aligned with national strategies. However, the key takeaway is that aid transparency is still insufficient for conducting more rigorous analysis. As such, the international community needs to invest in developing a standardized reporting methodology and clear expectations and rules for such reporting. In turn, donors need to use that information for enhanced coordination amongst themselves as well as interactions with national governments and civil society groups.

Part II: Assessing Donor and National Government Strategies

While international agreements on climate change remain beleaguered by high level politics, the emergence of numerous national strategy and action plans signals a growing commitment to addressing climate change and natural disaster risks in developing countries. As part of our study, we conducted an inventory and critical survey of national and donor strategies and plans around climate change adaptation (CCA) and disaster risk and reduction (DRR) management for 11 countries in the South and South-East Asian region.[xvi,xvii] The review of these plans revealed a strong consensus on the need to prioritize CCA and DRR in national development agendas and, at the same time, numerous obstacles to implementation of these strategies. These obstacles include a serious lack of technical capacity, financial resources, and political capital to put these plans into policy and practice. By identifying these challenges to operationalizing national and donor action plans, this brief aims to assist national and international policymakers in identifying

where action plans can be strengthened in ways to constructively inform national CCA and DRR programs.

This phase of our research entailed detailed follow-up to our first analysis, on the national CCA and DRR plans and their implementation in Bangladesh and Nepal. [xviii] While that study relied heavily on interviews in the field, this broader study surveyed national and donor strategies and plans for 11 countries in the South and South-East Asian region.[xix] We first reviewed each country's national plans that address climate change and disaster risk reduction. We then review for each country the top five donors' strategies who collectively account for over 75% of the development assistance funding in all of these countries. These included the Asian Development Bank (ADB), United Kingdom's Department for International Development (DFID), the Japanese International Cooperation Agency (JICA), the United States Agency for International Development (USAID), and the World Bank (WB). The review of all of these strategy documents reveals a number of obstacles to implementation, including a lack of capacity, financial resources, and political capital. Together, these two briefs provide insight into the region's relevant policies and plans, their implementation challenges, and ways forward.

Building on our findings in Bangladesh and Nepal, this study split the analysis for each country into four parts:

1. **Country Overview and Climate Change Vulnerability Assessment:** This section introduces the country's climate-related challenges, highlighting its vulnerabilities and risks. More information on our methodology for assessing vulnerability can be found in an accompanying brief.[xx]
2. **National Plans Addressing Climate Change and Disaster Risk Reduction:** This reviews existing national CCA and DRR plans, focusing on whether and how these issues are integrated with each other.
3. **Donor Community Actions:** What are the top five donors' priorities and activities in these countries? This section provides an overview of our five donors' strategies and coordination practices.
4. **Challenges in Coordination and Implementation:** Finally, we analyze government and donor challenges in implementing these reviewed plans.

Overall, we found that countries and donors in the region are highly aware of and sensitive to the climate change and disaster-related risks. As such, all countries have specific strategies that address these issues. However, our critical review of these documents, informed by our other qualitative work, identifies three main challenges to implementation. These include (1) a lack of relevant historical data to inform vulnerability assessments and strategies; (2) lack of technical capacity to formulate and fully implement and enforce CCA and DRR programs; (3) unclear ministerial mandates and responsibilities which can hinder implementation.

To understand where and how national and international CCA and DRR strategies interact, we systematically analyzed publicly available agendas and strategies published over a twelve year period from 2004 to 2016 from national governments and the five top donors in the region who are most active in CCA and DRR work: the World Bank, Asian Development Bank (ADB), United States Agency for International Development (USAID), Japanese International Cooperation Agency (JICA), and the United Kingdom Department for International

Development (DFID). These donors constitute anywhere from 40% to 87% of study countries' aid receipts, indicating that their activities may have the most influence on national government approaches. In several instances, more than one 'current' policy document exists for a theme – in these cases, all versions are reviewed. We also reviewed general economic planning documents, where available, to assess the integration or mainstreaming process (Tables 4 and 5 summarize analyzed information). In this work, our objective was to compare central goals of disparate strategies and to assess the degree to which they contained have feasible implementation plans that would enable countries to move beyond rhetoric in addressing climate change and disaster risks.

These strategy documents were analyzed along several dimensions, including the main elements of the strategies (e.g., preparedness, preparation), areas of focus, stated challenges and gaps, and ministries (or departments) in charge. These elements fundamentally shape the reach and implementation of the document. This analysis briefly highlights key elements of each country's strategy documents as well as donor DRR and CCA strategies. Further details about these documents can be found in an accompanying annotated bibliography, available online.

We selected two countries, Bangladesh and Nepal, for further exploration of their approaches and programs. Bangladesh has often been portrayed as ground zero in addressing climate change and disaster risk reduction, and analysis of its governmental and donor strategies, approaches, and activities would shed light on current practices and challenges. Similarly, Nepal faces significant CCA and DRR related challenges. The March 2015 earthquake and subsequent aftershocks also heightened the country's awareness of and need to address DRR. Over May – November 2016, we conducted semi-structured interviews with 52 representatives from key ministries, donor partners, and civil society organizations (CSOs) in Bangladesh and Nepal. The questions targeted the representatives' understandings and practice of CCA and DRR, policy formulation, and extents to which strategies and actions were coordinated and integrated into other development plans. Additionally, we explored organizational capacities to program and implement these strategies. These conversations shaped our analysis of the strategy documents – underscoring the importance of ministerial ownership and leadership and challenges posed by document proliferation.

Table 4. Number of Documents Reviewed by Topic and Country

	Climate Change	Disaster Risk Reduction	National Development Plans	Number Reviewed
Bangladesh	3[1]	3	1	7
Bhutan	1[2]	2	1	4
Cambodia	3	4	2	9
India	1	2		3
Laos	2	2	2	6
Myanmar	1	1	-	2
Nepal	1[3]	1	-	2

Pakistan	1	3	1	5
Sri Lanka	3[4]	3	-	6
Thailand	3[5]	2	-	2
Vietnam	1	2	2	5

[1] Currently formulating a National Action Plan (NAP) and updating the Bangladesh Climate Change Strategy and Action Plan (BCCSAP)
[2] Counted as one document as the second is an update on progress of the NAP
[3] Currently formulating a NAP
[4] Documents are in five year increments
[5] We could not find these documents online and thus were not able to analyze

Table 5. Analysis of Countries and Donor Strategies

Topic/Donor	Climate Change	Disaster Risk Reduction	DFID	USAID	JICA	World Bank	ADB
Bangladesh	✓	✓	✓	✓	✓	✓	✓
Bhutan	✓	✓	No operations	Has a presence, no official strategy available	✓	✓	✓
Cambodia	✓	✓	No strategies, 2 active projects	✓	✓	✓	✓
India	✓	✓	✓	✓	No strategies though there are ongoing projects	✓	✓
Laos	✓	✓	No strategies though there is 1 ongoing project	No strategies though there are ongoing projects	✓	✓	✓
Myanmar	✓	✓	✓	No strategies though there are ongoing projects	No strategies though there are ongoing	✓	✓

					projects (and 1 specifically for DRR)		
Nepal	✓	✓	✓	✓	✓	✓	✓
Pakistan	✓	✓	✓	✓	✓	✓	✓
Sri Lanka	✓	✓	No operations	✓	✓	✓	✓
Thailand	Not available online	✓	No operations	No strategies or official programming in Thailand; support regional cooperation activities	✓	No CPS exists currently. Expected sometime in 2017.	✓
Vietnam	✓	✓	✓	✓	✓	✓	✓

From our initial analysis of these strategies, we draw out three main findings.[xxi] There is little doubt that most, if not all, countries are experiencing climate-related hazards and extreme events more regularly. Some, like Nepal, India, and Bhutan, are also wary of non-climate related hazards like earthquakes. These experiences, and those of their neighbors, are raising awareness of the need for a more coordinated and strategic approach to understanding their risks, vulnerabilities, and options for preparedness and response. As a result, we observe increasing attention to crafting responses to CCA and disaster risks at a relatively high level of strategic planning.

However, three key challenges exist to turning these strategies into action plans that can be fully implemented, monitored and enforced at the national level.

1. *Lack of Inter-Ministerial and Institutional Coordination*

While these countries have passed Acts and devised plans and strategies for climate change and DRR, our analysis and qualitative interviews with subject matter experts show that it is still very difficult to implement, monitor, and evaluate these documents. Many of these strategies require a holistic rethinking of current practices and significant buy-in from departments and ministries that may not be amenable to ceding some of their regulatory or administrative powers. Several strategies reviewed have also indicated that coordination is often a challenge.

Through our interviews, we found that inter-ministerial power struggles often hamper deeper cooperation (i.e., other than in name or strategies) between government agencies and between the ministries and external donors. For example, in Bangladesh, we found that while the Ministry of Environment and Forests (MoEF) and the Ministry of Disaster Management and Relief (MoDMR) are both mandated to address climate change and disaster risk reduction issues, actual cooperation and collaboration between the two is rare. Programs are often not coordinated, with both Ministries financing or supporting similar projects. Interviewees repeatedly stated that these Ministries are protective of their "turf" – where climate change is specifically the MoEF's responsibility and DRR is the MoDMR's. Any encroachment is frowned upon – these Ministries lobbied for separate sections in the country's latest 5-year plan but were pressured to coordinate.

Likewise, in Nepal, we found that the Ministry of Home Affairs (MoHA), the current authority on disaster response, has hindered the passage of the 2009 draft strategy as it dilutes some of their power and authority to other ministries, like the Ministry of Federal Affairs and Local Development. The 1982 Calamity Relief Act covers emergency response and relief activities but does not address DRR. Representatives from the government, DPs, and CSOs all agreed that this reluctance to approve the 2009 strategy hindered a comprehensive approach to DRR in Nepal. Further, it should be noted that the Ministry of Population and Environment, the focal agency for CCA activities, is not involved in these DRR discussions and has their own program of action.

Our document analysis and interviews indicate that significantly more attention needs to be paid to the underlying power and institutional structures that dictate and shape how programs and strategies are actually implemented in practice. The documents examined indicate that in several instances, new authorities, committees, and ministries have been established to address CC and DRR issues. While this can indicate that governments are taking these issues seriously, it also burdens relatively new institutions with a significant portfolio that requires inter-ministerial coordination. The creation of specific institutions for cross-sectoral challenges like climate change could unintendedly hinder integration and implementation if these institutions do not also have the right to enforce and penalize non-compliance by other ministries. Ministries of environment, climate change, and disaster risk reduction have historically been weaker institutions, as they are often not given adequate budgets, prestige, or acknowledgement for their significant portfolios. This lack of support for these institutions, combined with the difficult task of enforcement and inter-ministerial coordination, is an issue that needs to be addressed in future CC and DRR strategies.

2. Lack of Capacity and Knowledge to Pursue Large-Scale CCA and DRR Programs.

All countries, regardless of their political status, economic growth trajectories, or income level, have formally communicated the need for greater capacity and technical knowledge – for both climate change and disaster risk reduction. All donor and country strategies have communicated the need for better data monitoring and collection systems and the technical capacity to analyze and disseminate relevant information. Building a research community that can understand the risks faced, probable impacts, and provide greater insights into solutions appears to be a priority as well. Further, all have indicated the need for building

capacity at lower levels of administration, reflecting that national strategies and action alone cannot achieve the desired changes. Electoral incentives

What exactly does this knowledge and capacity need to look like? In Bangladesh and Nepal, interviewees stressed the need for longer-term programs that integrated CC and DRR issues into government staff colleges, technical colleges, and university curricula. Interviewees cited workshops, trainings, and knowledge exchange trips as ways to improve capacity. Interestingly, donor partners and CSOs cited the need to ensure that such training recipients were asked to impart acquired knowledge to departmental colleagues upon their return. Further, while government representatives appreciated equipment and external consultant aid, these were viewed as temporary and not the kind of longer-lasting capacity building necessary. These insights indicate that knowledge and capacity building programs need to be designed as sustainable, multi-year longer-term strategies that equip administrative and technical staff with the necessary skills and knowledge.

3. Challenges in Mainstreaming (i.e. integrating) CCA and DRR

Generally, the strategies reviewed did not integrate their approaches to CCA and DRR. Many countries explicitly did not address climate change-related issues in their disaster management strategies. However, DRR was explicitly considered in CCA documents. Interestingly, most countries approached DRR in a holistic manner – i.e., they included considerations of non-climate related hazards, like epidemics, waste, and geological hazards in their plans. Integration and mainstreaming of CCA and DRR into other sectors (and into each other) remains a challenge. Several reviewed documents pointed to the difficulty in understanding how to integrate these considerations.

Limited technical resources and capacity and issue complexity prevent and challenge mainstreaming efforts. Often, the institutions charged with DRR and CCA are newer, with lesser technical, financial, and human resources to address their portfolios. These institutions are saddled with not building internal knowledge and capacity to address these issues but are simultaneously charged with assisting other sectoral line ministries on needed changes. Interviewees also cited the technical complexities in integrating related principles into other sectors. For example, how does one restructure bureaucratic practices for road and other infrastructure construction to consider climate change and disaster risk reduction principles and ensure that all government sponsored construction adopt these principles? This remained a challenge especially when even current standards are not often followed.

Conclusion

This exercise has shown that there are significant commonalities in what countries in South and South East Asia are trying to address with respect to climate change and disaster risk reduction. Countries are struggling to address climate change and disaster related challenges, in addition to promoting socio-economic development. Donor partners, for the most part, are cognizant of recipient countries' priorities and challenges. They have explicitly conducted country consultations and reviews to ensure overlap and country buy-in. This indicates some level of policy and implementation cohesion. However, donors' and country strategies emphasize similar

or complementary activities, yet none address the need for coordination across these multiple actors. This may result in duplicate or inconsistent approaches.

Our review and interviews in South Asia indicate that institutional organization and architecture, technical capacity, financial and human resources are integral to implementing these relatively comprehensive strategies. This exercise has not evaluated the implementation process or results. This would be a logical next step in understanding these Acts', plans', and strategies' strengths and weaknesses. Understanding these processes would be integral to better policy-making, implementation, and results with regards to climate change and disaster risk reduction.

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[i] Heinrich Böll Stiftung (HBF) and the Overseas Development Institute (ODI). "Climate Funds Update." https://www.climatefundsupdate.org.

[ii] Robert S. Strauss Center for International Security and Law. "Adaptation Aid." Climate Change and African Political Stability (CCAPS). https://www.strausscenter.org/ccaps/research/about-adaptation-aid.html.

[iii] Overall, recent analyses have indicated that DRRM activities are woefully under resourced, in comparison to the extent of damages caused by natural disasters. A review of the last 20 years (1991 – 2010) of ODA, leveraging the Disaster Aid Tracking database, indicates only $106.7 billion was devoted to disasters, and of that, the majority was directed at emergency response ($69.9 billion) and reconstruction and rehabilitation ($23.3 billion), with the remaining spent on preparedness. Please refer to Jan Kellet and Alice Caravani, *Financing Disaster Risk Reduction: A 20- Year Story of International Aid.* (London: Overseas Development Institute and Global Facility for Disaster Risk Reduction, September 2013).

[iv] A similar analysis undertaken by Global Humanitarian Assistance on the spending for disaster risk reduction and management (for 2000 – 2009), found that in 2009, 68% of DRRM funding came from humanitarian funds, rather than ODA. Please refer to Jan Kellet and Dan Sparks, *Disaster Risk Reduction: Spending where it should count.* (Somerset: Global Humanitarian Assistance of Development Initiatives, March 2012).

[v] William and Mary. "Aid Data." http://www.aiddata.org.

[vi] Kellet and Caravani, *Financing Disaster Risk Reduction*, www.gfdrr.org/sites/gfdrr/files/publication/Financing-DRR_Publication_0. pdf.

[vii] Kellet and Sparks, *Disaster Risk Reduction*, www.globalhumanitarianassistance.org/wp-content/uploads/2012/03/GHA-Disaster-Risk-Report. pdf.

[viii] Catherine Weaver and Nisha Krishnan, *Beyond Emergency Relief: Tracking Aid for Disaster Risk Reduction and Management*. CEPSA Brief #2. (Robert S. Strauss Center for International Security and Law, May 2016). https://www.strausscenter.org/cepsa-research-briefs.html.

[ix] Robert S. Strauss Center for International Security and Law. "Tracking Climate Adaptation Aid: CCAPS Climate Codebook." Climate Change and African Political Stability. https://strausscenter.org/codebooks/ClimateAidCodebook.pdf.

[x] *Bangladesh: Disaster Risk Reduction as Development.* (United Nations Development Programme, November 2011). http://www.undp.org/content/undp/en/home/librarypage/poverty-reduction/supporting_transformationalchange/Bangladesh-drr-casestudy-transformational-change/.

[xi] *Country Updates: GFDRR Engagement in 29 Focus Countries (2007-2012).* (Global Facility for Disaster Reduction and Recovery, October 2012). https://www.gfdrr.org/sites/default/files/publication/update-gfdrr-country-engagements-2012.pdf.

[xii] Government of the People's Republic of Bangladesh, *National Plan for Disaster Management (2010-2015).* (UNDP, April 2010). http://www.bd.undp.org/content/bangladesh/en/home/library/crisis_prevention_and_recovery/national-plan-for-disaster-management-2010-2015.html.

[xiii] "Geonames." http://www.geonames.org/.

[xiv] *Bangladesh Select Donors Geocoded Research Release. (*Aid Data, William and Mary, 2015). http://aiddata.org/research-datasets.

[xv] The following sector codes were used to focus the projects on climate related activities in the AidData database: Agriculture, Communications, Development Aid/ Food Security Assistance, Disaster Prevention and Preparedness, Emergency Response, Energy Generation and Supply|Agriculture, Energy Generation and Supply|General Environmental Protection, General Budget Support, General Environmental Protection, General Environmental Protection|Mineral resources and mining, Government and civil society, general, Government and civil society, general|Energy generation and supply, health (general), humanitarian aid, multisector, other commodity assistance, other social infrastructure and services, reconstruction relief, support to non-governmental organisations(NGOs) and government organizations, unallocated/unspecified, water supply and sanitation, women.
[xvi] Bangladesh, Bhutan, Cambodia, India, Laos, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam.
[xvii] Weaver and Krishnan, *CEPSA Brief #2*, May 2016.
[xviii] Nisha Krishnan, Caleb Rudow, and Catherine E. Weaver. *Policy Architectures for Disaster Risk Reduction and Climate Change Adaptation in South and South East Asia: Evidence from Bangladesh and Nepal.* CEPSA Brief #6. (Robert S. Strauss Center for International Security and Law, May 2017). https://www.strausscenter.org/cepsa-research-briefs?download=644:disaster-risk-reduction-and-climate-change-adaptation.
[xix] Bangladesh, Bhutan, Cambodia, India, Laos, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam.
[xx] For more information on how these vulnerability maps were created, please refer to Joshua W. Busby, Todd G. Smith, Nisha Krishnan, and Charles Wight, *Climate Security Vulnerability in Asia 1.0*. CEPSA Brief #1. (Robert S. Strauss Center for International Security and Law, May 2016). https://www.strausscenter.org/cepsa-research-briefs?download=627:climate-security-vulnerability-in-asia-1-0.
[xxi] Weaver and Krishnan, *CEPSA Brief #2*, May 2016.

Complex Emergencies Dashboard: Integrating Research on Risks and Responses
Ashley Moran, Martha Staid, Sebastian Dimunzio, Vanessa Goas, Josh Powell, Liliana Mercado, Daniel Bianco, Ionut Dobre, and Charles Wight

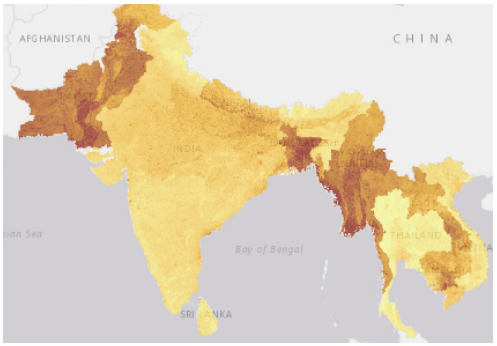
Project Purpose

The Complex Emergencies Dashboard is an open access, online mapping platform that seeks to facilitate the use of CEPSA research in policy planning and response. It includes data and modeling produced by the CEPSA program, related external datasets, and qualitative analysis to provide a data-driven framework for analyzing the convergence of security vulnerabilities and responses in Asia.

Policymakers, practitioners, and researchers must be able to quickly and intuitively use CEPSA datasets and modeling. Yet the program's diverse subtopics, research approaches, and dataset structures make leveraging the full capabilities of even a single dataset difficult. This challenge is compounded when analysts seek to combine two or more datasets. Questions like "Which datasets are compatible?," "How can datasets be linked and combined in time and space?," and "How do location fields align?" are examples of complicated questions that require detailed knowledge of the datasets to answer. The Complex Emergencies Dashboard is a data portal that solves these questions behind the scenes, allowing users to leverage all program datasets to pose their own questions and find answers.

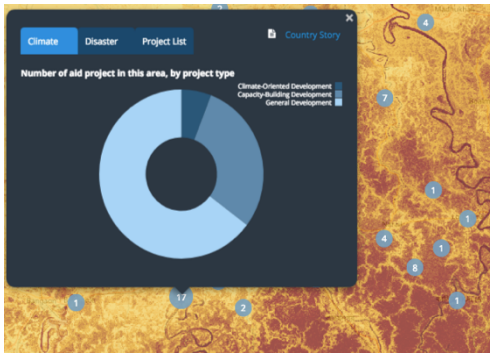
Design and Approach

1. Visualizing CEPSA and External Data. The dashboard visualizes CEPSA datasets on climate vulnerability, conflict, national disaster preparation, and international climate and disaster aid, along with related external datasets on other security concerns like food security and forced migration. This allows users to assess each of these dynamics individually and to assess the co-location of climate risks, conflict risks, other security risks related to complex emergencies, and national and international response efforts. The dashboard includes the following models and data.

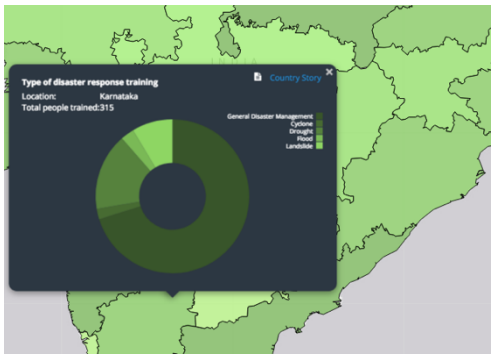


CEPSA Climate Vulnerability Modal: Users can explore the model's depiction of overall composite vulnerability, as well as its assessment of vulnerability in four core areas that contribute to this composite vulnerability: climate exposure, population density, household and community resilience, and governance and political violence. Users can also explore alternate versions of the model to assess how different conceptions of vulnerability affect our understanding of population risks.

CEPSA Conflict Data: Users can filter conflict data by event types—including battles, violence against civilians, remote violence, riots, and protests—and by actor types—including government forces, rebels, militias, foreign forces, and civilians. Users can show data by the number of events or fatalities at each location. Info-windows allow users to see conflict data in map, chart, and list formats in one screen. Data are available for all 11 countries under study from 2015 to present, updated weekly, and for some countries back to 2010, updated as available.



CEPSA Climate and Disaster Aid Data: Users can filter aid data by donor, climate focus, and disaster focus. Users can thus see where climate-oriented, capacity-building, and general development projects are located relative to climate and other security vulnerabilities. Users can also see the distribution of aid projects focused on disaster preparedness, prevention, response, and recovery and rehabilitation. Info-windows show charts on the number and type of aid projects at each location, as well as project lists with the start date, end date, and name of projects at each location.



CEPSA Disaster Response Training Data: These data track the extent of training for government officials in general disaster management and in responding to specific hazards, including cyclones, droughts, earthquakes, floods, landslides, and tsunamis. Users can filter data by training type and year to see data for each state in India. Info-windows show the number of people trained in each hazard type and in general disaster management in each state for the selected year(s).

External Data: The dashboard includes related external datasets produced by other organizations. These include data on food price volatility (Food and Agriculture Organization of the United Nations), internal displacement from disasters and conflict (Internal Displacement Monitoring Centre), forced international migration (World Bank), water and electricity infrastructure (NASA Socioeconomic Data and Applications Center, Oak Ridge National Laboratory, National Geospatial-Intelligence Agency), terrorism events (University of Maryland), and piracy (Daxecker and Prins).

ArcGIS Online Data: Importantly, users can also bring in their own or other layers by searching the ArcGIS Online database included on the tool panel. Layers that the user selects from ArcGIS Online search results will appear on the user's tool panel. The user can then show or hide each dataset on the map along with other CEPSA and external datasets provided on the dashboard.

For any of these data layers, users can select varied base maps to show terrain, streets, or administrative boundaries. On the back-end administrative module, the dashboard stores appropriate metadata about each dataset to combine and present each layer intelligently. For example, the system allows the CEPSA program to specify how each dataset will display on the map, how data in each dataset will be

aggregated over multiple years or locations (e.g. summed or averaged), which fields can be used to filter data, which fields should be used to link datasets together, and which datasets cannot be shown on the map at the same time to prevent duplication. The back-end also allows the CEPSA program to set Featured Maps that are available to users on the tool panel, which allows CEPSA to highlight key trends and program findings without restricting users' self-guided exploration of the data.

2. Comparing Data. The dashboard allows users to split the dashboard screen into two maps to show different data and years on separate maps. This Compare 2 Maps feature allows analysis of different phenomena, time periods, or datasets that are best analyzed side-by-side rather than as layers on the same map. Figure 1, for example, compares different conceptualizations of climate vulnerability—in this case comparing climate risks alone to a composite view of vulnerability that includes communities' ability to respond to those risks. Figure 2 compares conflict trends in recent years—in this case comparing incidents of violence against civilians. Other comparisons could likewise focus on CEPSA data, for example, comparing the distribution of climate-specific aid to general development aid; or they could compare CEPSA data to other data, for example, comparing the CEPSA climate vulnerability model with other indicators of vulnerability like the EM-DAT International Disasters Database.

Figure 1. Climate risks alone (top map) compared to climate, population, household, and governance risks combined (bottom map)

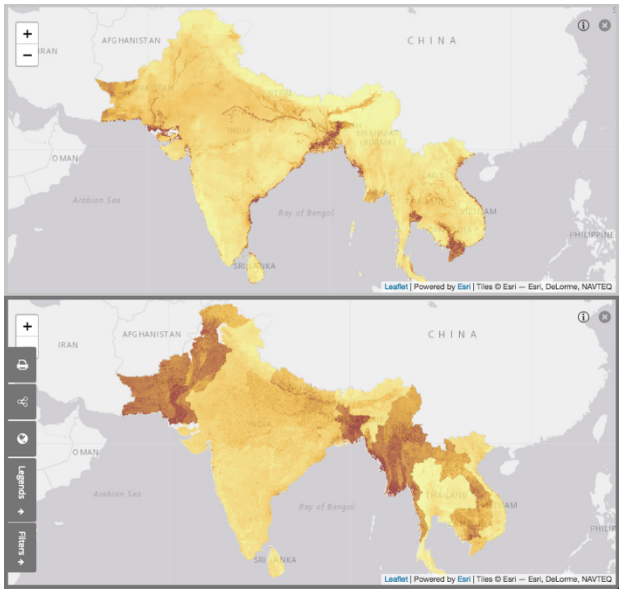
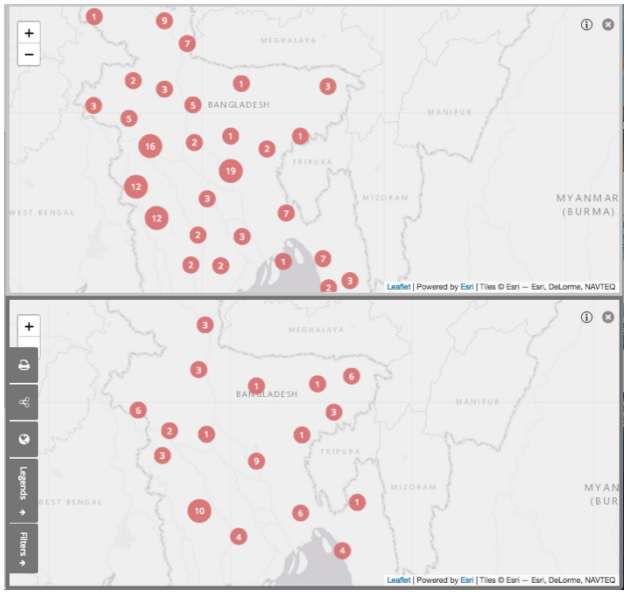


Figure 2. Violence against civilians declined in Bangladesh from 2016 (top map) to 2017 (bottom map)



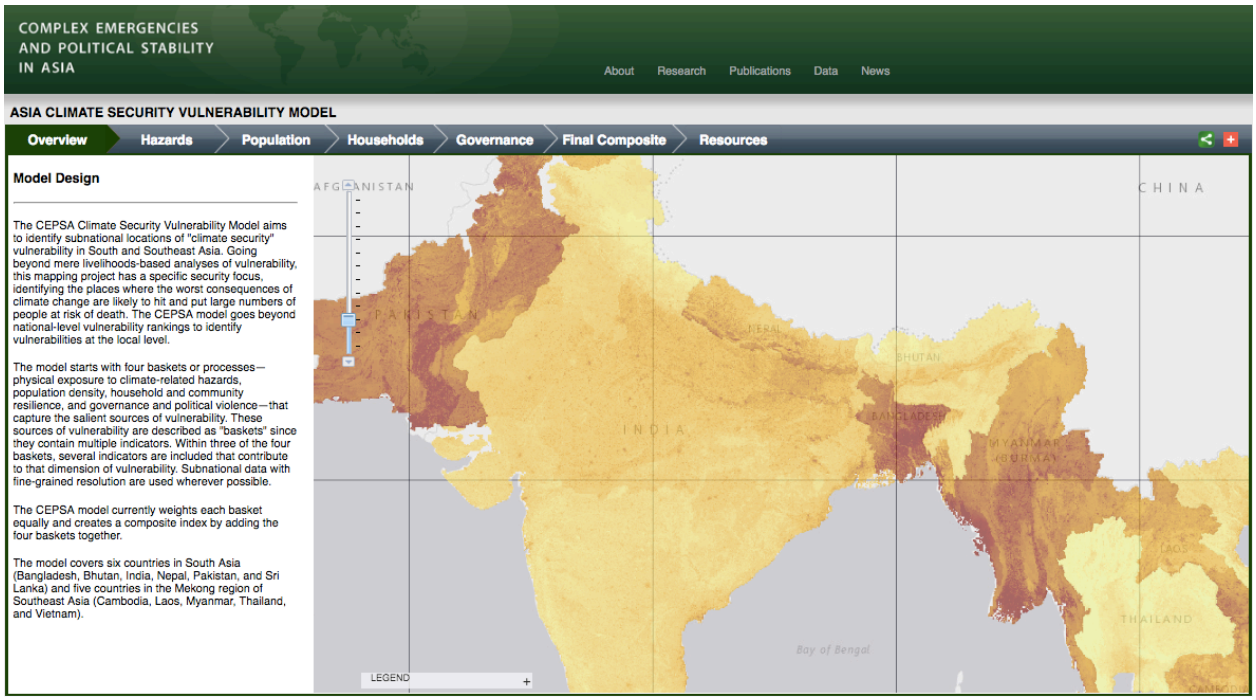
3. Analyzing Context. The dashboard allows users to switch to a Country Story panel that provides contextual information on the climate, conflict, disaster, governance, regional, and international aid challenges each country faces. The Country Story explains mapped data, charts quantitative CEPSA data, summarizes qualitative CEPSA research in these areas, and links to CEPSA publications on the selected country (see Figure 3). This allows users to assess the spatial, temporal, *and* contextual dimensions of each CEPSA dataset *and* to engage with the program's qualitative research. The Country Story is also an important part of the dashboard's effort to have users move easily between regional, national, and subnational analysis.

Figure 3. Excerpt of India Country Story

4. Exporting Data and Maps. Users can export CEPSA data shown on the dashboard, and they can also print the maps they create or share them through social media and email. With this, the program seeks to make its data as widely accessible as possible.

5. Mapping Stories. In addition to the integrated, user-driven Complex Emergencies Dashboard described above, CEPSA also developed a separate platform that allows us to prefilter the data to tell a story with a series of maps. What we call the "tabbed dashboard" allows us to show prefiltered data on each tab, accompanied by text, to walk users through a particular model or a particular trend in the data. Figure 4, for example, shows a tabbed dashboard that lets users click through the grey tabs across the top to see text and maps that explain each component of the CEPSA climate vulnerability model and how they are combined to create a composite view of climate vulnerability.

Figure 4. Tabbed dashboard on CEPSA climate vulnerability model



Conclusions

The Complex Emergencies Dashboard plays a key role in the program's effort to integrate and present its various lines of research in ways that are of greatest use to policy, practitioner, and research audiences. Making the program's various data and research available in one platform has sought to:

- Provide policymakers with an interactive tool to visualize trends in climate vulnerability, conflict, other security risks related to complex emergencies, and national and international responses in these parts of Asia;
- Allow analysts to explore how various insecurities converge to impact vulnerability in Asia, and simultaneously access qualitative research that assesses where and how these insecurities could develop into complex emergencies;
- Support analysts in asking and answering questions that cut across disciplinary borders; and
- Ensure CEPSA research and data are available to interested parties in a range of formats.

Exploring State Vulnerability and Climate Change
Climate Vulnerability and Governance

Paula Newberg and Jason Cons
University of Texas at Austin

1. Executive summary

Our project focused on three elements of governance in south Asia's encounter with climate change: development-related planning in Bangladesh; policy-related planning in Pakistan; and relationships among multi-disciplinary approaches to studying climate vulnerability across the region, with a focus on south Asia's coastal cities. The project produced three research briefs.

2. Introduction and Project Purpose

Among the challenges posing the greatest uncertainty for south Asia are the twinned problems of climate change and governance. Given the size of the region's growing population, the combined stresses of heat, changing monsoon patterns and accelerating glacial melting, aridity in some areas and flooding in others, and the glaring and immediate public health consequences of these phenomena, it is clear that the region's climate has already had a profound impact on the lives and futures of its people. At the same time, the political economies of the states in the region, as well as relations between and among these states, continue to raise important questions about the capacity of the region to withstand existing climate-related strains and plan effectively for the future. These factors underscore the rationale behind our examining the relationships between climate vulnerability and governance, and even more broadly, between multi-faceted vulnerabilities in the region and multi-dimensional governance vulnerabilities at several levels of governing.

Scholarly and policy literatures on climate change in south Asia have generally taken as their contexts the joined concepts of vulnerability, resilience, adaptation and mitigation, seeking to identify core problems and potential policy-related solutions to the complicated calculus of climate change, with governance as potentially interesting but often understudied problem. We chose to focus specifically on vulnerability for several reasons: first resilience, adaptation and mitigation all rely on assumed concepts of vulnerability that are often unarticulated; second, the meanings of vulnerability often differ profoundly in the economic, political, social and climate arenas; and third and perhaps most important, because the states that we chose to highlight are themselves often described as fragile or vulnerable (climate questions notwithstanding), are often hampered in critical arenas by unwieldy and/or ineffective governing practices, and therefore come to the climate arena already burdened with considerable uncertainties.

Equally important, much of the literature on south Asia's encounter with climate change looks at the region as a whole. We chose to narrow this focus by looking specifically at the contrasting experiences of Pakistan and Bangladesh, on the one hand, and on the other, to broaden our purview by looking at the region through the shared experiences of its coastal urban areas. These coastal cities are critical to the economies of the region and join them to the global

economy in intricate and important ways. By virtue of their vast populations and seaside locations, they also underscore the fragile relationships between natural and man-made environments. These, in turn, shape not only the challenges of governance but also local capacities to bring the tools of governing to problems that are at once local, national and regional.

These three foci allowed us to look at governance in three different ways: as phenomena that contribute to the region's ongoing state-building, as phenomena that reflect the development of communities (at times joined to the national enterprise and at times divorced from it), and as phenomena that are intrinsic to regional and global climate-related enterprises. Each of our three research briefs highlight different aspects of similar problematics: governance philosophies and practices are both causes and consequences of climate change in south Asia, and climate vulnerability can be seen less as an effect of climate change and more as a contributing factor toward the instability and security of the region as a whole.

3. Country case studies: Bangladesh and Pakistan
   Research Brief: *Bangladesh's Resilience Plan (Cons)*
   Research Brief: *Governance as Vulnerability: Preliminary Lessons from Pakistan (Newberg)*

3A. Case study rationale: Bangladesh

In recent years, Bangladesh has emerged as an epicenter of climate change programming. This is due, in part, to the fact that the country, and especially its southern delta region, are especially vulnerable to a range of projected and unfolding effects of planetary warming. But it is also due to Bangladesh's historical position in the broader universe of development programming. Since its independence from Pakistan in 1971 and, particularly, since the famine that followed quickly on the Liberation War's heels, the country has been locus of international development programming and experimentation. Thus, Bangladesh's history and possible future are markedly conditioning the ways that the country is understood in the present. Bangladesh increasingly is recognized as a "canary in the climate coal mine," and increasing amounts of international aid are flowing into the country to address potentially catastrophic environmental change. This research inquired into, on the one hand, the ways that development organizations understand climate interventions within the country and, on the other hand, how those understandings do or do not map to governmental understandings of climate change.

Parallel to the explosion of climate-oriented development planning in Bangladesh has been a renewed academic interest in the development arena within the country. But the bulk of new research on climate change tends to inquire into specific adaptation strategies, specific projects, and the structural organization of specific agencies. Little work, as yet, has tried to understand the overarching logics of climate-oriented development programming within the country or assessed the ways that it maps to stated national development goals, such as the Vision 2021 plan for Bangladesh to achieve middle income status by the fiftieth year of its independence. This project sought to fill that gap.

3B. Case study rationale: Pakistan

Unlike Bangladesh, Pakistan remains a reticent actor in the climate arena. The passage of Pakistan's National Climate Change Policy in 2012 after many years of negotiation -- one of only a few efforts to cooperate with the international community on climate planning -- was an important step in the government's efforts to acknowledge the country's climate fragility and the complex efforts that will be needed to move toward a more confident and stable climate future. As its preface clearly states, "Pakistan is among the countries most vulnerable to climate change and it has very low technical and financial capacity to adapt to its adverse impact" – a message echoed by former Prime Minister Mian Nawaz Sharif at the Paris climate summit at the end of 2015. The 2013 National Disaster Risk Reduction Policy is more specific, citing Pakistan's "geo-physical conditions, climatic extremes and high degrees of exposure and vulnerability." The reluctance of the Government of Pakistan to take on the threats that climate change poses to the entire state can be credited to many factors, including preoccupations with regional security, political instability, frequent changes in governance structure, an incapacity to rise above some of the inheritances from its colonial past and entrenched political habits that continue to reinforce privileges for the few while ignoring the needs of the many.

Pakistan's governance vulnerabilities-- divisive politics combined with poorly defined and weakly implemented policies -- are shaped by the state's traditional security-orientation, the corrosive effects of political corruption on its diverse habitats, the ignored effects of poverty on the political economy, and the state's weak capacity to prepare for and respond to disasters. The state's disinclination to face the consequences of slow and incomplete climate change prevention and response is likely to compromise both its climate future and its overall governance capacities.

3C. Approaches and methods

Paula Newberg and Jason Cons have both lived and worked in the region for many years, have conducted field work in the areas that were most important to this study, and brought that experience to this project.

The methodology for this work was primarily qualitative, although approached differently by the two authors. The Bangladesh component included a review of grey literature and policy working papers, as well as semi-structured interviews with actors in the development arena in Bangladesh (conducted over two visits to the capital city, Dhaka, in 2015 and one visit to Kolkata, India also in 2015). The Pakistan component included private interviews and public discussions members of the policy communities at many levels of government, non-governmental and international organizations in Pakistan, and programmatic discussions with research universities.

3D. Findings: Bangladesh

The results of this research are provisional, particular given the rapidly shifting and fluid terrain of development and climate change in Bangladesh. Yet, several early stage conclusions can be drawn.

First, the policy language for terminology around climate change is highly ambiguous. In some arenas, there is significant and broad agreement over what programs should be pursued. For example, a suite of programs in Disaster Risk Reduction are working to establish things like village preparedness councils, embankment repair and reinforcement programs, and to construct cyclone shelters in coastal areas. However, there is little consensus around terms such as "adaptation" and, especially, "resilience" that are central to the overarching logic of most climate oriented development programming in the country at the moment. This creates a policy and programming arena where there appears, *prima facie*, to be a tremendous amount of consensus about the nature of the problem and the ways to tackle it. In practice, terms like "resilience" and "resilience thinking" lead to a broad and often contradictory set of approaches on the ground.

Broad patterns of programming seem to be emerging. On the one hand, many new resilience programs are focused on developing technological solutions to changing ecological circumstances. These include increased focus on developing and marketing climate-smart and saline-resistant seeds (primarily for rice, wheat, and vegetable varietals), new agricultural technologies such as tube-agriculture and multi-use fish ponds, and new architecture and building strategies so that households can weather periodic flooding and cyclonic events. These might be broadly categorized as strategies to stem climate-induced migration.

On the other hand, an increasingly large number of development organizations are focused on managing future migration in an orderly fashion. This fits into a vision of economic development within the country focused on the expansion of export oriented manufacturing, particularly in the ready-made garment sector. This type of development programing is focused, on the one hand, on job retraining and, on the other, on ways to address the infrastructural challenges associated with increasing migration into urban areas (especially Dhaka, Khulna, and Chittagong).

Second, and related to the trend towards managing in-migration to urban areas, at a governmental level there is an increasing focus on addressing climate change through what might be thought of as a "sustainable development" business as usual strategy. Government programs, financed through the government's Climate Change Funds and through programs put in place through particular ministries (often in collaboration with international development organizations), tend to imagine a solution to climate change through already articulated development goals. These involve addressing climate change through strengthening the export sector, including the development of deep-water ports in Chittagong, increasing industrial capacities and expanding export processing zones in the Sundarbans region (especially in and around Mongla port), attracting new foreign direct investment in the garment sector, expanding labor migration programs to Gulf states, and more. These plans rearticulate the stated objectives of the major climate change planning documents within the country. It is unclear whether such programs will mitigate or exacerbate projected effects of global warming in the region.

Third, there is broad acknowledgement that there is a need to think beyond what geographers refer to as the "nation-state as container" logic which dominates much development and policy planning in India and Bangladesh and to reconceive the problems of climate change as fundamentally regional. But, despite this, there are tremendous and possibly insurmountable challenges to developing cross-border climate change agendas. These are notable in the broad disjuncture between planning and vision documents for the Sundarbans Delta Plan (developed by IUCN in Bangladesh and WWF in West Bengal). Whereas the India plan recommends bold projects of re-zoning and depopulating the Sundarbans region, the Bangladesh plan suggests knowledge generation and building strategic partnerships. These disjunctures are, in some ways, related to the fact that India is able to conceive of large-scale population transfer out of ecologically sensitive areas in the Bengal delta. In Bangladesh, with a population 165 million, there are few options for such large-scale transfers. But they also speak to fundamentally different agendas and priorities for ecological management of the delta zone. The possibility for developing robust cross-border strategies is further complicated by increasing friction between the Bangladesh government and the Modi administration in India, which is currently manifesting in an increase in tension and violence along the India-Bangladesh border.

3E. Findings: Pakistan

The confluence of two imperative challenges -- governing the state well and governing constructively to tackle climate change -- presents a double challenge to Pakistan, where unstable governance has been the byword for most of its independent life. It also underscores the fact of climate change as a complex emergency in which competing government priorities create conflicting policy narratives. The burdens of the past, however, range more deeply than simple distraction or habit. Climate *insecurity* is fundamentally (although not exclusively) the legacy of Pakistan's security-oriented state; climate *vulnerability* is a legacy of its bureaucratic state -- a colonial inheritance that has deepened in the seventy years of independence. Added to this is a profound *vulnerability in policy* in these arenas.

The security-oriented state assumes a logic of governing that is often directed toward countering (and often creating) domestic and foreign threats that reinforce military primacy across the polity and the economy. As a result, patronage and power combine -- albeit often indirectly -- to frame the state to challenge constitutional precepts, participatory politics and economic opportunity. Resources for encountering climate vulnerabilities are limited by the press of other commitments, as well as a studied indifference to the profound effects of changing climate on those with the fewest personal and financial resources to combat them. A politics rooted in past practices limits the spheres of governance where the most attention is needed -- taxation and financial management, conservation and poverty alleviation. For some, therefore, the challenge of climate change is to locate it on the familiar agendas of national security; for others, confronting climate vulnerability means relocating the conditions under which conflicts about power and authority are waged -- that is, repairing vulnerabilities by repairing the nature of the state itself. This process has itself been challenged by recent policies of decentralization that have replicated central institutions at the provincial level without executing any mechanisms to join them in the face of common problems.

Pakistan's bureaucratic state not only fits within the national security state in its agendas, but privileges expedience rather than principle, reinforces patronage politics, and is structured to fit familiar policy agendas rather than confront the holistic challenge that climate change brings to the state. This, in turn, means that the limited laws and policies dealing with climate are made to fit into old policy categories which, in the experience of those working within them, are unequal to the challenges of climate change to the state itself. The result is deeply practiced fragmentation within the security-bureaucratic state in its interpretation of climate vulnerability: the state structures its response to vulnerability, and becomes a part of that vulnerability. Consequently, the policy arena is limited, and reduced in a sense to an abstract notion of climate adaptation that focuses on discrete measures that fit fragmented politics rather than fixes them. This, too, is self-reifying and self-limiting: Pakistan's 2012 policy sees the country's climate environment and threats as a problem to be encountered, but not to be solved. As a result, climate policy elides the fundamental problems of governance in Pakistan, and this relative vacuum weakens the foundation for future governance as well.

4. Regional case: Coastal south Asia, urban south Asia (Paula Newberg)
Research Brief: *Climate Vulnerability in South Asia's Coastal Cities (Newberg and Tabory)*

4A. Regional case study rationale

The vulnerability of South Asia's coastal cities to climate change is already evident and is anticipated to be broad and deep. As such, it challenges the capacities of cities to manage and plan their ecological, social, administrative and political futures, and the capacities of their home states to organize revenues, expenditures and policies to face inevitable problems of political choice and political economies. Home to tens of millions of residents and growing exponentially – the six largest cities in Bangladesh, India and Pakistan have a combined population of more than 73 million – many of these coastal cities are larger than countries and are at once global and local, encompass trading centers and peri-urban locales, and often, are both the source and receivers for migrants. They are situated along rising seas, exposed to changing monsoons and shortages of potable water, their sources of food for their increasing populations are potentially compromised, and by extension, limits to the effectiveness of their governance. Rapid population growth and expanding urban footprints are also challenging their capacities to regulate (and with time, limit) energy consumption, while at the same time radically altering the landscape of their environments. The resource availability of the region's urban areas is already constrained, and their many models of urban growth and social and political development add pressure across the entire spectrum of urban sustainability, financial resilience and governance.

The governance capacities of these coastal cities are closely tied to national policy choices about state security, environmental wellbeing, and their links to climate security. Each of these policy arenas is additionally tested by the stresses of changing climates in ways that may permanently alter the political economy of coastal states that are already home to more than 1.7 billion residents. The region's coastal cities are often managed by a combination of state and local mechanisms, as well as formal and informal social and political systems that – while often reflecting imagination and resilience, whether planned or spontaneous – can both support and undercut the basic needs of governance, reshape the capacity to govern well (and sometimes, at all), provide the foundation for fiscal security, and exacerbate and/or reinforce inequalities and inequities. These factors raise

general questions about the capacities and durability of south Asia's coastal cities and their relationships to the states in which they live. They also raise specific questions about the nature of vulnerability and prospects for adaptation for the region's people and states, and for their relationships with one another.

4B. Approach and methods

To explore these issues, we convened a group of social scientists from across south Asia to discuss two related phenomena to analyze climate and governance vulnerabilities through a multi-pronged agenda comprising urban ecology planning, finance and politics, on the one hand, and habitat hazards, environmental vulnerability and adaptive capacity on the other.[i] The diversity of approaches favored by members of this group was purposeful: urbanists began with the city as society and urban planners with the city as a physical and political entity; ecologists and climate specialists started with habitat and habitat history; economists with the city's place in the state's financial life, and political scientists and policy experts with the ways that politics and policies reflected and changed interactions of power and authority in the face of climate change.

The agenda reflected the previously identified priorities of the *Climate Vulnerability and Governance* project: the nature of vulnerability, relationships between governance and inequality, and the intersecting ambits of the city and the state across the region.

4C. Findings

South Asia, a region more often characterized by competition and conflict than by cooperation, provides an interesting context for coastal urban climate vulnerability. On the one hand, they share their locations in fragile locations, but are also competitors in the businesses of regional maritime security and global trade. These regional and global sensibilities frame common but diverse (and often fraught) experiences dealing with extreme heat; water scarcity, sharing and flooding; land management; poverty and housing; economic and political inequity and inequality; and urban laboratories for confronting crowding, corruption and coastal fragilities. The intersections of natural and human-induced fragilities combine to create a multitude of vulnerabilities that climate change only exacerbates. Their varying capacities to handle local civic disputes and national conflict -- which differ within the region's states and among them -- reflect a combination of old and new vulnerabilities. In effect, coastal climate change is a critical context for future urban vulnerability, but other climate-related vulnerabilities add layers of complexity.

The centrality of land and water to the future of these cities (many of them megacities) is closely linked to spatial distribution: what counts as an urban area and an urban resident continues to change not only in the face of changing ecologies, but also in terms of local and national regulation and (closely related) tolerance for corruption. Informalities, in particular, colors the nature of governance across the region, and particularly in its urban centers: these are both physical and political conditions that combine to create new -- and often deeply contested -- governance patterns and at the same time, conspire in the short term to exacerbate class divides, pressures on land and water, and in the longer term, to threaten food security and health. In effect, the combination of climate vulnerabilities with the deep vulnerabilities of coastal urban environments establishes new

and wide-ranging pressures on existing governance vulnerabilities that move beyond the city to the state and the region.

In particular, climate contextual economic and political informality weakens the bonds of citizenship and the political economy of cities, undercuts the viability of the urban unit (while creating new pressures on urban-rural relationships), and strains the rule of law. While these phenomena differ from state to state and city to city, they share patterns of stress and uncertainty. At the same time, they provide contexts for structural and infrastructural violence -- particularly with regard to the poor and weakly-enfranchised -- that create new vulnerabilities for climate-stressed urban environments. These are already apparent in some coastal cities: floods are at the center of national conflict in Dhaka, ethnic and class contests have long created the fault-lines for conflict over water and sea access in Karachi.

As structural vulnerability meets climate vulnerability, the capacity to adapt is further limited. Whether they are views as characteristics of development or of political processes, they highlight the incremental failures of the state to govern equitably and with respect for future consequences. The region's deep inadequacies in confronting climate change are grounded, literally, in the cumulative, slow onset conditions of urban governance. The results may increase poverty, shortages of water and food, degraded infrastructure, class and political tensions, or outright conflict between the city and the state -- whether in the region's democracies or its fragile states. They may also increase the depth and breadth of climate vulnerability, and thus the stability of the state and the region.

These conditions have already raised questions about the capacities of the region to anticipate, plan for and cope with massive migration. Whether its coastal cities become the source or the destination for climate migrants, it is clear that the combination of sea level rises, inundation and salinization, flood and droughts, as well as population growth and land shortages are likely to alter profoundly the capacity to mitigate disaster. While a region-wide effort to anticipate these problems would be ideal, historically tense relationships across south Asia have, thus far, argued against cooperation, even in these spheres. Even if the onset of disaster is slow, the region is ill-prepared to confront it, or the almost inevitable diminution of governance and rights protections could well color local, national and regional politics. In this sense, the climate vulnerability of south Asia's coastal cities is literally the complex vulnerability of its urban governance.

[i] This workshop was spearheaded and organized through the CEPSA project, with active underwriting and collaboration from the Center for International and Regional Studies at Georgetown University/Qatar, and additional financial support from University of Texas endowments. Participants came from Bangladesh, India, Pakistan, Bhutan, Canada, the United Kingdom, and the United States.

Data Collection and Analysis of Conflict and 'Disorder' across Asian States

Clionadh Raleigh

Executive Summary

The Armed Conflict Location & Event Data Project (ACLED) collected over 75,000 events on political violence and protest across South and Southeast Asia as part of the CEPSA grant. Through the CEPSA project, ACLED expanded into South and Southeast Asia from August 2013, becoming a thriving program providing data and analysis for public consumption. ACLED has also produced several reports on the patterns of conflict across South Asian states, detailing how disorder manifests in this region and distinguishing the patterns from other developing contexts. In detail, South and Southeast Asia has a far higher rate of small protests and riots compared to any other developing context, but the region is home to a diverse set of security challenges.

Introduction

This report summarizes the work undertaken by the ACLED team and Prof. Clionadh Raleigh under the CEPSA project. From August 2013 through 2017, the team produced disaggregated data for the South and Southeast Asian regions for varying time periods between 2010 and into real time. These data are then used for in depth analysis on the political violence and protest trends across the region.

Project purpose and findings

This purpose of this project was to design of a system of ongoing data collection that could be used for several purposes, including identifying and testing complex emergencies cases. The concept of complex emergencies is a popular frame within which to understand conflict across South Asia. Here, population growth, poverty, urbanization, inequality, and sectarian tensions overlap. Further, conflict fault lines arising from ideological, religious, social and livelihood issues are active, and can intersect in periods of political competition. But most obviously, South Asia – and especially India and Bangladesh – are sites of active protest and rioting as the population seeks to redress most grievances through demonstrations.

The literature on demonstrations has actively cultivated an Indian perspective, and looked to explanations of institutions and government interests (see Wilkinson, 2004)[i] to understand how elites use elections and election positioning to cultivate support through riots. In contrast, Varsney (2003)[ii] observed communal rioting for ten years to determine how increases in Muslim targeting are designed to organize Hindus around a new political ideology that would benefit these wealthy peasants. Both Wilkenson and Varshney used event data for their studies of India violence and two aspects of their studies are notable:

1. Both regard rioting as the main form of violence in India that demanded further study;

2. Both chose to limit their areas of concentration (in Wilkenson's case) or their sourcing (in Varshey's case) because the amount of information is extreme.

In reference to the second issue, this is largely due to the immense and often insurmountable number of source materials for India in particular, coupled with the enormous number of reported protests and riots. The sheer volume of sources and repetition in South Asia necessitates choices for any coding organization. Limitations on the scope of study can be justified – as they were in both Wilkinson's and Varshey's cases – as being representative of the larger whole, or an appropriate sampling of the Indian political context they were eager to examine. But for India, the drawback involving the volume of information is an important one. The choices in area and reason underscore two potentially common mistakes: suggesting that urban and communal activity is the most prevalent and the most intense form of rioting or political violence activity. However, based on the ACLED strategy of capturing the population of reported riots, protests and acts of political violence, both assumptions are not true. Indeed, the vast majority of protests appear to be motivated by small political issues, and continue throughout the year and across years.

There are particular distinctions in South Asian protests that make their study particularly difficult. These include the common practice of 'hire a crowd' actions where business people, elites and even members of the government pay members of the public to protest. It is largely impossible to discern the difference between hired crowds and those who – of their own volition – have chosen to express a legitimate grievance. The public motivation, size, intensity and location are very similar for 'paid protests' and the vast quantities of 'legitimate' small protests.

Finally, and somewhat surprisingly, is that these demonstrations are both highly localized, and whether engineered or genuine, seem to have little impact on policy. If any impact is noted, it is also highly localized. Typical South Asia protests are not 'protest movements' in any sense. They are designed for, and function towards, changing policy, reputation, public sentiment, etc. towards a specific and often limited local end. None of these movements have impacts on any politics outside the local level.

This leads to a consideration of the first accepted fact regarding Indian (and other contexts in South Asia). Rioting – apart from peaceful demonstrations – is the most common form of intra-communal, cross-communal organized violent activity. There are a significant number of riots across India (ACLED records their activity as 9% of total actions and 12% of all demonstrations). India has been home to several episodes of state wide rioting that have taken on a sectarian dimension, but the vast majority of riots are ways in which specific groups (often political parties, student organizations, business organization, etc.) interact with the government over a policy that has raised tensions. The vast majority of attention has been on election and sectarian conflicts, while there is no study of the other factors that give rise to rioting behavior. ACLED, through CEPSA, has produced an in-depth review of South Asia data and can confirm that these events

occur regularly in and outside of election and sectarian contexts. Further, the focus on urban issues, sectarian issues or other common tropes tends to obscure other, critical political issues that lead to significant protests and violence across India. These include: class and caste system based abuse, land rights, poverty, local corruption, crime, poor response of security sector to crime, development and other local issues.

Finally, the focus on protests and riots may be warranted in the South Asian cases where there are significantly different levels of both compared to other conflict contexts. Regularly, 80% of real time conflict and protest events collected in India and Bangladesh are categorized as rioting and protesting. But there are also significant levels of ongoing fatal violence, especially as various ideologically-based armed, organized groups engaged with police forces (e.g. Naxalites) or assassinate civilians for possible engagement and collaboration with the police. Finally, party militias pose a significant violent problem in any democratizing or unstable context (Raleigh, 2016). Armed violence by a variety of different types of groups occurs in Pakistan, Myanmar, the Philippines, etc. where the focus is often on the domestic politics of states. In particular circumstances, such as the Rohingya crisis and refugee flow and its impact on Bangladesh, a concentration on the complex emergency aspect would be a novel interpretation of the overlapping risks.

To summarize: much of the previous studies on conflict in South Asia are characterized by a narrow focus which reinforces stereotypes about the organized actions and risks facing citizens and states. However, a wide range of conflict, coupled with multiple security and non-security issues, face populations living in states controlled by governments with different abilities to adapt and mitigate them. Without a clear interpretation of the central complex risk – conflict – it has been largely impossible to assess the risks to subnational populations, and the trajectories of those risks. However, South Asia has a number of characteristics that has made conflict and protest collection challenging, including high media source content of variable reliability, but variable quality data from in country organizations (low in India, high in Thailand, Myanmar and Philippines). This has clear implications for the design of the data collection for South Asia and the following analysis.

See attached dashboards of all Asia and individual Asian States

Study Design and Methodology

ACLED designed a methodology that was originally used for African conflict and intermittent protests. This methodology is designed to collect all reported acts of political violence and protest. A premium is placed on local sources, although most of the historical data is based on media sources and/or groups located at the national level within states. A standardized system of coding allows for cross country, cross time and cross event comparisons. That is especially important as ACLED expanded into Asia after concentrating on Africa for six years. As a result of the ACLED Africa system, there is a hierarchy of collection foci including activities between or by armed,

organized active groups (on the state, each other or citizens), security services, communal groups and riots and protesters. This corresponds to the distribution of events as is typical across an active Africa state, but differs in the South Asian context.

There are several areas that require a reconfiguration from typical practice:

Sourcing: Contrary to typical sourcing experiences, the South Asian context returns repeated references to small and large events well above the typical number common in other developing contexts. This is a function of a robust media environment whereby localities have specific media sources, and their events are repeated in state media, regional media and often national media. However, given the size of India, there are three reporting environments: North, East and South/Central that require distinct coders and media sources in part because the coverage returns for sources is so high.

In other contexts, like Bangladesh and Pakistan, the sourcing issue is pronounced for riots and protests, but less for acts of armed organized violence. These acts are clustered in particular areas, but can also flare up in urban areas where there reporting is clustered for violent events.

In other areas – including Myanmar – there are key sources with limited similar reporting (as in a number of events come from distinct sources, rather than many sources reporting the same event as in much of South Asia). The sourcing environment for each case differs substantially and all coding has to be adapted to it. This is separate from issues of bias, which are addressed by the coding researchers separately.

In many of the new expansion countries, ACLED did seek local partners. However, a key partner expected for the subcontinent had inconsistent coding practices of violence depending on the groups involved, and did not collect information on protests or riots. The work was therefore more straightforward to do using ACLED practices and checks.

How many source hits do we get for each sub-region of India each week? And how many events come from those sources?

J&K: 974: 52
North India: 1,747: 118
East India: 789: 26
South India: 1,427: 92

Note: The numbers above are from one week (Feb 04 – Feb 10). Those sourced directly from websites or supplemental sources are not included.

What is the average weekly number of events by country for the South Asian and SE Asian states?

India: 242
Pakistan: 92

Afghanistan: 145
Sri Lanka: 7
Bangladesh: 19
Nepal: 12
Myanmar: 12
Thailand: 5
Laos: 1
Vietnam: 2
Cambodia: 4
Indonesia: 2
Philippines: 30

How many different sources are people actively using?
Total: 151

India: 26 (source list)
Pakistan: 19 (source list)
Afghanistan: 24 (source list)
Sri Lanka: 16 (source list)
Bangladesh: 6 (source list)
Nepal: 9 (source list)
Myanmar: 6 (source list)
Thailand: 3 (source list)
Laos: 8 (source list)
Vietnam: 5 (source list)
Cambodia: 2 (source list)
Indonesia: 6 (source list)
Philippines: 21 (source list)

Terminology and documentation: As noted above, we use the same definition for all events, but a key difference in the South Asian data are the use of terms referring to official castes, or commonly used names in South Asia. Their use reflects the environment of risk and conflict.

Please see extensive documentation of the ACLED coding practices at acleddata.com/methodology, including codebooks and specific definitions.

Analysis

The South and South East Asian expansion plan was designed to capture the political violence by armed groups and the police, concentrating on the areas of complex action. Pakistan, India and Myanmar are the states with the most active 'conflict environments' and require consistent attention to the emergence of new groups, the actions of the security sector, and the relationships formed between the government, security sector and armed, local groups. These actions have severe impacts on the stability of lives, livelihoods and the trust in national institutions.

Of the data collection, there are clear variations in the magnitude of conflict summarized by Dashboard 1 and in individual country dashboards attached to this report. In addition, 43 analysis reports on individual states are attached here. Each report discusses a regional or country specific issue/country. These include (but are not limited to):

- ISIS activity in Bangladesh;
- the large-scale protests by the Dalit caste occurring in India;
- an overview of data collected from the disputed territory of Jammu and Kashmir;
- electoral violence in West Bengal and Bangladesh;
- targeting of religious minorities in Pakistan;
- a focus on Pakistan's most violent spaces;
- the rise of conservatism in India;
- Myanmar's tenuous peace with rebel groups;
- Thailand's conflict environment from 2010-2015;
- large scale attacks on civilians;
- protests on issues surrounding the quality of life in Cambodia and Vietnam;
- a review of violent groups who target civilians, as opposed to military targets;
- Operation Zarb-e-Azb; and
- land conflicts in India.

[i] Steven Wilkinson, Votes and Violence: Electoral Competition and Ethnic Riots in India. Cambridge and New York: Cambridge University.

[ii] Ashutosh Varshney, Ethnic Conflict and Civic Life: Hindus and Muslims in India. Yale University Press.

Conclusions and Future Research Directions

The CCAPS and CEPSA project were both composed of multiple strands of work, including hot spot mapping, conflict coding, aid coding, natural disaster preparedness, and dashboard development. Each program had some specific dimensions, with some work in CCAPS on urban vulnerability and constitutional design and CEPSA incorporated the lens of complex emergencies and a wider examination of governance.

Perhaps the most significant difference was the scale of support and shorter-time frame for CEPSA, though CEPSA was extended a bit beyond its initial three-year mandate (true also of CCAPS which ultimately lasted a bit beyond five years). In CCAPS, there were fewer efforts to knit the discrete strands together. In CEPSA, we held monthly meetings to share the latest findings of different research teams to try to encourage more cross-pollination.

While that had its virtues, such an effort would likely have been more effective with a longer time horizon for the grant and a larger infusion of support. One of the challenges of a multi-member research team is that commitment to the common endeavor may be diminished if the level of support is small. So, even though the project as a whole commanded significant resources, some strands of this project provided modest incentives for some scholars to commit considerable time to the enterprise.

The short three-year time frame for the project meant that data access and coding delays given regional complexity meant that a lot of the research was completed near the end of the project. That meant there wasn't as much time for integrative, synthetic research that knit the discrete pieces together. For example, the efforts to backdate ACLED to 2010 took a long time in a number of countries, meaning that our hot spot mapping team ultimately relied on data from other sources for subnational conflict indicators.

While we have some preliminary findings about conflict dynamics in the region, these aren't theorized by us in the project in terms of their relation to climate hazards. So, while CCAPS generated a tremendous amount of research on the relationship between climate hazards and different kinds of conflict outcomes, we do not have a comparable corpus of scholarly work yet emerging from CEPSA on the topic. It may come in time, but a lengthier project would have had more of an opportunity to pursue these loose ends.

The level of resources associated with CCAPS allowed the team to pursue interesting collaborations that emerged from initial findings. For example, in the mapping work of climate hot spots, we developed a partnership with climate modelers at UT, which resulted in important publications and development of a regional climate model for Africa for the 2050 period.

The shorter time frame for CEPSA and smaller resource endowment did not foreclose those programming adjustments. We were able to fashion collaborations with scholars at Rutgers and the University of Oklahoma to create an indicator of heat wave events as well as an indicator of land degradation. That said, some of the work, such as incorporating heat wave events, occurred at the very end of the project, with little time for reflection or publication in peer-reviewed outlets.

Moreover, the land degradation work remains unfinished as the project wound down before we completed validation of the work. Here, our intuition was that land degradation, that is conversion of forests to agriculture or conversions of natural areas to urban slums, might intersect with climate hazards to disastrous effects. We worked with geographers at the University of Oklahoma to use remote sensing data to develop a new disturbance index, which would serve as a proxy land degradation. We hoped to generate maps of the intersection of climate hazards and land degradation but we ran out of time. That remains an interesting area for future research.

Likewise, our national disaster preparedness team advanced work on subnational governance metrics, by examining differential training levels within India by different Indian states. Most of the indicators we have of governance are national level aggregates, which fails to capture diversity of governance quality, particularly within large federal states like India. We discussed a number of different potential metrics of subnational governance quality, such as making use of Transparency International's state-level surveys of corruption in India, but we ended up running out of time to pursue this adequately. Variation within states in terms of governance quality is likely hugely consequential in terms of differential responses to extreme weather events.

The team's regional expertise ultimately was more South Asia centric, and the resource levels and time frame of the project did not permit as extensive field work as CCAPS enjoyed. Thus, some countries like Bangladesh, Pakistan, and India received considerable attention from our team; we had less bandwidth and experience in Southeast Asia.

More time might have also permitted some breakthroughs on data transparency with a number of donors for which project documents were hard to come by.

The project was also largely carried out as a series of country case studies, but we were less able to pursue cross-border climate management issues like migration and transboundary river resources.

In addition, while some inter-regional comparisons were possible, an integrated regional hot spot mapping approach could serve to highlight the relative vulnerabilities between Asia and Africa to climate hazards. Africa has received the lion's share of scholarship on climate and security, but Asia is the dominant locus for climate-related disasters. An integrated hot spot mapping platform for both regions would more explicitly reveal those population differences between Africa and Asia.

Lastly, the idea of overlapping vulnerabilities, of climate and conflict serves as a powerful conceptual frame, which can elide some of the trickier aspects of ascribing the cause of conflicts to climate factors.