

Case Studies in Retreat – Flash Presentations

Beyond compound events- extreme weather, conflict and displacement in Somalia

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Extreme weather and migratory events have been topics of great interest for decades. More recently, a debate has emerged whether the human impact of climate change can lead to armed conflict, and how conflict and extreme climate events, sometimes compounding, interact in inducing large-scale displacement. Research findings on the relationship between climate, displacement and conflict are context specific and contested. In Somalia, populations have historically been using migration as a coping mechanism for the effects of recurring floods, droughts and heatwaves, often paired with incidences of conflict and socio-economic uncertainties. However, with the on-going humanitarian crisis and conflict, population resilience is at a critical level calling for a system's analysis approach. To assess these complex links, we use methods from the emerging field of climate econometrics (Castle & Hendry, 2020). We show the influence of recent drought, flood and conflict events on internal displacement flows and explore tipping points. Our results show that there are significant interaction effects of extreme weather events on internal displacement, also indicating that duration, distance and reason for displacement differs depending on the type of extreme event. Our results also suggest that pre-existing conflict conditions act as accelerators of extreme weather-related displacement. We argue for enhancing, safeguarding and more holistically understanding human mobility – a fundamental response to change, stress and opportunity. Anticipatory actions can help increase resilience for affected populations to prevent or minimise additional extreme weather-related displacement. Our case study advances the debate of climate mobilities providing novel insights into the statistical modeling for solution-oriented policies facilitating voluntary migration in a changing climate.

Can pre-emptive retreat strategies be practically implemented? Issues and approaches.

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Ongoing sea-level rise during the twenty-first century and beyond poses huge climate change adaptation challenges, for low-lying coastal settlements; some are already functionally disrupted from repetitive non-extreme flooding, others are approaching decision points or adaptation thresholds. In such cases near term decisions will chart the course for decades to come. Research is showing that sea-level rise will impact far more people, far sooner than previously thought, as seas rise incrementally and as the frequency of coastal flooding increases, combined with rising water tables coinciding with higher tides. Increasingly, our adaptations in low-lying coastal locations have either increased human exposure or are temporary at best, raising significant questions of equity and justice around who can move when and how and who pays for past, current and future development decisions. Pre-emptive managed retreat, as

an adaptation response is becoming inevitable, a desirable option to avoid the disruption and inequities associated with extreme event response-and-recovery regimes that are currently mainstream globally. However, implementing managed retreat has proven elusive for political and governance reasons raising issues of equity and justice. Drawing from critical insights and lessons for governance and policy from New Zealand exemplars we set out some practical issues and approaches for managed retreat as a long-term adaptation strategy. We discuss how pre-emptive managed retreat can be designed, sequenced, and implemented alongside other forms of adaptation within anticipatory forms of governance.

Dichotomous or progressive choices: in situ protection and retreat as strategies for climate adaptation

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The growing cost of climate-driven coastal impacts requires improved understanding of how coastal populations engage with adaptation decisions. While many studies explore factors driving coastal adaptation, generally, few evaluate how residents consider relationships between in situ, protective adaptation vs. out-migration from at-risk areas. Our work focuses on whether or not retreat and adaptation are considered to be progressive or dichotomous strategies to adapt to climate change, and what factors influence residential preference for adaptation. To address this, we distributed a drop-off/pick-up survey in 2017 to residents of North Carolina's Albemarle-Pamlico Peninsula inquiring about respondents' property, knowledge, beliefs, opinions, experiences with flooding, saltwater intrusion, and aspects of their community engagement. With this datum we asked a series of questions: What is the relationship between residents' exposure, perceptions of climate trends, and concerns about the future? How do these factors influence attitudes to different adaptation strategies? Are these strategies considered to be progressive – where protection is indexed to minor threats and retreat occurs when protection measures fail – or are these dichotomous choices? We applied a structural equation model to evaluate these decision pathways. The results suggested that different perceptions of past conditions and trends and future risks lead to dramatically different adaptive responses, as mediated by prior, self-reported exposure. This was further supported by our finding of no significant correlation between residents' willingness to protect property or structures and their willingness to migrate, indicating that individuals are open to engage in either in situ or out-migration responses, but not both. In short, our results reveal that residents commonly view protection and retreat as mutually exclusive, rather than progressive, methods for reducing risk, and that their preferences are correlated with different understandings of climate threats. However, our study left open the possibility that in situ protection and out-migration could occur progressively over the long-term. As conditions deteriorate due to climate change, it may be reasonable to expect that residents' perspectives will shift, leading towards an increased willingness to change strategies from protection to out-migration. Further, given conditions of increased flooding risk, it is not clear if residents' intentions to protect or migrate lead to actual protection or migration outcomes. To address this, we have distributed a second round survey to the residents (return of n=87) and are in the process of better understanding how residents' perspectives have shifted over time through a longitudinal analysis. Early results indicate that perspectives are shifting towards retreat over in situ protection, possibly driven by exposure to Hurricane Florence (2018), which took place between the two rounds of surveys.

Emotions and feelings in Enseada da Baleia's preventive and self-managed relocation

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This paper discusses the preventive and self-managed process of relocation of Comunidade Caiçara Enseada da Baleia. The community is located in the Island of Cardoso, a conservation Park in São Paulo State, Brazil. The caiçaras are artisanal fishers predominantly residing on the south-eastern coast of the country. After decades of struggling with slow and gradual erosion, a cyclone accelerated this process, reducing the community's land considerably. 2017, the forces of water completely invaded the place where Enseada was. This paper tracks the emotions during the struggle and resistance of preventive and self-managed relocation. A situation of abandonment, invisibility and climate injustice shape the spectrum of emotions during the relocation. The reconstruction process in their new location involves legal, environmental, historical, cultural and emotional elements. This paper rescues an ancestral remembrance from a process of loss and the conquest of the relocation by putting together narrative pieces from an ethnography research. After conversations with community members, it is evident that relocation is a process beyond what is considered material and the effort to adapt to a new life. However, many relocation's narratives limited to investigate strategies and results, dehumanising and depoliticising the experience. For this reason, this paper intends to explore the emotional spectrum of the Nova Enseada Community's preventive and self-managed process of relocation. Emotions are vital for understanding how social space is created, understood and lived it. Emotions explore how market bodies through history and encounters with racialisation, gendered, capitalism, and imperialism feel about themselves and others (bodies, places, environment, etc.). Taking emotions in consideration can help develop a more compelling notion of Climate Justice and relocation processes.

Prototyping a scenario-based framework for adaptive Managed Retreat of a New Zealand Stormwater and Wastewater Network

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Coastal communities are increasingly affected by the effects of sea-level rise and associated compound climate hazards. These climate induced stressors have a substantial effect on the performance of stormwater and waste-water drainage systems within low-lying coastal areas. Since communities rely on services from these systems it raises the issue of how and if local government can adapt these systems to maintain levels of service for the two waters as the impacts of climate change worsen over the coming decades and beyond. Our research focussed on the development of retreat as an adaptation option for stormwater and wastewater systems alongside a community retreat. How can these systems be adapted over time until local retreat thresholds are reached? We have prototyped a framework using a dynamic adaptive pathway planning (DAPP) approach to gradually retreat stormwater and wastewater infrastructure in a scenario-based or staged manner. It allows for locally identified thresholds for retreat and uses adaptation pathways to maintain levels of service for the community until the point of retreat. These were identified using key local stakeholders in our prototype study area in New Zealand. It thereby aims to make retreat a more manageable adaptation option that can be staged using individual pathway portfolios for different retreat areas. Retreat stages are placed alongside possible pathways in a specific sub-area. This enables the interactions between adaptation pathways in the sub-areas to be visualized as conflicts and synergies, thus providing a basis for decision making while selecting initial adaptation

pathways. For example, repurposing can be implemented using water sensitive urban design options to extend pathways by creating extra storage capacity in the system. Giving the retreated sub-area a new purpose enables technical challenges in adaptation of the system to be addressed, as well as increase wider community involvement. Managing this spatially and using a staged and scenario-based approach with the framework could help gain community support and prevent large cost increases for the local government managers over time.

Shifting landscapes of coastal flood risk: environmental (in)justice of urban change, sea level rise, and differential vulnerability in New York City

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Climate-driven changes in coastal flood risk have enormous consequences for coastal cities. These risks intersect with unequal patterns of environmental hazards exacerbating differential vulnerability of climate related flooding. Here we analyze differential vulnerability of coastal flooding in New York City, USA, as an environmental justice issue caused by shifts in flood risk due to increasing floodplain extents. These extents are represented by updates to the 100-year floodplain by the Federal Emergency Management Agency, and urban changes in land use, land value, and socio-economic characteristics of flood exposed populations. We focus on six local community districts containing disproportionately vulnerable communities. Across our study areas, we observed increases in the floodplain's extent by 45.7%, total exposed population by 10.5%, and population living in vulnerable communities by 7.5%. Overall flood risk increases regardless of increases in the updated floodplain extent, as do floodplain property values. However, variability is high between community districts; in some cases, increases in exposure coincide with decreases in vulnerability due to shifts in racial demographics and increases in income (i.e. potential floodplain gentrification), while others experienced increases in exposure and vulnerability (i.e. double jeopardy). These findings highlight that the dominant drivers of coastal flood risk in NYC are ongoing real estate development and continued increases in sea level rise and storm severity, both of which have explicit implications for flood vulnerability.

When capacity limits ambition: lessons from flood-related property buyouts in Grand Forks, BC

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In May 2018 the worst flood in 70 years swept through the land-locked City of Grand Forks, BC, Canada. Located in a mountain valley at the junction of two rivers, the City experienced a perfect storm of spring snow melt and heavy rain, resulting in massive flooding and unprecedented damage to residential and commercial property. Guided by local actors, the community decided to move forward with a voluntary residential property buyout program which moved residents of close to 200 properties out of flood-prone areas. The first program of its kind in British Columbia, the Grand Forks buyouts have been described as a proverbial “canary in the coal mine”, highlighting comparable flood risk, a changing climate, and limited capacity in countless communities across the province. The research described here was based on both key informant interviews (n=26) and analysis of secondary data on the flood and subsequent buyout program. As more jurisdictions in Canada begin to explore property buyouts as a long-term adaptation in the face of climate change, the Grand Forks case provides valuable lessons for

policy and practice at all levels of government. This research highlights successes and challenges of the City's buyout model, and explores the disconnect between local desires for community-lead solutions and the need for support from higher levels of government.